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Matthias Fink and Isabella Hatak (Eds.)

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Acknowledgments

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Matthias Fink & Isabella Hatak

Vienna, October 2010

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Editorial

The body of academic literature on SME management and entrepreneurship has expanded enormously over the past years. In particular the role of small, young and entrepreneurial ventures has been linked to economic development, employment and technological advancement. Volatile markets as well as the possibilities induced by the new technologies require strategies to ensure the competitiveness of small units. As the only enduring advantage stems from the ability to generate innovations, entrepreneurship as willingness to interpret change as an opportunity for a better performance is of particular importance for SMEs.

Within the European Union alone, there are approximately twenty-three million SMEs, characterized by employing less than 250 people and by being independent from larger companies (European Commission, 2003). According to this definition, more than 99 percent of all enterprises within the European Union are SMEs. These SMEs provide over one hundred million jobs in Europe and account for more than three quarters of all jobs in some sectors. SMEs also account for a significant share of inter-firm cooperation across national borders (Fink/Kessler, 2009). Against this backdrop, it is not surprising that SMEs have become a popular topic of academic research since Birch (1979) found that small firms create more jobs than large firms. The creation and the failure of firms are key elements in the dynamism of modern economies. New ventures attract resources to new activities and when they prosper and are able to grow rapidly, they generate a significant number of new jobs.

However, ‘a small business is not a little big business’, as Welsh and White already noted in 1980. This implies that management in SMEs is not downsized big business management. Management can be regarded as a set of tools to reduce the complexity of large business units to a level that makes it possible for a manager to act. At the same time, due to the lower level of complexity concerning structures and processes it is often deduced that SMEs do not require special management tools. However, as SME managers often possess of a high propensity to overestimate their sure instinct, so that they treat management issues in a rather cavalier fashion, the development of special management tools is necessary - not for substituting the existing management styles, but rather for supporting the intuitive management, especially in cases where the threshold of clarity has been passed (Kirsch, 1983). Recent empirical findings in the fields of business administration and economics emphasize that not only well-established management tools in an adapted form, but also completely new management approaches benefit the growth of SMEs (Pichler et al., 2000; Fink/Kraus, 2009). The following papers shall thus contribute to the development of such an SME management body within the context of a changing business environment.

In the first paper, titled ‘What determines the number of spin-offs generated by European universities?’ Sven H. De Cleyn and Johan Braet aim at explaining why European universities differ in the number of spin-offs generated. By applying linear regression on a sample of 268 universities in 21 countries, their results mainly point to the interaction between a university’s size and general resource base on one hand and policies and mechanisms to support entrepreneurial initiatives on the other.

Subsequently, Amélie Jacquemin and Frank Janssen strive to improve the understanding of the impact of regulation on entrepreneurship and to explain why studies on that topic led to conflicting results. Under the title 'Studying the impact of regulation on entrepreneurship: How to overcome current conflicting results?', they develop a classification of regulation impact studies by differentiating between 'correlation studies' and 'explanatory studies' and argue that these different approaches have led to conflicting results.

This is followed by a study presented by Gaël Gueguen, Estelle Pellegrin-Boucher and Hervé Chappert entitled 'Interpersonal relationships and failure of cooperation between SMEs', which investigates the strategic process of establishing cooperative arrangements between competing SMEs by taking into account the rationality of the SMEs' owner managers.

Next, under the title 'Towards a Distinction between Technology Incubators and Non-Technology Incubators: Can they contribute to Economic Growth?', Tiago Ratinho, Rainer Harms and Aard Groen investigate the nature of technology incubators by comparing the levels of business services provision, selection criteria, exit policy and tenants' characteristics. The results based on the analysis of data collected in 12 incubators located in six Northwestern European countries and a total of 101 incubated companies show that technology incubators provide more tenants with their services, select younger companies and practice stricter exit policies. Additionally, they tend to attract more experienced teams of entrepreneurs.

Subsequently in his paper titled 'Micro data based macro level competitiveness measurement', Gábor Márkus presents a competitiveness measurement technique that directly links the micro- or firm-level and the macro- or regional/country-level factors of competitiveness. By applying the interaction variable method in an innovative way on business-level data from the Global Entrepreneurship Monitor (GEM) database combined with institutional variables derived from various large international institutions, the competitiveness of individual businesses can be calculated individually.

Finally, in their contribution entitled 'Test of entrepreneurial orientation construct: the case of an emerging market', Lilla Hortovanyi, Miklos Dobak and Roland Zs. Szabo test the entrepreneurial orientation (EO) construct in the context of emerging markets and link it to Timmons' model of entrepreneurial processes. By taking the uncertainty of entrepreneurs in emerging markets as an effect of the current economic and financial crises into account, the authors also suggest an alternative methodology (Multidimensional scaling) for testing EO construct.

To adequately position this edited volume within the universe of scientific publication it is important to know that Inter-RENT is not the final destination of the presented manuscripts. Inter-RENT is rather an initiative by the European Council for Small Business and Entrepreneurship (ECSB), which is designed to support researchers in developing their papers presented at the annual RENT Conferences further so that they can succeed within the review processes of international peer-reviewed journals.

We selected six contributions presented at the RENT 2009 Conference in Budapest according to the following criteria (1) potential of the research question, (2) potential

of the data collected, (3) teams of authors consisting of at least one well established and at least one emerging scholar and (4) national diversity within the edited volume to mirror the international nature of ECSB.

In the process of Inter-RENT we provide the authors with two substantial reviews from experts in the relevant field in a double blind process. Some of the reviewers also agreed to take the role as facilitators, who entered into a direct discussion process with the authors. We encourage the authors to consult the feedbacks when preparing a manuscript for the submission to a scientific journal.

From the design of the process it becomes apparent that the manuscripts presented here differ in the way they have gone so far on the road towards being fit for publication in a renowned international journal. However, one selected manuscript cannot be presented here, as it has already been published in Voluntas in the mean time. Two other teams of authors have been invited by international journals to revise and resubmit their manuscripts which are presented here.

We wish the 14 authors from across Europe all the best for the demanding process of getting their work published!

Matthias Fink & Isabella Hatak

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What determines the number of spin-offs generated by European universities?

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Abstract

Prior studies have investigated various aspects of academic spin-off ventures from different perspectives and at different levels. At meso-level, six groups of scholars have investigated why some universities generate more spin-offs than others, mainly in the North American context. This study builds upon these seminal works and aims at explaining why European universities differ in the number of spin-offs generated from a resource-based perspective.

Using linear regression on a sample of 268 universities in 21 countries, the results mainly point to the interaction between a university's size and general resource base on one hand and policies and mechanisms to support entrepreneurial initiatives on the other. In a statistically significant model with nine variables, almost 60% of total variation is explained. As main implication, universities and policy makers should be willing to devote a substantial amount of their scarce resources to research and invest in technology transfer offices to support further commercialisation of the research outcome by installing effective and efficient support mechanisms.

Keywords

Spin-off venture, academic entrepreneurship, technology transfer, Europe, university, high-tech start-up

Introduction

"*Scientific knowledge is considered to be the most important raw material which generates economic growth*" (Chiesa and Piccaluga, 2000, p. 329). In the academic environment this awareness has been growing in recent decennia, amongst others due to decreasing share of total budgets emanating from public money (Etzkowitz 1998; Chiesa and Piccaluga 2000; Rasmussen, Moen et al. 2006). One possible way to generate economic returns out of knowledge production is through the creation of new ventures (spin-offs) exploiting this knowledge and trying to (maximally) capture its economic or financial value. As recent literature reviews by Djokovic and Souitaris (2008) and Rothaermel et al. (2007) have illustrated, the attention to this way of transferring technology to the market – as an alternative for the classical ways using education, scientific publications, contract research and licensing – has grown unremittingly in recent years.

Prior studies on academic spin-offs (ASOs) have investigated individual factors influencing new venture survival and/or performance (see e.g. Wallmark 1997; Davidsson and Klofsten 2003; Nerkar and Shane 2003; Bjørnåli and Gulbrandsen 2009). Others have conducted research at the meso-level (university level), investigating the role of universities and technology transfer offices in the creation of ASOs (see e.g. Bray and Lee, 2000; Feldman et al., 2002; Goldfarb and Henrekson, 2003). A third research stream (Djokovic and Souitaris, 2008) concerns macro-level studies on the general environment and the role of government and industry (see e.g. Benneworth and Charles, 2005; Bozeman, 2000; Klofsten and Jones-Evans, 2000).

Throughout the paper and following the definition of De Cleyn and Braet (2009, p. 327), an academic spin-off (ASO) will be defined as "*[1] a new legal entity (company) [2] founded by one or more individuals from an academic parent organisation [3] to exploit some kind of knowledge [4] gained in the parent organisation and transferred to the new company*".

Despite this increased attention to (numerous aspects of) the spin-off phenomenon, our knowledge and understanding of the factors creating a fertile breeding ground in academic environments for scientists to engage in new venture start-up is relatively limited (Rothaermel, Agung et al. 2007; Yusof and Jain 2010). In their seminal work, Di Gregorio and Shane (2003) investigated why some American universities generate more start-ups than others. Other studies have built on this paper to explore the same topic, mainly in the North American setting (see e.g. Link and Scott, 2005; Lockett and Wright, 2005; O'Shea et al., 2005; Powers and McDougall, 2005; Gras et al., 2008). Several authors have recognised this limitation of current research on the ASO topic and have called for more studies outside the dominant American context (see e.g. Mellahi and Wilkinson 2004; Rothaermel, Agung et al. 2007; Yusof and Jain 2010). This study seeks to address this research gap from a resource-based perspective in the European context. The central research question for this study is then:

> *Why do European universities differ in the number of academic spin-offs they generate?*

The European context is in many regards different from the North American. In first instance, its educational system differs substantially, especially with regard to flexibility of the academic job market (Franklin, Wright et al. 2001; Goldfarb and Henrekson 2003; O'Gorman, Byrne et al. 2008). Additionally, the track record and tradition of creating ASOs to transfer new knowledge to the market is not yet generally adopted outside the Anglo-Saxon world (Degroof and Roberts 2003; Pirnay, Surlemont et al. 2003). In this sense, this study thus complements the existing, predominantly North American studies.

In the next section of this paper, we provide an overview of prior scholarly studies on the factors fostering or impeding new venture creation in the academic context. The third section builds on these prior results. Embedded in the resource-based view (RBV), the conceptual model is described. Afterwards, the hypotheses are developed in the fourth section. The fifth section then deals with methodological aspects of our study. Afterwards, the empirical results are discussed. Finally, a discussion on the implications and limitations of our study concludes this paper.

Literature review

As indicated, this study builds upon insights gained in earlier works by various scholars. The literature search in the most common databases (EBSCO, Science Direct, Ingenta Connect, JSTOR, Springer Link, SwetsWise) was focused on the specific research question. Many papers touch upon the subject concisely, but few handle it in detail. The latter category of studies investigated the factors causing variation in the number of ASOs created by different universities. They focused principally on the North American situation, with the exception of Lockett and Wright (2005), who tested their hypotheses on a large data set obtained in U.K. universities, and Gras et al. (2008), who conducted seven case studies in six different E.U. countries.

The single European study based on a large dataset is thus U.K. based. Although being a European country, their longer tradition in spinning off new ventures based on academic research results makes the U.K. differ substantially from other European countries. Additionally, European countries might differ in their propensity for using ASOs as technology transfer mechanism and the factors underlying these differences might differ. Therefore, a large-scale study adopting a multi-country perspective in the European context could add to our understanding of the topic.

Table 1. Prior research results

Authors	Year	Sample details	Variables investigated
Di Gregorio and Shane	2003	116 universities in the U.S.	Venture capital availability; Commercially-oriented research; *Intellectual eminence**; *University licensing policies**
Link and Scott	2005	51 U.S. research parks°	*Research orientation of university**; *Age of science park**; *Distance between university and science park**

Lockett and Wright	2005	48 universities in the U.K.	Total research expenditure; *Expenditure on external IP advice**; Number of TTO staff members; TTO age; *Business development experience of TTO**; *University spin-off policy**; Presence of medical school; Presence of science park; RandD intensity of region
O'Shea et al.	2005	141 universities in the U.S.	*Prior experience with spin-off foundation**; Number of postdoctoral students; Number of faculty members; *Intellectual eminence**; *Science and engineering budget**; *Number of TTO staff members**; Presence of an incubator
Powers and McDougall	2005	120 universities in the U.S.	Faculty size; *Industry RandD revenue**; *Intellectual eminence**; University patents; *TTO age**; *Venture capital munificence**
Gras et al.	2008	7 universities in 6 E.U. countries	Tech transfer policy; *Human capital stock**; Staff involved in contract research; Technological production; Tech transfer experience of TTO; Spin-off support experience of TTO; *TTO staff dedicated to spin-off support**; Number of TTO staff members; *Professional experience of TTO staff**; *Availability of financial support**; *Availability of non-financial support**; Availability of infrastructural support

° = *Research parks affiliated to a university*

* = *Significant at 1% or 5% confidence level*

The main results of prior studies on the subject provide mixed evidence. For example the seminal study by Di Gregorio and Shane (2003) indicated the importance of a university's intellectual eminence and licensing policies, while the availability of venture capital and commercial orientation of research exert a much smaller (insignificant) influence on the number of ASOs originating from a university. Similarly, the study by O'Shea et al. (2005) illustrated the importance of intellectual eminence, the general resource base (amount of federal and industry funding), the type of research conducted (nature of the faculties) and the prior experience of the technology transfer office. The findings of Gras et al. (2008) support the importance of intellectual eminence in terms of human capital for both spin-off creation and performance. Evidence on the size of universities, whether in terms of total budget, staff size or other parameters, is inconsistent. The same holds for the presence of an explicit tech transfer policy or the availability of funding (venture capital, internal funding sources, …). Table 1 summarises the results of prior scholar studies on the subject.

In addition to some of the elements these studies considered influential, we have added some independent variables that intuitively are considered important in explaining the variance in ASOs creation. On the other hand, some variables,

especially those dealing with characteristics of the external environment (e.g. availability of venture capital, RandD intensity of a region) have been omitted in our study to keep the focus on internal university factors.

Theoretical insights

This study will be framed within the resource-based view of the firm (RBV). Consequently, the focus will remain with internally-oriented variables. Aligned with the RBV, the potential of creating ASOs is assumed to increase with the number of resources available at a university, as a larger amount of resources could give occasion to more research output, and thus normally more output with commercial potential. If these resources are additionally inimitable and non-substitutable, an organisation could sustain these advantages over time (Barney 1991). This partially relates to the path-dependency (Teece et al., 1997), where the prior history of universities can play a major role in shaping its reputation towards external stakeholders in the start-up process of establishing ASOs. This reputation, together with prior entrepreneurial role models, potentially acts as leverage to attract (future) resources (Di Gregorio and Shane, 2003).

In further contributions to the RBV, various scholars have stressed the need for (dynamic) capabilities in exploiting firm resources (e.g. Teece et al. 1997; Eisenhardt and Martin 2000). These capabilities are the means by which the value of resources is leveraged. In isolation, resources provide no benefit to the firm. However, their latent value can be made available if the firm possesses the right capabilities (Teece et al. 1997; Newbert 2007). In this regard, the universities' technology transfer offices (TTO) can be seen as source of dynamic capabilities to leverage the other resources in the process of creating ASOs. Especially the experience of TTO staff members contributes substantially to a university's stock of relevant capabilities. Additionally, these capabilities refer to those of scientists, both in terms of research as commercialisation capabilities.

For scholars adopting the RBV, resources are broadly defined as all assets (both tangible and intangible) semi-permanently tied to the firm (Mustar et al. 2006). Various scholars have elaborated on the different resource types by constructing typologies. In this study, we draw upon the works of Barney (1991) and Brush et al. (2001).

More specifically, the resource types investigated in our study will be subdivided into four categories, inspired by previous research results on this topic. The number of ASOs created by European universities will be explained in view of these resource types. It is our belief that the university size and its general resource base have an impact on its ASO potential. It seems intuitively logical that the more resources a university has, the more research output with commercial potential could be generated. Knowledge spillovers are more frequent in larger universities, where knowledge accumulation often finds a more fertile ground (O'Shea, Allen et al. 2005). Additionally, size is to an increasing extent determined by the ability to attract external resources (mainly from industrial partners) (Powers and McDougall 2005). This evolution has been demonstrated to have a positive impact on the levels of commercialisation (O'Shea, Allen et al. 2005).

Secondly, the intellectual eminence of a university might be influential. Universities are institutions competing for funds, students and top scientists to increase their reputation and intellectual eminence (Powers and McDougall 2005). This strive towards intellectual brightness requires time and is an ever ongoing process. Therefore, this eminence is the present quality of the research and staff as outcome of the historical evolution of the university. Both aspects are taken into account, using the age of the university and the ranking as variables. The impact of intellectual eminence on the number of ASOs created can be explained using two arguments. Firstly, better quality researchers have been found to be more likely to exploit their research findings (Di Gregorio and Shane 2003). Given the tacitness of a large portion of highly specialised academic knowledge, scientists have to become entrepreneurs themselves to capture rents to their intellectual capital (Zucker, Darby et al. 1998). Secondly, better researchers are mostly found in more eminent universities, which in turn makes it easier for them to obtain the necessary resources to start an ASO and exploit their research findings (Di Gregorio and Shane 2003), given the higher level of credibility (Vohora et al., 2004).

A third category concerns the resources dedicated to the technology transfer office, responsible for supporting the commercialisation of the research output, and other policy mechanisms to foster academic technology transfer. Explicit university policies to lay down rules for the commercialisation of academic research findings might foster or hamper ASO creation, depending on its characteristics. For example, Di Gregorio and Shane (2003) found that policies with lower royalties to be paid to the parent university has a positive effect on the number of ASOs created. Besides a policy framework, universities often create TTOs to support technology transfer and university-industry interaction (Gras, Lapera et al. 2008). TTOs must understand both the commercial and academic world in order to effectively support scientists to commercialise their findings (Powers and McDougall 2005; Gras, Lapera et al. 2008). Given the fact that the latter often are not acquainted with pursuing business opportunities, the role of TTOs can be of high importance in the entrepreneurial process (Shane 2004; Powers and McDougall 2005).

Lastly, we include the orientation of the research, as it is more probable that research in (applied) science, medicine and engineering faculties leads to output with commercial potential. Scientists with more external funding (who are almost by definition conducting more application oriented research) have been shown to share their experiences with other colleagues more frequently (Powers and McDougall 2005) and engage in commercialisation efforts more often (O'Shea, Allen et al. 2005). The commercial orientation of research is also partially path dependent, as it is influenced by historical choices and directions (Di Gregorio and Shane 2003).

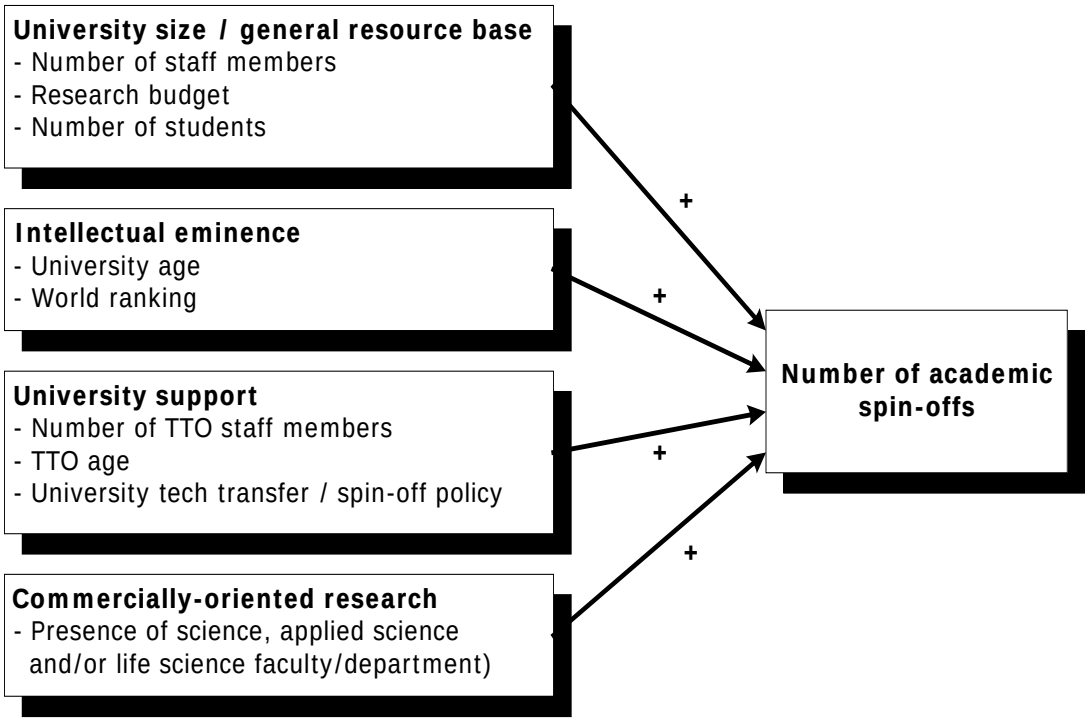
Hypothesis development

In our study, the dependent variable is the number of academic spin-off ventures (ASOs) created by a university between 1985 and 2008.

Building on the four previously determined resource-oriented categories, we investigated nine variables which could be of influence in our opinion: (1a) number of students, (1b) research budget, (1c) total university staff, (2a) year of foundation,

(2b) university's ranking, (3a) TTO staff, (3b) TTO age, (3c) university policy, (4) nature of faculties. The conceptual framework is summarised in Figure 1. The next paragraphs will elaborate on these variables and conceptually derive the expected directions of their relationships with the dependent variable.

Figure 1. Conceptual framework



Resource base

One of the main factors that might influence the number of ASOs generated is the size of the university. This general resource base a potential explanatory variable has been used in the research of O'Shea et al. (2005) and Powers and McDougall (2005). It seems intuitively logical that larger universities are a more favourable breeding ground to create more ASOs, because a certain critical mass is required to come up with cutting-edge research results. Additionally, as O'Shea et al. (2005) indicated, a larger 'stock' of human capital implies a larger available base of skills and knowledge, which might positively affect the amount of research output with commercial potential in a university. It is then debatable whether the relationship between university size and expected number of ASOs created is linear or not. In this study, the size of the university will be measured using three dimensions: the total number of staff members (in the academic year 2007-2008), the total number of students (registered for the academic year 2007-2008) and the size of the budget (fiscal year 2007). In order to account for the skewness of the size distributions, the natural logarithms of the three variables will be used. These relationships result in following hypotheses:

H1a Universities with a higher number of students enrolled will generate more ASOs.

H1b Universities with a higher number of total staff will create more ASOs.

H1c Universities disposing of a greater research budget will generate more ASOs.

Intellectual eminence

A second group of variables refers to the intellectual eminence of the university. As Figure 1 illustrates, this eminence is in our study measured by the university's age and the ranking.

With regard to the age, the opinion of Chiesa and Piccaluga (2000, p.337) runs as follows: "*recently founded universities [...] usually tend to adopt more entrepreneurial and less traditional strategies*." Thus, following this argument, younger universities might be more willing to embrace academic entrepreneurship. On the other hand, one could argue that the older the university, the more opportunities it has had to build up its reputation and research tradition. These path dependencies determine a university's current status (Teece et al., 1997), but on the other hand also influence their future potential. Due to the contrast in both lines of reasoning, the direction of the relationship with our dependent variable is unclear. As the path dependency argument has been found to be of influence in prior research, we hypothesise a positive relationship between a university's age and its propensity towards generating spin-offs.

H2a Older universities will generate more ASOs.

The intellectual eminence of the university is important for other reasons. Firstly the reasoning goes that better researchers are more often found in more eminent universities and that they are more likely to produce exploitable and cutting edge knowledge (Di Gregorio and Shane, 2003; Powers and McDougall, 2005). Especially in some fields, these start-ups are a way to capture economic rents to the founders' intellectual capital (Zucker et al., 1998). Additionally, Di Gregorio and Shane (2003) argued that for researchers from top universities it might be easier to attract resources to create ASOs, given their higher credibility. This reasoning is reinforced by the findings of O'Shea et al. (2005), who found a positive and statistically significant effect of a high faculty quality NRC (National Research Council) index rating. Therefore, it is hypothesised that the intellectual eminence of the university is positively related to the number of ASOs created.

The intellectual eminence of the university has been operationalised by the world ranking of the university according to Webometrics, an initiative of the Cybermetrics Lab (a research group belonging to the Consejo Superior de Investigaciones Científicas, the largest public research body in Spain). This ranking is based on comparison and evaluation of the quality of education, internationalisation, size of the university, research output, impact and prestige. It currently ranks 20,000 universities worldwide.

This ranking has been chosen for its extensive coverage of universities worldwide. Some other major ranking (e.g. Academic Ranking of World Universities of the Shanghai Jiao Tong University; Times Higher Education Supplement; Centre for

Science and Technology Studies at Leiden University) cover a limited amount of universities (between 500 and 1,000), which would results in a large amount of missing data, given the focus on European universities in this study. Additionally, recent research has demonstrated a reasonable amount of similarity between the different rankings (Aguillo, Bar-Ilan et al. 2010).

H2b The higher the university is ranked, the more ASOs it will generate.

As the higher ranked universities have a lower rank number, we hypothesise a negative relationship between the ranking and the number of ASOs generated.

University support

Universities are not always eager to invest a share of their scarce resources into risky activities, such as the commercialisation of research output through ASOs. In order to develop and support these activities, many universities have set up a separate entity, whether as department within the existing university structure or as separate legal body controlled by the university. These technology transfer offices (sometimes also called incubators or liaison offices) need a certain investment in order to start their operations. This amount differs according to the business model chosen (e.g. depending on whether the university makes equity investment in its spin-offs or not) (Shane, 2004).

Universities willing to invest in the promotion of academic entrepreneurship need to dedicate resources towards this initiative. Additionally, it takes time to change the academic mindset of researchers to (sometimes) incorporate a commercial reflex and to build up a portfolio of potentially interesting inventions on which start-ups can be established (O'Shea et al., 2005). Technology transfer staff members are crucial in pulling down the (cultural) walls between academia and industry and build mutual trust between the academic and industrial/commercial environment (Friedmand and Silberman, 2003; O'Shea et al., 2005).

In this regard, it can be argued that the number of staff members working in the technology transfer office (TTO) of the university is likely to influence the number of spin-offs created. As O'Shea et al. (2005) argued, TTO staff members play a key role in stimulating academic entrepreneurship. The argument is that TTOs need to attain a critical mass to be able to handle the process of spin-off creation and support and to have all required expertise. Therefore, we hypothesise a positive relationship between the number of TTO staff members (measured in the year 2008) and the number of start-ups generated. Additionally, prior experience of a TTO in the spin-off creation process can be an important asset in detecting suitable opportunities. The more experience a TTO has built up over the years, the more likely it is the TTO has developed the necessary capabilities and thus establishes more ASOs.

With regard to the TTO, a third element besides experience and size) might be at play. The direction of the relationship between the number of TTO staff members and the number of ASOs created by a university can be subject to debate. If a TTO has more capacity for handling dossiers and exploring the university research groups for interesting opportunities, it is more likely some interesting opportunities will emerge and result in the establishment of ASOs. Thus, one might expect that more TTO staff members lead to a higher spin-off output. However, the relationship might be inverse

as well. Due to a higher number of dossiers, a university might need to hire more TTO staff in order to cope with the large amount of workload. Thus, more potential spin-off dossiers might lead to a higher required number of TTO staff. Therefore, a two-way relationship should be tested.

Thirdly, universities having a clear attitude and policy on the exploitation of research results might positively affect the number of spin-offs they generate. Indeed, as entrepreneurship and commercial exploitation of research findings demands for radically different capabilities, activities and evaluation mechanisms compared to the traditional university tasks of providing education and carrying out scientific research, universities with a clear policy to deal with the issue might provide the required clarity and incentives (Lockett and Wright, 2005). The framework provided by the policy shapes an environment where staff members and externals know how to behave and what the boundaries and implications of certain actions are. Therefore, we hypothesize that universities having an explicit policy on spin-off ventures and/or technology commercialisation will generate more ASOs.

H3a The more people working in the TTO of the university, the more ASOs the university will generate.

H3b The older the TTO of the university, the more ASOs the university will generate.

H3c Universities with an explicit policy on how to deal with spin-off ventures and/or technology transfer will generate more ASOs.

Commercially-oriented research

The last category investigated in our study concerns the nature of the research undertaken in the universities. The nature of the research often depends on the funding source (O'Shea et al., 2005). Industry has a tendency to invest more in applied or commercially-oriented research (Di Gregorio and Shane, 2003), which makes that public money is more directed towards fundamental research. Thus, the nature of the research might differ according to the funding sources.

Additionally, universities tend to differ in the extent to which their research is application-oriented. This can either be caused by the principal-agent pressure due to the funding sources, by the historical evolution and development of the university (culture) (see prior discussion on path dependency) or by personal preferences. Given the nature of their research (results), it is more probable to expect that universities having science or engineering faculties produce more ASOs. Therefore, in line with the reasoning formulated by O'Shea et al. (2005), we suggest a positive relationship between the nature of faculties and the number of ASOs generated, where faculties of (applied) science and/or engineering are expected to results in a higher number of ASOs. The nature of the faculties has been operationalised by dummy variables for different faculty or department types (science, applied science, economics/management, life science, arts/humanities and other).

H4 Universities with faculties of (applied) science, medicine and engineering will create more ASOs.

Methodology

From a methodological point of view, a two-step approach has been adopted. In first instance, the technology transfer offices of more than 800 universities in 24 countries have been contacted by e-mail to obtain the number of ASOs created based upon their research and/or knowledge between 1985 and 2008. This data collection occurred as part of a larger research project. Based on the responses, 268 universities in 21 countries were selected as basis for this study. This first part provided the data on the dependent variable, namely the number of ASOs created by the universities in the period 1985-2008. Table 2 summarises the results of the first research step.

Table 2. Number of universities and spin-offs per country

Country	Number of universities	Number of ASOs
Austria	8	235
Belgium	9	364
Czech Republic	6	11
Denmark	2	107
Finland	8	201
France	38	525
Germany	37	1,626
Greece	4	88
Iceland	2	85
Ireland	3	32
Italy	21	237
Luxembourg	1	1
The Netherlands	5	95
Norway	3	29
Poland	15	38
Portugal	12	160
Serbia	2	43
Slovakia	3	2
Spain	15	124
Sweden	12	424
Switzerland	6	336
United Kingdom	56	945
Total	**268**	**5,708**

The second part of the research focused on collecting data with regard to the independent variables. Using desk research (internet data sources, mainly the universities' websites, and where available the annual reports), data have been collected on the parameters (see earlier) of the universities included in our sample. In case of missing variables, the universities have been contacted by e-mail to obtain the missing values. However, this only provided additional data on four universities, due to a very low response rate. Table 3 provides an overview of the overall availability of the data on independent variables.

For the data analysis, linear regression has been used since all data are numerical. As for some universities data are missing on particular variables, several regressions have been run. Stepwise, more independent variables have been added to the model in decreasing order of data availability. This procedure allows capturing a maximal amount of information and results.

Table 3. Data availability

Independent variable	**Data completeness (N = 268)**	
ln (Number of staff)	196	73.13%
ln (Number of students)	216	80.60%
ln (University budget)	120	44.78%
University age	268	100.00%
Policy	268	100.00%
ln (Number of TTO staff)	160	59.70%
TTO age	149	55.60%
World ranking	260	97.01%
Fac. Science	258	96.27%
Fac. Applied Science	258	96.27%
Fac. Economics/Management	258	96.27%
Fac. Life Science	258	96.27%
Fac. Arts and Humanities	258	96.27%
Other faculties	257	95.90%

Results

Due to missing data for several variables, we subdivided the final data analysis into five distinct linear regression tests. Table 4 summarises the main results of each of the individual tests. The detailed model specifications and estimations can be found in Appendix 1. The first regression analysis was run with six independent variables on a dataset of 180 European universities. The results indicate that this model is highly significant at a 99% confidence level ($p = 0.000$) and the model manages to explain almost 25% of the variance. At the individual variable level, the general size of the university (measured by the number of staff members and students) appeared to the main explanatory variable. Both measures are highly significant (respectively at a 99% and 95% confidence level). In contrast to the number of staff members, the number of students seems to have a negative relationship with the number of ASOs created. A third significant variable (at 90% confidence level) is the presence of a faculty or department of economics, business and/or management, which surprisingly has a negative impact on the dependent variable.

In the second model, the third measure of university size has been added (natural logarithm of the total budget), thereby lowering the number of observations to 110 due to missing data. This model is still highly significant at a 99% confidence level ($p = 0.000$) and explains slightly over 31% of the variance. Again, the size of the university (measured by ln (number of staff members)) and the presence of a faculty

of economics are highly significant and the direction of the relationship remains identical.

The third model elaborates on the university structure to support new venture creation. Rather surprisingly, the total variance explained by the new model decreases substantially to slightly over 17%. The overall model is significant at a 90% confidence level. Consistent with the prior models, the presence of a faculty of economics has a negative and significant relationship with the number of ASOs created. In this model, the world ranking of the university is highly significant and the direction of the relationship is as hypothesised. Overall, the size of the university thus seems to have a stronger impact on the number of ASOs created than the size and experience of the TTO team. The size of the TTO is even negatively related to the dependent variable, though not significant.

Table 4. Summary of the results

	N	R^2 value	ANOVA (p-value)	Variables
Model 1	180	24.73%	0.000***	ln(staff)***, ln(students)**, age, tech transfer policy, nature of faculties*[(1)], world ranking
Model 2	101	31.42%	0.000***	ln(staff)*, ln(students), ln(budget), age, tech transfer policy, nature of faculties**[(1)], world ranking
Model 3	110	17.15%	0.056*	age, tech transfer policy, ln(TTO staff), TTO age, nature of faculties**[(1)], world ranking***
Model 4	57	40.77%	0.012**	ln(staff), ln(budget), age, tech transfer policy, ln(TTO staff)**, nature of faculties***[(1)], world ranking
Model 5	39	58.82%	0.025**	ln(staff), ln(students), ln(budget), age, tech transfer policy, ln(TTO staff)**, TTO age, nature of faculties***[(1)], world ranking

** Significant at the 90% confidence level.*
*** Significant at the 95% confidence level.*
**** Significant at the 99% confidence level.*
[(1)] Only the dummy variable for the Faculty of Economics, Business or Management is significant on its respective confidence level and has a negative coefficient.

The fourth model combines measures of university size and tech transfer policy and support. This model increases substantially regarding it explanatory power (R^2 of over 40%) and is significant at a 95% confidence level. The size of the TTO team becomes significant and negatively impacts the number of ASOs created. The presence of a faculty of economics retains its negative and significant relationship with the dependent variable. However, the smaller number of observations included in this model (57) prompts to cautious interpretation of the results.

The fifth and last model includes all variables, resulting in a low number of observations (39). The explanatory power further increases to almost 59% and the model is significant at a 95% confidence level. On the level of individual variables, the size of the TTO and the presence of an economics faculty remain significant and negatively related to the dependent variable.

Although the variables are not consistently significant on the individual level, the results indicate that the largest influence is exerted by the interaction between the size of a university and its resources to support academic entrepreneurship (TTO, explicit policy, …). The strong increase in R^2 from respectively models 1, 2 and 3 to 4 supports this finding.

On the individual level, two variables display a consistent and almost always significant relationship with the dependent variable. In the first place, the presence of a faculty or department of economics, business and/or management seems to hamper the creation of ASOs. One possible explanation could be that the presence of knowledge and expertise in this domain increases consciousness of the potential risks associated with new venture creation, especially in the often high-tech environment in which ASOs typically operate (Shane 2004). Alternatively, more expertise in the management domain might lead to the adoption of differentiated business models for the transfer of knowledge and technology from the academic to the commercial or social environment, i.e. licences and other transfer mechanisms instead of ASO creation.

Secondly, the size of a technology transfer office surprisingly has a negative effect on the number of ASOs originating from universities. TTO staff members might prove supportive for potential entrepreneurs, but on the other hand they might create procedures and selection mechanisms that somewhat hamper ASO creation. More experienced TTO teams might wipe out these negative effects (Powers and McDougall 2005). The negative effect might be time and experience dependent, and thus a more dynamic model could be useful in detecting its real impact. As such, TTO might have a positive effect on the quality of the ASOs created due to their selection of which ASOs to support, but simultaneously have a negative impact on the pure number of ASOs created.

Overall, the results thus only provide partial support for our hypotheses. The first set of hypotheses expected a positive relationship between a university's size and general resources base and the number of ASOs created. Hypotheses 1a and 1b receive support, especially in models 1 and 2. Hypothesis 1c is not supported by our data. The second set hypothesised a positive effect of the intellectual eminence, measured by the age and world ranking, on the dependent variable. However, none of both variables turned out to have a significant effect, thereby leading to a rejection of hypotheses 2a and 2b.

The third set of hypotheses assumed a positive contribution of university support mechanisms towards academic entrepreneurship on the actual outcome of the entrepreneurial process. Contrary to the expectations, having an explicit technology transfer policy and an experienced technology transfer office did not have any direct significant contribution to the number of ASOs created (H3b and H3c are rejected). However, the size of the TTO team seems to matter (H3a). As indicated earlier, the

TTO size has a consistent negative effect and thus contradicts the hypothesised direction of the relationship. Further research might focus on this issue to determine its causes and possible remedies.

The last hypothesis assumed a positive effect of having more application-oriented research faculties or departments (e.g. (applied) science, engineering or life science) on the dependent variable. None of these variables had a consistent and significant effect. However, the presence of a faculty of economics, business or management turns out to hamper ASO creation. H4 is thus not supported by our data.

Using our nine different independent variables, the model manages to explain almost 60% of total variance in the number of ASOs created by the universities at a 95% confidence level. However, the relatively small number of observations in the fifth model moderates the robustness of this result.

Conclusions and implications

This study focused on the different determinants of ASO creation in an academic context within a resource-based framework. Based on four different explanations – general resource base, intellectual eminence, university support and commercially-oriented research – we explored the importance of nine variables in explaining inter-university variance in the creation of ASOs. Within a sample of 268 universities in 21 European countries, we used linear regression models to investigate the importance of our variables. The results show that the interaction between the general resource base and the university support measures (tech transfer policy, TTO) has significant influence on the number of ASOs established. Due to the sample characteristics – a sufficiently large sample of universities in different countries (a mix of large and smaller countries) – we believe the findings are important and significant for the entire population of universities and ASOs in Europe.

Our findings sometimes contrast existing literature on the subject. For example, O'Shea et al. (2005) found a positive correlation between the size of the TTO and the number of ASOs created. On the other hand, the results of Lockett and Wright (2005) showed that the influence of TTO size is only significant in the absence of variables concerning TTO experience and/or capabilities. In the same line, Di Gregorio and Shane (2003) found only intermittent support for TTO size as variable explaining ASO formation rate. The overall role of TTOs and technology transfer policies in the ASO creation process remain somewhat unclear. Despite the findings of Lockett and Wright (2005) and O'Shea et al. (2005), other authors did not find the same strong correlation between TTO and tech transfer policy presence on ASO creation (see e.g. Di Gregorio and Shane, 2003; Gras et al., 2008). Although our study did not find support for the importance of these variables on the individual level, in interaction with the university's size and general resource base they seem to have a substantial impact on the number of ASOs created. Other literature findings have not been confirmed by our results. E.g. the role of intellectual eminence as such is not of significant importance according to our study, while it has been identified as important factor in other studies (see e.g. Di Gregorio and Shane, 2003).

Prior studies also investigated the influence of some external mechanisms, such as the presence of and distance to incubators and business parks and the availability of

venture capital in a region. More research might be necessary to study the interactions between the internal resource-based variables used in this study and the more externally-oriented variables in order to gain a deeper understanding of the process of ASO creation.

The study has several limitations. The most important relates to the linear regression method. For some of our parameters, it is rather unlikely to find a linear relationship with the number of ASOs created. This has partially been rectified by the use of natural logarithms for size measures, in order to account for the skewness of their distributions. The second limitation relates to the sample size. Although the initial sample is deemed reasonable to perform relevant analyses, the relatively high amount of missing data decreases the sample size for the more complex tests, thereby hampering their statistical significance. A third weakness to be improved by further research is the static nature of the variable values. As we collected data on a single year (2007), the models do not control for variations over time. It might be better to work with multi-year averages to overcome this limitation. Additionally, a time lag occurs between the availability of resources to conduct scientific research and the effective creation of ASOs, which further strengthens the need for a more dynamic model. A fourth limitation simultaneously creates an opportunity for further research. The role of the intellectual eminence, in our framework measured by the age and the ranking, can be seen as moderating variable, especially within the resource-based view adopted in this study. Indeed, the intellectual eminence can be seen as the outcome of what universities realised with the resources they received (or attracted) in an earlier phase. Therefore, our theoretical framework might require some adaptation and refinement.

The last limitation relates to our dependent variable. The number of ASOs generated by universities is probably an underestimation of the real number for several reasons. In the first place, TTOs probably did not exist from the foundation of the first ASO onwards. Therefore, it is likely that not all ASOs have been documented and followed over time. Secondly, not all ASOs pass via a TTO or other governing body. Especially in the case of people leaving their faculty positions or (PhD) students, ASOs sometimes remain ‘under the radar’ of the TTO and are thus not counted. Thirdly, some ASOs disappear over time as independent unit due to mergers, acquisitions, failures or discontinuation. They might disappear from the TTO’s records and thus be ‘forgotten’ in ASO counts. Overall, we therefore believe the number of ASOs in this and other studies is an underestimation of their real occurrence.

In parallel, using the pure number of ASOs generated as dependent variables yields certain risks. Finding the balance between quantity and quality is a subtle and hard to achieve exercise. Indeed, the economic impact in terms of net job or added value creation is at least equally important, if not more (Shane 2004). Additionally, given the triple risk associated with new ASOs – [1] technological risk due to new product/technology development, [2] market risk due to absence of a prior track record and resource buffer and [3] emergence out of the non-commercial academic environment (De Coster and Butler 2005; Lerner 2005) – survival as such is rather

uncertain. Thus, further research in some way should take the quality and survival rate of the ASOs into account.

Despite the limitations, our findings have important implications. They mainly relate to two stakeholders, being universities and public policy makers (governments). For universities willing to be entrepreneurial and to actively contribute to regional economic development, the results clearly indicate the need for a strategic investment in and commitment to having a technology transfer office with a certain critical mass. Our findings indicated the importance of the number of technology transfer staff members in explaining the amount of spin-offs created. This finding is in line with the findings of Di Gregorio and Shane (2003) and Lockett and Wright (2005), who found evidence that universities having technology transfer policies generate more start-ups. Although they used different proxies to measure the university policy variable (i.e. inventor's share of royalties and willingness to make equity investments), their results pointed in the same direction. University management teams might need to invest (scarce) resources in the development of a technology transfer unit in order to obtain results. Similarly, governments and other public bodies expecting entrepreneurial outcome of publicly funded research should be willing to devote parts of their budget to the set-up and development of professional technology transfer units in universities. Other studies (e.g. O'Gorman et al., 2008) have also identified this need. On the other hand, our findings pointed to the danger of large TTOs, which can hamper ASO development. Therefore, the balance between TTO size and red tape should be safeguarded.

A second implication towards universities is related to the university size. Given the significance of this independent variable in our model, universities should at least devote a reasonable effort to attracting external funding, in order to further stimulate the research. With regard to governments, a similar message can be given. If the government wishes to stimulate academic entrepreneurship, it might need to aim at somewhat larger universities to obtain economies of scale rather than maintain many smaller universities. Despite the insignificance of the industry funding of university research in the study of Di Gregorio and Shane (2003), we believe in the importance of joint research projects as supplement to basic or fundamental research. This view is supported by the results of Powers and McDougall (2005), who found a significant influence of industry RandD revenue on the number of ASOs generated. In the light of our results, industry-sponsored research adds to reaching a substantial and sufficient research budget, which turns out to be a significant variable in explaining the amount of ASOs arising from academic research. Thus, this result has implications for universities (need to develop policies and mechanisms to attract research funding and this way try to grow), policy makers (need to fund research and facilitate industry-academia research cooperation) and industry.

Overall, this paper has contributed to our knowledge and understanding of what determines the number of ASOs generated by European universities in the period 1985-2008. From a resource-based perspective, our regression models point to the importance of the interplay between university size and adopting policies and support mechanisms that foster entrepreneurial initiatives amongst scientists.

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Appendix 1 Model specifications and estimations

Model 1

Regression details	
Multiple correlation coefficient R	0,4973
R-squared	0,2473
Adjusted least square	0,1980
Standard error	29,8515
Observations	180

Analysis of variance

	Degrees of freedom	*Sum of squares*	*Average squares*	*F*	*Significance F*
Regression	11	49178,205	4470,746	5,017	0,000
Residual	168	149706,773	891,112		
Total	179	198884,978			

	Coefficients	*Standard error*	*T- statistics*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-7,982	34,120	-0,234	0,815	-75,340	59,377
ln (staff 2008)	17,357	3,742	4,639	0,000	9,970	24,744
ln (students 2008)	-9,286	3,813	-2,435	0,016	-16,813	-1,758
Age	0,015	0,011	1,410	0,160	-0,006	0,037
Policy	-4,618	7,185	-0,643	0,521	-18,803	9,567
Faculties of Science?	8,535	7,204	1,185	0,238	-5,687	22,756
Faculties of Applied Science?	0,631	5,226	0,121	0,904	-9,686	10,947
Faculties of Economics?	-11,193	6,044	-1,852	0,066	-23,125	0,740
Faculties of Life Sciences?	-6,581	5,454	-1,207	0,229	-17,348	4,186
Faculties of Arts and Humanities?	-5,765	6,030	-0,956	0,340	-17,669	6,140
Other faculties?	3,446	5,368	0,642	0,522	-7,152	14,044
World Ranking	-0,003	0,002	-1,410	0,160	-0,008	0,001

Model 2

Regression details	
Multiple correlation coefficient R	0,5605
R-squared	0,3142
Adjusted least square	0,2206
Standard error	29,0216
Observations	101

Analysis of variance

	Degrees of freedom	*Sum of squares*	*Average squares*	*F*	*Significance F*
Regression	12	33950,088	2829,174	3,359	0,000
Residual	88	74118,268	842,253		
Total	100	108068,356			

	Coefficients	*Standard error*	*T- statistics*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-128,282	54,968	-2,334	0,022	-237,519	-19,045
ln (staff 2008)	13,821	6,973	1,982	0,051	-0,037	27,679
ln (students 2008)	1,600	5,524	0,290	0,773	-9,378	12,577
ln (budget 2008)	2,096	1,994	1,051	0,296	-1,867	6,058
Age [N = 268]	0,012	0,015	0,820	0,415	-0,018	0,043
Policy [N = 268]	1,421	10,322	0,138	0,891	-19,091	21,933
Faculties of Science?	15,350	9,537	1,609	0,111	-3,604	34,303
Faculties of Applied Science?	-4,077	7,303	-0,558	0,578	-18,590	10,436
Faculties of Economics?	-17,614	8,567	-2,056	0,043	-34,639	-0,589
Faculties of Life Sciences?	-3,137	7,820	-0,401	0,689	-18,676	12,403
Faculties of Arts and Humanities?	-13,488	8,997	-1,499	0,137	-31,368	4,393
Other faculties?	6,413	7,206	0,890	0,376	-7,907	20,732
World Ranking	0,001	0,003	0,283	0,778	-0,006	0,008

Model 3

Regression details	
Multiple correlation coefficient R	0,414
R-squared	0,171
Adjusted least square	0,078
Standard error	31,112
Observations	110

Analysis of variance

	Degrees of freedom	*Sum of squares*	*Average squares*	*F*	*Significance F*
Regression	11	19629,144	1784,468	1,844	0,057
Residual	98	94858,674	967,946		
Total	109	114487,818			

	Coefficients	*Standard error*	*T- statistics*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	34,439	15,318	2,248	0,027	4,041	64,837
Age	0,014	0,016	0,835	0,406	-0,019	0,046
Policy	0,794	7,103	0,112	0,911	-13,300	14,889
ln(TTO staff)	-4,733	3,893	-1,216	0,227	-12,459	2,992
TTO age	-0,219	0,761	-0,288	0,774	-1,729	1,291
Faculties of Science?	8,051	9,355	0,861	0,392	-10,513	26,614
Faculties of Applied Science?	4,776	7,257	0,658	0,512	-9,625	19,178
Faculties of Economics?	-16,701	7,766	-2,150	0,034	-32,114	-1,289
Faculties of Life Sciences?	-7,402	7,628	-0,970	0,334	-22,539	7,736
Faculties of Arts and Humanities?	-4,418	7,369	-0,600	0,550	-19,042	10,206
Other faculties?	5,344	6,852	0,780	0,437	-8,254	18,943
World Ranking	-0,007	0,002	-3,150	0,002	-0,011	-0,003

Model 4

Regression details	
Multiple correlation coefficient R	0,6385
R-squared	0,4077
Adjusted least square	0,2461
Standard error	27,8992
Observations	57

Analysis of variance

	Degrees of freedom	*Sum of squares*	*Average squares*	*F*	*Significance F*
Regression	12	23569,867	1964,156	2,523	0,013
Residual	44	34248,027	778,3643		
Total	56	57817,895			

	Coefficients	*Standard error*	*T- statistics*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-28,039	62,576	-0,448	0,656	-154,153	98,075
ln (staff 2008)	3,628	9,099	0,399	0,692	-14,710	21,966
ln (budget 2008)	1,963	2,444	0,803	0,426	-2,964	6,889
Age	0,005	0,021	0,262	0,794	-0,036	0,047
Policy	9,517	13,102	0,726	0,471	-16,889	35,922
ln(TTO staff)	-8,492	3,617	-2,348	0,023	-15,782	-1,202
Faculties of Science?	20,994	16,093	1,305	0,199	-11,439	53,428
Faculties of Applied Science?	-9,429	9,492	-0,993	0,326	-28,559	9,702
Faculties of Economics?	-36,497	12,028	-3,034	0,004	-60,737	-12,256
Faculties of Life Sciences?	10,785	10,729	1,005	0,320	-10,838	32,408
Faculties of Arts and Humanities?	-6,835	11,647	-0,587	0,560	-30,308	16,638
Other faculties?	8,717	8,807	0,990	0,328	-9,033	26,466
World Ranking	-0,004	0,004	-1,078	0,287	-0,012	0,004

Model 5

Regression details	
Multiple correlation coefficient R	0,7669
R-squared	0,5882
Adjusted least square	0,3479
Standard error	29,8590
Observations	39

Analysis of variance

	Degrees of freedom	*Sum of squares*	*Average squares*	*F*	*Significance F*
Regression	14	30560,214	2182,872	2,448	0,026
Residual	24	21397,376	891,557		
Total	38	51957,590			

	Coefficients	*Standard error*	*T- statistics*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-19,339	125,622	-0,154	0,879	-278,610	239,931
ln (staff 2008)	-2,671	13,566	-0,197	0,846	-30,670	25,328
ln (students 2008)	14,530	12,176	1,193	0,244	-10,599	39,660
ln (budget 2008)	-0,613	3,688	-0,166	0,869	-8,224	6,998
Age	-0,011	0,029	-0,384	0,704	-0,070	0,048
Policy	1,551	15,743	0,099	0,922	-30,940	34,043
ln (TTO staff)	-12,173	5,427	-2,243	0,034	-23,373	-0,972
TTO age	-0,355	1,400	-0,254	0,802	-3,245	2,535
Faculties of Science?	28,171	21,443	1,314	0,201	-16,086	72,428
Faculties of Applied Science?	-13,206	12,893	-1,024	0,316	-39,816	13,405
Faculties of Economics?	-67,931	21,454	-3,166	0,004	-112,211	-23,652
Faculties of Life Sciences?	1,816	20,746	0,088	0,931	-41,001	44,633
Faculties of Arts and Humanities?	-18,292	17,954	-1,019	0,318	-55,346	18,763
Other faculties?	7,670	13,674	0,561	0,580	-20,551	35,891
World Ranking	-0,008	0,005	-1,507	0,145	-0,018	0,003

Studying the impact of regulation on entrepreneurship: How to overcome current conflicting results?

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Abstract
There is an important and growing academic interest for the question of the impact of regulation on small businesses or entrepreneurship. A lot of studies have been published in this field since the end of the 90's. The objective of this theoretical paper is to provide a literature review of the impact of regulation on entrepreneurship and, by doing so, to explain why studies on that topic have reached conflicting results. We start from the observation that regulation is a complex and multidimensional phenomenon. We first show that researchers used diverse approaches regarding the question of whether to and how they should define regulation. We stress that few regulation impact studies provide a definition of what they understand as regulation. We study the existing definitions of the regulation concept and make a proposal to improve these definitions. Second, we observe that researches differ generally in the way they consider the impact to be measured. We propose our own classification of regulation impact studies by making a distinction between "correlation studies" and "explanatory studies". The research question in correlation studies is "What do entrepreneurs think about regulation?". These studies are focused on the negative impact of regulation on entrepreneurship. Explanatory studies rather investigate "How do entrepreneurs adapt to regulation?". These studies assess the various possible effects (negative, positive, neutral) that regulation can produce on entrepreneurship. We highlight that these different approaches have led to conflicting results preventing us from being able to make a clear judgment on the question of the impact of regulation on entrepreneurship. We end by making some suggestions to overcome these controversies in future research.

Keywords
Entrepreneurship, regulation, Impact Studies

Introduction

The literature on the impact of regulation on entrepreneurship or small businesses' activity is relatively recent. This question is rooted in the school of thought that prompted researchers to move away from the question "Who is the entrepreneur?" (personality) to focus on the "What does the entrepreneur do?" question (behaviour). This has led to the examination of the environmental conditions in which the entrepreneur works and of the impact that these conditions can have on the entrepreneur (Covin and Slevin, 1991; Gnyawali and Fogel, 1994).

In the 70's and the 80's, some researchers started examining the influence of the fiscal and regulatory environment on businesses (Kilby, 1971; Kent, 1984; Dana, 1987, 1990). The conclusions of these initial studies were consistent: countries or regions that maintain few rules and regulations and that offer tax incentives provide a "conductive" environment and increase the likelihood of new companies being set up.

A lot of studies have been published in this field since the end of the 90's. Even though a majority of these works highlights a negative impact, the results remain relatively confusing.

The objective of this theoretical paper is to provide a literature review of the impact of regulation on entrepreneurship and, by doing so, to explain why studies on that topic have reached conflicting results. We start from the observation that regulation is a complex and multidimensional phenomenon. We first show that researchers used diverse approaches regarding the question of whether to and how they should define regulation. We stress that few regulation impact studies provide a definition of what they understand as regulation. We study the existing definitions of the regulation concept and make a proposal to improve these definitions. Second, we observe that researchers differ a lot in the way they consider the impact to be measured. We propose our own classification of the regulation impact studies by distinguishing between "correlation studies" and "explanatory studies". We highlight that these diverse approaches led to conflicting results preventing us from making a clear judgment on the question of the impact of regulation on entrepreneurship. We make suggestions to overcome these controversies in future research.

In this paper, we define regulation as "The legal and administrative rules created, applied and enforced by state institutions – at local, national and supranational levels – that both mandate and prohibit actions by individuals and organizations, with infringements subject to criminal, civil and administrative penalties." (SBRC, Kingston University, 2008).

This definition sheds light on the three main characteristics of the concept of "regulation": (i) the role played by public authorities, (ii) a binding effect and (iii) a prescriptive function. The role played by public authorities has to be included in the definition because, otherwise, regulation could be seen as any mechanism of social control influencing behaviour in any possible way. The second key issue is the binding effect. This element allows us to distinguish between "policies" (generic term, not always binding) and "regulation" (more restrictive term, always binding). The last element of the definition is the prescriptive function of regulation, i.e. imposing a certain abstention or action. For Ogus (1994), regulation is the means by which the state "seeks to encourage or direct behaviour which it is assumed would not

occur without such intervention". According to Hecquard-Théron (1977), regulation is [we translate] "an act creating rights and obligations, of a general and impersonal nature". For lawyers, it is thus its prescriptive function that makes regulation what it is. Regulation alters the legal set-up. It is this feature that is essential and not the one of the penalty which is any consequence of the change made to the legal order. In this respect, public authorities have three tools at their disposal to influence the behaviour of citizens and companies: the communicative tool (persuasion), the economic tool (levy or subsidy) and the legal tool (enforcement) (Nijsen, 2009). The third one corresponds to regulation.

Moreover, we define entrepreneurship as the process of creation and development of new business of any kind. We chose this definition since people surveyed or interviewed in regulation impact studies are business owners. This issue will be explained in more details in section 3 of this paper.

This article is divided into four sections. In the first section, we will present our methodology. Second, we will review the regulation impact studies. Third, we will discuss the key results of this literature and explain the contributions of our research. Finally, we will conclude on the current state of research and make some recommendations.

Methodology

The majority of studies investigating the relationship between regulation and small businesses or entrepreneurship have been published since the end of the 90's. We reviewed recent journal articles, books and books chapters (1995-2010) on this issue. We searched for articles in databases such as Google Scholar using the search terms "small businesses", "entrepreneur", "entrepreneurial activities", "entrepreneurial performance" combined with the key words "better regulation", "regulation" or "laws". We found 27 empirical papers. These articles have been published in 20 different journals. This diversity is not surprising since our research topic is a multi-disciplinary one. These journals are journals in management (e.g. *Human Resource Management Journal*, *Technology Analysis and Strategic Management*), economics (e.g. *Quarterly Journal of Economics*, *Small Business Economics*, *Journal of the European Economic Association*), entrepreneurship (e.g. *International Journal of Entrepreneurship Education*, *International Entrepreneurship and Management Journal*) and SMEs (e.g. *International Small Business Journal*, *Journal of Small Business and Enterprise Development*), or political and legal sciences (e.g. *Environment and Planning C: Government and Policy*, *Industrial Law Journal*, *Policy Studies*). The journal *Environment and Planning C: Government and Policy* has published the largest number of relevant papers for our research. Moreover, we looked at 6 reports ordered by public authorities in several countries. These official reports are interesting since they provide empirical data as well as information on how to study the phenomenon of regulation.

Regulation impact studies: clear results and contradictory elements

The reviewed regulation impact studies can be classified into two categories corresponding to the research questions they intend to provide answers to. In a first

group of impact studies, researchers investigate what entrepreneurs think about regulation. In a second set of studies, the research question is rather "How do entrepreneurs adapt to regulation?". We analyze the results of these two types of studies and highlight the elements that led to clear results and those that remain contradictory.

What do entrepreneurs think about regulation?

Many regulation impact studies try to understand what entrepreneurs think of the regulations. In these studies, several questions are usually first asked to determine whether the entrepreneurs know the regulations and if they perceive these as being satisfactory or too burdensome. Second, entrepreneurs are asked to assess the costs to comply with regulations and, therefore, to identify the regulations weighing the most heavily on the creation and development of their activities.

These studies point out some interesting issues and there seems to be an agreement among researchers on some aspects.

On the one hand, the general level of satisfaction of entrepreneurs with regulation is quite low (Carter, Mason and Tagg, 2009; Kegels, 2008; SBRC, Kingston University, 2008; Vickers, James, Smallbone and Baldock, 2005). For instance, Carter et al. (2009) measured the small business owners' perceptions of the general regulatory regime in the UK. 54% of the respondents of their sample complained about the level of complexity of legislation, 53% about the volume of legislation and 51% about the compliance costs. In the study of Vickers et al. (2005), 64% of small business owners judged that the level of current regulation was too high, with 37% strongly agreeing with this statement.

On the other hand, the level of regulation awareness is generally low, and even very low among small firms (Vickers et al., 2005; Blackburn and Hart, 2003). For instance, Vickers et al. (2005) showed a very low level of awareness of health and safety legislation in small firms in the UK, with 63% of respondents even being unable to identify any such legislation relevant to their business.

However, at the same time, these regulation impact studies reach conflicting results on other main questions. Even though most studies highlight that the impact of regulation on entrepreneurship is rather negative, there is disagreement on the type of regulation that has the most negative impact. Results regarding the impact of entry regulations on entrepreneurship are good examples of this confusion. According to the World Bank (2008), entry regulations in general have a negative impact on entrepreneurship. Other studies moderate these results. Dreher and Gassebner (2007) reach the conclusion that only some forms of entry regulation have a negative impact on entrepreneurship, i.e. the number of procedures to start a business and the requirements regarding the minimum capital. Van Stel, Storey and Thurik (2007) show that the administrative burdens, such as the number of procedures required to start a business, are unrelated to firm creation rate, but that rules imposing a minimum capital on the company and employment regulations lower entrepreneurship rates.

Another example of these conflicting results can be found in studies analyzing the impact of deregulation on the banking sector. For Kerr and Nanda (2008), deregulation of this sector leads to the reduction of financial constraints, weighing

down on small start-ups in particular, and "democratizes" the arrival of these companies on the market. Black and Strahan (2004) stressed that deregulation strengthens competition between banking institutions, improves access to financial capital and, therefore, raises the number of entrepreneurs. Nevertheless, Wall (2004) reexamined Black and Strahan's data and strongly moderated their claims by demonstrating that deregulation only produces beneficial effects for entrepreneurship in some regions and not in others. These regional discrepancies suggest that there is a more subtle and ambiguous relationship between bank competition and entrepreneurship.

A last example of these confusing results is given by several studies analyzing the impact of perceived administrative complexities on various entrepreneurial engagement levels. Van Stel and Stunnenberg (2006) found that perceived administrative complexity has a negative impact on the level of business ownership, this effect being not immediate but rather seeming to emerge in the long run. This idea of a negative effect in the long run is also present in the results of Grilo and Thurik (2005a). They highlighted that administrative complexities have a significant negative impact on higher entrepreneurial engagement levels, i.e. having a business (whether young or old), relative to less decisive entrepreneurial standings, i.e. not considering or taking steps to start a business. However, Grilo and Thurik (2005b) as well as Grilo and Irigoyen (2006) found that the perceived administrative complexities have a negative effect on both latent entrepreneurship, i.e. the probability of a declared preference for self-employment over employment, and actual entrepreneurship, i.e. the percentage of self-employed. Thus, administrative complexities have negative impact not only on the higher entrepreneurial engagement levels (being self-employed), but also on less decisive entrepreneurial engagement levels when a person think about his/her preference for self-employment over employment.

How do entrepreneurs adapt to regulation?

Some regulation impact studies investigate the influence of a complex set of internal factors, e.g. entrepreneurs' capabilities, as well as external factors, e.g. the product, labour and capital market conditions that explain to what extent regulation changes the firm's practices and performance. The main objective of these studies is to better understand how entrepreneurs adapt to regulation. Researchers ask entrepreneurs to describe the effects produced by one or several laws on their organizational practices.

The results of these studies are opposed to those studies that we have seen in section 2.1. since they point out that there are situations where the impact of regulation on entrepreneurship is not negative, but rather neutral or even positive. These studies show that regulation has no uniform effect on entrepreneurs.

For instance, some authors show neutral and positive effects of employment regulations. Regarding neutral effects, a majority of small firms are able to adapt to regulatory change, such as the one imposing a national minimum wage in Great Britain, by making only minimal adjustments (Edwards, Ram and Black, 2004; Arrowsmith, Gilman, Edwards and Ram, 2003). Edwards et al. (2004) observed that most small firms can do this either because the cost increases imposed by regulation

were minimal or because the firm's product market position and “informal” workplace relationships enabled cost increases to be absorbed or passed on to customers. Arrowsmith et al. (2003) added that the national minimum wage (NMW) did not produce a shock sufficient to jolt employers or workers out of their customary practices and habits, although the cost implications of the NMW were significant for many small firms. Furthermore, employment regulations can have positive effects on entrepreneurship. Edwards et al. (2004) also examined employment regulations and showed that positive effects were reported by firms adopting a strategy of moving up-market, i.e. producing higher value goods or services. These entrepreneurs think that employment regulations could create a “level playing field”, preventing unfair competition from businesses that cut costs by non-compliance.

Blackburn and Hart (2003) stressed others reported positives effects linked to the individual employment rights. These rights seem to create positive effects by providing guidelines and clarification in the employer/employment relationship. Another example of positive effect is given by Tabone and Baldacchino (2003). They studied a specific Maltese rule imposing a mandatory annual statutory requirement to all companies. They found that this audit process has a positive effect on the entrepreneur and his/her staff by imposing financial discipline and providing specialist advice in other non-audit areas. This is in the interest of third parties, particularly unsecured creditors, and of society in general.

Discussion of the reviewed regulation impact studies

We stressed that the regulation impact studies reach conflicting results on two main issues. First, most studies highlight the negative impact of regulation on entrepreneurship, but, at the same time, do not agree on the type of regulation that has the most negative impact. Second, a minority of authors show that the impact of regulation on entrepreneurship can be positive or neutral, rather than only negative and that regulation has no uniform effect on entrepreneurs.

Two factors can explain these conflicting results. On the one hand, researchers used diverse approaches regarding the question of whether to and how they should define regulation. On the other hand, researchers considered the impact to be measured in different ways. These two elements are developed below. We now turn to the analysis of the first issue: defining regulation.

Defining Regulation

We first analyze whether researchers studying the impact of regulation on entrepreneurship define the concept of regulation. We review and analyze the different approaches. Then, we focus on studies proposing a definition of regulation and discuss these.

Do regulation impact studies define regulation?

Regulation is a polysemic concept. Regulation can indeed impose a wide range of different obligations on people and/or businesses: prohibiting some types of activity, for example if they are dangerous; making it mandatory to hold a prior authorization for certain activities, e.g. obtaining a permit; keeping the authorities informed of

several issues; etc. In addition, it covers a large spectrum of different legal fields (tax laws, employment laws, trade laws, etc.). We postulate that this complexity explains why researchers studying regulation adopt different attitudes about whether to and how they should define regulation. A precise definition of this concept was found in only one impact study (SBRC, Kingston University, 2008). In the other impact studies, regulation is approached in different ways without being defined as such. We found three different approaches: (i) researchers give a list of the specific laws of which they study the impact; (ii) regulation is defined in negative terms such as burdens or costs; (iii) regulation is not defined at all. We have summarized the different approaches in Table 1 below.

TABLE 1. Approaches Adopted by Researchers Regarding the Definition of Regulation in the Regulation Impact Studies

The reviewed articles and official reports	Precise definition	"Listing" approach	"Burden" definition	No definition
Kerr and Nanda (2010)		X		
Carter et al. (2009)		X		X
Armour and Cumming (2008)		X		
Capelleras et al. (2008)			X	
Kegels (2008)			X	
SBRC, Kingston University (2008)	X			
van Stel et al. (2007)			X	
Baldock et al. (2006)				X
Borkowski and kulzick (2006)		X		
Grilo and Irigoyen (2006)			X	
Janssen et al. (2006)			X	
Mason et al. (2006)		X		
van Stel and Stunnenberg (2006)			X	
Grilo and Thurik (2005a)			X	
Grilo and Thurik (2005b)			X	
Vickers et al. (2005)				X
Edwards et al. (2004)		X		X
Joos and Kegels (2004)			X	
Arrowsmith et al. (2003)		X		
Blackburn and Hart (2003)		X		
Chittenden et al. (2003)			X	
Edwards et al. (2003)		X		X
Hansford et al. (2003)			X	
Marlow (2003)		X		
Patton and Worthington (2003)				X
Ram et al. (2003)		X		
Tabone and Baldacchino (2003)		X		
De Vil and Kegels (2002)			X	
Djankov et al. (2002)			X	
Gilman et al. (2002)		X		
Marlow (2002)		X		
Ram et al. (2001)		X		
OMB (2000)			X	
Vickers and Cordey-Hayes (1999)		X		

A precise definition of regulation. Surprisingly, only one impact study proposes a formal definition of regulation (SBRC, Kingston University, 2008). This definition is discussed below in section 3.1.2.

The "listing" approach. A second set of studies does not provide a definition of regulation as such, but rather a list of the specific laws they study. It could be (i) a set a several laws belonging to one legal field such as environmental regulations (e.g. Vickers and Cordey-Hayes, 1999) or employment laws (Carter et al., 2009; Marlow, 2002); (ii) a specific law (e.g. Arrowsmith et al., 2003; Ram, Edwards, Gilman and Arrowsmith, 2001; Ram, Gilman, Arrowsmith and Edwards, 2003, test the impact of the national minimum wage on small firms); (iii) one or several specific obligations imposed by a law (Tabone and Baldacchino, 2003, test the audit requirements specified in the Maltese Companies Act). Several papers (Carter et al., 2009; Edwards et al., 2004) mix questions about the impact of several specific laws and the impact of the whole regulatory system in a country. This is why we have classified these papers in two different categories ("no definition" category for the questions on the whole regulatory system and "listing approach" for the questions on the particular laws mentioned by the interviewers). By using this mixed approach, researchers are able to better understand the gap between the perceived effect of regulations *("What do you think about regulations?"*) and the real effect of regulations ("*How do regulations affect your business in a concrete way?*").

The "burden" approach. In many studies, regulation is defined in terms of administrative complexities, burdens, barriers, constraints or compliance costs (e.g. Chittenden, Kauser and Poutziouris, 2003; Grilo and Thurik, 2005a, 2005b; van Stel et al., 2007). As explained by Kitching (2006), this approach does not allow entrepreneurs to report any other effects than negative effects. Indeed, by asking entrepreneurs whether "*it is difficult to start a business due to complex administrative procedures*" (e.g. Grilo and Irigoyen, 2006), it is impossible to test any potential positive or neutral effects of regulation.

Studies that do not define regulation. In a last group of studies, no definition of the regulation concept is given at all (e.g. Patton and Worthington, 2003; Vickers et al., 2005). This approach is mostly used to check whether entrepreneurs are able to identify the relevant regulations applying to their businesses (e.g. Baldock, James, Smallbone and Vickers, 2006), i.e. the level of awareness of regulation. The problem with this approach is that entrepreneurs often do not exactly know what the regulation really is and/or contains. They draw on their own representations that could fail to cover the full range of regulatory influences on their activity and/or shed light on non regulatory issues. For instance, it is not always easy to distinguish between administrative burdens decided by public authorities and the ones simply linked to the management of the firm. Entrepreneurs could indeed voluntarily decide to regularly update key financial information and communicate them to their main suppliers/clients for good management reasons. This could lead to the overestimation of the regulatory burdens.

To summarize the different advantages and shortcomings of these approaches, we could say that studies that propose a formal definition of regulation as well as the ones using the "listing approach" allow the surveyed entrepreneurs to exactly know what regulation is, whereas the "burden" approach only measures some aspects of the regulation phenomenon, i.e. its negative impact. In the studies that do not define

regulation, the risk is high not to measure the full range of regulatory influences on entrepreneurial activity and/or to shed light on non regulatory issues.

Is the definition of the regulation concept satisfactory?

Only one impact study contains a formal definition of regulation (SBRC, Kingston University, 2008). It defines regulation as: "The legal and administrative rules created, applied and enforced by state institutions – at local, national and supranational levels – that both mandate and prohibit actions by individuals and organizations, with infringements subject to criminal, civil and administrative penalties." We found a similar definition in an OECD publication (OECD, 1995): "The full range of legal instruments by which governing institutions, at all levels of government, impose obligations or constraints on private sector behaviour."

This definition has several advantages. First, it distinguishes the concept of regulation from the broader concept of policies. Policies do not have binding effect on their addressees. Second, it makes a distinction between "legal rules" and "administrative rules". This means that some regulations are adopted by administrative authorities, while others are adopted by other public authorities. This may also mean that only some regulations generate administrative formalities for the addressees of these regulations, while others do not create any administrative burdens. In this regard, the main objective of many regulation impact studies is to look at the administrative burdens created by regulations by measuring the costs occurred to comply with these administrative formalities. Such studies confuse regulations and red tape and are only focused on the measurement of the negative effects of regulation. Third, this definition emphasizes the different levels of power from which regulation can emanate. However, we did not find any regulation impact study that truly takes this element into account by comparing the impact of different regulations from different authorities.

The above definition is not entirely satisfactory since it does not highlight the diversity of legal fields to which the regulations can belong. Although this element is not theoretically stressed by definitions, we found some regulation impact studies that take this issue into account. In this regard, it has been shown that employment regulations primarily affect the activity of large businesses, but only a little, if any, small businesses' activity (e.g. Kegels, 2008; Edwards et al., 2004; Arrowsmith et al., 2003; Blackburn and Hart, 2003). Conversely, tax laws create many burdens for small businesses (e.g. Kegels, 2008; Janssen et al. 2006; Joos and Kegels, 2004; Chittenden et al., 2003; De Vil and Kegels, 2002). Environmental regulations mainly affect large industrial businesses (e.g. Kegels, 2008; Joos and Kegels, 2004; De Vil and Kegels, 2002).

Therefore, we propose to improve the existing definitions of regulation by adding this dimension. Our definition is the following one [*added elements are emphasized*]:

"The legal and administrative rules *belonging to different legal fields (e.g. tax law, environmental law)* created, applied and enforced by state institutions – at local, national and supranational levels – that both mandate and prohibit actions by individuals and organizations, with infringements subject to criminal, civil and administrative penalties."

Measuring Regulation

We will present the main features of the two main approaches adopted by researchers to measure the impact of regulation on entrepreneurship. We respectively call these "correlation studies" and "explanatory studies". We will detail the different types of correlation studies and explanatory studies. Finally, we will discuss the distinction between correlation studies and explanatory studies and their contribution to literature and practice.

Correlation studies and explanatory studies: main features

In regulation impact studies, we found two main approaches that we respectively call "correlation studies" and "explanatory studies". Two elements differentiate these two types of studies. First, the research questions that these studies try to answer are different. Second, the main assumptions behind these studies are significantly different. As a result, the correlation studies are focused on the negative impact of regulation on entrepreneurship, while explanatory studies assess the various possible effects (negative, positive, neutral) that regulation can produce on entrepreneurship. The main features of the two different approaches are presented in Table 2 and are analyzed in details below.

Table 2. Approaches Adopted by Researchers to Measure the Impact of Regulation on Small Businesses or Entrepreneurs' Activities

	Correlation studies	**Explanatory studies**
Main assumptions	- Regulation has an effect in itself - This effect is a pure reflection of the regulation properties - The effect is the same one for all entrepreneurs	- Regulation has an effect through behavioural changes adopted by economic actors as a response to regulation - The effect is the consequence of the different behaviours adopted by entrepreneurs as a response to regulation - Regulation has no uniform effect on entrepreneurs
Measurement	- Isolate and test correlations between regulatory and entrepreneurial variables - Quantitative methodologies - Measurement of the impact at the macro (national or regional) level	- Investigate the « invisible hand of regulation », i.e. a complex set of internal and external factors explaining to what extent regulation changes company practices and performance - Qualitative methodologies - Measurement of the impact at the micro (organizational) level
Research question	What entrepreneurs *think* about regulation?	How entrepreneurs *adapt* to regulation?
Results	Identification of the situations where regulation has a negative impact on entrepreneurship	Identification of the situations where regulation has a negative, positive and/or neutral impact on entrepreneurship

Correlation studies. In the stream of research that we call "correlation studies" (e.g. Kerr and Nanda, 2010; Armour and Cumming, 2008), the main assumption is that

regulation has an effect in isolation, i.e. on its own. This effect is the same for all entrepreneurs since it is a pure reflection of the properties of the regulation itself. The authors of these studies isolate and test correlations between regulatory variables and variables assessing economic and/or entrepreneurial activities. The methodology they use is generally purely quantitative. Most correlation studies are focused on the measurement of the overall impact of regulations at the national or regional levels (macro level). The research question in these studies is "What do entrepreneurs *think* about regulation?". Therefore, the concept of regulation is defined in terms of "costs" (e.g. Hansford, Hasseldine and Howorth, 2003), "procedures" (e.g. Djankov, La Porta, Lopez-de-Silanes and Shleifer, 2002), or "burdens" (e.g. Capelleras, Mole, Greene and Storey, 2008). For instance, some authors ask the entrepreneurs if "*It is difficult to start a new business due to the complex administrative procedures*" (e.g. Grilo and Irigoyen, 2006; van Stel and Stunnenberg, 2006) or to assess the administrative burdens created by regulations (e.g. Kegels, 2008; Janssen, Kegels and Verschueren, 2006). Correlation studies are thus focused on the assessment of the negative effects of regulation on entrepreneurship.

Explanatory studies. The authors of what we call the "explanatory studies" (e.g. Vickers et al., 2005; Marlow, 2003) tackle the regulatory phenomenon from a different point of view: they believe that regulation does not have an effect in isolation; it only has an effect through behavioural changes of economic actors as a response to regulation. The effect of regulation is therefore not the same for all entrepreneurs since it is a consequence of the diverse behaviours adopted by entrepreneurs. These studies measure the influence of a complex set of internal factors, e.g. entrepreneurs' capabilities, as well as external factors, e.g. the product, labour and capital market conditions that explain to what extent regulation changes the firm's practices and performance. This is what Kitching (2006) calls the "invisible hand of regulation". The methodology is generally qualitative. However, some explanatory studies combine quantitative and qualitative methodologies (SBRC, Kingston University, 2008; Vickers et al., 2005). Explanatory studies investigate the effect of one or several specific laws on the behaviour of entrepreneurs (micro level). The research question in these studies is "How do entrepreneurs *adapt* to regulation?". Regulation is thus presented as a factor that does not simply "restrict" but that does also "enable" or "promote" opportunities for business development (SBRC, Kingston University, 2008). In most explanatory studies, researchers ask entrepreneurs to describe the effects produced by one or several laws on their organizational practices. They assess the various possible effects (negative, positive, neutral) that regulation can produce on the creation or the development of businesses. For instance, some authors ask entrepreneurs if they have been affected, positively, negatively or not at all, by regulation (Carter et al., 2009), or what they see as the costs and the benefits of different regulations (OMB, 2000).

The different types of correlation studies and explanatory studies

Each of these two main approaches can be subdivided into categories corresponding to different types of correlation studies and explanatory studies. We identified three types of correlation studies and three types of explanatory studies. These subcategories are presented in Table 3 and are analyzed below.

Table 3. Classification of the Regulation Impact Studies

	Correlation studies			Explanatory studies		
The reviewed articles and official reports	"Temporal" approach	"Macro level" approach	"Micro level" approach	Global	By legal fields	Specific
Kerr and Nanda (2010)	X					
Carter et al. (2009)				X	X	
Armour and Cumming (2008)		X				
Capelleras et al. (2008)		X				
Kegels (2008)			X			
SBRC, Kingston University (2008)				X		
van Stel et al. (2007)		X				
Baldock et al. (2006)					X	
Borkowski and kulzick (2006)	X					
Grilo and Irigoyen (2006)		X				
Janssen et al. (2006)			X			
Mason et al. (2006)						X
van Stel and Stunnenberg (2006)		X				
Grilo and Thurik (2005a)		X				
Grilo and Thurik (2005b)		X				
Vickers et al. (2005)					X	
Edwards et al. (2004)				X	X	
Joos and Kegels (2004)			X			
Arrowsmith et al. (2003)						X
Blackburn and Hart (2003)					X	
Edwards et al. (2003)				X	X	
Hansford et al. (2003)			X			
Marlow (2003)					X	
Patton and Worthington (2003)					X	
Ram et al. (2003)						X
Tabone and Baldacchino (2003)						X
De Vil and Kegels (2002)			X			
Djankov et al. (2002)		X				
Gilman et al. (2002)						X
Marlow (2002)					X	
Ram et al. (2001)						X
OMB (2000)				X		
Vickers and Cordey-Hayes (1999)						X

We first look at the three types of correlations studies:

The "temporal" approach. The first type of correlation studies looks at an economic parameter and the way it develops over time to try to determine the effect produced by a new regulation or its removal (Borkowski and Kulzick, 2006; Kerr and Nanda, 2010). In other words, it compares what this economic parameter was before the regulatory change and what it has become after the regulation in order to draw some conclusions as to the impact of regulatory changes.

The "macro level" approach. In the second type of correlation studies, researchers use variables that measure the level of entrepreneurial activity of a country such as business ownership rate, actual and latent entrepreneurship rates, self-employment rate and variables related to regulation such as perception of the complexity of administrative procedures imposed by regulation, the lack of financial support from public authorities, or the "forgiving" nature of bankruptcy laws (Djankov et al., 2002; Grilo and Thurik, 2005a, 2005b; Grilo and Irigoyen, 2006; van Stel and Stunnenberg, 2006; van Stel et al., 2007; Cappelleras et al., 2008; Armour and Cumming, 2008). To this end, van Stel et al. (2007) and Armour and Cumming (2008) used databases made up of official information published by public authorities or surveys conducted with national experts. Grilo and Thurik (2005a), Grilo and Thurik (2005b), Grilo and Irigoyen (2006) as well as van Stel and Stunnenberg (2006) used databases made up of surveys that measure the views held by entrepreneurs.

The "micro level" approach. The third and final type of correlation studies is a group of studies measuring entrepreneurs' perception of regulation, its compliance costs and its impact on the activities or performance of their company (De Vil and Kegels, 2002; Hansford et al., 2003; Joos and Kegels, 2004; Janssen et al., 2006; Kegels, 2008). Here, the goal is, for instance, to measure their perception of the volume and complexity of some specific laws and/or of the overall regulatory system as well as of the costs incurred to comply with these rules or to measure the perception of the quality of regulation and the contacts with administrative authorities.

We now turn to the analysis of the three different types of explanatory studies.

Global explanatory studies. The first type of explanatory studies encompasses works measuring the impact of the overall regulatory system, i.e. of all regulations that could affect a country's business activity (SBRC, Kingston University, 2008 on regulation in the United Kingdom; OMB, 2000 on the federal regulations in the United-States). Several papers mix questions about the impact of the whole regulatory system in the country and the impact of several specific laws belonging to one legal field. Carter et al. (2009) and Edwards et al. (2004) measure the perception of the impact of the whole UK regulatory system as well as the impact of different employment regulations. This is why, in Table 3, these articles are mentioned in type 1 and 2.

Explanatory studies by legal fields. In the second type of explanatory studies, researchers measure the impact of a specific legal field (on social law: Marlow, 2003, 2002; Blackburn and Hart, 2003; Edwards et al., 2004; Carter et al., 2009; on health and safety: Vickers et al., 2005; Baldock et al., 2006 and on environmental regulations: Patton and Worthington, 2003).

Specific explanatory studies. The objective of the third type of explanatory studies is to measure the impact of one or several specific laws possibly belonging to different legal fields. For instance, several authors measure the impact of an employment regulation enforced in the United Kingdom, i.e. the national minimum wage (Ram et al., 2003, 2001; Gilman, Edwards, Ram and Arrowsmith, 2002; Arrowsmith et al., 2003; Mason, Carter and Tagg, 2006). Another example is the study of Tabone and Baldacchino (2003) investigating a Maltese auditing law. A last

example is the one of Vickers and Cordey-Hayes (1999) who examined a set of specific environmental and social laws that has contributed to push companies to adopt environmentally-friendly production systems.

Discussion of the distinction between correlation studies and explanatory studies

We contend that the distinction between correlation studies and explanatory studies allows us to explain why some results of regulation impact studies are contradictory. Moreover, it allows us to identify some issues that have not yet been sufficiently investigated by regulation impact studies.

Regulation impact studies lead to unclear results because their authors investigate that field by asking different research questions and by starting from different assumptions. The research question in correlation studies is what entrepreneurs think about regulation, while explanatory studies are focused on the understanding of how entrepreneurs adapt to regulation. Moreover, according to the authors of correlation studies, regulation has an effect on its own. This effect is a pure reflection of the properties of the regulation itself. In contrast, the main assumption in explanatory studies is that regulation only has an effect through behavioural changes of economic actors as a response to regulation. We think that these two approaches should not be opposed to each other since they are rather complementary. The comprehensive impact of regulation on entrepreneurship should indeed be explained by the characteristics of the regulation itself, as well as by some entrepreneurial characteristics.

However, developing new correlation or explanatory studies would add to the confusion already present in this research field. In this regard, our distinction suggests that there is another research question that needs to be investigated in order to really enter into the black box of the regulation phenomenon. There is indeed a research gap regarding the conditions explaining why the regulatory impact is positive, negative or neutral. This is the question of the determinants of the various possible effects of regulation on entrepreneurship. This kind of studies could have important practical contributions for policy makers. Knowing the costs of various regulations or learning that the regulation can have different impacts on entrepreneurial activity does not really help public authorities in their task of producing laws. Conversely, a reflection on the conditions explaining the various potential effects of regulation on entrepreneurship would allow policy makers to understand why some regulations only create constraints, while others create opportunities for entrepreneurs. Isolating the determinants of the positive impact of regulation could help policy makers to produce "entrepreneurial" regulations, i.e. regulations creating opportunities for the creation and/or the development of entrepreneurial activities.

Conclusions and future research avenues

There is an important and growing academic interest for the question of the impact of regulation on small businesses or entrepreneurship. Some researchers started examining this question in the 70’s and the 80’s, but a majority of studies investigating that issue have been published since the end of the 90’s. We have reviewed these studies. We stress that this literature reach relatively clear results on

several questions like the level of (dis)satisfaction with regulation and the level of awareness of regulation. The level of satisfaction of entrepreneurs or small firms' owners with regulation is quite low (e.g. Carter et al, 2009). Their level of regulation awareness is also generally low (e.g. Vickers et al., 2005).

However, at the same time, we do not have a precise view on the identification and understanding of the various possible effects that regulation can have on entrepreneurship. More precisely, this paper stresses that regulation impact studies reach conflicting results on two main issues. First, most studies highlight the negative impact of regulation on entrepreneurship, but, at the same time, do not agree on the type of regulation that has the most negative impact. Second, a minority of authors show that the impact of regulation on entrepreneurship can also be positive or neutral, rather than only negative and that regulation has no uniform effect on entrepreneurs. These conflicting results can be explained by the fact that researchers used diverse approaches regarding the question of whether to and how they should define regulation. Another explanation lies in the fact that researchers used diverse approaches concerning how to consider the impact to be measured.

Regarding the definition of regulation, we only have a precise definition of this concept in one impact study (SBRC, Kingston University, 2008). We highlighted the advantages of this definition. One advantage is that it stresses the different levels of power from which regulation can emanate. However, we could not find empirical study that truly takes this element into account. Future regulation impact studies should therefore investigate this issue by comparing the impact of different regulations emanating from different levels of power.

We also stressed the weaknesses of the existing definition and made a proposal to improve it for future research. The added dimension is the diversity of legal fields to which regulations can belong.

In the other impact studies, regulation is approached in different ways without being defined as such. This paper proposes a classification of these approaches and stresses their potential shortcomings. We found three different approaches. In the first one, researchers give a list of the specific laws of which they study the impact. We do not see any potential shortcoming in these studies since they allow the surveyed entrepreneurs to exactly know what regulation is. In the second approach, regulation is defined in negative terms such as burdens or costs. We contend that this is problematic since it does not allow entrepreneurs to report any effects other than negative ones. In the last approach, regulation is not defined at all. The problem here is that entrepreneurs often do not exactly know what the regulation really is and/or contains. They draw on their own representations that could fail to cover the full range of regulatory influences on their activity and/or shed light on non regulatory issues. Future regulation impact studies should therefore precisely define regulation or, at least, provide a list of the studied regulations.

For the measurement of regulation, we found two main approaches that we respectively call "correlation studies" and "explanatory studies". Our distinction between correlation studies and explanatory studies stresses that regulation impact studies investigate diverse research questions and use different main assumptions. In

this paper, we contended that this diversity explains why existing research in that field does not reach clear conclusions.

We identified research gaps in both approaches. In correlation studies, the impact of regulation on entrepreneurship is explained by the characteristics of the regulation itself. In explanatory studies, it is explained by some of the entrepreneurs' characteristics. We believe that these two views are not necessarily contradictory, but might be complementary. However, we contend that developing new correlation or explanatory studies would add to the confusion of the results already produced in this research field. In this regard, to really enter into the black box of the regulation phenomenon, we suggest a new research question, i.e. the analysis of the conditions explaining why the regulatory impact is positive, negative or neutral.

Finally, we make two recommendations. First, future research should be led at the micro, rather than the macro level. Many studies are focused on the measurement of the overall impact of regulations at the national or regional levels. For Chittenden et al. (2003), no assessment of a regulatory system put in place by a country or region can establish a clear causal link because it is difficult to attribute behavioural changes to any given particular law. The study of Borkowski and Kulzick (2006) is a good illustration of this shortcoming. They analyzed the impact of two specific U.S. laws: the Balanced Budget Act of 1997 and the Sarbanes-Oxley Act of 2002. The impact is measured by looking at the number of newly created health maintenance organizations and at the evolution of the Medicate managed care segment of the industry over time, i.e. before and after the entry into force of the two laws. They conclude that, since the enforcement of the two studied laws, the number of new health maintenance organizations has decreased. Moreover, because of these regulations, major changes have occurred within the managed care industry with many plans reducing or terminating their Medicare product line and/or withdrawing from certain geographic markets. They thus suggested that the two studied laws have negatively impacted the entrepreneurial activity within the healthcare industry by increasing uncertainty within this sector ant therefore creating a more hostile environment for new and rapidly growing businesses. However, we think that these changes could be caused by other factors than the two new laws. Another factor should be for instance the lack of investors' confidence in the market following diverse financial scandals such as the ENRON affair. It therefore seems difficult to establish a clear causal link through this type of study. Moreover, there is another potential shortcoming when the impact of regulation is measured at the macro level. When the impact is measured at the national level, it often requires to aggregate databases established by region and/or under different legal fields. Measuring the impact of regulation at the international level often requires to aggregate national databases. This is problematic since the different databases are often difficult to compare in terms of quality of data, methodology and periods of time analyzed. We therefore contend that researchers could form a clearer judgment on the links between regulation and entrepreneurship by undertaking more research at the organizational level.

Second, future research should combine diverse methodologies. According to Bartik (2002), we can only break into the "black box" of regulation by combining two

complementary types of methodology: statistical analyses of variances (comparison of a target group and a control group) and surveys and focus groups that would help us to better understand the impact of regulation on the decision-making process of entrepreneurs. The majority of researchers only use one type of research methodology. Correlation studies frequently use a purely quantitative methodology, while explanatory studies are, for the most part, qualitative. We have identified very few studies that combine quantitative and qualitative methodologies (SBRC, Kingston University, 2008; Vickers et al., 2005). Nevertheless, for Curran (2000), the problem with studies that mix the two methodologies is often that the qualitative part is seen as a simple complement to confirm the results obtained via the main quantitative part of the study. This author calls for quantitative research to be added to a main qualitative part, rather than the opposite, or even to only do qualitative research. Qualitative data are important to better understand under which conditions the impact of regulation on entrepreneurship will be negative, positive and/or neutral. Surveys with closed questions, nowadays prevalent, are not sufficient to investigate the attitudes of entrepreneurs toward regulation in depth.

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Interpersonal relationships and failure of cooperation between SMEs

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Abstract
In this paper we will analyse the phases of a complex process faced by two SMEs: a strategic process of agreement (a progressive process of cooperation and then a process of merger). We analyse the different steps through the interpersonal point of view. Due to our research focus and the rarity of this strategic behaviour among SMEs, we are led to analyse the process of cooperation of two competing SMEs and the rationality of the SME's owner manager. This process fails in spite of obvious objective interests. The aim of this research is to identify the major factors that have been determinant in the failure of an attempted cooperation and this, through a qualitative methodology.

Key Words
interpersonal relationships, failure of cooperation, strategy, rationality, SME

Introduction

Working together requires a certain degree of compatibility. When two SMEs decide to merge after a period of cooperation, their owner-managers play a prominent role: they initiate the merging strategy and try to make it viable. This strategy must satisfy the interests of both the companies and their owner-managers (Beaver and Jenning, 2005). The merging decision will involve some rationality, but SME managers are not always rational (Lang et al., 1997). Thus, in an SME context, the compatibility between the owner-managers' personalities may turn out to be fundamental in order to carry out the cooperation. Should owner-managers get along well with each other in addition to their companies being complementary? In fact, bridge-building between two SMEs may be justified by some rationality based on economic advantages inherent in the companies (Street and Cameron, 2007). Still, the interaction taking place between the owner-managers may bias the perception of these economic interests (Marchenay, 1997a; Payne et al., 2005).

Through our work, we propose to study the failure of a collaborative process between two SMEs. The historical analysis of this process will be viewed from the standpoint of interpersonal relationships. We think that the decision of a SME to create an agreement with another company, in this case to cooperate with a competing SME, and then to envisage a merger, includes strong relational aspects (Ring and Van de Ven, 1992; Detchessar, 1998). These relational aspects can bias an objective vision of this type of strategic process. In other words, a strong economic interest will not be the unique factor introducing an agreement as a merger. However, if we accept the existence of interpersonal factors, which status can we confer to this dimension? Indeed, we will question the nature of interpersonal relationships, whilst taking into consideration the objective economic interests. We will try to characterise the nature of the variable « interpersonal relationships » and its effects when the SMEs are in a process of strategic agreement. This will allow us to emphasise the concept of interpersonal fit in SME which can be considered as the degree of fit between psychological profiles of owners and leaders of small structures who are going to attempt to find an agreement with each other.

In order to discuss this proposal, we will analyse the phases of a complex process faced by two SMEs: a strategic process of agreement (progressive process of cooperation leading to a merger process). We will analyse the different steps that have affected a small company through the interpersonal point of view. Due to our research focus and the rarity of this strategic behaviour among SMEs (Puthod, 1995), we will analyse the process of cooperation between two competing SMEs. Our study will be about two small companies that embarked on a project that led to the creation of only one company (merger). This process failed in spite of obvious objective interests. With the use of a qualitative methodology (Yin, 1984; Le Moigne, 1995), we will try to identify the major factors that have been determinant in the attempt of cooperation and in its failure.

After having addressed the question of the rationality of the owner-managers of SMEs and considered the factors that may foster inter-company cooperation, we will ask ourselves what influence interpersonal relationships have on SMEs collaborative

processes. With the help of a case study that will be presented in chronological order, we will discuss this question in light of the observed facts.

Strategic decisions of a SME: expectations and rationality of an owner-manager

The management of a SME is based on diverse constants: centralisation of the decision-making, strategic projects strongly connected to the aspirations, purposes and values of the leader, strong personalisation of relations, and lack of formalisation in the elaboration of a strategy or a strategic process heuristics compared to the expectations of the leader (Marchesnay, 1993; Marchesnay and Fourcade, 1997). Therefore, to envisage the rationality in the management of a SME means especially wondering about the rationality of the leader. While an organisation has no mood, a human being is inevitably inserted into a psychological and social logic which conditions one's actions. Moreover, the strategic development of a SME also rests on this logic (Beaver and Jenning, 2005).

Nevertheless, all these aspects will be able to characterise this notion of rationality. Because of its necessarily relative character, rationality integrates various aspects and Simon (1947) judges that it would be preferable to add systematically an adjective to this notion. However, Miller (1987) identifies four variables to determine whether a decision arises from a rational process: analysis of situation, planning, systematic scanning of environments, explicitness of strategies. In this framework, individual perspectives are largely omitted, which hardly seems to be appropriate in a context of SMEs because of the importance of the leader. In SMEs, the rationality, envisaged by Simon (1947: 69) as the choice of the alternatives which will be preferred according to a consequent system allowing to estimate the consequences of the chosen behaviour, will firstly be packaged by the rationality of its owner-leader and by its possible ways of perception (Payne et al., 2005).

Marchesnay (1997a), following the works of Williamson, identifies two important modes of economic regulations and connects them to two types of rationality: the regulation by the market partner in a substantive rationality (maximisation of a purpose) and the regulation by the hierarchy associated with procedural rationality (satisfaction according to a process). For all that, Marchesnay sets logics of behaviour in individuals and organisations which can pollute the rationalities. He thus envisages a widened rationality integrating the motivations of the individuals. The rationality of the entrepreneur, the leader of the SME, can appear to be more complex, integrating individual behaviour: "In small firms, the importance of the individual is considerably superior to that of the hierarchy or the market" (1997a). The degree of personal realisation will be a key dimension in understanding the undertaken decisions.

For example, the estimation of the future of the company is considered as more subjective in SMEs than in large companies: the tools on which decision-making is based are less formalised and less used (Smith et al., 1996). Thus, Lang et al. (1997) consider that the leaders of SMEs adopt a less rational behaviour, in particular as regards the forecasts. More exactly, it seems that the leaders of SMEs show an increased optimism in their processes of decision making (Brunetto and Farr-Wharton, 1997). However, this way of optimism is not always verified (Casar and Gibson, 2007).

In his work dedicated to bounded rationality, Simon (1947) considers that rationality is defined by three areas: limits linked to competencies, habits, reflexes, limits linked to values and objectives and finally, limits linked to knowledge and information. Small companies suffer from a lack of resources, thus it is possible to consider that the business leader of a SME has a bounded rationality. In addition to the lack of access to information (Lang et al., 1997; Moreau et al. 2004), the importance of the survival of the company can be a determining factor for the choice of pursued values and objectives (Julien and Marchesnay, 1988) while the lack of time narrows the development of competencies (Mahé de Boislandelle, 1996). Thus, proximity can be considered as palliative to the above mentioned restrictions. Torrès and Gueguen (2008) consider the notion of 'proxemicing' behaviour in order to characterise the importance of the proximity in decision making for the SME's business leader. The decision maker will use the knowledge, the information and the available individuals in his environment of proximity. Thus, if proximity is characterised by the importance of interpersonal relationships and that proximity is a determining factor to the decisions of corporate leaders in SMEs, we can deduct that the interpersonal relationship affects the decisions taken within the SME. Thereby, personal considerations among SME leaders (Saporta, 1997) should lead to a specific apprehension of the strategic developments of their companies.

It thus seems that the rationality of the leader of a SME conditions the rationality of his SME. Personal and interpersonal factors are going to interfere with an objective apprehension of the strategy of the SME. As a result, strategic decisions such as cooperation or merging will be conditioned by both objective factors and more subjective aspects linked to the owner-managers' aspirations.

Elements promoting strategic collaboration: the role of interpersonal aspects

Without any doubt, the Resource Based View (RBV) is the theoretical approach that has been the most used to explain why it is in the best interests of a company, even competing ones, to cooperate together. Indeed, according to this theory, firms which are capable of accumulating rare resources and competences, non substitutable and difficult to imitate, will obtain a substantial competitive advantage compared to other competing firms (Rumelt, 1984; Dierickx et Cool, 1989; Barney, 1991). Moreover, organisations cooperate in order to reduce uncertainty and acquire resources. Thus, inter firm cooperation is seen as a means to acquire, exchange or renew its resources and competencies and contribute to the improvement of its competitive advantage (Lado et al., 1997 ; Luo, 2004). Cooperation between firms, whether it be an alliance or, as in our case, a project of acquisition and merger, allows the firm to reach a critical mass, to capture new markets and to make up for competence deficits (Doz et Hamel, 1998). Cooperation aims to reinforce the potential of firm competitiveness. Cooperation between competing firms is also a way to reduce the time for innovation, to share development risks, to accelerate the access to market and reduce costs.

However, the implementation and success of the cooperation process need adapted organisational ways of coordination (Marks and Mirvis, 2000). Moreover, the existence of mutual objectives, of complementary needs and above all the existence of trust are the key elements of a successful relationship (Joffre, 2007). In the case of

a merger project which corresponds to our case study, Schweiger et al. (1987) have listed key success factors of mergers that include: the degree of strategic integration, the capacity to manage human relationships and trust. Nevertheless, like in the majority of works about mergers, these authors focus on the post-merger relationships (Monin et al, 2005). There are very few works that analyse the relationship before the merger from a qualitative and longitudinal point of view, i.e. the phases when firms collaborate in order to prepare the merger. Yet, this period when firms try to cooperate and become closer is at the heart of this research and we will see that the questions that it raises mainly concern the relationships between the SME leaders.

Indeed, inter-organisational cooperation is extremely influenced by the links between the business leaders. For some authors, cooperation is very much influenced by trust and relational links, even though it must also be coordinated by discreet, hierarchical and recurrent contracts. For Ring and Van de Ven (1992), the level of trust and risk within the cooperative agreement conditions coordination mechanisms of this cooperation. Adler (2001) proposes that different institutions combine the three coordination mechanisms and forms (price for market, authority for hierarchy and trust for community) in different proportions. Larson (1992) also observes that mutual trust between actors exists prior to contract. As Froelicher (1998) says, « anterior social links play an important role by reducing the risks of an economic partnership ». In the same vein, the importance of the social network, the social origins and social paths of the players (Detchessar, 1998) has been described in the literature. By focusing on the process of cooperation between companies themselves, Froelicher (1998), shows that a business leader implicates his company in a partner relationship when two elements are gathered: the feasibility and the potentiality of cooperation. Feasibility of cooperation is equivalent to the facility with which players are able to organise themselves around a table. When these personal links are already established, it only requires a motive to start cooperation. It is what the author defines as the potentiality of cooperation.

The theoretical perspectives linked to cooperation specially apply to SMEs. According to Schermerhorn (1980), SME management problems are linked to time pressure, lack of resources and a lack of knowledge. A limitation of their competitiveness can be reduced by the use of inter-firm cooperation (Street and Cameron, 2007). But the insertion of an SME in a cooperative logic suffers from many barriers: daily management, lack of time and limited human resources, fear of a loss of competitiveness, distrust concerning the sharing of ideas, rights and duties of the partners, geographic distance between partners etc. Thus, many factors can be listed in order to understand the choices made by SMEs in terms of cooperation with other players of their environment (cooperation, network, strategic alliance or merger, etc). Street and Cameron (2007) identify the individual characteristics of the entrepreneur and the leader, the organisational characteristics of the SME and their partners, the intrinsic characteristics in the relation (strength of the association) and the characteristics of the environment. The specificities of the strategy and its planning, the type of management of the partnership, the development of the activity (access to the resources and the perspectives), the level of competition added to these elements, the nature of the competitive advantages and the objectives were pursued by the SME in terms of performance.

There is thus an obvious interest for the mergers between SMEs, in particular in terms of strategic location. The various forms of mergers, acquisitions, absorptions and alliances require a particular organisation and certain predispositions to work. Organisational dimensions (mutual objectives, control and follow-up) will be associated with other factors where the individual can play a part in such things as trust, distribution of power and equality. It seems that these factors will be particularly important in the case of SMEs. If the individual dimensions are not the only explanatory variables of a partnership process between SMEs, we think that these will strongly condition the choices made during an alliance.

What is the nature of interpersonal dimensions on cooperation or merger?

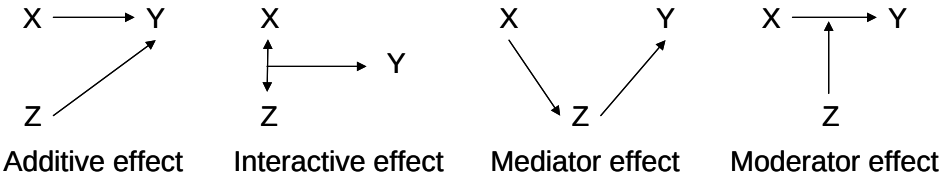
Throughout our review, we have underlined the role that the interpersonal dimensions can play on the process and the outcomes of an alliance or merger between SMEs. In a more general way, the interpersonal dimensions are to be connected with the strategic processes of the SME in addition to an objective economic interest. But what is the real nature of these dimensions? From a methodical point of view, several works tried to define the nature of the effects observed between three variables (Sharma et al., 1981; Venkatraman et al, 1989; Gueguen, 2001).

Mbengue and Vandangeon-Derumez (1999) identify four types of effects concerning the impact of a variable Z on the relation between an explanatory variable X and an explained variable Y (figure.1). The effect of the interpersonal relations, in a process of cooperation between SMEs, compared to objective economic interests, can thus be envisaged in four different manners. For our study, we shall consider that the interpersonal relations correspond to the variable Z, the economic interests to X and the merger to Y.

- The additive effect. The variable Z adds its effect on Y to the effect of X on Y. In that case Z is considered as independent of X. Because of the good relationship between the leaders of SMEs, the merger is going to become obvious even if the objective interest is not obvious. On the other hand, if the disagreement dominates, it will put the merger in danger although the objective interest is real.
- The interactive effect. The variable Z is associated with the variable X and this association produces an effect on Y. The economic interest is going to influence the relations between leaders. If the relations are good, the economic interest is going to be perceived as more important. This interaction is going to facilitate the merger between SMEs.
- The mediator effect. The variable Z is an intermediary between X and Y. X influences Z which influences Y. The economic interest is going to facilitate the relations between leaders of SMEs and these good relations are going to facilitate the cooperation.
- The moderator effect. The variable Z is going to modify the intensity or the sign of the relation between X and Y. In that case Z is considered as independent of X. The interpersonal relations are going to amplify the relation between economic interests and the merger. If the merger seems positive and the relations between leaders of SMEs are good, the interest will be envisaged in a stronger way than if the interpersonal relations are bad. Conversely, if the merger seems to

compromise the economic interest of the SME, bad relations are going to strengthen the loss of interest. If they are good, the perception of the loss will be underestimated and the leaders will focus on the positive aspects rather than the negative ones.

Figure 1. Effects linked to the introduction of the third variable



Source: Mbengue and Vandangeon-Derumez, 1999

We are now going to present the case which will serve as empirical material to capture the nature of the interpersonal relations in a merger process between SMEs according to objective economic interests at heart.

Methods

Because of the professional activity of one of the authors, we had the opportunity to study the attempted approach between two SMEs through their leaders. This case was selected because it seemed to contain strong interpersonal dimensions in connection with our research objective. At the beginning of the study we thus knew the outcome of the merger.

We questioned the persons in charge of the companies on the basis of semi-directive interviews (face-to-face and on the phone) in compliance with four sub-themes: the history and presentation of the company, the merger process, explanation of the failure and the outcome for the company. We thus adopted a historical perspective without imposing the theme of interpersonal relations. We preferred to let the interviewed persons speak spontaneously to avoid bias of the imposition of problems. In conclusion to the conversations, we modified our mode of interview, making it more directive and by asking for precision concerning certain approached points. The fact that there were two of us leading these conversations allowed us to confront our points of view at the time of the analysis and to reduce a certain amount of bias. We must also specify that the names of the companies were made anonymous.

All the data were collected between May 2007 and October 2007. In order to capture central patterns and ideas, the data were subject to a content analysis (McCarthy, 2003). Data coding and first analysis were conducted by one of the authors and checked by a second author. Comments were coded under the concepts analyzed in the literature review, being (1) the nature of strategic decisions in a SME, (2) the expectations and rationality of an owner manager, and (3) the nature and the role of interpersonal dimensions on cooperation.

The choice of a unique case study justifies itself by our capacity to investigate and relate a complex strategic process in detail (Yin, 1984). Because of the differences of

representation, the interpretation of the researcher has to allow identification of the important dimensions. We know the problems of generalisation of this method (Royer and Zarlowski, 1999). However, the constructivist perspective which animates us leads us to want to investigate in detail a situation to qualify a type of effect and allow a proposition of research which will be later tested. We also parallel the logic of the causal diagrams (Miles and Huberman, 2003: 274) which allows a visualisation of the most important independent and dependent variables and of their interrelations in a grounded study. These causal diagrams are of determinist nature and allow us to identify the sense of the relations. Our case study will thus allow us to put in relation the various factors considered as crucial.

The case

Alpha and Beta are strongly similar on several aspects. Both are SMEs with approximately forty employees for a turnover of nearly 6 million euros at the time of their merger and both are situated in the South of France. Their profession is the distribution of stationery for companies and communities (hygiene, small equipment, etc.). Their area of activity concentrates on a single region in the South of France.

Both SMEs are of family nature. Alpha was created in the middle of the 70s and the leader's son joined the company in 1996 to help his father who was self-taught. The mother helped, from the very beginning, with the administrative tasks. At the instigation of the son, graduate of a masters degree in computer systems and management, the company was transformed and developed more formalism (management by the quality and standardisation), organised by an integrated information system, an extranet, an organisation by professions, commercial training, the web site, etc.. Beta was created during the same period (1974) and the self-taught son of the creator, resumed the activity in 1978 further to an accident of his father. His activities are identical to Alpha but the mode of management seems more formalised - use of index cards, methods, intranet, representation of the staff, the works council, etc.

Initially, their geographical positioning did not place them in a situation of pure competition because they were situated in close but different areas. Gradually, the competition between both companies developed because of their geographical extension in four areas. If Beta competed with Alpha on its localisation of origin, the opposite was not true. In terms of approach of the market, an interesting difference seems to exist: Beta is rather like a discounter and produces in volume, whereas Alpha is more centred on differentiation and margins, and thus the prices are higher. In a general way, while there are phenomena of concentration in the sector, SMEs continue to be the most prevalent type of structure in the sector.

In terms of potential strategic developments of these companies, two orientations are to be noted: membership with purchasing groups and creation of product ranges. We shall see, afterwards, that these orientations are not neutral in the strategic choices to come. As regards the purchasing groups, the various distributors belong to platforms of supply and thus have exclusive contracts. Alpha and Beta initially belonged to two different groupings. Regarding the creation of range, certain distributors, for example Alpha, opt for the creation of a legal entity of the type holding company which

subcontracts the products which will be marketed under a name and appropriate brands. This perspective perfectly meets the logic of differentiation pursued by Alpha. During our interviews, the strategic perspectives appeared less present in the speech of the leader of Beta. Still, a medium-term formalisation of the strategic development seems to be considered by Beta. We also specify that Beta always worked with partners. As such, one of the partners, because of his training and profession, was specialised in the methods of management and was thus able to help the leader of Beta in terms of management of the company.

The phase of cooperation

Both business managers had known each other for several years. The social interaction, outside the professional network, was obvious because, the founder of Alpha was initially a swimming coach in the club frequented by the leader of Beta. In the middle of the 90s, Alpha and Beta met on the idea of a possible association but it ended. Later, due to a modification in the distribution of their main supplier, Alpha and Beta met each other within the same retail chain. From 2003, the idea of an alliance between both companies flourished. This alliance was wished all the more as Alpha and Beta belonged to two rival groupings. That of Beta was less centred on the main activities of the company. The cooperation with Alpha would allow stronger synergies.

Following several meetings between the leaders (but also with their employees), a merger protocol was signed in 2004. According to this agreement, Alpha acquired 51 % of Beta then, seven years later, acquired a supplementary 45 % of Beta. A merger between equals was planned, that is both companies were considered as having the same values. The main problem laid in the membership in different groupings (exclusivity). It was thus decided to create a third company which had to receive the businesses of Alpha and Beta. However, the groupings had to give their agreement to allow the merger. Besides, let us specify that this protocol stipulated that if a problem arose in the management of the new company, it was the leader of Beta who had to withdraw. In other words, according to Alpha, the project could continue without the leader of Beta in the case of difficulties and opposition.

The interest of this alliance was to become leader in the region, because a certain number of complementarities existed between both companies (geographical, activities, industries etc.). The economic objective and rational opportunity were thus present and it was in the interest of both companies to unite. Let us envisage some elements in order to better understand the objective interest of this merger:

- It is an activity where large suppliers dominate. The size thus appears as a factor of dependence. A merger between both companies would allow a higher power of negotiation and the obtaining of economies of scale;
- The complementarity of a geographical zone, in an activity where the logistic dimension is important, is a source of earnings. Indeed, by getting closer, both companies were going to have warehousing relays in the extremities of the region allowing a better rotation of their logistic fleet for the deliveries with the customers;

- The complementarity in terms of clientele also allows us to expect positive results. If Alpha is well placed in the hotel business-restoration, Beta is more dedicated to public communities;
- We can consider that the age and the family situation of the protagonists also seem to be an element justifying the alliance between both SMEs. The leader of Alpha is about sixty and his son around thirty. The leader of Beta is about forty. In other words, there is a complementarity of age between the three actors. Furthermore, the leader of Beta has no children and thus the direct family succession is not possible. This merger would allow the organisation of Beta's succession and then assure its continuity.

Furthermore, the personal dimensions conditioned partially the first stage of the negotiations of the merger. Although both leaders of the companies had different psychological and manager profiles, several common points gathered them in particularly in terms of complementarity. One privileged hands-on experience and meeting people; the other was a little less concerned by his clientele. If one of them left more place for intuition and pragmatism, the other developed management skills through an accurate and formalised approach. With this particular period in mind, the leader of Beta indicated that they had many points in common and, at the time of the merger, the attitude of the leaders of Alpha could be qualified as very positive. It seems that the same conception of what an SME had to be was shared between the actors of the case. Especially since this phase of alliance was a means to exchange the same vision of the profession. The leader of Beta evoked the following element: "we spoke about the same profession. It pleased me a lot. We wanted to make things together". In other words, as long as both companies did not still work in symbiosis, the common perspectives were appreciated on both sides. So if the leader of Beta was considered as more "blazing", the leader of Alpha could be considered as more "extroverted" (comment of the son of the leader of Alpha). All this leads us to believe a shock of ego in case of difficulties.

In order to highlight the situation, we must specify that the dimensions of formalism on behalf of Beta were not to displease the son of the Alpha leader. The son knew how to develop techniques and management reasoning within his company and saw the formalisation and the precision of the leader of Beta as an obvious advantage. Furthermore, Beta seemed to have some weaknesses concerning commercial aspects, one of the strengths of Alpha. The complementarity and the new synergy created by this cooperation particularly seduced the son of the Alpha company who saw a source of important economic opportunities in this alliance. Therefore, he mobilised to facilitate this cooperative process.

Finally, the question of leadership and power sharing was raised. It is an essential theme in the understanding of the SMEs. It was decided that the leader of Alpha would become CEO of the new structure and would be in charge of the commercial part. His son would become a Deputy CEO and would be responsible for the organisation and the IT part of the company, whereas the leader of Beta, as well as being a Deputy CEO, would be responsible for the legal aspects. A projected budget was planned and in case of over budget, a common discussion would have to be

engaged. Both companies thus began to get organised to work together and tried to harmonise their methods of management.

The failure of the cooperation

We can consider that the tensions between the leaders of Alpha and Beta crystallised following a difference concerning a business opportunity. At the end of 2004, the Delta Company was for sale. Globally, Delta had the same activities as our two companies but was smaller. It operated in the zone privileged by Alpha. The leader of Beta showed his deep interest as regards this acquisition, as some years previously, he had already tried to buy this company, which differed from his due to its better after-sales service. He discussed the matter with Alpha and according to the information we obtained, the leader of Alpha was not very motivated by this acquisition in the middle of the period of merger between the two companies. According to the leader of Beta, Alpha was financially incapable of buying Delta and Alpha indicated that either the purchase would be made together, or it would not be made at all. A financial plan was envisaged but did not convince the leader of Beta who then refused to buy Delta in common with Alpha. Between Alpha and Beta the situation began to turn ugly.

Beta, convinced of the interest of this acquisition, thus decided to buy Delta in spite of the position of Alpha and suggested that afterwards, the opportunities of the merger between Alpha and Beta could be studied again. This attitude strongly irritated the leaders of Alpha who hardly understood this one-sided decision which compromised their union. Alpha considered that it had the financial means to acquire Delta, whereas Beta thought the opposite. If Beta did not explicitly refuse the continuation of the merger process, its attitude demonstrated, to the leaders of Alpha, an evident will to slow down the process. The underlying tensions between the two leaders came out and rancour built up until then exposed. The atmosphere between both leaders deteriorated on the basis of the following set of criticisms:

- The limits of the initially planned functions were not respected;
- Incoherence in the methods of management was considered as penalising;
- A decline of the profitability of Alpha was planned but Beta had not been informed about it;
- Both companies considered that they had given too much information to the other one, without equivalent reciprocity;
- There was a mutual incapacity to work with the other partners, etc.

At the beginning of 2005, the break between Alpha and Beta became obvious and the end of the merger process between both companies can be dated to spring 2005. No legal approach was engaged following the protocol and the cancellation of the contract. However, the beginnings of the merger had led to new strategic contingencies. Indeed, during the period of cooperation, the sales people of both companies did not have to go to the customers or to the geographical zone privileged by the other company. Inevitably, it led to a loss of turnover. Furthermore, in the optics of the merger, Alpha gave up its former supplier to take Beta’s supplier.

After the failure of the cooperation

The outcome of the failure is not neutral for both SMEs because their strategies are going to be modified. At first, to put the strategic options in context, and to understand the interpersonal relationship, we can consider that the connections between the leaders of both companies have been degraded so much that, over the period following the failure, the relationship can be considered as vindictive, even resentful. As evoked by the son of the leader of Alpha: "at this moment, the grudge was born". It seems that feelings of treason and vengeance affected the interpersonal relations of the business managers and vindictive exchanges took place. If, objectively and economically, the interests of the fusion were real, the incompatibility of the people involved made void any new link between them. The hostility revealed at the end of the process seemed to make any union between Alpha and Beta impossible.

Alpha faced two major developments after this failure: a geographical repositioning and the creation of a brand. The geographical repositioning became a reality by the opening of a new entity in the original city of Beta. This geographical development should more logically have been made in another department where the competition was less lively (and, at least, one close department presented these characteristics). But the choice of localisation of the new establishment is linked considerably to the noticed antagonism. Indeed, the repositioning objective is partially diverted by a will to bother Beta in a zone where it has an important turnover. In other words, the setting-up of Alpha in the city of Beta translates the wish to make Beta lose a part of its market. The emotional considerations seemed to condition the actions.

The creation of a mark for Alpha occurred with the change of its supplier during the period of cooperation with Beta. It allowed the acquisition of a marketing know-how (for example specific colours according to the families of products), and the leaders of Alpha realised the limits of the previous supplier. Alpha thus continued to work with Beta’s supplier (until March, 2006) and to develop an independent structure for the realisation of products (since January, 2006). This allowed the development of a certain number of innovations in the catalogue and, while pursuing a strategy of differentiation, to propose a large variety of products. The internal growth was thus privileged.

Beta concretised its link with Delta. This acquisition brought an external growth of +30%. Its strategic evolutions were more measured except that, because of the purchase of Delta, Beta was now even more in competition with Alpha. Beta pursued its collaboration with its supplier. Beta has experienced an internal growth of 7 % today.

Today, the economic interest of the link between Alpha and Beta is more real than ever but because of the presented situation, this issue seems impossible. The various people involved seem to be aware of this situation. Alpha has always kept the possibility of taking over another company but for the moment it privileges internal growth. Besides, the outcome of the failure has lead Alpha to consider that, if in the future, it could acquire a company, it would exclude any joint-management with the leader. It is the same for the leader of Beta who does not exclude a possible merger but, equally, does not wish to share the management.

Analysis of the case

In a determinist perspective, a process of cooperation can take two forms:

- Emergent process: companies begin by cooperating, and then they intensify their collaboration because of the initial success. Then they merge because it becomes evident that complementarities allow more success if there is a single entity;
- Strategic process: companies decide very early to merge but do it in good conditions; they envisage progressive stages allowing the harmonisation of the methods of management, to get to know each other better, etc.

The last point seems to correspond to the studied case. It thus seems important to understand why, in the end, they couldn't carry out what they had planned. Our case allows us to consider the interpersonal factors bound as critical to the managers.

The analysis of the case allows us to notice the ambivalent role of the interpersonal relationships:

- The cooperation of both SMEs was made on rational and objective bases consolidated by a mutual appreciation between the leaders;
- The failure of the process is attributable to disagreements when the realisation of the link took place. The interpersonal links then degraded and amplified the dissensions.

In this case, social links existed prior to the cooperative process. These relationships allowed the players to share the possibility to link the destiny of their two companies at any given moment. Then, a mutual incomprehension developed while each of the leaders thought they were right. Indeed, it was economically noticed that the cooperation between both entities was not, in any measure, relevant any more. Even after the integration of the company Delta by Beta, the interest was still valid, even more than ever. Indeed, the consolidated turnover increased and more importantly, the activity in the Alpha zone was strengthened by integrating a competence bound to the after-sales service.

But during the process of cooperation it turned out that their incompatibility in terms of personality and modes of management made an easy going collaboration impossible. The episode of the purchase of Delta that we can call a critical incident, and the mutual incomprehension between the leaders of both companies, marred the original shared confidence. Yet, the confidence is, in an SME context, a strong moderating variable of the collaborative behaviour (Brunetto and Farr-Wharton, 2007). Therefore, we can consider that if both leaders had to work together for at least seven years, this alliance would have been a source of problems more than profits. The decision of stopping the cooperation process then appears as a kind of rationality (in a relative sense). But this rationality is better expressed on psychological and interpersonal bases than on economic and objective data (Marchesnay, 1993; 1997a).

We think that the importance of the affective dimension (and, in our case, "a lack of affection") is conjugated with the phenomenon of 'egotrophy' (the effect of one person focus) (Mahé de Boislandelle, 1996; Torrès, 1999). Indeed, as noted by Torrès: "the management of an SME tends to be centred on the leader. The business of the company is at first and above all a personal business. (…) The SME is a megaperson by opposition to the big company megastructure. Because of this strong personalisation of the management, the analysis of the profile of the leader is

necessary to understand the functioning of a SME and the problems of management in SMEs must often be put in socio-psychological terms". The SME is considered as an extension of the leader. If both leaders do not get on together, both SMEs cannot work together in spite of the objective and economic interests. So as long as the process of cooperation was in emergence and informal, this reality did not appear, but it became true as soon as the actions became more formal (protocol) and when the differences of opinion were based on a precise fact (acquisition of Delta).

We can estimate that both SMEs tangled up in a patrimonial logic (family inheritance, integration of the members of the family in the process of management, development and local anchoring, etc.). In such context, the links with the company are almost emotional and the main objective is to ensure the continued existence of the company (Julien and Marchesnay, 1988). At the end of the process of cooperation, both entities had to disappear, which was in contradiction with the objective of durability (for Beta), while leading to a loss of autonomy (for Alpha). In other words, the merger was not compatible with the psychological orientations of the leaders.

Mignon (2002) identifies several types of perenniality:

- The durability of power composed of the perenniality of control (detention of the capital) and of the durability of management (decision);
- The durability of the project composed of the perenniality of the activities (continuation of the initial activity) and of the organisational perenniality (stability in the time of the organisation).

The project of the merger of Alpha and Beta allowed them to increase the durability of the activities, while the perenniality of control, management and organisation was in jeopardy. This loss of perenniality can be acceptable when the owner-leader is in a logic of buyout. But neither Alpha (succession of the son) nor Beta (his leader is still young) were in this situation. Therefore, the personal dimensions attached to ensure the continued existence of the company got the upper hand.

As Marchesnay (1997b) notices, the will of independence and autonomy is also a characteristic for most of the owner-leaders of SMEs. For example, during our conversations, the leaders clearly envisaged the difficulty for a leader of an SME to share its power. Here are some comments: "We believe we hold the truth", "when we are alone to decide, we have no opponents", "in an operation of alliance, it is necessary to accept change and when we are a boss, we brake even more", "there are difficulties adapting oneself in SME when the conceptions are different", "we don’t have the same vision, thus we think that what we make at home is better", "a small boss decides alone, it is a boss of divine law!", "in cases as ours, it is the mood which governs, we do not want to lose face". It thus seems that the loss of independence and the loss of the decision-making power condition the outcomes of the SME relationships because of the personalisation of the management.

A study conducted among 765 Canadian companies (Feltham et al. 2005) measured the degree of dependence of family companies on the owner-manager. This dependence appears as very strong and seems to ease only when the leader is old or close to his departure. The authors notice that if a wide majority of owner-leaders think that the company is dependent on them, they do not lead actions to limit this dependence. The leader of an SME can thus have a representation of his company as

inexorably bound to his own person and an objective change can therefore interfere with the good progress of the strategy in the SME. Yet, the ego of the owner-manager can lead him to increase his power on his company and this attitude can turn out to be fatal and lead to failure (Beaver and Jenning, 2005).

In the typology of the perenniality of Mignon (2002), in our case study, the risks inherent to the perenniality of management seem to have conditioned the perspectives of union. A logical hierarchical organisation of this durability (the control of the capital determines the control of the management which decides on activities which will condition the organisation) enables us to notice the importance that the durability of management takes on, when the control of the capital is shared. To learn to part from one's power, or at least to share it, seems a difficult task in our case. This theme is as important as SMEs experiencing little forces of opposition. The shareholders are often in the environment of nearness, the representation of the staff is rarely formalised, and the financing is made in a close way. The leader of an SME does not face much opposition.

Finally, the case also reveals the importance of human relationships in the strategy of the SME. Indeed, the increase of the competition between the two companies (more important presence of Beta in the initial zone of Alpha and penetration by Alpha of the initial zone of Beta) can be explained, partially, by the feeling of the two leaders of the companies. One of the people interviewed expressed clearly that his installation in a zone served by the other company was motivated by the idea "not to allow the competitor to get fat at his home".

Initially, both companies were relatively indifferent to each other, without being in an excessive confrontation. But the outcome of the attempt to approach conditioned a resentment which urged them to be even more in competition. The analysis of the strategic movements of the SME thus requires reasoning in terms of bounded rationality more than economic rationality (Marchesnay, 1997a; Jaouen, 2006). The case thus envisages this widened rationality both in the process of a merger and its failure and in the underlying outcome. The competitive behaviour is packaged and personalised by the leaders of the SME.

The analysed case allows the binding of three concepts: economic interests, the process of a merger and the interpersonal relations.

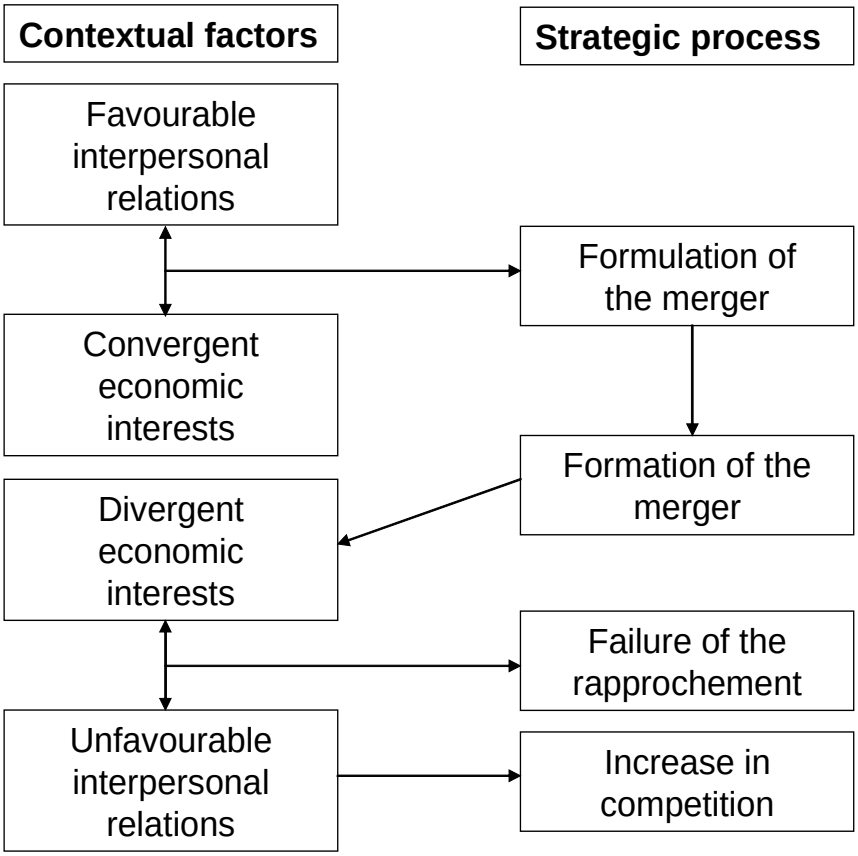
- Economic interests are real if companies are well managed. Indeed, towards the various approached points, the durability of companies seems to be strengthened. But if there is a fear concerning the loss of independence and if conflicts of opposition can affect the functioning of the company, then the durability is threatened;
- The process of a merger is based on two phases: its formulation and its formation. This classic dichotomy in strategy allows us to make the difference between a period when the leaders have the idea to merge their companies and envisage an action plan (formulation) and a period when this plan is concretely operated (formation);
- Concerning the interpersonal relations, four types of effects can be envisaged (Mbengue and Vandangeon-Derumez, 1999): an additive, interactive, mediator or moderator effect (cf. § 3).

Our interpretation of the events leads us to the following synthesis. If we resume the various noticed facts, we can identify an evident initial objective economic interest. Besides the commercial, logistic and strategic intensification, the merger between the suppliers and the situation of the respective platforms allowed us to consider the merger between both SMEs under very good auspices. This was stressed by the same point of view, the same conception of the profession of the two leaders. An effect of intensification was developed. Because economic interests were obvious, the interpersonal relations focused on positive points which reassured the leaders even more as far as potential earnings went. The idea of the merger was born.

After this phase of formulation of the merger (protocol), the union became a reality (formation of the merger) and pulled the update of crucial difficulties concerning the independence of decision-making and the durability because of the oppositions (each of the leaders was afraid that the new company would be badly managed). These threats caused a different perception from the economic interest of the merger. Gradually, the leaders realised the dangers of a union which could not be governed as they wished. This created a modification in the interpersonal relations (noxious relations) which led to an intensification of a pessimistic vision of the expected outcome. The fears for the future partners in the degradation of relations instigated the failure of the merger. Furthermore, this led to a more aggressive competitive logic. We thus represent the followed progress (figure 2).

According to this analysis and to the specificity of our case, it thus seems that the interpersonal relations constitute an interactive effect. The economic interest and the interpersonal relations condition each other and their combined effect directs the merger. When the potential earnings seem evident, the agreement between the leaders is good and consequently strengthens the conviction of the success. This leads to the idea of the merger. Afterward, when the earnings stemming from the merger seem less obvious, the disagreement dominates, strengthening the idea of loss. This new adjustment drives the failure of the merger. Our interpretation of this interactive effect is strengthened by the fact that the personal relations evolved from a positive attitude towards a negative attitude. As a change of attitude was noticed, an external factor inevitably instigated the modification. In our case, this external factor is the perception of the objective economic interest. This statement leads us to eliminate the additive and moderator effects for which the variable "interpersonal relations" is considered as not dependent. Furthermore, the economic elements initially envisaged under positive aspects are afterward envisaged in a negative way. These economic elements are always present in the speech of the interviewees and are considered as important reasons. This thus excludes the mediator effect which limits the importance of the variable "objective interest" for the benefit of the variable "interpersonal relations". This leads us to think that the effect identified in our case corresponds to an interactive effect.

Figure 2. The observed process



Conclusion

Our analysis of the process of a merger between two SMEs allows us to qualify the role played by the interpersonal relations on the objective economic interest and the strategy of the SME as an interactive effect. The perspectives of complex rationality involving objective elements with subjective elements are thus consolidated by our results. What are the conclusions? Two perspectives seem to appear:

- The strategic analysis in SMEs has to integrate personal dimensions. The purposes pursued by the owner-leader must be integrated into the plan of understanding of the strategic evolution of the SME. It does not seem possible to argue in a purely objective way. Even if there was a formal contract between the two firms, it has not been respected when the "relational contract" was evolved. Furthermore, this non respect of the contract did not lead to legal proceeding. A strategic solution will be possible according to the specificities of the company and the specificity of his leader.
- The interpersonal relations represent a complex effect. They condition the perception of the economic interest and are conditioned by objective variables. Thus, the personal dimensions to be integrated into the strategic analysis also have to be complemented with interpersonal dimensions. Besides the specificity of the company and its leader, it will be necessary to envisage what we shall name the interpersonal fit (by analogy for the strategic fit) in the analyses. This notion of interpersonal fit is linked to the degree of coherence and cohesion of the

profiles of the leaders of SMEs who can potentially work together. These profiles must be envisaged according to their psychological dimensions. Thus, if two SMEs have to work together, it not only has an economic and strategic fit to exist but also a personal fit between the leaders' profiles.

Our work is of an exploratory nature. Studying a single case study does not allow us to establish whether the interpersonal relations can take other forms depending upon circumstances and the people involved. The effect was considered as interactive in the observed situation but we cannot generalise our conclusions. It will thus be advisable to conduct the other studies concerning joint strategies of SMEs and to envisage the nature of this effect a second time round. We can, for example, make the hypothesis of a contingency of the effect according to the type of strategy mobilised by SMEs. Nevertheless, this work has allowed us to analyse in depth the failure of a process of merger between SMEs. Its results can be of use as a base to quantitative studies allowing the modelling and testing of the observed effects.

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Towards a Distinction between Technology Incubators and Non-Technology Incubators: Can they contribute to Economic Growth?

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Abstract
Business incubators are an increasingly popular tool for promoting job and wealth creation. Yet given the heterogeneity of incubation models, it is not always clear how incubators operate, what their main characteristics are and how can they best contribute to job and wealth creation. If technology is central in promoting economic growth and new firm creation the crucial mechanism in transferring new knowledge to markets, then technology incubators have the biggest potential to contribute to economic growth. We define technology incubators by their strategic choices in terms of mission, linkages to universities and geographical location. We investigate their nature by comparing the levels of business services provision, selection criteria, exit policy and tenants' characteristics. Our sample includes 12 incubators located in six Northwestern European countries and a total of 101 incubated companies. Data were collected in both incubators and among their tenants. Results show that technology incubators provide more tenants with their services, select younger companies and practice stricter exit policies. Additionally, they tend to attract more experienced teams of entrepreneurs. Our main contribution is a better understanding of the technology incubators impact against the remainder population of business incubators. We speculate that incubators not focused in incubating technology might not be fostering company creation and therefore not actively contributing to growth. Further, the low levels of service provision are both a product and a consequence of slack selection criteria and weak exit policies. Finally, we discuss the implications of our findings to business incubator managers, policy makers and prospective tenants.

Keywords
Business Incubators, Technology Incubation, Business Support, Entrepreneurship, Economic Growth

Introduction

Explaining, modelling and controlling economic growth as long been an ambition of researchers, practitioners and policy makers (Landes, 1998; Maddison, 2001; Smith, 1776). In the 1950s, Robert Solow first attempted to explain economic growth (Solow, 1956) by putting technical progress central in the creation of wealth of advanced economies. Today, the notion that technology change is responsible for economic growth is widespread (Romer, 1990). According to this view, growth is driven by technological change created endogenously and intentionally by purposed investments in the creation of knowledge. More recently, Audretsch (2007) suggested the mechanism thought which new knowledge is brought to the market, creating new products and services, is entrepreneurship. This definition, presuming the creation of new firms, is in line with the traditional view of entrepreneurship (e.g. Low and MacMillan, 1988). The larger of technology based firms, more externalities will be in generating and exploring new knowledge and therefore the faster the economy will grow. It becomes apparent that promoting economic growth should include appropriate tools for supporting creation of new knowledge. Further, all mechanisms able to transform that output into new marketable products and services should also be among the policies to create jobs and wealth.

One of the most famous initiatives to bridge the gap between the creation of new knowledge and marketing new products and services is the Small Business Innovation Research (SBIR). The SBIR program started in 1982 as a direct instrument to stimulate technological innovation among small business in the United States (Wessner, 2008) and link universities to public and private markets. Also, SBIR is a tool for promoting commercialization of innovation within the private sector, which is mostly achieved by the creation of firms (Wessner, 2008). In fact, a significant number of firms would not have started without the SBIR initiative (Audretsch et al., 2002). Business incubation assumes itself to bridge the same gap yet having a significant difference compared to the SBIR.

Business incubators (BI) are organizations which support actively the process of creation of new companies. Governments have been vigorously supporting business incubators in the past decades as tool to promote economic growth (Adkins, 2002; EC, 2002). BIs provide nascent and fledgling companies with an array of services such as infrastructure, business support and access to networks (NBIA, 2007; OECD, 1997; UKBI, 2007). The basic mechanism behind BI operation is similar to that of SBIR - to bridge the gap between the creation of new knowledge and marketing new products and services. However, BIs go further by guiding the new firms during their early stages of development.

BIs can be differentiated along various lines. For example, Grimaldi and Grandi (2005) divide BIs according to whether they are privately or publicly owned. Others attempts have been made using more dimensions to characterize types of BIs, such as strategic choice (Carayannis and von Zedtwitz, 2005), service portfolio (von Zedtwitz and Grimaldi, 2006) or management features (Aerts et al., 2007; Clarysse et al., 2005). However, the outcomes of BIs in terms of job and wealth creation are not present in any of these typologies. In fact, most of these studies lack a business incubation theory lens (Hackett and Dilts, 2004).

The strong theoretical and empirical link between innovation and economic growth suggests that BIs particularly focused on the support of technology based firms could be an effective policy tool. Previous differentiations do not capture so much the idea of technology business incubators (TIs). The closest category would be the university-based BIs (Grimaldi and Grandi, 2005; von Zedtwitz and Grimaldi, 2006), in which provision of both tangible and intangible assets is conceptualized. Although TIs have also deserved some attention of researchers, studies seldom operationalize the process of business incubation or business incubation features (cf. Chan and Lau, 2005; Colombo and Delmastro, 2002; Mian, 1996, , 1997)[1].This contributes to the poor current understanding of the differences between TIs and non technology based business incubators (NTBI).

We argue that BIs have a potential effect on economic growth; yet their contribution will only be meaningful if the process of incubation is itself successful. As proxy for the success of the incubation process, we take the level of services provided to tenants in each BI. Tenants' needs are similar to the needs of every nascent company. If the BI is not providing a high level of services its tenants, it transpires that the BI is not contributing actively to the development of its tenants. In other words, if the tenants do not have access to a service portfolio, they are as good as outside the BI.

We set out to investigate the differences between TIs and NTBIs comparing each group level of services provided to tenants. The comparison will be made using business incubation dimensions, such as provision of infrastructure, business support and access to networks. We will also investigate their selection strategy as well as tenant firms' characteristics.

This paper is structured as follows. We start by discussing characteristics of BI in general and TI in particular. Also, we provide a solid theoretical lens to business incubation. After outlining our definition of TI, we describe the empirical setting, the operationalization of key variables and the method of analysis. After presenting the results, we discuss them furthering explanation for the differences between the types of BIs. Finally, we discuss the managerial implications for business incubators, policy makers and prospective tenants.

The Nature of Business Incubators

What are technology business incubators?

Both practitioners and academics have put forth definitions of business incubators (Table 1) (Bergek and Norrman, 2008; EC, 2002; Hackett and Dilts, 2004; Hansen et al., 2000; Merrifield, 1987; NBIA, 2007; OECD, 1997; Peters et al., 2004; Phan et al., 2005; UKBI, 2007). Two key common features can be distilled. First, BIs focus on the support of nascent and young companies promoting their growth and maximizing their chances of survival. The main goal is that these supported companies will survive and thus contribute to creating jobs and wealth. Second, the support services

[1] Exception include Mian (1996) and Chan and Lau (2004) who provide different operationalizations of incubation. Yet Mian did not include intangible services such as coaching or venture capital as part of the analysis; Chan and Lau assess jointly incubators managers, graduate firms and tenants on their perception of success factors of university based incubators.

are targeted to firms' needs and consist of physical infrastructure, business support services and access to networks.

Table 1. Definitions of Business Incubation

National Business Incubation Association. Business incubation is a business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services. These services are usually developed or orchestrated by incubator management and offered both in the business incubator and through its network of contacts. A business incubator's main goal is to produce successful firms that will leave the program financially viable and freestanding. These incubator graduates have the potential to create jobs, revitalize neighborhoods, commercialize new technologies, and strengthen local and national economies (NBIA, 2007).
United Kingdom Business Incubation. Business Incubation is a unique and highly flexible combination of business development processes, infrastructure and people, designed to nurture and grow new and small businesses by supporting them through the early stages of development and change (UKBI, 2007).
European Commission. A business incubator is an organization that accelerates and systematises the process of creating successful enterprises by providing them with a comprehensive and integrated range of support, including: Incubator space, business support services, and clustering and networking opportunities. By providing their clients with services on a 'one-stop-shop' basis and enabling overheads to be reduced by sharing costs, business incubators significantly improve the survival and growth prospects of new start-ups. A successful business incubator will generate a steady flow of new businesses with above average job and wealth creation potential. Differences in stakeholder objectives for incubators, admission and exit criteria, the knowledge intensity of projects, and the precise configuration of facilities and services, will distinguish one type of business incubator from another (EC, 2002).
Organisation for Economic Co-operation and Development. Technology incubators are a specific type of business incubator: property-based ventures which provide a range of services to entrepreneurs and start-ups, including physical infrastructure (office space, laboratories), management support (business planning, training, marketing), technical support (researchers, data bases), access to financing (venture capital funds, business angel networks), legal assistance (licensing, intellectual property) and networking (with other incubators and government services) (OECD, 1997).

TIs are a special type of BI focused on supporting technology based ventures (OECD, 1997). Knopp (2007) lists TIs among the most frequent self-reported categories within the North American population of BIs. We define TI as the BIs which fulfil at least two of the following criteria. First, a clear mission statement endorsing the creation of technology based new ventures. BIs strategically oriented this way are more likely to incubate technology based ventures than their counterparts. Second, TIs have strong links to a research oriented university or other research centres. Such

BIs are closer to sources of new knowledge and therefore more likely to help creating and supporting technology based companies. Lastly, TIs are geographically close to a university campus or other research centres. These BIs are more likely to nurture university spin-offs due to their location (Audretsch et al., 2005). These three criteria ensure that TIs are closer to bridge the gap between knowledge creation and markets. Furthermore, TIs will be more prone to engage in technology transfer and therefore have a significant contribution to job and wealth creation.

Dimensions of business incubation

Business incubation has three fundamental dimensions: infrastructure, business support and access to networks (e.g. Barrow, 2001; Smilor and Gill, 1986). As aforementioned, most work on BI is atheoretical (Hackett and Dilts, 2004). We will improve the current theoretical foundation of BIs providing arguments *why* BI can have a potential effect on incubatee survival and performance. This will, in its turn, have a positive impact on economic growth.

Infrastructure

The concept of business incubation is inextricably tied to infrastructure (Phan et al., 2005). Infrastructure is often associated with space and shared resources. Space is generally an office rented to tenants at or below market prices. In addition, BIs often have small production facilities or mixed units available to their tenants. Provision of space is critical to business incubation. Empirical evidence suggests it as the most beneficial feature to tenants (Chan and Lau, 2005), particularly for those in early stages of development. General shared resources such as reception, clerical services, meeting rooms, conference rooms or car parking (EC, 2002; McAdam and McAdam, 2008) are often offered together with the space. Specialized shared resources such as laboratories or research equipment can also be part of the BI's infrastructure (Grimaldi and Grandi, 2005).

This typical BI setting providing space together with shared resources impacts nascent firms on many levels. First, overhead costs are reduced for the tenants. BIs provide their tenants with services they probably would not have easy access to if located elsewhere. Car parking, meetings rooms, reception services are examples of this. Also, the burden of planning, setting up and costing a series of individual providers is inexistent when tenants enter this kind of ready to use office. Second, tenants located inside a BI display a signal of quality and increase their external credibility and legitimacy. All BIs have more or less extensive selection procedures. This means that being accepted to a BI signals the nascent firm as promising in terms of growth. This external legitimacy has a positive impact on young firm's survival even in situations of resource scarcity (Singh et al., 1986). Finally, putting firms under the same roof and sharing significant parts of the infrastructure increase the chances of synergies between them to arise. Knowledge sharing, formal alliances, buyer-seller relationships are examples of these.

The rationale for infrastructure can be found in the economies of scale. BIs tend to have high setup costs, but much lower operating fixed costs and declining marginal costs. After a certain space has been built, the operating costs of BI consist mainly on the shared resources discussed above. The costs of providing one more tenant with

the infrastructure (space and shared resources) decrease as the number of tenants increases. To a lesser extent, economies of scope are also present when establishing and managing a BI. In fact, BIs often bundle infrastructure provision to reduce their number of services available within their infrastructure portfolio. Tenants normally pay rent for office space *including* shared resources such as parking, meeting rooms and cleaning; shared resources often cannot be paid separately from infrastructure.

Business support

New firms often lack experience such as necessary management processes and organizational routines to cope with sudden environmental shifts. This results in a higher death propensity, particularly in early stages. This "liability of newness" has been extensively studied since Stinchcombe coined the term in his 1965 seminal work (e.g. Brüderl and Schussler, 1990; Henderson, 1999). The liability of newness can be reduced by external credibility (Singh et al., 1986), as discussed in the infrastructure section. In addition, business support such as experienced advice can provide valuable help geared towards accelerating the venture's learning curve. By enjoying business support services, the incubatees will be able to make better and faster decisions, which results in higher firm performance (Eisenhardt, 1989). Furthermore, training sessions on relevant topics can contribute to increase the ventures' human capital and therefore have a potential impact on their development and performance (Colombo and Grilli, 2005; Davidsson and Honig, 2003).

Business support is an integral part of business incubation and arguably its most complex dimension. Previous work on business support identified four typical services: coaching, training, business plan support and direct subsidies. Coaching is often referred as the most important service business incubators can provide to their tenants (Hansen et al., 2000; Mian, 1996). Within a coaching program, each incubatee is assigned one coach when admitted to the incubator, either free of charge or for a fee. Meeting with the coach can be compulsory or on demand. BIs which do not possess in-house coaching expertise may facilitate access to a coach through their network of contacts. Coaching has already been found in literature as critical to tenants' timely graduation (Peters et al., 2004) and as having an impact on firm development (cf. Robson and Bennett, 2000).

Training is often available within BIs (Aerts et al., 2007; Barrow, 2001). Training tools are less interactive and customized than coaching sessions. Training tools range from a training session on a specific topic to newsletters or access to common communication platforms. Peña (2004) found training within BIs to have a positive influence on tenants' performance. Writing a business plan is a conventional activity for nascent companies. Also, young start-ups often need to update their business plans as this is an often seen tool to gain access to potential investors (e.g. Delmar and Shane, 2003). BIs were found to provide assistance in business plan writing, particular when they include idea development in their activities (Peña, 2004). Lastly, BIs can also provide direct subsidies to companies (Peña, 2004).

Access to networks

Access to professional business services or financial resources via networks of professional contacts is also part of the incubator concept (Bøllingtoft and Ulhøi, 2005; Hansen et al., 2000). Access to networks stimulates external collaborations. Yet

the incubation management should only connect tenants to the adequate networks of suppliers, costumer or investors after carefully understanding their needs (Lee and Osteryoung, 2004). Empirical evidence suggests that access to networks is critical for the development of tenant companies (McAdam and McAdam, 2008). Access to financial resources is often offered by business incubators (Aerts et al., 2007). Connections with business angel networks and venture capital firms are important means of providing financial resources during early stages of tenants' development.

The concept behind the idea of compensating for a lack of resources using networks is social capital (e.g. Portes, 1998). New firms seldom have access to established networks to compensate their lack of human and financial resources. Previous work provided empirical evidence of the important role of social capital in building human capital (Coleman, 1988) and its impacts on firm performance (Davidsson and Honig, 2003; Yli-Renko et al., 2001). Accessing professional business services via networks is commonly out of reach for new young firms. For instance, a venture trying to gain access to professional advice on a specific field of IP expertise might fail to do so because it does not have enough financial means to pay high consultancy fees.

New firms often need external finance for development. Typical source of capital for new firms are business angels, venture capital firms or public subsidies (Clarysse and Bruneel, 2007). Among those, venture capital has an important influence on the professionalization of the venture. Venture capitalists typically have a control function, supervising the firm's activities to ensure their own investment as well as a support function to support the growth of their portfolio companies. As a result, venture capitalists contribute to the firm's development by covering their financial needs as well as professionalizing organizational structure and managerial processes (Hellmann and Puri, 2002).

Incubatee selection strategy

Selection criteria and exit policy are among the most important management features of business incubators. (Aerts et al., 2007; Lumpkin and Ireland, 1988). These procedures impact the population of incubated companies as well as the effectiveness of the process of incubation itself. New firm's needs vary according to their development (e.g. Kazanjian, 1988; Vohora et al., 2004). Therefore, the more heterogeneous the population of a BI is, the more difficult it will be to provide them all with the appropriate business support portfolio and access to a useful network of contacts. Selection criteria typically include financial ratios (liquidity, profitability), personal traits of the entrepreneurial team (skills, experience) and market factors (business plan, innovativeness of product or service) (Aerts et al., 2007; Lumpkin and Ireland, 1988). More recently, Aerts et al. (2007) found that the more balanced the selection process is in terms of those selection factors, the better tenants will perform.

Research Design

Empirical setting

We investigated a total of 12 BIs located in six Northwestern European countries. All BIs were part of Nensi – North European Network of Service Incubators, an EU funded project which ran from 2005 until 2008. Based on our definition of TI, we

found 5 TIs and 7 NTBIs which allowed us to have two equally large groups of BIs (Table 2).

The TIs in our sample have similar characteristics. All of them were founded by universities and are still located within their premises. The exceptions are Emergence and the TechnologiePark Münster which are located closely to university campus and research institutions. However, these two TIs were explicitly established to support regionally the creation and development of high-tech companies. All TIs show a clear mission towards the support of technology based ventures. NTBIs in our sample are also similar among themselves. Promoted by other organizations than research universities and located in urban locations, NTBIs do not show any particular focus on supporting technology based ventures. The exception is the BTC which is located close to a university campus and has among its shareholders a technical research-oriented university. Yet its mission is not clearly directed at supporting new technology based ventures but rather service companies (Table 2).

Methodology of data collection

During the Nensi project, we collected data on both business incubators as well as their tenants (for a detailed description of both questionnaires and the monitoring tool see Jenniskens, 2006). The questionnaire sent to business incubation managers included questions on their mission, strategy, focus, stakeholders, university linkages and location. Furthermore, other information on operational features such as tenants' profile, cost structure and business services portfolio was also part of the survey. We triangulated our data with complementary data gathered during site visits (Yin, 2003). Site visits included interviews with the incubation managers and other key staff. These interviews were semi-structured and the script based mostly on the analysis of the returned questionnaires. This allowed us also to clarify response in the questionnaires and to confirm some of the data already collected by alternative wording of the same questions (Fowler, 1995).

The questionnaire sent to tenants contained questions on the several dimensions of business incubation. An initial version of the tenants' questionnaire was used as script for semi-structured interviews to tenants of a selected BI. This procedure enabled us to assess the time needed to fill out the questionnaire as well as to correct some ambiguities in the questionnaires (Dillman et al., 2008). We asked tenants about the availability of infrastructure, business support services and access to networks within their respective BI. Demographic data such as age of venture, age at entry, sector of activity and teams' experience was also collected. Data on tenants was collected by incubator staff. We asked the incubation managers or other key staff within the incubator to manage the data collection process in each incubator. This way we covered a bigger sample of tenants and saved time during data collection. The incubator managers were duly prepared by the first author to carry this task and counted on his constant support while collecting data. From the initial call to 354 companies, 101 returned valid questionnaires (29%) (Table 3).

Table 2. Typology of the researched business incubators

Country	Incubator	Mission statement	University linkages	Location	Focus
Netherlands	BTC	"Focus on knowledge intensive companies and organizations specialized in "high-tech" or high value services" (quotes on the original)	The University of Twente (research university) and Saxion (applied sciences university) are among the shareholders.	Campus / Business and Science Park	Mixed use
	Campus Business Centre	No clear mission found. Campus assumes itself as office rental while mentioning network of professionals for providing support to early stage ventures.	Owned and promoted mostly by ROC van Twente (Regional Educational Centre)	Urban	Mixed use
	Masterdam Ondernemers Centrum	Masterdam positions itself in bridging the gap between the education at ROC ASA and companies.	Owned and promoted mostly by ROC ASA (Regional Educational Centre)	Campus	Mixed use
UK	EPIC - Eliot Park Innovation Centre	No clear mission found. If you are a technology and knowledge based small to medium sized enterprise then EPIC is the ideal environment for you to grow and develop, although all enquiries are considered"	Promoted by Coventry University Enterprises, a for profit subsidiary of Coventry University.	Urban	Mixed use
	EMIN - Innovation Centre	Focused in supporting high-tech new ventures.	Founded by DeMontfort University (research university)	Campus	Technology based
	EMIN - Sparkhouse Studios	"Help new-start businesses grow and develop by providing them with the best possible advice and support available". Focus in the field of creative industries.	Founded by the University of Lincoln.	Campus	Technology based
Ireland	DCEB - Guinness Enterprise Centre	"To provide incubator space (…) to new and established small businesses, primarily in software services oriented businesses, light hi-tech prototype engineering and	No linkages found.	Urban	Mixed use

Country	Incubator	Mission statement	University linkages	Location	Focus
		international/technological traded services, E-commerce, multi-media, internet and mobile software development"			
	DCEB - iCELT	No specific mission found for the business incubator. The BI is however "home to a number of knowledge intensive start-up companies working in the areas of finance, education and learning technologies".	Founded and promoted by the National College of Ireland (teaching oriented university)	Campus	Mixed Use
	DCEB - Terenure Enterprise Board	"To provide practical, realistic support and training to all members in the community, with priority for disadvantaged members."	The Community Enterprise Society Limited is a voluntary organisation with charitable status established in 1984.	Urban	Mixed use
France	Emergence	Emergence was created as a "tool (…) for company creation, aimed at supporting young technology based companies to start, develop and survive."	Although geographically located close to Universities and Research Centers, the centre is not formally connected to any.	Campus / Business Park	Technology based Focused on young ventures
	Normandie Incubation	Housing and support of "innovative enterprise creation projects based in Lower Normandy."	Founded by the University of Caen Lower Normandy, the National Graduate School of Engineering in Caen and the one public research laboratory.	Campus	Technology based Focused on pre starters
Germany	TechnologiePark Münster	"Promotion of innovations and technologies and the consultancy in the formation and growth of technology-oriented firms."	Although geographically located close to Universities and Research Centers, the centre is not formally connected to any.	Urban	Technology based

Table 3. General characteristics and data availability of the researched business incubators

Country	Incubator	Year of Foundation	Size (m^2)	# companies	# valid answers	
Netherlands	BTC	1982	4700	68	11	16%
	Campus Business Centre	2005	5000	49	18	37%
	ROC ASA	2006	300	10	4	40%
UK	CUTP - EPIC - Eliot Park Innovation Centre	-		17	2	12%
	EMIN - Innovation Centre	2001	640	18	6	33%
	EMIN - Sparkhouse Studios	2003	320	10	6	60%
Ireland	DCEB - Guinness Enterprise Centre	1997	4000	67	7	10%
	DCEB - iCELT	2004	1300	13	3	23%
	DCEB - Terenure Enterprise Board	1985	750	25	6	24%
France	Emergence	1995	650	16	13	81%
	Normandie Incubation	2000	300	19	14	74%
Germany	TechnologiePark Münster	1985	6900	42	11	26%
Total				354	101	29%

Variables

Business services

BI services were operationalized using dummy variables for each service within each dimension discussed in section 0. We investigated a total of nine business incubation services. In the questionnaires, we asked tenants about the availability of each of the nine services. We interpret positive answers as available services which are therefore used. Tenants who report not knowing whether the service is available are certainly not using it. *Infrastructure* was measured asking tenants about availability of space and shared resources. Under *business support services* we put internal coaching, training, business plan writing and direct subsidies. *Access to networks* was measured using the variables external coaching, brokerage and seed/venture capital.

Selection criteria and exit policy

Selection criteria and exit policy were captured by using two variables for each. Selection criteria can be proxied by the entry age of tenants. Different entry age of tenants reflects different strategic orientation of the BIs. For instance, accepting older tenants implies a focus on supporting companies already established while admitting younger tenants means the BIs focuses on nascent companies. Additionally, we included a question on the difficulty to get accepted within the BI (dichotomous variable). This will approximate the

extension of the selection procedure. Similarly, exit policy can proxied by the current tenants' age. For entrance, older tenants imply a weak exit policy resulting in housing companies beyond the incubation age. Additionally, we asked tenants whether they know when to leave the incubator. Negative answer can be translated in lack of exit policy.

Tenants' characteristics

Finally, we enquired on characteristics of the entrepreneurial teams. These include experience (in years), specific preparation in entrepreneurship, whether the company was founded by a team, current number of employees and if any member of the team had previous experience in starting businesses.

Analysis

Data analysis will consist of non-parametric independence tests between the two groups, TIs and NTBIs. We did not specifically craft any hypothesis since we set out to uncover the differences between the two kinds of BIs. In any case, it is exremelly difficult to hypothesise on theoretical grounds why any kind of BI would have a higher level or service provision.

Results

An important finding of this study is that TIs and BIs differ in two of those dimensions while being similar on the other. TIs provide almost all their tenants with the infrastructure, business support services and access to networks while NTBIs only exhibit this in the infrastructure dimension. In fact, both types of incubators provide all their tenants with infrastructure, both space and some kind of shared resources. In the business support and access to networks dimensions, TIs show better levels of provision of services to their tenants than NTBIs. Although not covering the entirety of tenants, TIs provide business support services to around 90% of their population of housed firms. Similarly, TIs provide 90% of their tenants with access to network services. The exceptions are direct subsidies (business support) and seed/venture capital (access to networks) which are provided to less than 80% of the tenants.

NTBIs score lower on both business support and access to networks dimensions. Business support services are provided to less than 70% of housed firms. Only training scores higher (77.5%); direct subsidies score much lower, however (48.4%). In terms of access to networks, only brokerage is provided to TIs' comparable levels (more than 80%). External coaching and seed/venture capital are provided to less than half of NTBIs' tenants. We performed nonparametric independence tests to investigate whether the differences are statistically significant. We found that, apart from infrastructure services and brokerage, levels of provision of services in any dimension are statistically significant (p value ≤ 0.05) (Table 4).

Results also show statistically significant differences in selection criteria and exit policy variables between TIs and NTBIs (

Table 5). TIs tend to select younger companies (average entry age = 0.76 years) and use a more sophisticated selection procedure. This is shown by the reduced proportion of their tenants who found it not difficult to get accepted (28.0%). Also, a larger proportion of companies is aware of when to leave the BI (34.7%) and tend to graduate timely (average

current age = 3.02 years). Conversely, NTBIs select much more mature companies (average entry age = 3.02 years) which do not have any difficulty in getting accepted. 64.7% of NTBIs' tenants found it not difficult at all to get accepted within the incubator. Furthermore, tenants do not have any obligation to leave (only 16.3% know when to leave the BI) and are, on average, much older than the typical incubated company (average current age = 5.45 years). All differences are statistically significant (p value ≤ 0.05).

Table 4. Service availability in the researched business incubators

Service (%)	N	TIs (N=50)	NTBIs (N=51)	p value
Infrastructure				
Space	101	100.0	100.0	n.s.
Shared resources	101	100.0	100.0	n.s.
Business support				
Internal coaching	79	93.9	71.7	≤ 0.05
BP support	59	88.5	60.6	≤ 0.05
Training	73	93.9	77.5	≤ 0.05
Direct subsidies	49	78.4	48.4	≤ 0.05
Access to networks				
External coaching	67	90.5	50.0	≤ 0.01
Brokerage	58	90.5	81.1	n.s.
Seed/venture capital	51	76.5	38.2	≤ 0.05

Table 5. Employment, selection criteria, exit policy and entrepreneurial teams' background in the researched business incubators

	N	TIs (N=50)	NTBIs (N=51)	p value
Employment	99	3.08	3.33	n.s.
Selection criteria				
Average entry age (years)	100	0.76	3.02	≤ 0.01
% of not difficult entrance	86	28.0	64.7	≤ 0.05
Exit policy				
Average current age (years)	101	3.02	5.45	≤ 0.05
% of knowing when to leave	98	34.7	16.3	≤ 0.05
Entrepreneurial teams background				
% team start	100	72.0	42.0	≤ 0.01
% serial entrepreneurs	96	29.2	29.2	n.s.
% entrepreneurship preparation	99	40.0	46.9	n.s.
Average accumulated years of experience (years)	92	21.0	14.0	≤ 0.1

In terms of tenants' experience and background, our results show that TIs are attracting significantly more entrepreneurial teams than single entrepreneurs (p value ≤ 0.01), who also have more accumulated experience (p value ≤ 0.1). Yet no statistically significant differences are observed in terms of specific entrepreneurship background or experience in founding prior businesses. Finally, employment is approximately the same on average among both TI and NTBI tenants. The difference is not statistically significant.

Discussion of results

To uncover the difference between TIs and NTBIs, we compared their service provision level and their tenant selection and exit strategies. Statistically significant differences were found in every incubation dimension apart from infrastructure (both premises and shared resources) and brokerage, a service part of the access to networks dimension. It is not surprising that both types of BIs provide the same level of infrastructure. Although the concept of virtual incubation has been gaining notoriety as a way to support new ventures without physical premises (Nowak and Grantham, 2000), most BIs are still property based (Phan et al., 2005). Additionally, our survey was only administered to companies who were physically located within the incubators. To our knowledge none of the BIs in our sample had any virtual incubatees besides the ones located within the physical space (cf. Durão et al., 2005). The fact that brokerage was also not statistically significant suggests that NTBIs provide the same level of brokerage as TIs. In other words, NTBIs act at least as good brokers, providing the relevant contacts to their tenants.

We also investigated the differences in selection strategy. Results show that TIs differ significantly from their counterparts. TIs have stricter and more sophisticated selection procedures while showing also exit policies in line with typical BIs' benchmarks (EC, 2002). The fact that NTBIs have less strict selection criteria and slack exit policies can be the reason behind the observed lower shares of tenants using services. Firms' needs vary throughout their various stages of development (Kazanjian, 1988; Vohora et al., 2004). Not surprisingly, NTBIs housing older tenants show different patterns of service usage than TIs housing younger ones tenants. BI services are especially designed to support companies during their first states of development. Due to strong industry associations, such as the NBIA in the United States of the UKBI in the United Kingdom, it is likely that BIs establish the same kind of services. Unfortunately, this might happen regardless of specific contingencies of each BI and its target population of tenants. Services such as coaching are crucial for nascent companies, become less important for start ups and potentially lose its utility for more mature companies (McAdam and McAdam, 2008). Services such as seed/venture capital, writing business plan are only meaningful for nascent companies. Still, NTBIs still have significant proportions of tenants using other more general services such as training and internal coaching. This suggests that NTBIs might have a diverse portfolio of tenants in terms of age and stage of development.

The reason behind weak selection criteria and slack exit policies might be the built-in potential conflict between the profitability of a property based BI and the longer term goals of support technology based ventures (OECD, 1997). In our sample, most NTBIs are owned and promoted by private organizations and therefore less likely to value technology based venture creation activities above generating revenue. This is also visible in the average age of tenants. Most NTBIs are less than 10 years old which leads us to think that

selection criteria and exit policies were never exclusively focusing in technology based ventures. In fact, it is known that some BIs accept accountants, financial services and insurance companies (OECD, 1997) while showing a reduced number of the type of companies they claim providing support to (Quintas et al., 1992; Ratinho, 2007).

TIs attract more experienced people in terms of work experience as well as a bigger share of entrepreneurial teams as opposed to single entrepreneurs. The differences between serial entrepreneurs and specific entrepreneurial preparation are not statistically significant. The positive role of teams in technology based firms has been extensively discussed (e.g. Colombo and Grilli, 2005). It would be therefore expectable that TIs, which focus specifically in supporting technology based ventures, would end up having more entrepreneurial teams than NTBIs. Similarly, it has been shown that TIs attract more experienced entrepreneurial teams' (Colombo and Delmastro, 2002). The average number of employers of tenants is only marginally higher in NTBIs than it is in TIs. This is unsurprising since it is likely that younger companies grow faster that more mature ones. At the same time, it might mean that companies within NTBIs are not actually growing. The infrastructure of a BI is typically designed for small nascent companies offering office space for small entrepreneurial teams. Therefore, NTBIs' tenants do not grow because they are located within a BI; or due to their sluggish growth combined with slack exit policies, they are still located within a BI.

Conclusions and Implications

Taken together, our results suggest that TIs provide better services to their tenants than their counterparts NTBIs. Better to the extent that the services cover a bigger proportion of tenants and can be therefore seen as more adequate. These high levels of provisions of services suggest that tenants companies are being properly incubated and, arguably, their chances of survival and growth perspectives will be higher. Furthermore, companies housed within TIs are more likely to be technology based and access more new knowledge since they are closely linked institutionally to sources of knowledge creation. Finally, our study suggests that there is a strong differentiating effect of choosing a certain strategic positioning for the BI. This impacts some of its most fundamental operational characteristics such as levels of service providing and tenants' profile.

Our results have implications for BI managers, prospective tenants and policy makers. BI management has to take in account the impact of managerial practices n the population of tenants as well as in the consequent levels of business services provision. Well defined selection criteria and strong exit policies are determinant to the share of companies willing and needing to enjoy every dimension of business incubation beyond infrastructure. If older and diverse tenants are present, business services are, arguably, less needed. BI management might look for alternative strategies to provide business support services to the tenants who still need them to some extent (outsourcing instead of in-house expertise, service level agreements, among others). Prospective tenants have also now an improved understanding on the profile of BIs to look for, according to their stage of development and need for business support services. Not all firms will need an TI environment to develop. Finally, policy makers can also better design BIs and their features according to specific policy aims. When economic growth through transferring of new knowledge to markets using new firms, TIs are bound to be better tools than their counterparts, NTBIs.

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Micro data based macro level competitiveness measurement

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Abstract

The importance of the SMEs in the modern economies have increased in the past decades. While the link between economic growth and competitiveness is well-known, present competitiveness measures lack the microeconomic foundation. In this paper I present a competitiveness measurement technique that links directly the micro- or firm-level and the macro- or regional/country-level factors of competitiveness. I use business-level data from the Global Entrepreneurship Monitor (GEM) database that are combined and weighted with institutional variables derived from various large international institutions. By applying the interaction variable method in a unique way, the competitiveness of the individual businesses can be calculated individually. The country-level rank of competitiveness is the result of the aggregation of the individual business competitiveness. The final rank is relevant and has strong correlation with other existing well-known competitiveness rankings.

Keywords
competitiveness, measurement technique, interaction variable method

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Introduction

The importance of the small and medium-sized businesses (SMEs) in the modern economies have increased several ways in the past decades (Gumpert 1982, Piore 1990, Feldman et al. 2005, Autio et al. 2005, Hellmann 2007). Although their many drawbacks (small size, lack of managerial capabilities, missing resources, undercapitalization etc.), these firms employ the majority of the workforce, while concerning other macroeconomic data (e.g. export, profitability etc.), large multinational companies have decisive leverage. Moreover, SMEs are the major sources of breakthrough innovations. While the SME sector can be generally viewed as a whole, it constitutes very diverse businesses. For instance, a general finding in this literature is that with respect to the entrepreneurs' gender (DeTienne and Chandler 2007; Langowitz and Minniti 2007), the differences are minor contrary to the family background (Hundley 2006) where the differences are conspicuous. The same results are published about the role of the environment both in the developed (Le 1999) and the emerging countries (Manolova et al. 2008). Finally, the positive relationship between the entrepreneurial activity of this sector and the economic growth is evident nowadays (Audretsch and Thurik 2001, Wong et al. 2005, Salgado-Banda 2007). Additionally, in the economic crisis the most important question addresses that who will survive until the economy recovers. These are the reasons why the competitiveness of SMEs should be investigated in details.

The analysis of competition as the fight for scarce resources is in the centre of researches from the 1980s. However, it is relatively a new phenomenon to define competitiveness as the ability to achieve dominance and steadiness in the competition (Botos 2000). The theoretical and practical researches have primarily been focused on Michael Porter's model system (Porter 1998) and its critique[2] (Krugman 1994).

Various measures of competition can be found in the standard economic theory (Samuelson and Nordhaus 2002). The measurement of competitiveness is not without challenges because first we have to declare at which level we want to measure competitiveness. We can speak about at least two levels of competitiveness: the micro- or firm-level and the macro- or regional/country-level competitiveness. Although Krugman's often cited critique denies the existence of macro-level competitiveness, I argue about the superpose and interdependence of it: large numbers of local competitive firms can provide positive externalities (Varga and Schalk 2004) that support and accelerate regional development which will found macro-level competitiveness (Czakó 2000). Despite existing theoretical debates, there are several widely accepted macro competitiveness ranking lists such as Global Competitiveness Report[3] and World Competitiveness Yearbook[4]. All of them focus mainly on the macro-level competitiveness, applying a top-down approach and using no or only some micro-level data. Contrary, micro-level competitiveness measures are published only in the past few years (Chikán et al. 2006, Márkus 2008).

[2] Krugman draws the attention to the fact that countries do not compete with each other the way corporations do, so the blessing of competitiveness easily leads to bad policy.

[3] Global Competitiveness Report published by World Economic Forum since 1979, nowadays about 130 countries all over the world.

[4] World Competitiveness Yearbook published by International Institute for Management Development (IMD) since 1989, nowadays about 55 countries all over the world.

My purpose is to present a bottom-up measurement method where enterprise-level data are weighted and aggregated to measure both the micro and the macro level of competitiveness. My researches and results are based upon another pioneering research project (Szerb and Acs 2009), and the results are comparable.

The paper is structured as follows: in the first section I present the database, then the competitiveness model is introduced. In the third section I discuss the results and finally, I draw the conclusions.

The database

As mentioned previously, there are several macro- and some micro-level competitiveness indexes. Although it could be trivial, these indexes give no evidence for the transition between the two levels. The micro-level indexes care about firms' relative competitiveness in a given country and do not care about the country-level competitiveness, and vice versa. My purpose is to show an example how to fill this gap by presenting a bottom-up model where company-level data are weighted and aggregated to country-level measures resulting an alternative solution to connect the two levels. All variables, the core methodology and the theoretical assumptions are the same as in another pioneering research project which aims to publish the Global Entrepreneurship Index (GEI) (Acs and Szerb 2009). However, there are two notable differences:

(1) Acs and Szerb (2009) apply individual data aggregated on the country level while I use the original individual data, calculate the competitiveness index value of a firm then aggregate them on the country level;

(2) I use existing businesses' (older than 42 months) data while Acs and Szerb (2009) use early-phase (nascent and baby) businesses' data.

The business-level data are from the Global Entrepreneurship Monitor (GEM) Adult Population Survey database. The 2005 and 2006 data set is merged together. I use only the responses from businesses older than 3.5 years. The used country-level distributions of established businesses (businesses older than 3.5 years) are the following[5]:

Table 1. The number of businesses in the data set on the country level

Country	Frequency	Percent		Country	Frequency	Percent
Argentina	265	1,5		Latvia	197	1,1
Australia	459	2,6		Malaysia	159	0,9
Austria	123	0,7		Mexico	90*	0,5
Belgium	276	1,5		Netherlands	369	2,1
Brazil	441	2,5		New Zealand	87*	0,5
Canada	468	2,6		Norway	245	1,4
Chile	216	1,2		Peru	220	1,2
China	415	2,3		Philippines	440	2,4
Colombia	204	1,1		Russia	23*	0,1
Croatia	156	0,9		Scotland	63*	0,4
Czech Republic	95*	0,5		Singapore	332	1,8
Denmark	623	3,5		Slovenia	317	1,8
Finland	321	1,8		South Africa	85*	0,5

[5] . Some countries are over- (e.g. Spain) and some are under-represented (e.g. USA). Despite these facts, the chosen methodology – described following – ensure the robustness of the findings. Additional calculations are available upon request.

Country	Frequency	Percent		Country	Frequency	Percent
France	53*	0,3		Spain	3251	18,1
Germany	586	3,3		Sweden	219	1,2
Greece	390	2,2		Switzerland	546	3,0
Hungary	214	1,2		Thailand	654	3,6
Iceland	319	1,8		Turkey	284	1,6
India	127	0,7		United Arab Emirates	27*	0,2
Indonesia	359	2,0		United Kingdom	2348	13,1
Ireland	302	1,7		United States	303	1,7
Italy	187	1,0		Uruguay	125	0,7
Jamaica	631	3,5		Venezuela	171	1,0
Japan	197	1,1		**Total**	**17982**	**100**

*Since the frequency in these countries is less than 100, in what follows, their scores are calculated but not presented.

The description of the methodology and the variables

To link business- and country-level competitiveness I selected 12 business-level variables and 12 related country-level institutional variables as follows. All of the institutional variables are well-known, widely accepted and freely accessible at large international institutions and research centers. Because entrepreneurship depends on the mutual interplay of the individual level and institutional variables (Busenitz and Spencer 2000) I multiplied the business-level variables by institutional variables to demonstrate their conditional effect on the competitiveness. This interaction variable method is popular in econometrics (Acs and Varga 2005) where the combined and not the individual effects are the subject of investigation. The description of these variables is shown below, the summary is in the Appendix.

The first two business-level competitiveness variables are about the innovation activities (Szerb 2000, Pitti 2005), namely, the *product and technology innovation* (with 3 possible values for each). The chosen institutional variables are *RandD percentage of GDP* and the *Innovation index points* from Global Competitiveness Index suggesting that innovation in developed countries is a more systematic activity than in developing countries that tend to buy or copy existing products and technologies. The third indicator is the *Export* (Luostarinen 1994) (measured by the percentage of customers living abroad) weighted with the *KOF's Index of Globalization* of the given country. The fourth indicator is *Foundation motivation* (Bygrave et al. 2003) (necessity – mixed – opportunity motivated) multiplied by the World Bank's *Doing Business Index* reflecting the easiness of startup. The *Level of competition* is also included (Solow 1956, Meyer 1995) and it is weighted by the level of *Freedom of the economy* from Heritage Foundation indicating the freedom to start, operate and close businesses in the investigated country. The *Education level* of the entrepreneur is one of the necessary success factor (Laki 1998) (measured by post/no post secondary degree) weighted by the *Human Development Index* of the United Nations which measures the life expectancy, educational attainment and income in the given country. The seventh business-level variable is the *Business opportunities* perception (Bedő et al. 2006, Takács 2008) multiplied by *Market size* from Global Competitiveness Index which emphasize that larger countries with higher purchasing power provide better opportunities than smaller and poorer countries. The present *Personal skills* (Autio 2005) of founding and operating the business has to be considered and it is weighted by the *Percentage of population enrolled in post-secondary education* which capture the effect of

education on startup skills. One of the hindering effects is the *Fear of failure* (Wong et al. 2005), the chosen institutional variable is *Country Risk Rate* from Coface expressing the general financial macroeconomic and business climate of the businesses in a given country. Also necessary is the adequate personal *Connections* (Hundley 2006, Pintér 2004) and the reliable infrastructure measured by *Internet users per 100 inhabitants*. The local supportive culture (Mueller and Thomas 2001) is measured by the *Career choices* and it is weighted by the *Corruption Perceptions Index*. Finally high-*Growth* businesses are the most competitive businesses (Birch 1981, Autio 2005 and 2007) and it is weighted by *Business Strategy Sophistication Index* from Global Competitiveness Index expressing the ability of companies to pursue distinctive strategies.

The company-level variables have 2 or 3 possible values. The institutional, country-level variables are measured on several different ordinal and interval scales. First, these scales have to be normalized to a [0;1] scale:

$$\overline{\mathrm{iv}_{\mathrm{jk}}} = \frac{\mathrm{iv}_{\mathrm{jk}}}{\max(\mathrm{iv}_{\mathrm{jk}})} \qquad (1)$$

where:

- $\overline{\mathrm{iv}_{\mathrm{jk}}}$ is the normalized value of the *k*th institutional variable of the *j*th country,
- $\mathrm{iv}_{\mathrm{jk}}$ is the original value of the *k*th institutional variable of the *j*th country,
- $\max(\mathrm{iv}_{\mathrm{jk}})$ is the maximum value of the *k*th institutional variable of the *j*th country.

To calculate the Micro (business level) Competitiveness Index, I numerated the sum-product of the indicators:

$$\mathrm{MCI}_{\mathrm{ij}} = \sum_{\mathrm{k}} \mathrm{ci}_{\mathrm{ijk}} \times \overline{\mathrm{iv}_{\mathrm{jk}}} \qquad (2)$$

where:

- MCI_{ij} is the micro (business) level competitiveness index of the business *i* in country *j*,
- ci_{ijk} is the *k*th competitiveness variable of business *i* in country *j*,
- $\overline{\mathrm{iv}_{\mathrm{jk}}}$ is the normalized value of the *k*th institutional variable of country *j*.

After obtaining the MCI (from equation 2) with the help of the competitiveness indicators described previously, I computed the Aggregated Country Competitiveness Index by averaging the domestic business scores as follows.

$$\mathrm{ACCI}_{\mathrm{j}} = \frac{\sum_{\mathrm{i}} \mathrm{MCI}_{\mathrm{ij}}}{\mathrm{N}_{\mathrm{j}}} \qquad (3)$$

where:

- $ACCI_j$ is the Aggregated Country Competitiveness Index of country *j*,

- MCI_{ij} is the micro- (business-) level competitiveness index of the company *i* in country *j* (getting from equation 2),
- N_j is the number of firms in countrv *i*.

For a better comparison I normalized the $ACCI_j$ score to a [0;1] scale:

$$\overline{ACCI_j} = \frac{ACCI_j}{\max(ACCI_j)} \qquad (4)$$

where:

- $\overline{ACCI_j}$ is the normalized Aggregated Country Competitiveness Index of country *j*,
- $ACCI_j$ is the original Aggregated Country Competitiveness Index of country *j*,
- $\max(ACCI_j)$ is the maximum value of the original Aggregated Country Competitiveness Index.

Results

After calculating the business- (MCI) then the country-level ($\overline{ACCI}$) index scores, finally, I obtained the Aggregated Country-level Competitiveness Rank list as follows:

Table 2. Aggregated Country-level Competitiveness Rank

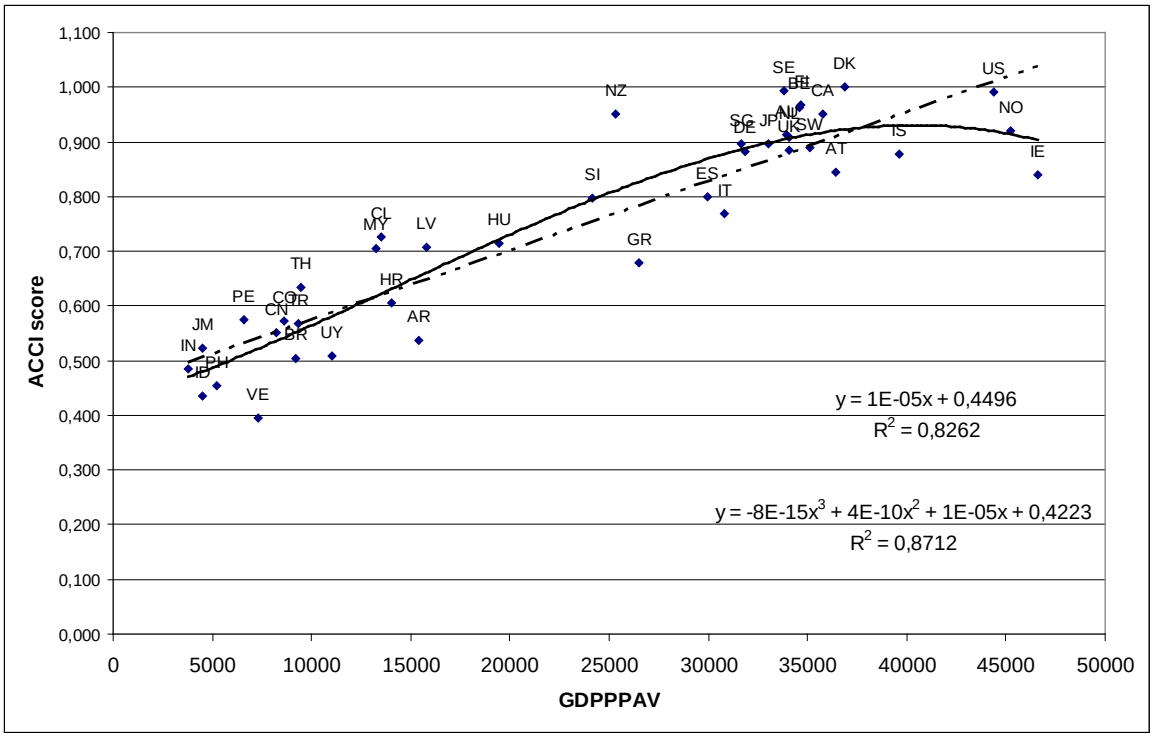
Rank	Country	ACCI score	Rank	Country	ACCI score
1	Denmark (DK)	1,000	21	Italy (IT)	0,769
2	Sweden (SE)	0,992	22	Chile (CL)	0,725
3	United States (US)	0,991	23	Hungary (HU)	0,714
4	Finland (FI)	0,967	24	Latvia (LV)	0,707
5	Belgium (BE)	0,962	25	Malaysia (MY)	0,704
6	New Zealand (NZ)	0,951	26	Greece (GR)	0,678
7	Canada (CA)	0,951	27	Thailand (TH)	0,634
8	Norway (NO)	0,919	28	Croatia (HR)	0,605
9	Australia (AU)	0,914	29	Peru (PE)	0,576
10	Netherlands (NL)	0,909	30	Colombia (CO)	0,573
11	Japan (JP)	0,897	31	Turkey (TR)	0,568
12	Singapore (SG)	0,896	32	China (CN)	0,552
13	Switzerland (SW)	0,890	33	Argentina (AR)	0,536
14	United Kingdom (UK)	0,885	34	Jamaica (JM)	0,523
15	Germany (DE)	0,883	35	Uruguay (UY)	0,508
16	Iceland (IS)	0,878	36	Brazil (BR)	0,505
17	Austria (AT)	0,844	37	India (IN)	0,484

Rank	Country	ACCI score
18	Ireland (IE)	0,840
19	Spain (ES)	0,800
20	Slovenia (SI)	0,798

Rank	Country	ACCI score
38	Philippines (PH)	0,454
39	Indonesia (ID)	0,434
40	Venezuela (VE)	0,396

Comparing country scores to per capita GDP averages in PPP (GDPPPAV, 2006-2007, World Bank) the correlation coefficient is 0.8712. By estimating the linear and exponential trends I got the following results:

Figure 1. Curve estimation



As it is seen, the cubic polynomial trend has the best fit, explaining 87.12% of the variance of GDPPPAV.

Finally, I compared my results to two existing competitiveness researches: the Global Competitiveness Index and the World Competitiveness Yearbook:

Table 3. Spearman correlation coefficients of competitiveness ranks

	WCY	ACCI
Global Competitiveness Index	0.901*	0.856*
World Competitiveness Yearbook	1	0.804*
Aggregated Country Competitiveness Index		1

*Significant at 1% significance level.

As indicated in table 3, there is a strong, significant correlation between ACCI and the two main competitiveness rankings, showing that the results are relevant in comparison of the existing indexes.

Concluding Remarks

In this paper I presented a measurement method of competitiveness, combining the micro- or firm-level and the macro- or regional/country-level measurements. The main contribution of my work is that this measurement uses a business-level database and aggregates it to a country-level score. The core theoretical assumption was the superpose in the micro and macro level that large numbers of local competitive firms can provide positive externalities that support and accelerate regional development, which is the basis of macro-level competitiveness. The business-level data are from the Global Entrepreneurship Monitor (GEM) 2005-2006 aggregated database for established businesses (businesses older than 3.5 years) for 40 countries. I chose 8 business-level competitiveness indicators and 12 institutional variables for weights from external databases, and aggregated them to get the Aggregated Country Competitiveness Index.

By investigating the scoring, I found that the cubic polynomial ("S"-shaped) trend line was best fitted to per capita GDP averages in PPP, while the rank correlations with two main macro-level competitiveness ranks were over 0.8.

The limitations concerning my work are mainly due to the pioneering methodology of the combination of the individual and institutional variables and the relative low number of the investigated countries. In spite of the theoretical intuitions, the business-level competitiveness indicators should be investigated deeply and the institutional variables either. Another interesting question is that how robust the model and the ranking order are to newer and newer data.

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Appendix: The applied competitiveness and institutional variables

Business level competitiveness variables			Country level institutional variables	
Indicator	**Question**	**Possible values**	**Institutional variable**	**Source**
Product innovation	Do all, some, or none of your potential customers consider this product or service new and unfamiliar?	(1) All (2) Some (3) None	GERD (RandD percentage of GDP)	OECD
Technology innovation	Have the technologies or procedures required for this product or service been available for less than a year, or between one to five years, or longer than five years?	(1) More than 5 years (2) Between 1-5 years (3) Less than a year	Innovation index points from Global Competitiveness Index (GCI)	World Economic Forum (GCI)
Export	What proportion of your customers normally lives outside your country?	(1) Less than 10% (2) More than 10%	Index of Globalization	KOF Swiss Economic Institute
Foundation motivation	Are you involved in this firm to take advantage of a business opportunity or because you have no better choices for work?	(1) Necessity (2) Mixed (3) Opportunity	Doing Business Index	World Bank
Level of competition	Right now, are there many, few, or no other businesses offering the same products or services to your potential customers?	(1) No competitors (2) Some competitors (3) Many competitors	Freedom of the economy	Heritage Foundation
Education	Educational Attainment	(1) no post secondary degree (2) post secondary degree	Human Development Index	United Nations
Business opportunities	In the next six months there will be good opportunities for starting a business in the area where you live	(1) No (2) Yes	Market size from Global Competitiveness Index (GCI)	World Economic Forum (GCI)
Personal skills	You have the knowledge, skill and experience required to start a new business	(1) No (2) Yes	Percentage of population enrolled in post-secondary education	World Bank
Fear of failure	Fear of failure would prevent you from starting a business	(1) Yes (2) No	Country Risk Rate	Coface
Connections	You know someone personally who started a business in the past 2 years	(1) No (2) Yes	Internet users per 100 inhabitants	International Telecommunication Union
Career choices	In your country, most people consider starting a new business a desirable career choice	(1) No (2) Yes	Corruption Perceptions Index	Transparency International
Growth	Right now and five years from now how many people, not counting the owners but including exclusive subcontractors, are working for this business?	Employing 10 plus persons and over 50% growth or not.	Business Strategy Sophistication Index from Global Competitiveness Index (GCI)	World Economic Forum (GCI)

Test of entrepreneurial orientation construct: the case of an emerging market

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Abstract

The primary purpose of this article is to test the entrepreneurial orientation (EO) construct in emerging market context and link it to Timmons' model of entrepreneurial processes. The relevance of the research is justified by high level of uncertainty entrepreneurs confront in emerging markets as an effect of the current economic and financial crises. The authors also suggest alternative methodology (Multidimensional scaling) for testing EO construct.

Keywords

corporate entrepreneurship, entrepreneurial orientation, multidimensional scaling, speculation

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Introduction

Entrepreneurial Orientation (EO) refers to the strategy-making practices and decision-making styles of managers in identifying and exploiting opportunities. It is a mindset – an entrepreneurial perspective – that is reflected in a firm's ongoing behavior (Lumpkin, 2009). Entrepreneurial firm behavior consequently may be seen as a 'mode of management', and hence an organization is entrepreneurial when its management acts entrepreneurially (Stevenson and Jarillo, 1990). Researchers also acknowledged that EO originates from strategy-making process literature (Miller and Friesen, 1978; Lumpkin and Dess, 1996). Consequently, EO addresses process aspects – how managers act entrepreneurially. It is a way in which entrepreneurs behave in creating their "new entry" – be that entry a new firm, a new product or technology, or a new market.

The behavioral approach challenged the research community to decide where entrepreneurship ends and what distinguishes the characteristics of entrepreneurial management work from those of non-entrepreneurial – the administrative – management (Gartner, 1988). Furthermore, Brown et al. (2001) argue that the lack of empirical testing of entrepreneurial management is a major impediment to the further development of entrepreneurship theory given its importance to firm- and societal-level value creation. Theory development calls for surveys designed upon valid measures of key constructs of entrepreneurial management (Sexton and Landström, 2000).

Historically, Miller (1983) developed a scale to empirically measure firms' degree of entrepreneurship on the basis of the extent to which they take risks, innovate and act proactively. This measurement instrument has been subsequently further developed by Covin and Slevin (1986; 1989) to tap important aspects of firm-level entrepreneurship. These instruments have been in use as a baseline by other researchers (cf. Barringer and Bluedorn, 1999; Stopford and Baden-Fuller, 1994), even though Zahra (1993) critiqued them for not being comprehensive enough.

Comparision of previous studies has revealed a good deal of uniformity. The summary in Table 1, entitled 'Summary of previous studies on entrepreneurial orientation' provides a comprehensive overview of previous researches. The most striking limitations of these researches, in short, are the following:

First, there is a trend in EO research to collect data primarily from manufacturing companies. Service companies, which represent one of the fastest growing sectors in the global economy, have received only modest attention (Zahra et al., 1999). The negative effect of focusing on one single industry is that the studies are missing the chance to capitalize on inter-industrial differences in structure and competitive dynamics.

Second, the validation of constructs is overwhelmingly made upon American databases. Even though Europe is characterized by large differences between regions and countries, and there are various institutional settings that influence entrepreneurship (Huse and Landström, 1997), only a few attempts have been made to highlight differences in firm-level entrepreneurial activity in emerging markets.

Third, research has shown a methodologically unilateral character. In their review, Chandler and Lyon (2001) called attention to the methodological creativity which is indispensable when testing research models. Arriving at a similar conclusion, Oviatt and McDougall (2005) also called for a more sophisticated research design and for the use of

more appropriate analytical techniques in testing measures of firm-level entrepreneurial activities.

Fourth, resources are crucial to the performance of a venture; however, resources alone are not sufficient to achieve a sustainable competitive advantage. Entrepreneurs need to select competitive strategies to make better use of the resources available to them (Ucbasaran et al., 2001). It follows that it is also a key issue to analyze the contingencies in which empirically derived taxonomies are effective and to define the underlying dimensions that explain the variety among strategy types (Miller, 1996).

Table 1. Summary of previous studies on EO

Author	Year	Country	Firm size	Industry	Sample size	Factor analysis	Perfor mance
Covin & Slevin	1986	US	Large	Manufacturing	200+	☑	☑
Covin & Slevin	1989	US	Small	Manufacturing	344	☑	☑
Lumpkin & Dess	2001	US	Medium to large	Heterogeneous	131	☑	☑
Antoncic & Hisrich	2001	Slovenia/US	Medium to large	Manufacturing	141/50	☑	☑
Brown et al.	2001	Sweden	X	X	1233	☑	☑
Kemelgor	2002	Netherlands/ US	Large	Manufacturing	4/4	☑	☑
Wiklund & Shepherd	2005	Sweden	Small	Heterogeneous	413		☑

Fifth, the critical question posed by Gartner (1988) – What distinguishes the characteristics of entrepreneurial management work from that of conventional management? – has remained unanswered.

Based on the above listed gaps in literature, authors' goal was to investigate the research question "What are the differences in the drivers of entrepreneurial and administrative managers?" by designing such a survey that not only adds points of strength to previous studies but also improves our knowledge by applying state-of-the-art statistical techniques. Doing so, the entrepreneurial activity is tested in a new context, on an emerging market including the service industry. Moreover, the relationships among variables proposed by the research model are tested by a statistically more reliable technique, the multidimensional scaling (MDS). As suggested by Lumpkin (2009) the distinction between entrepreneurial and administrative management allows for refining our knowledge about entrepreneurial strategy, firm performance, or the characteristics and the drivers of the entrepreneur. Within the framework of present research, authors attempt to compare the proposed behavior of entrepreneurial managers to the behavior of non-entrepreneurial managers on the basis of Timmons' revised model.

The paper is organized as follows: First, we review the literature to show the theoretical foundation of the entrepreneurial construct and how previous studies attempted to measure it. The authors then examine ambiguities in the application of factor analysis and introduce multidimensional scaling as a solution for the validity problem. Next, focusing on contingencies the relationship between entrepreneurial management and assumed entrepreneurial behavior is tested. This is followed by the discussion of findings.

Literature Review

There has been a growing interest in the implications of conceiving of entrepreneurship as a set of firm-level behaviors. The concept of corporate entrepreneurship has been around for at least 20 years, marked by the seminal works of Burgelman and Sayles (1985), Burgelman (1984), Covin and Slevin (1989, 1991), and Lumpkin and Dess (1996), and since then it has grown in both extent and depth. Amongst researchers, however, there is still no consensus on what are the underlying assumptions and objectives. Broadly speaking, corporate entrepreneurship refers to the development of new business ideas and opportunities within established corporations (Birkinshaw, 2003).

The strategic decisions made early in a firm's history generally affect its strategy for years afterward (Sandberg, 1992). Romanelli (1989) found little change in strategies following the third year after founding. Not only do such decisions lock a firm into a strategy, but they also affect its structure and systems (Dobák, 1999). The structures and processes have become part of an integrated whole over the years in which it is difficult to change one element without unraveling the whole (Eisenhardt, 1988).

Hence, the job of senior executives is to develop a set of corporate systems and processes that promote such entrepreneurial culture and behavior throughout the organization. It is about creating an organizational climate of controlled freedom in which the senior executives do their jobs by getting out of the way of those they empower to execute strategy (Aldrich and Martinez, 2001). To keep the organization entrepreneurial, the manager's role would be parallel to that of the entrepreneur. According to Pinchot (1985) an entrepreneurial manager must be responsible for developing and communicating organizational vision, identifying new opportunities for the organization, challenging existing ways of doing things, and breaking down bureaucratic inertia. The entrepreneurial manager should do all this with an entrepreneurial approach to using power, leadership and motivation, and an ability to overcome organizational resistance to change.

Prior studies have focused to a large extent on contextual features in explaining why some managers act entrepreneurially and others, being exposed to the same corporate context, do not. Though it might be intellectually stimulating to find out what motivates entrepreneurial managers and how they differ, the authors share the point of view of Mair (2005) as well as Aldrich and Martinez (2001) that the critical question is how these individuals manage to create and sustain successful organizations despite severe obstacles and what distinguishes the characteristics of entrepreneurial management from those of conventional management (Gartner, 1988).

This implies that entrepreneurship is a behavioral phenomenon and hence, entrepreneurial management may be seen as a 'mode of management' different from administrative management style (Stevenson and Jarillo, 1990). In this regard, entrepreneurial firms are those in which the top managers have entrepreneurial management styles as evidenced by

the firm's strategic decisions and operating management philosophies (Covin and Slevin, 1986; 1989). Consequently, entrepreneurship is not a dichotomous variable. Rather, all firms fall along a conceptual continuum that ranges from highly conservative to highly entrepreneurial (c.f. Barringer and Bluedorn, 1999; Davidsson, 2003). At one extreme, the truly "promoter" firms are risk-taking, innovative, and proactive while at the opposite extreme, the conservative "trustees" are risk-averse, less innovative, and adopt a 'wait and see' posture (Stevenson, 2006).

Empirical studies which contrasted entrepreneurial with administrative management (cf. Nyström, 1979; Miller, 1983; Busenitz and Barney, 1997; Barringer and Bluedorn, 1999; Hortoványi and Szabó 2009; Hortoványi, 2007) have confirmed that a firm's position on this continuum is determined by the level of its entrepreneurial orientation.

The entrepreneurially behaving firms are generally distinguished from administrative firms in their ability to innovate, initiate change, and perpetuate the strengths of flexibility and responsiveness (Guth and Ginsberg, 1990). The classification scheme is an ideal one, in the sense that it emphasizes and highlights features that are less pronounced in the extremes. It does not imply that either type of firm by definition is better or worse from a strategic point of view. Thus, entrepreneurial management is not an idealistic example, but rather a range of behavior that consistently falls closer to the promoter's end of the spectrum.

The Measures of Entrepreneurship

Based on the literature there are five generally accepted measures of entrepreneurship: autonomy, innovation, proactiveness, risk-taking, and competitive aggressiveness.

Autonomy refers to the independent action of an individual or a team in bringing forth an idea or a vision. In general, it means the ability and will to pursue opportunities, even though factors such as resource availability, actions by competitive rivals, or internal organizational considerations may change the course of the initiative, but not sufficient to extinguish it (Lumpkin and Dess, 1996). As a consequence of delegating authority to operating units (Szabó, 2005) in entrepreneurial firms, the impetus for new initiatives stems from lower levels of the hierarchy.

The goal of innovation is the creation of a marketable competitive advantage rather than a pure technological invention. Accordingly, technical-technological, organizational, financial and commercial activities are equally present, and they – in interaction with one another, in an integrated way – determine the way of materializing an idea. Innovation as such demands extensive information processing capability across projects and organizational boundaries (Brown and Eisenhardt, 1997) and across organizational disciplines (Volberda, 1996).

Pro-activeness is concerned with 'first mover' and other actions aimed at seeking to secure and protect market share and with a forward-looking perspective reflected in actions taken in anticipation of future demand (Covin and Slevin, 1989; Lumpkin and Dess, 2001). A firm can be novel, forward thinking, and fast without being always the first (Lumpkin and Dess, 1996). That is why in our study we also included the anticipation of and acting on opportunities for the sake of shaping the environment – that is, to influence trends and create demands.

Measuring the extent to which individuals differ in their willingness to take risks is fraught with difficulty, especially when it is based on subjective evaluation. This is so because,

what one person regards as a "calculated" approach another may regard as "aversion". Hence we decided that in addition to the CEO's self-evaluation we cross-check risk-taking willingness by investigating the growth plans of the firm. We believe that the willingness to take risks increases as CEOs choose to move away from known territories – i.e., from existing products and the existing markets – to the unknown. Thus, diversification typically involves a greater risk than market penetration as the former usually requires new skills, new techniques, and new facilities. As a result, diversification almost invariably leads to physical and organizational changes in the structure of the business, which represents a distinct break with past business experience. By contrast, the market penetration is usually in the form of line extension, which builds on the same technical, financial, and merchandising resources used for the original product line.

Competitive aggressiveness refers to how the firm relates to competitors. It is the firm's propensity to directly and intensely challenge its competitors to achieve legitimacy and power. It may take the form of head-to-head confrontation, but it also reflects a willingness to be unconventional rather than rely on traditional methods of competing, for example via challenging a competitor's weaknesses (Lumpkin and Dess, 1996).

Theory Development and Hypotheses

The purpose of our study is to fill the gap identified in the literature by empirically gauging the behavior of Timmons' model of the entrepreneurial manager and to test it on a large sample of firms. Consequently, the central question of present research is this: what are the drivers of entrepreneurial management?

Building on Timmons' model of entrepreneurial process (Timmons and Spinelli, 2008) the authors hypothesize that opportunity-based entrepreneurial behavior is induced by the presence of persistence, social capital and research gaps.

Table 2. Hypotheses development

Timmons' model	Proposed model
Opportunity driven	Persistence
Team	Social capital
Parsimonious resources[7]	Resource deficits and gaps

As can be seen in Table 2, the model originated by Timmons suggests that the entrepreneurial process is opportunity driven, led by a team with parsimonious resources. Taking it one step further, the authors argue that in addition to being opportunity driven, entrepreneurial managers need to be persistent despite the odds; they need to move beyond their team by mobilizing their social capital; and they must confront not just "less" but missing (deficit) resources.

Entrepreneurial managers are assumed to be tested by the viability of their ideas. Rarely are entrepreneurs able to see 'the end from the very beginning'. This is so because there is no 'end' until the opportunity unfolds (Berger and Luckmann, 1967). Of course, in

[7] Parsimony is taken as the concept of „less is better"

evolutionary entrepreneurship theory entrepreneurial actions need not be completely blind; they may be deliberate or intelligent. However, entrepreneurs often learn that the nature and scope of the opportunity is different from what they originally believed. As Stevenson and Gumpert (1985) noted, entrepreneurial managers have the confidence to pursue their vision firmly and resolutely, despite the initial odds, along the way the opportunity takes shape and the end product evolves (Leifer et al., 2000). Such a trial-and-error learning, the firmness of purpose and the relentless pursuit of the entrepreneur's vision distinguish them from non-entrepreneurial managers. Therefore, the authors suggest the following:

Hypothesis 1: The level of opportunity commitment will be significantly greater in the case of high entrepreneurial management than in the case of low entrepreneurial management.

Hypothesis 2: The strategic development of social capital in order to access missing resources and information will be significantly greater in the case of high entrepreneurial management than in the case of low entrepreneurial management.

Hypothesis 3: The temporary resource gaps will be significantly more frequent in the case of high entrepreneurial management than in the case of low entrepreneurial management.

Methodology and Research Design

The researchers' goal in gathering empirical data was twofold. The first goal was to enrich our understanding by testing constructs on an emerging Central-European database. Authors have designed and conducted an online survey for testing our hypothesis on a large sample of small and medium-sized organizations (SMEs). The survey process was rigorously designed: Authors defined an SME, based on its size, as having between 10 and 250 employees. From a random sample of 1000 firms, only 587 non-agricultural firms that had been in existence at least three years were selected.

In order to accomplish the second goal, a new methodology – Multi Dimensional Scaling – was introduced. In their review, Chandler and Lyon (2001) pointed out that scholars increasingly tend to employ sophisticated methodology in entrepreneurship research; however, only 20% of the 416 articles reviewed used any statistical analysis beyond simple descriptive statistics. Arriving at a similar conclusion, Oviatt and McDougall (2005) called for more sophisticated research design and for the use of more appropriate analytical techniques.

Data Collection

In order to produce generalizable results, authors have utilized a simple random sample obtained from the Central Statistics Office (Budapest, Hungary) in October, 2008. The random sample of 1000 non-agricultural firms registered in Hungary, however, needed to be further reduced by eliminating those firms which failed to match the following two criteria: firms must have been in business at least since 2005 and the minimum number of their employees respectively must be at least 10. The imposed sampling frame yielded a sample of 587 firms. The survey took place between March 2009 and April 2009. Out of the 587 firms, we managed to collect 203 responses yielding a response rate of 34.58%. The authors believe that the considerably high response rate is sufficient to eliminate non-response bias.

Data collection was done through a structured online survey, where the respondents – founders or senior managers (mainly CEOs) – were asked a series of questions about pairs of statements representing the opposite ends of the entrepreneur-administrator continuum. They were asked to compare their own management style to those statements and to judge the degree of similarity or dissimilarity between their style and the style represented by the statements. One potential advantage of this perceptual approach is the relatively high level of validity because it allowed the authors to pose questions that directly addressed the underlying nature of the constructs. Entrepreneurship researchers frequently use the self-reported perceptions of business owners and executives because those individuals are typically quite knowledgeable regarding company strategies and business circumstances (Hambrick, 1981). For example Lumpkin and Dess (1996) refer to a study of Chandler and Hanks (1994) which found a correlation between the owner's and the CEO's assessments of business volume (earnings, sales etc.) and archival sales figures.

In order to reduce the occurrence of response contamination, the authors mixed the pair of questions time to time, so that each type of statement – entrepreneurial as well as administrative –could appear on both sides. The idea for mixing the questions was derived from Davidsson (2005) who suggested that the "higher" the level of measurement is for the operationalizations of a variable, the better.

Finally, the authors also have decided to take advantage of modern technology by designing a hundred-point equal-length scale from both ends of the continuum instead of the generally applied 7-point Likert scale. Respondents, however, were not expected to work with numbers; rather, they were asked to use a visual scale by placing the pointer between minus 100 and plus 100, including zero, in accordance with their personal judgment about the opposing pairs. By working with a 201-point scale, authors also believe that the MDS algorithm could better explain the underlying dimensions.

Testing Data

Based on the five measures of entrepreneurship (namely autonomy, innovation, proactiveness, risk-taking, and competitive aggressiveness) the authors have generated 11 pairs of statements (variables).

Analyzing previous studies that aimed to operationalize and validate entrepreneurial orientation (without claiming a complete list: Barringer and Bluedorn, 1999; and Brown et al. 2001; etc.), the authors found that researchers run factor analysis using principal components analysis and varimax rotation. The items in those research papers were usually measured on a 5- to 10-point scale; however, researchers did not enclose information about testing the normality of their data. According to Kovács (2006) the data suitable for factor analysis should have a bivariate normal distribution for each pair of variables, and observations should be independent.

While factor analysis requires that the underlying data is distributed as multivariate normal, and that the relationships are linear, Multidimensional Scaling (MDS) imposes no such restrictions. MDS (PROXSCAL) attempts to reduce data by finding the structure in a set of proximity measures between objects or cases. This is accomplished by assigning observations to specific locations in a conceptual space. Since MDS is relatively free of distributional assumptions, it is the most common technique used in perceptual mapping. In addition, factor analysis tends to extract more dimensions than MDS. Consequently,

dimensions obtained by MDS tend to be readily interpreted. Because of these advantages, the authors have decided to run MDS on the database.

Findings

By running MDS, a statistically more relevant technique, three dimensions were revealed out of which the "speculation" and "product push" dimensions remained hidden in previous studies. The discovery of the hidden dimensions is a great step forward, since around 60 percent of businesses in the sample are driven by drivers other than opportunity-based entrepreneurship. Managers who are not acting along the entrepreneurial continuum can be excluded for hypotheses testing. The three dimensions are the following:

1. Entrepreneurial orientation [EO]
2. Speculation orientation [SPO]
3. Product push orientation [PPO]

Each of the new dimensions also represents a conceptual continuum, just like entrepreneurial orientation does. Speculation orientation ranges from high risk tolerance to high risk avoidance. In case of product push, the range is between single product and highly diversified product lines.

Accordingly, firms in the sample were distributed due to their orientation level in each dimension. A firm's position on any of the three continuums is determined by the level of its orientation. For example, in the case of the second dimension a high speculative orientation means that the manager perceives innovation to be marginally important; however, she or he is rather speculative in the form of taking significant risk in the hope of high returns in the short term. Similarly high risk avoidance refers to preference for safe, low risk, and easily reachable ideas.

The third dimension, product push orientation, signals an aggressive attitude toward scaling up product lines and using promotions and advertising in promoting sales growth. Innovation efforts tend to be directed toward potential marketable improvements to an existing product or service. Hence innovation is perceived as an incremental, clearly defined, and time-tested process designed to prove or disprove its value to the company. In case of poor results, the management prefers to quickly abandon activity.

On the other hand, however, the single-product orientation implies that the manager is committed to the development of a single but radically innovative product idea. Innovation is perceived as a sporadic process, with starts and stops, dead ends and revivals. Persistence is a key element of the processes. A low level of product push orientation is also characterized by a relatively high level of uncertainty tolerance and a simultaneous effort to reduce risks to a manageable level. Finally, single-product orientation is also associated with the aim of breaking traditional ways of conducting business.

For testing managerial behaviors in the sample, the authors applied a two-step cluster analysis. The advantage of this method over both the hierarchical and the non-hierarchical k-means cluster analysis, is that two-step cluster analysis is based on its selected Schwarz Bayesian Information Criterion (BIC); hence it suggests the ideal number of clusters.

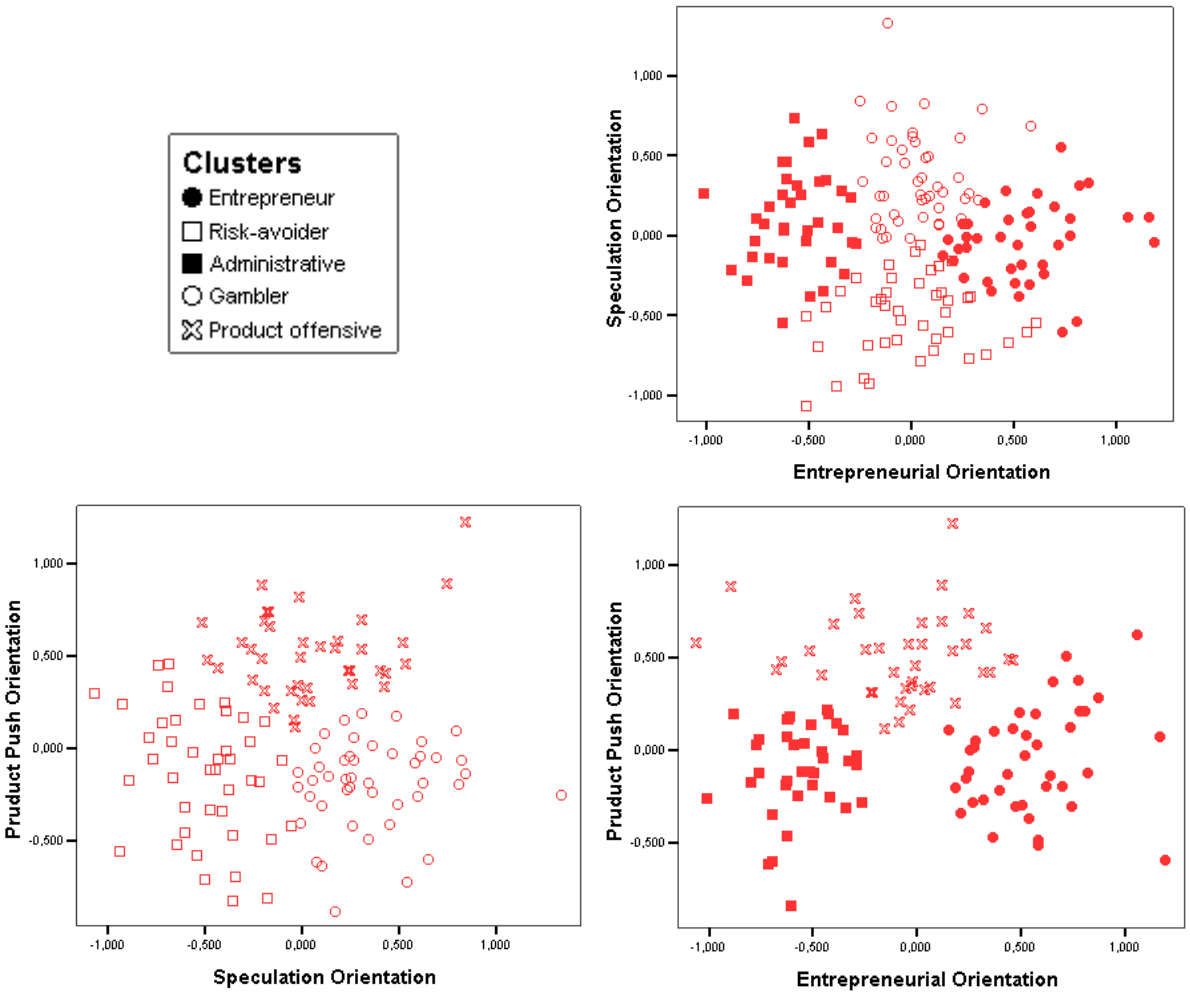
The cluster analysis resulted in five well-separated clusters. The distribution of the clusters is well balanced (See Table 3). Out of the 203 respondents, 40 fall into C1, the entrepreneurial manager cluster. There are 42 administrative managers in cluster C2, while

37 managers were identified as risk-avoiders representing cluster C3. The largest cluster, C4, is made up of 45 gamblers. Finally, 39 respondents are associated with the product offensive management style (C5). Figure 1 shows the distribution of the clusters along three pairs of dimensions.

Table 3. Interpretation of clusters

	EO	SP	PO	Cluster names	Distribution
C1	+	**0**	**0**	Entrepreneurial management style	**19.7%**
C2	–	**0**	**0**	Administrative management style	**20.7%**
C3	**0**	–	**0**	Risk-avoider management style	**18.2%**
C4	**0**	+	**0**	Gambler management style	**22.2%**
C5	**0**	**0**	+	Product offensive management style	**19.2%**

Figure 1. Cluster distribution



The authors have controlled the management style for size (number of full-time employees), industry, age of the firm, ownership, as well as for the age, educational background, international experience and gender of the CEO. The authors have also

confirmed that there is no relationship between the above-mentioned characteristics and the market behavior of the firm.

For testing the hypotheses the most appropriate method was testing the correlation between the independent variable (management style) and the dependent variables (opportunity, network, and resource gap) by using cross-tabulation and Pearson correlation to measure the association between the variables. The result of hypotheses testing is summarized in Table 4.

Table 4. Test of Hypotheses

Hypothesis	EO	SPO	PPO
H1 – Persistence	+	☒	–
H2 – Social Capital	++	–	☒
H3 – Resource Gaps	++	☒	–

In the case of Gamblers and Risk-avoiders, none of the hypotheses were supported. This is no surprise, since by definition, none of the two management styles is considered to be entrepreneurial. In the case of product offensive management style, however, there was a weak negative correlation with persistence. This is in line with the authors' expectations, since product offensive managers have a short-term orientation: in the case of poor early results they prefer to abandon activity quickly. They also prefer to have slack resources.

With regard to the entrepreneurial dimension, the results indicate that entrepreneurial managers tend to consider learning as part of the opportunity identification and exploitation process. According to the expectations, they tend to be persistent in testing the viability of business ideas and pursuing them despite the initial odds. The results, however, go beyond that and highlight that the exploitation of an opportunity is the first and most important drive. The managers do realize at the very beginning that the market niche and the final value proposition will take shape as the opportunity unfolds. Hence learning should also be incorporated when an opportunity is assessed.

Interestingly, however, entrepreneurial managers do not differ significantly from administrative managers. Both management styles tend to be persistent in testing the viability of business ideas and pursuing them despite initial odds.

The second hypothesis was strongly supported, implying that entrepreneurial managers are indeed more strategic in developing their social capital in accordance with their changing resource needs. By contrast, administrative managers – just like gamblers – are rather spontaneous in developing their networks. The network of entrepreneurial managers tends to have more weak ties and more structural holes. The aim of such a diverse network is to provide sufficient resources through potential partners. The partners, with whom entrepreneurial managers collaborate, have more stakes in the collaboration than pure return on investment. These partners tend to share the same goal and interest; hence both of them are in a win-win situation in case the opportunity is realized.

Finally, hypothesis 3 was also strongly supported because entrepreneurial managers perceived that they experience a greater frequency of resource gaps than their counterparts, administrative managers. This result is also novel, since so far quantitative empirical

research has focused mainly on the access to capital. For example, Wiklund and Shepherd (2005) found that low access to capital resulted in greater performance in both stable and dynamic environments. Resource gaps, however, usually manifest in other forms than capital. In addition, overcoming resource gaps is not a matter of technological innovation. Rather, it is the process of finding those marginalized consumers who are – for some reason, like too high prices – restricted from the consumption of the mainstream solutions and link their needs to an innovative value proposition. These marginalized consumers are ready to give up on certain features – e.g. do not need full performance – for the sake of having a solution for their previously unserved problems. Consequently, the power of entrepreneurial behavior comes from its ability to constructively solve consumer problems and turn resources into productive use.

Scholarly and Managerial Implications

The authors believe that present research has made three main contributions to scholars and entrepreneur educators. First, the research has justified the adequacy of multidimensional scaling technique in testing constructs of entrepreneurial management. According to our findings, multidimensional scaling is proven to equip us with statistically more correct and valid results.

Second, the empirical study has revealed that approximately 20% of the managers in the sample were qualified as entrepreneurial. This is an important step in advancing theory, since without the exclusion of gamblers, testing hypotheses may derive misleading results. Gambling over the last two decades has demonstrated extensive growth. Societies, like those in emerging markets, tend to allow a wide array of gambling opportunities. Some of these opportunities are often associated with less reputable activities with links to the grey economy. It is up to future research to test whether speculation and gambling is a contextual factor or whether it is an independent dimension for both emerging and developed economies.

Third, the authors managed to highlight a third dimension – product push. Research confirmed that the number of new products is not a measure per se of entrepreneurial innovation. The number of new products is indicative only if the products are extensively built on innovation.

Fourth, the distinction of entrepreneurial orientation allows for specifying relationships more precisely with firm performance, characteristics of entrepreneur, as well as entrepreneurial strategy. Elaborating these relationships is the subject of future studies.

Fifth, the results have implications to policy makers, too, drawing their attention to the speculation dimension. Supporting SMEs in times of crises runs the risk of inefficient distribution of financial aids since the targeted entrepreneurs only make up roughly 20% of the sample. In addition, SMEs can be the engine of regional growth only if they have innovation and long-term orientation; however, preference for a product offensive management style works against it.

The authors also believe that findings have implications for practitioners too, by highlighting that the behavior of entrepreneurial managers differs from administrative managers in the use of social capital and resource scarcity.

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Appendix: Goodness of fit

Stress and Fit Measures

Normalized Raw Stress	,03933
Stress-I	,19833[a]
Stress-II	,51588[a]
S-Stress	,09133[b]
Dispersion Accounted For (D.A.F.)	,96067
Tucker's Coefficient of Congruence	,98014

PROXSCAL minimizes Normalized Raw Stress.

a. Optimal scaling factor = 1,041.

b. Optimal scaling factor = ,947.