International collaborations and open innovation capabilities of SMEs:
The effect of institutional factors

Marine Falize,
Régis Coeurderoy,
Louvain School of Management
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Marine Falize, Louvain School of Management Louvain School of Management, Régis Coeurderoy, ESCP Paris Europe / Louvain School of Management

Summary

Our study contributes to the literature in International Entrepreneurship by advancing our knowledge regarding effects of open innovation capabilities and institutional dynamic on the propensity to collaborate with international business partners in the context of SMEs. International collaborations, even for innovative SMEs, are more the exception than the rule and we needed to understand the underlying internal and contextual driving factors. In this paper we argue that local networking activities with market and institutional partners, R&D activities and formal regulations help reduce search cost for international partner, cope with information asymmetries, and mitigate with appropriability hazard. The empirical setting of this paper comes from the fourth Community Innovation Survey. This survey has been conducted in European countries by Eurostat. The matching of our model was possible for 16 different countries and in the case of 43,704 SMEs.

Keywords: Internationalization, Innovation, Collaboration, Institution, Culture

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Corresponding author:
Marine Falize
Center for Excellence CRECIS
Louvain School of Management
Université Catholique de Louvain La Neuve
Place des Doyens, 1 (B.225)
B-1348 Louvain La Neuve, BELGIUM
Email: marine.falize@uclouvain.be

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President-ilsm@uclouvain.be, ILSM, UCL, 1 Place des Doyens, B–1348 Louvain–la–Neuve, BELGIUM
INTRODUCTION

Fast technological change and internationalizing markets have challenged the traditional innovation systems (Chesbrough 2003). Research on corporate innovation has highlighted that SMEs can substantially benefit from interactions with users, suppliers, competitors, institutions and with a range of partners inside the innovation system (von Hippel, 1988; Lundvall, 1992; Brown and Eisenhardt, 1995). Indeed, a general constraint that many small entrepreneurial firms face is a relatively restricted resource base as compared to what is available to larger and more established firms (Jarillo, 1988). A small number of SMEs has this capacity to manage the whole innovation process by themselves, and this encourage them to collaborate with other firms. Collaboration can occur at a regional, national or international level. Following Leung et al. (2005), the globalizing trend does not only boost the enterprises to collaborate, it also extends their geographical reach.

Nevertheless, research on international business networks is still under-developed in the field of SMEs studies (Shaw, 1998; Paniccia, 1998). This is may be because the access to specialized complementary assets through international network may encounters obstacles for small firms. First, SMEs can face search costs for cooperation with international partners. This search is a time and energy consuming activity, involving great opportunity costs. Second, SMEs can face a lack of credibility in the eyes of potential international partners that will abstain from joining forces with firms of uncertain quality.

Third, international collaborations involve appropriability hazard and hold up problems (Williamson, 1991). SMEs may be reluctant to broadcast their knowledge due to a fear of conveying information to potential competitors valuable. Therefore, these obstacles may induce SMEs to turn to a go-it alone strategy (Gans et al., 2002).

In this paper we claim that open-innovation capabilities and institutional dynamics figures prominently in explaining the likelihood of SMEs establishing international collaborations. Examples of open-innovation capabilities in our empirical setting include networking activities with business or institutional actors and Research and Development activities.
We argue that these capabilities are important in order to reach specific skills that the SMEs need to develop before entering international collaborations with business partners. Experimentation in local networking activities is essential for SMEs’ because it instills in them greater confidence in their ability to work with foreign partners. Besides, the referral benefit of institutional networking relies to a high level of trust among foreign partners and can be an effective means to reduce inferred uncertainty. Finally, the assertion that institutional dynamics tend to strongly impact the collaborative behaviors of SMEs will also be answered through our empirical study. The empirical setting of this paper comes from the fourth Community Innovation Survey (CIS-4). This survey has been conducted in European countries by Eurostat. The data are based on a common survey questionnaire and methodology, with reference to the Oslo Manual 1997, in order to get comparable, harmonized and high quality statistical results. This CIS-4 has collected information about around 100,000 enterprises. The matching of our model was possible for 16 different countries and in the case of 43,704 SMEs.

BACKGROUND AND HYPOTHESES

Here, it seems relevant to point out that clusters clearly differ from networks. While the former refers to "spatial concentration processes involving a set of related activities in which context firms may, but need not, cooperate, for example, to achieve dynamic purposes", the latter refers to "dynamic cooperation in the form of knowledge exchange between firms and other actors that may, but need not, develop these links at the local or regional level" (Visser, 2009: 168-169). Collaboration, describe as "the act of working together to one end", is often described with such terms as networking or cooperation (Mead, 1976: 8).

Network studies diverge in their units of analysis, crossing over individuals, teams and organizations. The literature on International Entrepreneurship has mostly focus on informational networks which involve social relationships among individuals embedded in an informal structure of personal relations bounded in geographical, social, or institutional spaces (Hitt et al., 2002).
The focus of this study is the organizational level and more specifically “the formal structure of international business connections”. Nieto and Santamaría (2007: 370) state that collaborating with different types of business partners should substantially enhance the amount and variety of shared knowledge, thereby enabling the alliance partners to fill out their initial resource and skill endowments. According to Sternberg and Arndt (2001) and Tether (2002), research has highlighted the benefits of business networking: exchanging information, providing assistance, discussing issues, encouraging each other (Chen et al., 1998), accessing a variety of resources, markets, and technologies, sharing the risks, inter-firm learning (Goerzen and Beamish, 2005), sharing fixed costs, enhancing own core competencies, increasing speed of market entry, economies of scale (Nooteboom et al., 1997).

While previous research has already examined the advantages of business connections development, the specificity of international ties has received little attention, especially in the field of SMEs studies. In international network gains are realized from exposure to new product and service ideas, as well as new technologies and workplace innovations (Zahara et al., 2001). In the same way, the literature on “boundary-spanning” has recognized the information advantages with access to external and heterogenic sources of knowledge (Allen, Tushman & Lee, 1979; Tushman & Scalan, 1981). International collaborations exposes actors to novel communities, diverse experiences and varying ideas which can provide actors superior information and opportunities (Burt, 1992). International connections increase the chance of unpredicted novel combinations of knowledge, which can then lead to radical discoveries. As combining resources from different environments, international ties can also lead to the identification of collaborative advantages that are not feasible in a single country. Firms within international business network have access to asymmetric information and other types of critical resources; they can play a key role in facilitating the recombination of ideas and generate innovations in their industries and their communities. Obtaining access to new markets is also facilitated through international collaborations. Companies lacking the necessary potential to expand their activities may indeed combine their forces to enter a foreign market and develop new products or processes there (Harris and Wheeler, 2005; Bhattacharya and Bloch, 2004; Rammer et al., 2009. Pittaway et al. 2004).
Judging from existing findings, the field has mostly highlighted the benefits provided by business connections, paying less attention to the conditions under which SMEs are able to develop these international collaborations. Much less research has explored the SMEs capabilities to extend international network activities. It is important to emphasize that access by SMEs to specialized complementary assets through international network may encounters obstacles. SMEs can face search costs for cooperation with international partners. This search is a time and energy consuming activity, involving great opportunity costs. SMEs can also face a lack of credibility in the eyes of potential international partners that will abstain from joining forces with firms of uncertain quality. Besides, international collaborations involve appropriability hazard and hold up problems (Williamson, 1991). Fear of expropriation may induce SMEs to turn to a go-it alone strategy (Gans et al., 2002). Nevertheless, Smith and McKeen, (2011) allege that for enterprises to be successful it is both needed to collaborate more intensively than in the past as well as to do it differently.

International networking activities for SMEs, are more the exception than the rule and we need to better understand the underlying driving factors. Our study contributes to the literature in International Entrepreneurship by advancing our knowledge regarding effects of open-innovation capabilities and institutional dynamic on the propension to collaborate with international business partners in the context of SMEs. Figure 1 depicts the overall research model.

\[\text{Insert Figure 1 about here}\]

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**Open Innovation Capabilities**

Following Amit and Schoemaker (1993: 35), we define capabilities as the firm’s capacity to deploy resources for a desired end result.
Capron and Mitchell (2009) distinguish between two modes of obtaining new capabilities: internal development and external sourcing. Internal development refers to creating a new capability within the existing boundaries of a firm by recombining the firm’s existing capabilities or creating new ones. External sourcing means trading in a strategic capability that stems from external sources.

**Relational capabilities** are viewed as capabilities to continuously interact and share significant knowledge with other firms (Lorenzoni and Lipparini, 1999). Singh and Zollo (2004) suggest that experiential learning develops relational capabilities that are crucial to the success of collaborations.

Market networking activities (with customers, suppliers or competitors) are important in order to reach specific skills that the SME need to develop before entering international collaborations. The accessibility of people and information provide the SMEs with access to a much larger range of skills, capabilities, resources, and knowledge than usually available. A firm’s local network can be thought as a mean to access key informational capabilities (Gulati, 1998) and can reduce search costs for international partners. SMEs can acquire general knowledge of local relationships, and this instills in them greater confidence in their ability to collaborate with foreign partners. Besides, in local network some form of social engagement is often necessary to establish reliability in advance of developing international collaborations.

Institutional networking activities (with public institutions) are important in order to reach specific knowledge and legitimacy for international collaborations formation. Universities and research institutes are important centres for the creation and dissemination of scientific and technological knowledge that SMEs can benefit (Caloghirou et al., 2004). Networking with universities and research institutions helps a company by allowing them to get access to specialist technical support, including experts and special equipment, to complement their existing internal R&D (Tether, 2002). The referral benefit of institutional networking relies to a high level of trust among value network partners and can be an effective means to reduce inferred uncertainty by international parties (Zaheer, 1995).
Hypothesis 1: Relational capabilities are positively related to international collaborations formation.

Innovation capabilities is defined as the key skills and knowledge needed to effectively absorb, master, and improve existing technologies, and to create new ones (Lall, 1992). Capability to innovate is likely to be a crucial learning output because it is the key to gaining dynamic competitive advantage (Romijn and Albaladejo, 2002). Innovation capabilities can then signals to uniformed international partner the quality of an SME. In high-technology context, international network of collaborations can also allow spreading the risks associated with the innovation over different partners. The partners are therefore led to "combine their efforts in order to create economies of scale or scope that will facilitate their search processes to expand to a wider field of research of activities or expand their competence" (Hagedoorn, 1993: 372). The potential benefit is the cost savings in particular including "compressing work flow, reducing development costs and enabling linkages with vendors, suppliers, and customers which speed up the supply chain and other work processes” (Smith and McKeen, 2011). Reducing and sharing the costs and risks linked to the innovation can then be a motivation for entering into international collaborations.

Hypothesis 2: Innovation capabilities are positively related to international collaborations formation

Institutional Dynamic

Propensities of firm to enter into international collaborations can also be influenced by cultural and institutional dynamics. Institutions, described as "the rules of the game in a society" by North (1990, p. 3), have influence on human interaction and on the evolution of organizations. Hoffman (1999) demonstrates that the actions that enterprises undertake are not strictly determined by their internal arrangements but also mainly by the influence of institutions.
International collaborations necessitates negotiation between enterprises with different norms, values and interests (Swan et al., 1999). Then, collaborative behaviors and openness can be affected by cultural and institutional values (Chen et al., 1998). The European Commission (2010) highlights that collaboration for innovation implies major policies in order to encourage the diffusion of knowledge while providing sufficient intellectual property protection, patents and trust between partners.

**Property right factors.** In spite of many advantages, collaboration is a complex concept with uncertain outcomes. A possible negative outcome include spill over of key information to competitors in firm alliances (Ahuja, 2000). International ties can raise appropriation concerns because of difficulties in screening and transferring capabilities into the firm (Williamson, 1975). Nooteboom et al. (1997) mention problems of mutual dependence, self-interest and opportunism. Costs of contracting and risk of losing proprietary technologies can then inhibit international collaborations (Kim and Park, 2010).

*Hypothesis 3: The degree of intellectual property right protection within a country is positively related to international collaborations formation.*

**Governance factors.** Schneider and Barsoux (2003) even affirm that each country has unique institutional characteristics, which can provide sources of competitive advantage if they are evaluated and exploited correctly. Quality regulation increases the stability of the relationships by reducing dissension and facilitating conflict resolution (Burt, 2002, Krackhardt, 1992). Governance policies can foster an open and collaborative culture notably based on converging expectations (Williamson 1991) and define broad rules for action under uncertainty (Camerer and Vepsalainen 1988). This is important because collaboration advantages can be quite limited if the parties involved, acting opportunistically and avoid sharing sensitive knowledge and information with each other.

Since international collaborations engenders risks, uncertainty and change, it can be assumed that high formal laws, rules, regulations and clear structures would tend to avoid it and prioritize collaborative behaviors.
Hypothesis 4: The degree of regulation quality within a country is positively related to international collaborations formation.

Cultural factors. Common values are critical to overcoming interpretative barriers and achieving the successful integration of different perspectives in collaborations (Carlile, 2004; Dougherty, 1992). Embedded relationships are characterized by norms of cooperation and reciprocity (Coleman, 1988). The likelihood that collaborative culture will engage in opportunistic behavior is low, because people hold group values and beliefs and seek collective interests (Hofstede, 1990). In these societies conformity is high because the cost of deviant behavior is high, the group may exclude people who violate norms (Ueno and Sekaran, 1992). SMEs in collaborative culture will be more willing to cooperate by sharing knowledge with each other because of the positive expectation that these efforts will be reciprocated in the future (Uzzi, 1997).

Hypothesis 5: The degree of collaborative culture within a country is positively related to international collaborations formation.

DATA AND METHODOLOGY

Data and Sample

The context of this paper is the empirical information taken from the fourth Community Innovation Survey (CIS-4). This survey has been conducted in European countries by Eurostat. The data are based on a common survey questionnaire and methodology, with reference to the Oslo Manual 1997, in order to get comparable, harmonized and high quality statistical results.
The Community Innovation Surveys are the main data sources for measuring innovation in Europe. This CIS-4 has collected information about around 100,000 enterprises with different types of innovation during the three years 2002 to 2004 inclusive. Most questions cover new or significantly improved goods or services or the implementation of new or significantly improved processes, logistics or distribution methods.

It is important to note that our unit of analysis is the single enterprise, which may be stand alone or belong to a wider company group, this is the unit surveyed by the CIS4. The CISs offer a comprehensive data in terms of the range of enterprises surveyed, it cover a lot of different sectors as well as small and large enterprises. The Survey is comprehensive in terms of the range of questionnaire items, including direct measures of innovation and a wide variety of factors as the national or international collaboration partners.

The countries studied in the paper are the following: Belgium, Bulgaria, Czech Republic, Germany, Estonia, Spain, Greece, Hungary, Italy, Lithuania, Latvia, Norway, Portugal, Romania, Slovenia and Slovakia. The matching of our model was possible in the case of 43,704 SMEs.

**Dependent Variable: International collaborations formation**

For the purpose of constructing network measure we utilize the information available on the use of international business partner groups specify in the survey questionnaire. Collaboration is defined strictly as involving mutual exchanges of knowledge, and its specified that pure contractual relationships are to be excluded. The survey requires that respondents identify their collaboration partners between seven different actors groups at different geographical locations (Europe, United States, Other countries). As we only focus on international collaboration formation, we compute the variable “INTCOLAB” which is the sum of each partner groups of international collaborations (from 0 to 21).
Explicative Variable: Firm Level

**Relational capabilities.** The variable “MKTNET” (from 0 to 4) indicate the number of local networking activities with market partners (suppliers, customers, competitors, consultants). The variable “INSTNET” (from 0 to 2) indicates the different types of public institutional networking activities (with universities or higher education institutions and government or public research institutes).

**Innovation capabilities.** The survey contains information on intramural and extramural R&D. The variable “INNOCAP” (from 0 to 8) indicates whether the company has developed intramural or extramural R&D, has undertaken creative work to increase the stock of knowledge or has established internal or external training for the personnel.

Explicative Variable: Country Level

**Property Right factors.** For the variable “PatentRight”, we used the index of patent rights updated by Park (2008) which was designed to provide an indicator of the strength of patent protection in a country.

**Governance factors.** The Worldwide Governance Indicators report on dimensions of governance. The aggregate indicators combine the views of a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. The individual data sources underlying the aggregate indicators are drawn from a diverse variety of survey institutes, think tanks, non-governmental organizations, and international organizations. The variable “RegQual” or regulatory quality reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

**Cultural factors.** To define collaborative culture, we used Hofstede's (2001) four cultural dimensions which are widely accepted and cited in international business disciplines (Bird and Osland, 2006; Dwyer et al., 2005; Gilbert and Rosinski, 2008; Hitt et al., 2005; Hofstede et al., 1990; Leung et al., 2005; Schneider and Barsoux, 2003; Steenkamp, 1999): Power distance, individualism, masculinity, uncertainty avoidance.
This model provides an index from 0 to 112 for each dimension. Each studied country has a position on this index, relative to other countries. Countries are split as being high or low based on their scores on the different indexes. The first dimension relates to power distance which is "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed inequality" (Hofstede, 2001, p. 98). The second dimension, the individualism-collectivism one, concerns the preference for the group's or for the individual's interests. The third dimension presented by Hofstede (2001) is the masculinity-femininity one referring to conventional gender roles of society. The fourth dimension relates to uncertainty avoidance defined as "the extent to which the members of a culture feel threatened by uncertain or unknown situations" (Hofstede, 2001, p. 161).

Control Variables

Five control variables are included on our model, we capture the international orientation of the SME by the variable “INTERNAT” (from 0 to 2) which take the value of one if the SME operates in the European market and the value two if the SME operates in all other countries with the expectation that firms which operate in international market are exposed to a higher level of international collaboration opportunities. The variable PUBFUN (from 0 to 3) indicates whether the SME has received public financial support for its innovation activities. In addition, for each country, we include the GDP per capita which is a proxy of the country’s size (“LogGDPcap”). We include a dummy for the size of the SME; The size is captured as a dichotomous variable which take the value 0 if the SME has less than 50 employees and the value of one if the SME has between 50 and 249 employees (“size04”). Finally, we include 30 industry dummies (“sector”) in the regression, albeit their coefficients are omitted from our tables.
Methodology

We test hypotheses developed in Section 2 using regressions in which propensity of international collaborations formation is explained by different experiential and institutional factors plus a set of control variables.

Our explained variable being the number of different business partner groups of international collaborations set up by SMEs (on a range from 0 to a maximum of 21), we definitively deal with a count variable. The number of “0” count is “excessive” in the survey for two reasons: first there is a strong proportion of “0” count (90%); second this “0” answer is made of SMEs which do not have innovation activities and SMEs which are innovators but do not get international collaborations. We thus use a zero-inflated negative binomial regression model (\textit{zinb} in stata words), where we control for innovation activities of SMEs in the first step. In this first step, we introduce the variables “\textit{INNO}” (\textit{inflate} – equation that determines whether the count is zero). This variable indicates whether the SME has undertaken innovation activities.

RESULTS AND DISCUSSION

We begin by discussing the experiential factors—i.e. those that reflected the networking activities and learning experiences of the SME, after which we shall discuss the institutional factors. Table 2 below presents the regression results testing our hypotheses.
Relational and Innovation Capabilities

The results support hypothesis 1, suggesting that SMEs that are engaged in local networking activities with market partners were more likely to elaborate international collaborations. There is a strong association between the number of local market partners over which the SME extends and the likelihood to develop international collaborations (coefficient=0.177, p < 0.001). This is understandable, assuming that international collaborations development related directly to at least some experience in local partnership. Besides SMEs in local network tend to have more information about potential foreign partners and it reduced the search costs. The SMEs tend to be better resourced to integrate international collaborations. Similarly, the relationships is significant for public institutional networking activities (coefficient=0.302, p<0.001). Universities and government or public research institutes are open and cheap sources of expertise which would make them attractive to cash strapped SMEs, which have a strong incentive to seek out such expertise. Furthermore, public institutions tend to be more prestigious partners with which to collaborate and to enhance legitimacy in the eyes of potential foreign partners.

Regarding hypothesis 2, the more an SME participate in R&D activities, the higher the SMEs’ propensity to develop international collaborations. Engagement in R&D had a clear and consistently positive effect on whether firm build international collaborations (coefficient=0.29, p<0.001). Prior experience in innovation knowledge creation and utilization has a positive influence on international collaborations formation. An explanation might be that highly innovative SME may seek for international collaboration partners when outcomes are seen as relatively riskier. We might infer that this behavior is an attempt to shift the cost and risk of technology innovation. Another point here is that innovation capabilities credibly signal to uniformed external parties the good quality of an SME.
Institutional Dynamic

The variables discussed above are firm-level in the sense that they relate directly to the networking and innovation activities and experiences of the firms. We now turn to the influence of the institutional dynamics in which the SME is embedded.

The hypothesis that different environmental factors induce different norms and behaviours has suggested that international collaboration strategies should vary with national contexts. The basic argument is that government support and cultural values lead organization members in different countries to be more or less open to different partners outside the national boundaries.

In the three following research propositions, we considered how institutional and cultural norms and values influence opportunistic behaviour and information sharing and then facilitate or inhibit the development of international collaborations.

First, as expected in hypotheses 3, the propensity to engage in international collaborations increased when intellectual property rights are protected (coefficient=0.08, p<0.001). This is understandable as international collaborations may raise opportunity cost concerns because of problems of self-interest and knowledge spillover. The risk of losing proprietary technologies inhibits international collaboration decisions. Property right protection can mitigate the intensity of the conflict between “trying to learn” and “trying to protect”. This conflict stems from the fact that conditions necessary to facilitate the sharing and learning process simultaneously magnify the danger of losing core and proprietary knowledge.

Second, overall and has expected, the likelihood for international collaborations increases with government support, supporting hypotheses 4. Regulatory quality captures perceptions of the quality of general infrastructure and the ability of the government to formulate and implement sound policies.
Establishing new international relationships is costly and consumes time, energy and financial resources. Government effectiveness may then result in faster and more flexible collaboration-making. The better the bureaucracy the quicker decisions are made and the more easily SMEs can develop international collaborations (coefficient=1.82, p<0.001).

Third, in hypotheses 5, we argued that a collaborative and open culture can help SMEs to develop international collaborations via mechanism such as mutual trust, common language and common systems. Using Hofstede's (2001) four cultural dimensions permits to establish a cross-cultural comparison of countries.

The first dimension relates to power distance which is "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed inequality" (Hofstede, 2001, p. 98). In countries with small power distance, inequalities are considered as undesirable and people try to minimize them. According to Hofstede’s researches, examples of such countries are respectively Norway, Germany, and Estonia. On the contrary countries with large power distance are characterized by centralized decision structures, authority, hierarchy, and formal rules. Examples of such countries are respectively Slovakia, Romania and Slovenia. It could be assumed that formal means such as government control and legal contract make it less risky for SME to collaborate (coefficient “PowerDis”=0.02, p<0.001). The specification and monitoring of contracts decreases uncertainty and therefore can provide both more pleasant and flexible international collaborations.

The second dimension concerns the preference for the group's or for the individual's interests. In collectivist country, loyalty and trust among group members are important values and conflicts are viewed as something breaking relationships. Collectivist people take care of the extended family, the cohesive group. Typical examples of such countries are first Slovenia, followed by Portugal, Bulgaria, Romania, and Greece. Of interest here is that cohesive communities are not likely to open up to broader perspectives of development (Nootbooom, 2007), they take care of themselves or their immediate family. According to Bird and Osland (2006), individualists are more likely to trust strangers.
The most obvious examples are Hungary, Italy and Belgium. In conclusion, the capacity of these entrepreneurial person to open up and to trust strangers should facilitate the building of international collaborations (coefficient “Individ”=0.04, p<0.001).

The masculinity/feminity dimension presented by Hofstede (2001) refers to conventional gender roles of society. This dimension assesses the degree to which “tough” values, such as assertiveness, success, and competition, prevail over “tender” values, such as nurturance, service, and solidarity. In masculine societies, opportunism is frequent and people are expected to promote their own self-interest and to attempt to maximize their own gains (Hofstede, 1984). The best examples of countries are Slovakia, Hungary and Italy. Feminine culture expects people and institutions to be nurturing and supportive and therefore trustworthy. Typical examples here are Lithuania, Slovenia, Latvia and Norway. Norms for solidarity and service in feminine societies restrict the range of acceptable behaviours to those supporting the common group and the cost of deviant behaviour is high. In feminine societies there is then a tendency toward less aggressive and more cooperative behaviour (coefficient “Mascul”= -0.02, p<0.001).

Uncertainty avoidance (Hofstede, 1984) addresses the concept of risk preference, and reliance on risk-reducing strategies. This dimension is defined as "the extent to which the members of a culture feel threatened by uncertain or unknown situations" (Hofstede, 2001, p. 161). Strong uncertainty avoidance countries are very resistant to change and intolerant of uncertain and ambiguous situations. From Hofstede's data, typical countries are first Greece, then Portugal, then Belgium. In contrast, weak uncertainty avoidance countries believe uncertainties are inevitable. People have a natural tendency to feel relatively secure and do not fear the future and tolerate risk easily (Ueno and Sekaran, 1992). The three best examples are first Norway, then Slovakia, and finally Estonia. Since international collaborations engenders risks, uncertainty and change, it can be assumed that high uncertainty avoidance countries would tend to avoid it and prioritize familiar domestic collaboration. We see the outcome regression indicating that “UncertAv” is negatively associated with international collaborations development (coefficient=-0.009, p<0.001).
According to Hofstede’s (2001) four cultural dimensions, we then define a “collaborative culture” as a culture with a high level of “individualism” and “power distance” and a low level of “masculinity” and “uncertainty avoidance”.

Finally, the table 2 shows that the propensity to engage in an international network of diverse collaborations for innovation increased with international orientation (coefficient “INTERNAT”=0.46, p<0.001). SMEs that span several geographic settings can find more opportunities and develop stronger capabilities for managing international collaborations. Another important point here is that public financial support for innovation also influence the propension to elaborate international collaborations (coefficient “PUBFUN”= 0.27, p<0.001). The certification effect of endorsement by an institutional organization signals to uniformed international parties the quality of an SME. By contrary, the propensity decreased with GDP per capita, countries with a high GDP are more likely to possess the relevant specialized assets within their boundaries and thus do not need to develop international collaborations (coefficient= -2.09, p<0.001). Finally, we consider the size and broad sectors of activity the SMEs were engaged in and there are size and industry effects; though we do not present the related coefficients of the dummies in the table.

CONCLUSION

In this paper, an interesting point of view quite diverging from what has been said so far can be observed. The focus of this paper is on international business collaborations in the context of small and medium sized firms. In the globalization context, SMEs might have the greater need for international collaborative agreements, because in general they have fewer internal resources and do not have the capacity to manage the whole innovation process by themselves. Within their limited resources, SMEs must find ways to achieve production economies of scale, to market their products effectively.
Collaborating with other organizations outside the national boundaries can be a solution. However international networking activities are more the exception than the rule and we needed to understand the underlying driving factors. It is important to emphasize that access by SMEs to international network encounters obstacles. First, SMEs can face search costs, such as time and energy consuming activity for cooperation with international partners. In our study we show that these opportunity costs decrease with SMEs relational capabilities in terms of experience in collaboration with local market partners. These firms enjoy an advantage with respect to other firms due to the information intermediation function performed by these market partners. Second, SMEs can face a lack of credibility in the eyes of potential international partners that will abstain from joining forces with firms of uncertain quality. In our work, we highlight that the certification effect of endorsement by institutional networking activities and R&D activities signals to uniformed international parties the quality of an SME. Third, international collaborations involve appropriability hazard and hold up problems that can be controlled by cultural and institutional factors. We assumed that high formal laws, rules, regulations and clear structures would tend to avoid it and prioritize collaborative behaviors and open culture.

To sum up, in this paper we claim that relational, innovation capabilities and institutions help reduce search cost for international partner, cope with information asymmetries, and mitigate with appropriability hazard which figures prominently in explaining the likelihood of these small firms establishing international collaborations with business partners.

As expected, relational and innovation capabilities affect the likelihood of international collaborations formation. We see the outcome regression indicating that market and institutional networking activities, and R&D activities are significantly and positively associated with international collaborations development. These capabilities results from actions to ensure learning, integration and transfer of knowledge, all aimed at sensing and seizing new opportunities in foreign markets. The results for the institutional dynamic suggest that the firm’s institutional context is key to develop international collaborations. Property right protection and regulatory quality help mitigate the intensity of the conflict between “trying to learn” and “trying to protect”.
And finally, according to Hofstede’s (2001) cultural dimensions, we can define a “collaborative culture” as a culture with a high level of Individualism, Power distance and Feminity and a low level of Uncertainty Avoidance.

The significance of this study stems from the selected population, 43,704 SMEs across 16 European countries. No large-scale study has examined the extent to which firm’s ability to build relational and innovation capabilities improve their chance to develop international collaborations in order to survive in the globalization context. This study also highlights the importance of institutional factors needed to implement international collaborations for SMEs. The main limit of this study is that the choice of variables was restricted by the available data, but it does not alter our message: international collaborations formation is a key success factor to small firm’s competitiveness and this implies major policies in order to encourage the diffusion of collaborative practices while providing sufficient intellectual property protection and trust between partners.
REFERENCES

APPENDIX 1: Table 1. Framework of the Research Model

![Framework Diagram]

APPENDIX 2: Table 1. Outcome of the Zero-Inflated Negative Binomial regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>p-value</th>
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</thead>
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<td>0.002</td>
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<td>0.084</td>
<td>0.786</td>
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<td>0.020</td>
<td>0.587</td>
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</tr>
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</table>

| ln(Tate)   | -2.573      | (4.59)**       |         |
| ln(INNO)   | 2.644       | (6.33)**       |         |
| lnalpha    | 1.373       | (29.05)**      |         |
| N          | 43.704      |                |         |

* p<0.05; ** p<0.01

Note: Industry dummies are not presented in the table