

BRIDGING THE GAP BETWEEN INSTITUTIONS OF HIGHER EDUCATION AND SMALL AND MEDIUM-SIZE ENTERPRISES

Enno Masurel
VU Centre for Entrepreneurship
Faculty of Economics and Business Administration
VU University Amsterdam
The Netherlands

Peter Nijkamp
Department of Spatial Economics
Faculty of Economics and Business Administration
VU University Amsterdam
The Netherlands

Abstract

Bridging the gap between knowledge institutions (especially universities) and small and medium-sized enterprises (SMEs) is one of the challenges of present economic policy. Innovation is one important aspect of this policy. However, the characteristics of both universities and SMEs appear to be an obstacle in bridging the gap between these two groups. In particular, this paper aims to highlight the potential of universities of professional education (UPEs) for innovative strategies of SMEs.

First, this paper reviews the pivotal role of innovation by SMEs. Next, it focuses on the function UPEs can assume in the innovation process by SMEs. The empirical part of the paper then presents findings from a regional case study in the Dutch region of Zwolle, in the eastern part of the country. Strategic and operational information from both lecturers and graduate-entrepreneurs of one UPE in the region concerned was collected in order to draw strategic policy lessons.

1. Mind the Gap

There is nowadays much talk about the ‘innovation gap’ and the ‘knowledge gap’. The first concept expresses the viewpoint that the business sector fails to use effectively the existing body of knowledge that is present in the R&D sector, so that it underperforms in technological innovativeness and business performance. The second concept reflects the idea that the knowledge sector (e.g. universities, research institutes) falls short in transmitting its available expertise and research findings to the industrial or public sector, so that the knowledge sector has to be blamed for the sub-standard performance of the economy. It is thus clear that the relationship between the research sector and the business sector is an uneasy one, which calls for further and detailed investigation (see, e.g., Jaffe 1989; Lundvall 1992).

The interaction between higher education/research and industry has at times indeed been problematic. In the 1960s and 1970s, it was ‘not done’ for a university or institution of higher education to have close links with the ‘dirty’ business sector. But 30 years later it was ‘not done’ for academia to live in ‘ivory towers’.

The main question at stake is whether universities (or public institutions of higher education and research) are able to have close and firm interactions with the business and public sector, so that a smooth and effective transfer of knowledge is ensured. This issue has received much attention in the recent literature (for a review, see, for instance, van Geenhuizen et al. 2007). In particular, the Triple Helix concept has gained much popularity in recent discussions on the interaction between the research sector, the industrial sector and the government. In this framework, spin-outs and industrial spin-offs, interaction networks and open knowledge systems have become useful and operational policy concepts and analytical mechanisms.

Clearly, the demarcation lines between scientific research and innovation have become fuzzy, as is witnessed by the very notion of R&D. Research can be – and sometimes ought to be – risky, as this is the basis for real innovations. The main challenge is to create a balanced portfolio, where government and market, public financing, and private venture capital play an integrated role. There is an abundance of literature that tries to assess the social benefits and economic impacts of basic (science-driven or fundamental) research (see, e.g., Kline and Rosenberg 1986; Martin and Tang 2006; Salter and Martin 2001).

In recent years, we have observed an interest in the circular research-innovation model (see Figure 1) that might be able to overcome the above-mentioned gaps in research and innovation.

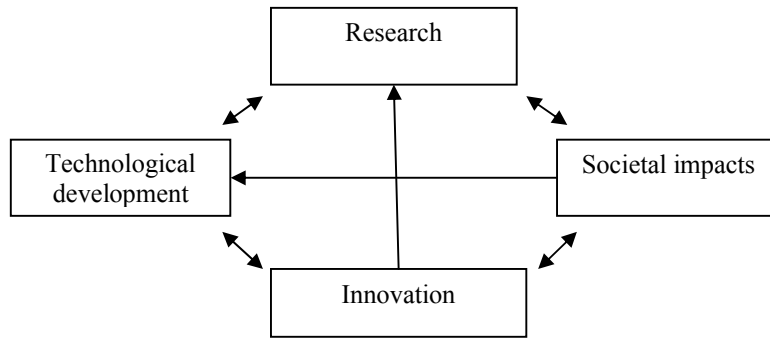


Figure 1. A circular research-innovation model

Figure 1 certainly has a great relevance for research and innovation pursued at a corporate meso- (sectoral) or macro- (regional or national) scale, but calls for additional complementary mechanisms at the micro-level of small-scale firms in the SME sector. The present paper seeks to address in particular the gap between institutions of professional education and the private business sector at a regional level, and to identify the critical success conditions for ameliorating or reducing the above-mentioned gap, by providing empirical evidence from a regional case study in the Netherlands. The paper is organized as follows. After an exposition on the key role of innovation in SMEs, the following section is devoted to basic research and the performance of SMEs. The paper then offers empirical findings from a Dutch case (Zwolle), followed by concluding remarks.

2. Innovation in SMEs

There is an abundance of literature on the motives and impacts of innovation, as part of the more general literature on entrepreneurship. The entrepreneur is the owner-manager of a firm, and hence both actual ownership and daily management are crucial in business performance. Entrepreneurship may also mean the design and management of business network constellations (Nijkamp 2003). Smart relationships with surrounding (third) parties are often regarded as crucial for the survival of firms, especially those relationships concerning information and knowledge (see also Malecki and Poehling 1999; Busenitz et al. 2003).

Much has been written in the business literature on innovation in the last two decades (see, e.g., Atuahene-Gima 1996; Cho and Pucik 2005; Cooper 1990; DeCanio et al. 2000; Drucker 1985; Edgett et al. 1992; Elenkov et al. 2005; Garcia and

Calantone 2002; Hippe 1988; Montoya-Weiss and Calantone 1994; Song and Parry 1997; Tang and Paré 2003; Tidd 2001; Yap and Shouder 1994; Wissema and Euser 1991; Zirger and Maidique 1990). However, the foundations of modern innovation theory were laid down by Schumpeter (1934), with his seminal work on the process of creative destruction. He mentioned five forms of innovation: introduction of new products; introduction of new production processes; entering new markets; using new supplies; and taking new organization forms. In his opinion, innovation is *the* characteristic of entrepreneurship, inducing a process of economic growth.

Over the years, many scholars have elaborated on this concept and have presented numerous definitions and types of innovation. One thing is clear: knowledge plays a crucial role in innovation (Major and Cordey-Hayes 2000; Tang and Paré 2003). This is not the place to discuss at length the substantive literature on innovation studies. Innovations are mostly driven by external incentives, although for some risk-loving people innovation may be a challenge in itself. Innovation is usually not an individualistic decision: the significant influence that business clusters have on the innovativeness of the firm is currently a frequently reported subject (Emden et al. 2006; Bell 2005; Rogers 2003; Elfring and Hulsink 2003; Ruef 2002; Wissema and Euser 1991; Witt 2004). An important group of stakeholders is also formed by the ‘outsiders’; recent research has pointed out that ‘outsiders’ have a positive influence on innovative behaviour by SMEs (Kleijn et al. 2007), as they are an influential group in the environment of the firm, in particular through cluster formation and network contacts (see Brass et al. 2004; Kleijn et al. 2007; Witt 2004).

Recent research undertaken by Kleijn et al. (2007) brings to light that firms which work with ‘outsiders’ are more innovative than firms which do not work with ‘outsiders’. The influence of ‘outsiders’ can inspire the entrepreneur to innovate and prevents the entrepreneur from focusing mainly on his daily concerns and business. In the rest of this paper we will address the question whether, why, and how SMEs deploy knowledge generated and offered by universities of professional education (UPEs) in a particular region (Zwolle) in the Netherlands.

Several economists have emphasized that SMEs innovate in a different way compared with larger firms (Nooteboom 1994; Thurik 1996), as is reflected in the general statement (Welsh and White 1981): “*A small business is not a little big business*”. Therefore, it is important to consider the specific characteristics of SMEs in their innovation process. It is not only the size that makes SMEs special. Other important characteristics are: the central position of the entrepreneur (the owner/manager), the short-term scope of SMEs and their local and regional

orientation. These characteristics also influence the innovation intensity and strategy of the firm. Crucial for innovation success is the central position of the entrepreneur (Atuahene-Gima 1996).

According to Nooteboom (1994) there is complementarity between SMEs and large firms in the context of their innovations: large firms tend to be strong in aspects where SMEs tend to be weak, and vice versa. SMEs can be characterized by their small scale, independence, and personality. SMEs are, in general, strong in innovations aimed at the application of basic technologies, in ventures to develop inventions and to implement and introduce them on the market, and to satisfy of demand in small niches or residual markets. Large firms are relatively strong in more fundamental research and inventions, and in efficient production and distribution, which exploits the effects of scale and scope. This is confirmed by Yap and Shouder (1994) who mentioned the importance of scale economies in innovation issues. In addition, Bashkaran (2006) mentioned that incremental innovations (ongoing improvements to products and processes) are important for SMEs. Without any doubt, the entrepreneur (including his way of managing the firm) puts his footprint on the innovation process. Incremental innovations may offer substantial competitive advantages to SMEs. Bashkaran (2006) called these incremental innovations ‘ongoing improvements’, as opposed to radical innovations. Verhees and Meulenbergh (2004) mentioned that innovation by SMEs is generally manifested in the form of modifications.

The introduction of new products, services or processes may lead a firm into a new phase of its existence, as the firm is not a static but a dynamic entity. The life cycle of the firm is a crucial concept here (see also Masurel and van Montfort 2006; Scott and Bruce 1987; Churchill and Lewis 1983). The question is now, to what extent SMEs are dependent on the research pool and facilities in their geographic environment.

3. Institutions for Higher Education and SMEs

3.1 Knowledge transfer

There is an abundance of literature in the field of knowledge transfer that focuses attention on the role of universities (or institutions of higher education) (see, e.g., Rosenberg and Nelson 1994; Lee 1996; Harmon et al. 1997; Argyres and Liebeskind 1998; Stephan and Everhart 1998; Bercovitz et al. 2001; Nelson 2001; Stefan 2001; Acs et al. 2002). It has become customary to make a distinction in institutions of

higher education between universities of professional education and ‘regular’ universities. The main differences between these two types of institution are that the former do not have an academic Master’s programme, do not conduct fundamental research and do not offer possibilities to pursue a doctorate. Strictly defined, a university of professional education can be seen as an institution of higher education offering empirical training and instruction in many industrial arts and applied sciences. A ‘regular’ university can be defined as a large and diverse institution of higher learning created to educate for life-long learning and for a profession, and to grant degrees. In the present paper we will focus on universities of professional education (hereafter abbreviated as UPEs). Alternative names for this kind of institution are: higher-educational institutes and polytechnics. The methodological approach of UPEs is more practical than the approach of ‘regular’ universities, and is more geared towards the operational character of SMEs. It is also noteworthy that UPEs often play an important role in their own geographic area, as do SMEs (in contrast to the traditional more national and international orientation of ‘regular’ universities). Therefore, UPEs may be more useful to SMEs (in a direct sense) in a regional activity setting than ‘regular’ universities.

3.2 UPEs and SMEs

An interesting consequence of the more regional and practical approach of UPEs is their stronger focus on SMEs, as well as their more frequent and direct contacts with SMEs (see Masurel and Mol 2009). This brings us to the main subject of this paper: the experience and opinion of SMEs concerning regional UPEs. In addition, we may highlight the importance of enterprise educational programmes that are targeted at obtaining insight into the desirability and feasibility of starting an own business (Peterman and Kennedy 2003). Before such educational programmes can be established properly, a thorough inventory of the needs of the entrepreneurs in the relevant focus group in the region concerned is necessary.

Already more than two decades ago, Ryans et al. (1987) claimed that the relevance of small businesses (in the US and Canada) is not reflected in the typical business school’s curriculum: most courses are directed toward preparing students for careers in Fortune 500-type companies, large non-profit organizations, or the public sector. Business schools can be defined as graduate schools for business studies, offering MBAs and related courses of study. Some aspects of small business management can easily be integrated into the general business curriculum, according to Ryans et al. (1987), but others are more or less unique to small business or deserve

special attention in a small business course. These topics include venture capital, entrepreneurship, business organization, business plans, government relations, and opportunities for women and minorities. It is also important to keep small business courses up-to-date by making extensive use of outside (guest) speakers who have special expertise.

It is noteworthy that, a decade later, Vesper and Gartner (1997) mentioned that the most frequently offered entrepreneurship courses at both the undergraduate and graduate levels in the entrepreneurship programmes are entrepreneurship or starting new firms, small business management, field projects/venture consulting, starting and running a firm, venture plan writing, and venture finance. The top-seven general criteria suggested for ranking entrepreneurship programmes are, according to Vesper and Gartner (1997): (i) courses offered (in terms of number of different courses, size of classes, number of credits or class sessions, how courses are taught, who is doing the teaching, etc.); (ii) faculty publications (books, journal proceedings, magazine articles, number of citations, whether data-based, how applied, nature of target audience, length, etc.); (iii) impact on community (public symposia, student consulting projects, company spin-offs); (iv) graduate exploits (number of start-ups by graduates, graduate participation in the ventures of others as investors, partners, employees or other helpers); (v) innovations (created by the graduates of these programmes or in the programmes themselves); (vi) graduate start-ups (accomplishments); (vii) outreach to researchers (hosting conferences, sponsoring journals, creating and distributing new teaching materials, publishing newsletters, and helping other journals).

An earlier applied study on the importance of institutions of higher education was undertaken by Corsten (1987), who asked SMEs about their experience in cooperation with universities in dealing with technical and scientific problems. About a quarter replied that they had indeed had such experience in the last ten years, especially the larger SMEs. The majority of the contacts were with graduates of the university now working for the firm, through personal contacts with scientists, for example, at conferences or seminars, and through transfer agencies. In general, these SMEs were satisfied with the cooperation. Corsten (1987) split the SMEs up into two groups: those that had worked with universities, and those who had not so far. The most important problem experienced by both groups originated from *communication difficulties*. *Lack of financial resources* was given only average importance by both groups. *Lack of practicality* revealed a significant difference between the two groups: those who had previously worked together with universities attached less value to this

argument than did the other group. Personal interaction (communication) is thus of particular importance here, especially personal interaction and trust. Problems must be approached in a way specifically geared towards the enterprise concerned, while cooperation must be flexible.

4. A Regional Case Study on SMEs

4.1 Introduction

In this section, we will focus on the experience that Dutch SMEs have with universities, and on the opinion they have about these institutions. In other words: what are the most important problems for SMEs in establishing and maintaining a relationship with these specific public knowledge institutions?

We focus on one area in the eastern part of the Netherlands (Zwolle and its surroundings, see Map 1). This area shows both the presence of SMEs and a single UPE, which makes it very suitable for our purposes. Although the case study was carried out in the Netherlands, the message of this paper is likely also applicable to other regions and other countries. The Zwolle region is more or less comparable to the Netherlands as a whole, in terms of distribution of firm size. Close to 90 per cent of the firms employ less than 10 people. However, the service sector plays a less important role in this region compared with the Netherlands as a whole.

Three questions are dealt with in our applied research:

1. What is the opinion of entrepreneurs on UPEs?
2. How are the lecturers of these UPEs perceived by the entrepreneurs?
3. How do graduate-entrepreneurs of these UPEs look back on their university period?

Windesheim University is one of the largest of the 55 UPEs in the Netherlands, with more than 15,000 students (full-time, part-time, and extra-curriculum) and 1,500 employees. It offers study programmes in some 50 different disciplines. The emphasis is on a student-focused, practice-oriented education. Windesheim University is located in Zwolle, in the eastern part of the Netherlands, and has a strong regional function.

Windesheim University is the result of a merger of various higher education institutions in 1987. After that, a number of other institutions joined, leading to the institution in its current form. Together with the 'regular' VU University Amsterdam, Windesheim University of Professional Education forms the holding VU-

Windesheim, one of the largest players in the Dutch higher education market. Entrepreneurship education plays an increasing major role for the holding VU - Windesheim. Important aspects of this entrepreneurship approach are innovation (with special focus on the Internet), sustainability and diversity. With its 'Windesheim year of entrepreneurship' (organized in 2007, see Box 1), and its Summer School Entrepreneurship 2007 (see Box 2), Windesheim University is establishing an image as a leader in the Dutch field of higher entrepreneurship education.

== INSERT BOXES 1 AND 2 ABOUT HERE ==

4.2 The opinion of entrepreneurs on UPEs¹

The files of the Chamber of Commerce of Zwolle and surroundings were used for targeting the names and addresses of the firms. We deliberately chose to look only at the sectors services, manufacturing, construction, and wholesaling, because we thought that firms from these sectors would be more interested in a relationship with knowledge institutions than other firms would be. It is noteworthy to mention that we deliberately did not limit ourselves to technology-driven ventures but that our research was also open to more conventional firms, as they fit in very well with the applied and regional focus of UPEs.

We approached in total 1,292 firms with at least 5 but not more than 50 employees (March 2004). 401 of them returned their form in time. This means a response rate of 31.0 per cent. In general this score is satisfactory and high enough to make general statements for these sectors in this region. However, not all firms answered all questions. 38.1 per cent of the participating firms employed less than 10 people, whereas 61.9 per cent employed more than 10 people (the division between small and medium-sized, according to former Dutch standards).

From Table 1 it becomes clear that only a small minority of the SMEs in the region made use of one or more of the specified knowledge institutions (little more than 10 per cent). The institutions are consulted much more by medium-sized enterprises than by small enterprises. The specified institutions were all 'regular' universities or UPEs (there was also one option to tick the answer *other*, which was done by close to 30 per cent of the respondents who made use of any knowledge institution). More than 90 per cent of the respondents who made use of a knowledge institution mentioned a UPE. Less than only 10 per cent of the respondents who made use of a knowledge institution mentioned a 'regular' university.

¹ This section is a summary of Masurel and Werkhoven (2009).

== TABLE 1 ABOUT HERE ==

Almost half of the respondents who made use of one or more of the institutions considered the relationship to be of low intensity (see Table 2). Almost one-quarter experienced the relationship as *moderately intensive*. The relationship is perceived as *very intensive* by 14.9 per cent. Finally, 12.8 per cent of the respondents had a relationship of *variable* (varying over time) *intensity* with the institutions. Note that we are talking about small numbers here, because only the firms that made use of one of the specified knowledge institutions were included here. However, there is hardly any difference between the two subgroups (small and medium-sized firms) in their perception of the intensity of this relationship.

== TABLE 2 ABOUT HERE ==

Nor is there a significant difference in the way the relationship with the institutions is brought about by the two subgroups (Table 3). According to Table 4 the relationship is, overall, *deliberately brought about by the entrepreneur*. The relationship is to a lesser extent *brought about by the institution*. Sometimes a *third party* (e.g. consultancy firm) brings about the relationship. *Coincidence* and *graduates* come next. Finally, a number of *other* answers were given.

== TABLE 3 ABOUT HERE ==

Table 4 shows that there are hardly any differences between the respective subgroups, when the form of the relationship is considered. *Internships* are the most popular form by far, with a share of more than half. *Training & development* follow with almost a quarter. *Joint innovation* comes third. The fourth place is for *contract students*. *Contract research* and *alumni days* come last according to Table 4. Under the answer *other*, examples like information meetings and joint use of machinery were given.

== TABLE 4 ABOUT HERE ==

The substance of the relationship between the two subgroups does not differ significantly either, as is shown in Table 5. *Marketing* and *quality* are the most

important subjects, each with shares of almost one-third, followed by *strategy*. *Finance* comes in fourth. *Working circumstances* and *environment* hardly played a role. *Export* does not play a role at all. Under the answer category *other* an array of answers was given, like product development and technical assistance.

== TABLE 5 ABOUT HERE ==

Table 6 shows that the most important reason for the respondents to establish the relationship is *quality improvement* (mentioned by more than half of the respondents). A second reason is *efficiency increase*, with a share of more than one third. *Sustainability contribution* follows, and finally *facilitating innovations* is mentioned. Under *other* a number of reasons are mentioned. There are hardly any differences between small and medium-sized firms.

== TABLE 6 ABOUT HERE ==

Table 7 makes clear that the majority of the respondents who have a relationship with knowledge institutions within this region are *satisfied*, or even *very satisfied*, with the relationship. Hardly anybody is *dissatisfied*. A minority is *neutral*, neither satisfied nor dissatisfied, and only a few respondents have a *varying opinion*. There were hardly any differences between the two subgroups. Both the expectations and performance of the knowledge institutions underlie this satisfaction.

== TABLE 7 ABOUT HERE ==

In hardly any case was a governmental subsidy granted (*yes*) (Table 8). However, the subsidies that were granted only partially covered the expenses. There were hardly any differences between the two subgroups.

== TABLE 8 ABOUT HERE ==

Finally, the perceived problems in establishing and maintaining a relationship with knowledge institutions were analysed. First, it is worth mentioning that more than one-third of the respondents did not experience any problem (*none*) (see Table 9).

Overall, respondents were ignorant of the services that the institutions offered (*service assortment unknown*). In their eyes, these organizations are institutions for education, not for business development. To a lesser degree they were not familiar with the procedures (*procedures unknown*) (e.g. concerning delivery time and confidentiality). The respondents who believe that such a relationship is *too time-consuming* are in third place. Here we do see an interesting difference between representatives of small businesses and those of medium-sized businesses: the latter put significantly more stress on this problem than representatives of small business. In fourth place comes the reason *not able to find the right person*. Here again, we see a difference between the representatives of small firms and those of medium-sized firms: the latter emphasize this problem more than the former.

Then a number of *other* reasons are given. It is worth mentioning that *lack of understanding* is mentioned slightly more by the representatives of medium-sized businesses.

== TABLE 9 ABOUT HERE ==

Finally, we looked at the differences between firms that have used the services of one or more UPEs, versus the firms that have not (see Table 10). First, it is interesting to note the outcome that firms that use the knowledge institutions have fewer problems than non-users. This confirms Corsten (1987).

Furthermore, there are two items that non-users have significantly more problems with than the users: *service assortment unknown*, and *procedures unknown*. Apparently, experience plays a role here, since users have fewer problems. The problems mentioned may be seen as reasons for the non-users not to make use of these institutions. Rather surprisingly, there were also two items that more users than non-users perceived as a problem: a *too time-consuming* relationship and an *unclear recommendation* from the UPE. Previous experience may play a role here, or the users may have taken such problems for granted.

The *secrecy* item hardly yields any results. Finally, the other four items did not yield any real differences between users and non-users: *not able to find the right person*, *too expensive*, *lack of understanding by the institution*, and *other* reasons.

== TABLE 10 ABOUT HERE ==

Our research makes clear that only 13.0 per cent of the SMEs in this Dutch peripheral region have made use of a public knowledge institution. There is a clear subdivision: medium-sized firms show this behaviour more often than small firms. In addition, a vast majority of the respondents in our case study who made use of a public knowledge institution mentioned they made use of UPEs.

The main actors in the relationship between UPEs and SMEs here are students, doing their internships and other practical parts of their studies. SMEs may open their doors to these students for a number of reasons: to get access to new technologies (knowledge transfer), for cheap consultancy and hands-on work, or for reasons of social responsibility.

Between the small and medium-sized firms there are hardly any differences concerning the following aspects: the intensity of the relationship (predominantly hardly), the ways of bringing about the relationship (usually deliberately sought for by the entrepreneur), the forms of the relationship (mostly internships), substance of the relationship (mostly marketing and quality), the purpose of the relationship (mostly quality improvement), satisfaction with the relationship (mostly satisfied), and whether they had had any governmental subsidy (hardly ever).

In our case study, frequently perceived problems with establishing and maintaining a relationship with knowledge institutions appeared to be service assortment unknown and procedures unknown in our case study. However, more than one-third of our respondents did not experience any problems. There appeared to be some differences between small and medium-sized firms: the latter more often mentioned problems such as the relationship being too-time consuming, not able to find the right person, and the perceived lack of understanding by the institution.

Furthermore, we see some differences in our case study between firms that had already made use of these public knowledge institutions versus the ones that had not. Non-users more often experienced problems with unknown services assortment and unknown procedures. Apparently, these are the main reasons for not getting in touch with knowledge institutions. Once familiar with these institutions, users in our case study more often experience problems with the time-consuming character and unclear recommendation.

Based on the outcomes of this project, a number of interesting recommendations can be formulated. Knowledge institutions are recommended to follow a double strategy towards attracting SMEs into the knowledge circulation process. The first line of approach considers those firms that do not yet make use of these institutions. The most important reasons for not making use of the institutions in our case study

are unfamiliarity with the services and the procedures. Communication is the key word in this situation. It might be useful to integrate stakeholders here, as they might be of importance in convincing the entrepreneurs that it is useful to make use of such institutions. Important stakeholders can be the Chamber of Commerce and (local) business associations.

Once a relationship is established, cooperation should run smoothly. It is therefore essential that the main complaints of the users should be considered and worked out, even more so because these could be reasons to end the relationship. The most important item emerging from this study is the need for an efficient organization (limiting the time involved, and making clear recommendations). Stakeholders again might play an important role here.

4.3 Perception of university lecturers by entrepreneurs

In this subsection, we take a closer look at the way the lecturers of these institutions are perceived by entrepreneurs. From the perspective of the institutions, the lecturers play a key role in the process of knowledge circulation between the institutions and the SMEs. In this way the innovation process by SMEs might be speeded up.

The relationship between these universities and SMEs can take many forms: workshops, Professional Master's degrees, alumni days, etc. In this section, we focus on one specific subject: internships by students, supervised by their lecturers. For this purpose, we investigated, amongst other things, the opinion of entrepreneurs, who had recently had one or more of such internships, on the capacities of their supervising lecturers.

Interviews were held with 27 entrepreneurs, who were already in the network of Windesheim University of Professional Education, and who almost all had had an internship in the previous 5 years. In other words: they were really capable of giving their opinion on their supervisors. The interview period was November 2004 – April 2005. The study was conducted in the same region as the study described in the first section.

The average age of the entrepreneurs was 42.3 years, and all but one were male. Their level of education was rather high: 21 of them held a university degree, and 5 respondents were sole shareholders of the firm.

Most of the firms were operating in the services sector or in the construction sector. The average firm size is 107.5 full time equivalents. 13 firms employed less than 50 people (small firms), 11 firms between 50 and 250 people (medium-sized

firms), and finally 3 firms more than 250 people (large firms). Most firms considered themselves to be in the maturity stage (10). Then follow the growth stage (8) and the renewal stage (6).

From Table 11 it becomes clear that more than one-quarter of the respondents consider their own firms as *very innovative* (this is subjective of course), and more than half as *rather innovative*. About 10 per cent see their own firms as *hardly innovative* and another 10 per cent as *not innovative* at all. 16 firms felt the urge to improve the innovativeness of their firm.

=== TABLE 11 ABOUT HERE ===

The out-of-pocket expenses for innovation vary strongly. 3 firms said they did not spend money on innovation at all in 2004; and 11 firms did not know how much they spent on innovation in 2004. The conditional² average of the other 24 firms was €134,000. We did not mention ask how much time was devoted to innovation in this project, which is an important item but complicated to measure, especially in SMEs.

The most common type of innovation is the *new product*, mentioned by more than three-quarters, closely followed by *improved products* (see Table 12), where it should be mentioned that each respondent could tick more than one answer. Then follow *improved processes*, *new services*, *new processes*, and finally *improved services*. In the category *other*, amongst various innovations, combined products-services were mentioned.

===TABLE 12 ABOUT HERE===

Almost all respondents (25) had had an internship in the previous 5 years. 11 respondents worked with 'project teams' (a form of learning on the job). Furthermore, 18 respondents had contact with Windesheim University of Professional Education in the form of workshops and alumni days.

The most important reason why the respondents worked with these students was to improve firm efficiency (17), followed by quality improvement (13), social responsibility (12), making innovation possible (9). The category *other* was mentioned by 11 people, and included finding new employees.

Innovation as a subject of discussion between the entrepreneur and the lecturer hardly occurred. 5 respondents mentioned that they had discussed this topic before the

² Those firms which said they had zero expenditure were omitted from the calculation.

start of the project, 6 (also) during the project, and 7 out of 27 (also) mentioned that they discussed it towards the end of the project. Discussion of sustainability innovations (in which the focus was on environmental and / or social aspects) occurred even less frequently: 4 times before the project, 6 times (also) during the project, and 5 (also) times towards the end of the project.

Table 13 presents the opinion of the respondents on the supervising lecturers. The respondents were asked to give their opinion on a 5-point Likert scale: *very negative*, *negative*, *neutral* (neither negative nor positive), *positive*, and finally *very positive*. The list of items is mainly based on the lecturers' competence profile that is used within the university. Before discussing these scores, it should be mentioned that the score *neutral* (neither negative nor positive) was ticked very frequently: the lowest percentage is 40.7 per cent (for *practical experience* and for *personal contact*) and the highest score is as much as 66.7 per cent (for *innovativeness*). These high *neutral* scores indicate that the supervising lecturers do not have a very clear profile in the eyes of their student-entrepreneurs.

The highest score is for *expertise* and *personal contacts*: more than half of the respondents rated this item to be *positive* or even *very positive*. Then follow *effectiveness* and *practical experience*, with scores slightly higher than 40 per cent. Roughly one-third of the respondents were (*very*) *positive* on *collaboration*, *flexibility*, *empathy*, *customer orientation*, and *coaching* by the supervising lecturer. *Innovativeness* came in the bottom place, by far: less than only 10 per cent were (*very*) *positive* concerning this aspect of the lecturers they dealt with.

===TABLE 13 ABOUT HERE===

The results described above were presented at two workshops in the Spring of 2005, one for lecturers and one for student-entrepreneurs. A number of recommendations came out of these workshops. The most important recommendations by the lecturers were:

- Make use of a more process like approach to innovation;
- Introduce the concept of innovation earlier in the study;
- Involvement of the firms earlier in the study project;
- Involvement of the lecturers earlier in the study project.

The most important recommendations by the student-entrepreneurs were:

- Put more emphasis on the coaching of the students, instead of just supervision;
- Do not isolate innovation from other managerial aspects;

- Be prepared for resistance to innovation;
- Make allowances for different educational levels.

The outcomes of this research and the recommendations by the lecturers and the entrepreneurs resulted in a new project, in which lecturers are able to spend more time on the supervision and coaching of students. On the basis of this and other projects they will receive additional training. Each project will start with an innovation scan at firm level.

Our research makes clear that innovation in SMEs is hardly a topic dealt with explicitly in the projects of the students of the university on which we focused. Even less attention was paid to sustainable innovations. This lack of attention coincides with the opinion of the entrepreneurs that innovativeness is the worst functioning characteristic of the supervising lecturers. Therefore, as innovation has never been an explicit judgment criterion for the students before, the lecturers should be instructed on this topic.

Lecturers and entrepreneurs gave a number of suggestions how the knowledge circulation process focusing on innovation could be improved. In summary, they concern the earlier involvement of both entrepreneurs and lecturers in the study projects, a different and earlier introduction of students to the subject of innovation, an alternative approach to innovation and the need to make allowances for different educational levels.

Finally, it can be concluded that the approach of our case study seemed to have worked. This opens the door to broaden the study into investigating possibilities to improve the process of knowledge circulation between UPEs and SMEs.

4.4 Graduate entrepreneurs looking back

The focus of this subsection is on 45 graduates of Windesheim University of Professional Education, who are now running their own company (hereafter referred to as UPE-graduate entrepreneurs). A number of features are disclosed, among which are the personal characteristics of these UPE-graduate entrepreneurs, and the type of firms they run. Furthermore, attention is paid to the role their university course has played in the decision to start their own business, and to the possibilities for developing a future relationship between these graduates and their former UPE.

The concept of graduate entrepreneurs is becoming more and more in vogue. In April 2007, the first ever Oxford Entrepreneurs event for Oxford graduates was organized (see www.oxfordentrepreneurs.co.uk). This event highlighted Oxford

Entrepreneurs' ambition to reach out to Oxford graduates and help them keep in contact with each other, as well as with current students. Oxford Entrepreneurs is the student society for the promotion and support of entrepreneurship at the University of Oxford and beyond. Another striking example is Stanford University that offers its graduate entrepreneurs the possibility to enroll via its website (see www.stanfordalumni.org).

In our opinion, UPE-graduate entrepreneurs are pre-eminently suited to be lecturers in entrepreneurship courses, at least for specific subjects (while the lecturer and the institution always have the ultimate responsibility for the course). In particular, these graduates are in a unique position to play the role of involved 'outsiders' for student-entrepreneurs. Coaching it seems, is one of the most relevant approaches for the educational involvement of these graduates.

From December 2006 to January 2007, 45 graduates of Windesheim University of Professional Education were asked to look back on their course of study there. All 45 of these UPE-graduates now have their own business, which makes them different from the main-stream graduates. The interviews were held by representatives of Qmac, a temporary students' firm. The accompanying questionnaire was drawn up in collaboration with the authors of this paper.

Each year a large group of students successfully graduate from Windesheim University. In the summer of 2007, more than 3,200 students graduated. According to Windesheim's alumni-bureau there are at least some 40,000 Windesheim graduates. It is difficult to make a subdivision into departments (or Schools, as they are called by the university itself), but an educated guess made by the alumni-bureau is that graduates in economics, communication and education dominate. An alumni-event is organized every first Saturday of November.

There is, however, no general file available on those graduates who are running their own business (see Vesper and Gartner 1997). Therefore, the selection of UPE-graduate entrepreneurs for our research project was done indirectly, mainly by asking lecturers, directors and others if they knew any graduates who were running their own business. Quite to our surprise, within two months (December 2006 – January 2007) we found 60 Windesheim graduates who were running their own business, predominantly in the region where Windesheim University is located. Nevertheless, the overall number of graduates who are running their own business is unknown, let alone the composition of this group. Therefore, we do not know how representative our research project was.

In total, 45 UPE-graduate entrepreneurs participated in our project, through face-to-face interviews, or interviews by telephone or by email. 35 of them were male and 10 female. 14 of them were born before 1976, i.e. were older than 30 years when the interviews were conducted. The oldest respondent was born during the period 1945 to 1950, i.e. was close to 50 years old, 18 respondents during the period 1976 to 1980, whereas 13 respondents were born after 1980.

The respondents use different function names. Most (23) call themselves directors. 11 entrepreneurs call themselves owners. Then follow partners (6), directors/large shareholders (2), joint owners (2) and sales manager (1). However, the name of the function does not seem to say very much about their real position within the firm. As one respondent put it: ‘Sometimes it is good to be modest and not to call yourself the director, as this makes a better impression on (potential) clients’.

Most of these entrepreneurs were educated at the School of Engineering and Design (or one of its predecessors) (20), followed by the School of Management and Law (10), the School of Journalism (5), the School of Business and Economics (4), the School of Information Sciences (3), the School of Human Movement and Sports (1), the School of the Built Environment and Transport (1), and the School of Education (1), or one of its predecessors.

The vast majority of respondents (39) had been full-time students. Only 4 had done the part-time variant, and 2 were both full-time and part-time students during their years at the university. Most entrepreneurs (19) graduated in the period 2000-2005. 9 entrepreneurs graduated after 2005, and 13 graduated before 2000. 4 entrepreneurs did not graduate at all, and left the university prematurely.

It is striking to see that the majority of respondents (27 out of 45) were wage earners before they became the owner of their own firm. 13 of our respondents directly started their own business after graduation. Only 3 respondents were the owner of another business before their present one, and 2 respondents continued with another course of study after their graduation. Almost half of the respondents (20 out of 45) came from an entrepreneurial family, which indicates the importance of family businesses here.

Most firms that were represented by the respondents were founded in 2005 and 2006 (9 in both years). Only two firms were founded in 2007, while 25 firms were started before 2005. Two respondents did not start up their current company, but joined at a later stage.

By far the largest number of firms are operating in the knowledge-intensive service industry (36): ICT/Internet business, journalism/photography, culture,

industrial services, education, translation services, and tourism. Then follow manufacturing (3), agriculture (2), construction (2) and retail (2). The average firm size (at 1 January 2007) was 9.5 full time equivalents. However, their size range was very large, varying from 0.1³ to 150 people. Most firms (39) were started by the entrepreneurs themselves. 6 firms, all family businesses, were taken over.

Table 14 shows when the idea arose to start a business. More than half of the respondents got the idea when they were still a student (*during period of study*), and more than 20 per cent *while working as an employee*. One respondent decided to start a business *during unemployment*. The category *other* contains almost a quarter of all answers, including the one that people had the idea of becoming an entrepreneur even before they entered university. One of the respondents even indicated that the idea arose shortly after his birth.

== INSERT TABLE 14 ABOUT HERE ==

The next question was what made them decide to start their own business. More than one answer could be given (in total 67 answers were given here). From Table 15 it becomes clear that exactly 60 per cent of the respondents had an intrinsic motivation: it was *an idea they wanted to realize*. More than one-third mentioned *freedom* as their motivation (not to work for a boss). Almost one-quarter mentioned that *entrepreneurship in their family* was a reason to start their own business. More than 10 per cent indicated that it was stimulated during their *years of study*. Finally almost 20 per cent mentioned other reasons, varying from experiencing frustration while working as an employee to accepting the challenge to start their own business and being inspired to be ambitious by an enterprising spouse.

== INSERT TABLE 15 ABOUT HERE ==

Finally, we asked our UPE-graduate entrepreneurs the role their education played in their personal development, thereby focusing on knowledge, capabilities and network. From Table 16 it becomes clear that their education played an important role in the development of their *knowledge*: more than half of the respondents said *much* or even *very much*. Still, more than 20 per cent of the respondents answered *little* or even *very little*. Almost a quarter of the respondents gave a *neutral* answer. On a 5-

³ One respondent worked only 10% of the time at the firm.

point Likert scale (with very little = 1 and very much = 5), *knowledge* takes a score of 3.36.

A more or less identical pattern is observed when looking at *capabilities*: more than half opted for (very) much, 20 per cent for (very) little and almost a quarter for neutral. The Likert-scale score is 3.38 here.

The *network* item, however, shows a totally different pattern. Two-thirds of the respondents indicated that their education contributed *little* or even *very little* to their network. More than 15 per cent gave a *neutral* answer, while slightly more than 15 per cent indicated *much* or even *very much*. The Likert-scale score on *network* is much lower than the ones on *knowledge* and *capabilities*: 2.16.

== INSERT TABLE 16 ABOUT HERE ==

More than one-third of the respondents saw a future role for their former university in building and developing *networks* (see Table 17). Furthermore, specific *training*, *coaching* and *internships* were mentioned. One of the *other* ideas was the marketing of the UPE-graduates' products by student-entrepreneurs. However, more than a quarter of the respondents indicated that the university is of no importance to the entrepreneur

== INSERT TABLE 17 ABOUT HERE ==

Finally, we asked what role the entrepreneurs had in mind for themselves in relation to their former university (see Table 18). More than 40 per cent of the respondents saw a future role for themselves as a *guest-speaker*. Furthermore, *business advice*, *internships* and *workshops* were mentioned. One other idea was coaching student-entrepreneurs. Again, almost a quarter indicated they saw no role for themselves in the future (*nothing*). See, additionally, Box 3 for the students' wish for coaching. This connects to the willingness of the UPE-graduate entrepreneurs to do some coaching.

== INSERT TABLE 18 ABOUT HERE ==

== INSERT BOX 3 ABOUT HERE ==

It is noteworthy that more than half of the UPE-graduate entrepreneurs were fed with the idea to start their own business during their years of study, indicating that these years can be an inspiring period. Furthermore, we saw that obtaining knowledge and developing capabilities played major roles in the educational process. Networks, however, played a minor role. Finally, most of the UPE-graduates were prepared to do something in return for their former university.

Bringing together the tracks of ‘outsiders’ and entrepreneurship education leads to the idea of letting the UPE-graduate entrepreneurs play the role of ‘outsider’ for student-entrepreneurs. The latter indicated that coaching (or mentoring) is important for them. And who are better suited to play the role of ‘outsider’/coach for student-entrepreneurs than the UPE-graduate entrepreneurs? They know (to some extent) the university, and they indicated that they are willing to play a role for the students. Another plus-point is that the ‘outsiders’ can bring in one thing the student-entrepreneurs are lacking: experience. The UPE-graduate entrepreneur may even take the position of informal investor.

Universities have graduates, and some of these graduates have their own firm. With 45 UPE-graduate entrepreneurs we looked back at their years of study. We found that, overall, they were positive about the way knowledge was transferred to them and how their capabilities were developed. However, networking received inadequate attention during their period of study. We saw strong loyalty to their former university, and willingness to give guest-lectures and to do some coaching. On the other side of the coin, we saw that (aspirant) student-entrepreneurs were asking for coaching.

Bringing together, on the one hand, UPE-graduate entrepreneurs who are willing to coach, and on the other, (aspirant) student-entrepreneurs who are asking for coaching is a process that can clearly profit from the literature in the field of ‘outsiders’. We saw that ‘outsiders’ can have a positive influence on the performance of the firms that they are coaching. Bringing together a UPE-graduate entrepreneur with a student-entrepreneur looks like a promising form of entrepreneurship education, with the UPE-graduate as a new sort of lecturer. All this could lead to the start of an intermediary university organization, placed between UPE-graduate entrepreneurs and student-entrepreneurs, in order to assist such duos on a professional basis.

5. Concluding Remarks and Recommendations

In this paper, we have explored the relationship between institutions for higher education and SMEs. Bridging the gap between these institutions and SMEs is one of the important challenges of present economic policy. Our paper showed that, although the relationship obviously has some potential, a number of gaps have to be bridged in order to arrive at a fruitful collaboration. On the basis of our circular research innovation model we focused on three case studies.

The first case study dealt with the opinion of entrepreneurs on universities of professional education (UPEs). It became clear that only a small minority of SMEs make use of UPEs. The main reasons for this are that the service assortment and the procedures are unknown by most entrepreneurs. The second case study addressed the way the lecturers of UPEs were perceived by UPE-graduate entrepreneurs. Our research made clear that innovation was hardly an explicit topic in the projects that were shared by the UPEs and the SMEs, and that the entrepreneurs were not impressed by the lecturers knowledge of innovation. Finally, with 45 graduates (all now having their own firm) we looked back at their years of study. We found that, overall, they were positive on the way knowledge was transferred to them and on how their capabilities were developed. However, networking received inadequate attention during their period of study.

Our study makes a number of recommendations. First, knowledge institutions should follow a double strategy towards attracting SMEs into the knowledge circulation process, for firms that do not make use of these institutions yet and for those who do so already. 'Communication' is the key word for the former group, 'smooth cooperation' for the latter group. Furthermore, our research suggests that both entrepreneurs and lecturers should be involved early in a project. Also, innovation should be introduced differently in the relevant project. On the basis of the third case study, we also recommend bringing together UPE-graduate entrepreneurs with student-entrepreneurs: this is a promising form of entrepreneurship education, with the UPE-graduate as a new sort of teacher-mentor.

Various lessons can now be formulated concerning entrepreneurship education/coaching, graduate policy and research. A well-functioning system of coaching (aspirant-)student-entrepreneurs should be set up at UPEs. Matching student-entrepreneurs and UPE-graduate entrepreneurs and facilitating the coaching process are the main challenges here. It is critical that within the graduate policy of UPEs, special attention should be paid to those graduates who have (or had) their own

firm. Such relationships would have to be followed on a longitudinal basis, in order to yield interesting research results, from which others can learn. Finally, special attention should be paid to networks, their viability and sustainability, and advanced Internet communication.

References

- Acs Z.J., F.R. FitzRoy and I. Smith (2002) High Technology Employment and Knowledge Spillovers, in: Z.J. Acs, H.L.F. de Groot and P. Nijkamp (eds.), *The Emergence of the Knowledge Economy*, Berlin: Springer, 155-172.
- Argyres, N.S. and J.P. Liebeskind (1998) Privatizing the Intellectual Commons: Universities and the Commercialization of Biotechnology, *Journal of Economic Behavior and Organization*, 35 (4), 427-454.
- Atuahene-Gima, K. (1996) Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia, *Journal of Product Innovation Management*, 13 (1), 35-52.
- Baron, R.A. (1998) Cognitive Mechanisms in Entrepreneurship: Why and When Entrepreneurs Think Differently Than Other People, *Journal of Business Venturing*, 13 (4), 275-294.
- Bashkaran, S. (2006) Incremental Innovation and Business Performance: Small and Medium-size Food Enterprises in a Concentrated Industry Environment, *Journal of Small Business Management*, 44, 1, 64-80.
- Bell, G.G. (2005) Clusters, Networks, and Firm Innovativeness, *Strategic Management Journal* 26 (3), 287-295.
- Bercovitz, J., M. Feldman, I. Feller and R. Burton (2001) Organizational Structure as a Determinant of Academic Patent and Licensing Behavior: An Exploratory Study of Duke, Johns Hopkins and Pennsylvania State Universities, *Journal of Technology Transfer*, 26 (1-2), 21-35.
- Brand, M., Wakkee, I. and M. van der Veen (2007) Teaching Entrepreneurship to Non-business Students, in: A. Fayolle, P. Kyrö and J. Ulijn (eds.), *Entrepreneurship Research In Europe: Outcomes and Perspectives*, Cheltenham (UK): Edward Elgar.
- Brass, D.J., J. Galaskiewicz, H.R. Greve and W. Tsai (2004) Taking Stock of Networks and Organizations: a Multilevel Perspective. *Academy of Management Journal*, 47, 795-817.
- Brush, C.G., I.M. Duhaime, W.B. Gartner, A. Stewart, J.A. Katz, M.A. Hitt, S.A. Alvarez, G.D. Meyer and S. Venkataraman (2003) Doctoral Education in the Field of Entrepreneurship, *Journal of Management*, 29 (3), 309-331.
- Bruyat, C. and P.-A. Julien (2000) Defining the Field of Research in Entrepreneurship, *Journal of Business Venturing*, 16 (2), 165-180.
- Busenitz, L.W., G. Page III, D. Shepherd, T. Nelson, G.N. Chandler and A. Zacharakis (2003) Entrepreneurship Research in Emergence: Past Trends and Future Directions, *Journal of Management*, 29 (3), 285-308.
- Cappellin, R. and P. Nijkamp (eds.) (1990) *The Spatial Context of Technological Development*, Aldershot: Ashgate.
- Cho, H. J. and V. Pucik (2005) Relationship between Innovativeness, Quality, Growth, Profitability, and Market Value, *Strategic Management Journal*, 26(6), 555-575
- Chrisman, J.J. (1999) The Influence of Outsider-Generated Knowledge Resources on Venture Creation, *Journal of Small Business Management*, 37 (4), 42-58.
- Chrisman, J.J., and W.E. McMullan (2004) Outsider Assistance as Knowledge Resource for New Ventures, *Journal of Small Business Management*, 42 (3), 229-244.
- Churchill, N.C., and V.C. Lewis (1983) The Five Stages of Small Business Growth. *Harvard Business Review* May-June, 30-51.
- Cooper, R. (1990) Stage-gate Systems: A New Tool for Managing New Products, *Business Horizons*, May/June, 44-54.
- Corsten, H. (1987) Technology Transfer from Universities to Small and Medium-sized Enterprises: An Empirical Survey from the Standpoint of Such Firms, *Technovation*, 6 (1), 57-68.
- Decanio, S. J., C. Dibble and K. Amir-Atefi (2000) The Importance of Organizational Structure for the Adoption of Innovations, *Management Science*, 46 (10), 1285-1299.
- Drucker, P.F., (1985) *Innovation and Entrepreneurship*, New York: Harper Collins Publishers.

- Elfring, T. and W. Hulsink (2003) Networks in Entrepreneurship: The Case of High-technology Firms, *Small Business Economics*, 21 (4), 409-422.
- Finkle, T.A. and D. Needs (2001) Trends in the Market for Entrepreneurship Faculty, 1989-1998, *Journal of Business Venturing*, 16 (6), 613-6340.
- Garcia, R. and R. Calantone (2002) A Critical Look at Technological Innovation Typology and Innovativeness Terminology: a Literature Review, *Journal of Product Innovation Management*, 19, 110-32.
- Gartner, W.B. (1990) What Are We Talking About When We Talk About Entrepreneurship? *Journal of Business Venturing*, 5 (1), 15-28.
- Gooderham, P.M., A. Tobiassen, A. Doving, and O. Nordhaug (2004) Accountants as Sources of Business Advice for Small Firms, *International Small Business Journal*, 22 (1), 5-22.
- Geenhuizen, M. van, D. Soetanto and P. Nijkamp (2007) Diversity as a Critical Element in Stimulating the Role of Technical Universities in the Regional Economy, *Studies in Regional Science*, 37 (2), 501-518
- Harmon, B., A. Ardshvili, R. Cardozo, T. Elder, J. Leuthold, J. Parshall, M. Raghian and D. Smith (1997) Mapping the University Technology Transfer Process, *Journal of Business Venturing*, 12 (6), 423-434.
- Hippe, E. Von (1988) *The Source of Innovation*, New York: Oxford University Press.
- ING Bank (2004) *Ondernemen in IJsseland, Regio in Economisch Perspectief*, ('Enterprising in IJsseland, Region in economic perspective'), Amsterdam, May.
- Jaffe, A. (1989) Real Effects of Academic Research, *American Economic Review*, 9, 957-970.
- Katz, J.A. (2003) The Chronology and Intellectual Trajectory of American Entrepreneurship Education 1876-1999, *Journal of Business Venturing*, 18 (2), 283-300.
- Kirby, D.A. (2004) Entrepreneurship Education: Can Business Schools Meet the Challenge?, *Education + Training*, 46 (8/9), 510-519.
- Kleijn, E.A., E. Masurel and K. van Montfort (2007) The 'Outsiders' Influence on Innovation among Medium-Sized Enterprises, *paper-under-review*.
- Kline, S.J. and N. Rosenberg (1986) An Overview of Innovation, in: R. Landay and N. Rosenberg (eds.), *The Positive Sum Game*, Washington DC: National Academy Press, 214-240.
- Kuratko, D.F. (2005) The Emergence of Entrepreneurship Education: Development, Trends, and Challenges, *Entrepreneurship Theory & Practice*, 29 (5), 577-597.
- Lee, Y.S. (1996) 'Technology Transfer' and the Research University: A Search for the Boundaries of University-Industry Collaboration, *Research Policy*, 25 (6), 843-863.
- Lundvall, B.A. (ed.) (1992) *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, London: Frances Pinter.
- Major, E. and M. Cordey-Hayes (2000) Knowledge Translation: A New Perspective on Knowledge Transfer, *Foresight*, 2(4), 412-423.
- Malecki, E.J. and R.M. Poehling (1999) Extroverts and Introverts: Small Manufacturers and their Information Sources, *Entrepreneurship and Regional Development*, 11 (3), 247-268.
- Martin, B.R. and P. Tang (2006) *The Economic and Social Benefits of Publicly Funded Basic Research*, Report to the Office of Science and Innovation, Dept. of Trade and Industry, Brighton: SPRU.
- Masurel, E. and F.G.M. Werkhoven (2008) The Relationship Between Universities of Professional Education and SMEs: Reasons for Improvement (work-in-progress).
- Masurel, E. and S. Mol (2009) The Relationships between Universities of Professional Education and Small and Medium-Sized Enterprises, *International Journal of Foresight and Innovation Policy*, 5 (1-3), 169-181.
- Masurel, E. and C.A.G.M. van Montfort (2006) Life Cycle Characteristics of Small Professional Service Firms, *Journal of Small Business Management*, 44 (3), 461-473.
- Montoya-Weiss, M. and R. Calantone (1994) Determinants of New Product Performance: A Review and Meta-Analysis, *Journal of Product Innovation Management*, 11(5), 397-417.
- Kleijn, E.A.H., E. Masurel and K. van Montfort, The Influence of 'Outsiders' on Innovation in Medium-sized Firms (work-in-progress)
- Mole, K. (2002) Business Advisers' Impact on SMEs: an Agency Theory Approach *International Small Business Journal*, 20 (2), 139-162.
- Nelson, R.R. (2001) Observations on the Post-Bayh-Dole Rise of Patenting at American Universities, *Journal of Technology Transfer*, 26 (1-2), 13-19.
- Nijkamp, P. (2003) Entrepreneurship in a Modern Network Economy, *Regional Studies*, 37 (4), 95-405.
- Nooteboom, B. (1994) Innovation and Diffusion in Small Firms: Theory and Evidence, *Small Business Economics*, 6 (5), 327-347.

- Peterman, N.R. and J. Kennedy (2003) Enterprise Education: Influencing Students' Perceptions of Entrepreneurship, *Entrepreneurship Theory & Practice*, 28 (2), 129-144.
- Ranganathan, J. (1998) *Sustainability Rulers: Measuring Corporate Environmental & Social Performance*, World Resources Institute: Washington.
- Rice, M.P. (2002) Co-Production of Business Assistance in Business Incubators: an Exploratory Study, *Journal of Business Venturing*, 17 (2), 163-187.
- Robinson, R.B. Jr. (1982) The Importance of 'Outsiders' in Small Firms Strategic Planning, *Academy of Management Journal*, 25 (1), 80-93.
- Robson, P.J.A., and R.J. Bennet (2000) SME Growth: the Relationship with Business Advice and External Collaboration, *Small Business Economics*, 15 (2), 193-208.
- Rogers, E. M. (2003). *Diffusion of Innovations*. 5th edition, New York: Free Press.
- Rosenberg, N. and R.R. Nelson (1994) American Industries and Technical Advance in Industry, *Research Policy*, 23 (3), 323-348.
- Ruef, M. (2002) Strong Ties, Weak Ties, and Islands: Structural and Cultural Predictors of Organizational Innovation, *Industrial and Corporate Change*, 11(3), 427-449.
- Ryans, C.C., J.K. Ryans Jr. and M.A. Pearson (1987) Educators' Views on Small Business Training, *Journal of Small Business Management*, 27 (3), 80-83.
- Salter, A.J. and B.R. Martin (2001) The Economic Benefits of Publicly Funded Basic Research: A Critical Review, *Research Policy*, 30, 509-532.
- Scott, M. and R. Bruce (1987) Five Stages of Growth in Small Business, *Long Range Planning*, 20 (1), 45-52.
- Schumpeter, J.A. (1934) *The Theory of Economic Development*, Cambridge: Harvard University Press
- Song, M. and M. Parry (1997), The Determinants of Japanese New Product Success, *Journal of Marketing Research*, 34 (1), 64-76.
- Solomon, G.T., S. Duffy and A. Tarabishy (2002) The State of Entrepreneurship Education in the United States: A Nationwide Survey and Analysis, *International Journal of Entrepreneurship Education*, 1 (1), 65-86.
- Stefan, P.E. (2001) Educational Implications of University-Industry Technology Transfer, *Journal of Technology Transfer*, 26 (3), 199-205.
- Stephan, P.E. and S.S. Everhart (1998) The Changing Reward to Science: The Case of Biotechnology, *Small Business Economics*, 10(2), 141-151.
- Tang, P. and D. Paré (2003) Gathering the Foam: Are Business Method Patents a Deterrent to Software Innovation and Commercialization?, *International Review of Law, Computers and Technology*, 17(2), 127-162.
- Thurik, A.R., 1996, Innovation and Small Business, *Small Business Economics*, 8(3), 175-176.
- Verhees, F.J.H.M. and M.T.G. Meulenbergh (2004) Market Orientation, Innovativeness, Product Innovation, and Performance in Small Firms, *Journal of Small Business*, 42 (2), 134-154.
- Tidd, J. (2001) Innovation Management in Context: Environment, Organization and Performance, *International Journal of Management Review*, 3(3), 128-141.
- Vesper, K.H. and W.B. Gartner (1997) Measuring Progress in Entrepreneurship Education, *Journal of Business Venturing*, 12 (5), 403-421.
- Welford R. (1995) *Environmental Strategy and Sustainable Development*. Routledge: London.
- Welsh, J.A. and J.F. White (1981) A Small Business Is Not a Little Big Business, *Harvard Business Review*, July-August, 18-32.
- Wissema, J. and L. Euser (1991) Successful innovation through inter-company-networks, *Long Range Planning*, 24 (6): 33-39.
- Witt, P. (2004) Entrepreneurs' networks and the success of start-ups, *Entrepreneurship & Regional Development*, 16 (5): 391-412.
- Yap, C.M. and W.E. Shouder (1994) Factors influencing new product success and failure in small entrepreneurial high technology electronic firms, *Journal of Product Innovation Management*, 11 (5), 418-432.
- Zirger, B.J. and M.A. Maidique (1990) A Model of New Product Development: an Empirical Test, *Management Science*, 7, 867-883.

Map 1. The Zwolle region in the Netherlands



BOXES

Box 1. Windesheim University Year of Entrepreneurship

2007 was proclaimed the year of entrepreneurship for Windesheim University, in order to put itself on the map as a leading institution in the field of entrepreneurship. Four main activities were developed by the Chair of Sustainable Entrepreneurship: (i) research among alumni-entrepreneurs (see Section 4 of this paper); (ii) research among student-entrepreneurs ; (iii) workshops for SMEs in the region; (iv) the Summer School Entrepreneurship (see Box 2).

Box 2. Summer School Entrepreneurship

From 16-22 July 2007, Windesheim University of Professional Education held a Summer School in Zwolle for their third and fourth year bachelor students. The supervisor and sponsor of this event was the ABN AMRO Bank. This Summer School was organized together with universities in Amsterdam, Tilburg and Delft, all Dutch universities. This was a follow-up of the Summer School Entrepreneurship 2006, which was organized in Amsterdam, by the VU University Amsterdam and the ABN AMRO Bank. In 2007, some 20 Windesheim-students attended this Summer School, together with some 60 students from the other universities. The most important entrance requirements were a (draft) business plan and an enthusiastic entrepreneurial attitude. During this week students attended classes on networks, administration and psychology, given by entrepreneurs, bank employees, consultants, the tax department and professional lecturers (amongst others). Furthermore a helpdesk was set up where student-entrepreneurs were given personal assistance in writing their business plan. The students were encouraged to include a paragraph on sustainable entrepreneurship in their business plan.

Box 3. Student-entrepreneurs want coaching

In December 2006 all 13,000 regular students at Windesheim University of Professional Education were approached via email to participate in a research project on entrepreneurship. 429 of them responded to that request, yielding a response of more than 3 per cent. Of them, 106 had their own company, and another 124 respondents had more or less serious plans to start their own business. The Internet appeared to play an important role for these (aspirant) student-entrepreneurs. We asked the student-entrepreneurs what they needed the most, in order to become more successful. Coaching/advice came first, closely followed by the inevitable answer 'money'. Other factors were: housing, specific expertise and collaboration. With the non-entrepreneurs the sequence was: coaching/advice, money, collaboration, housing and specific expertise.

TABLES

Table 1. Knowledge institutions by SMEs

	Small	Medium	All
Yes	5.9	17.4	13.0
No	94.1	82.6	87.0
Total	100	100	100

N= 399
P-value .00

Table 2. Intensity of knowledge relationship

	Small	Medium	All
Low	42.9	50.0	48.9
Moderate	28.6	22.5	23.4
Very	14.3	15.0	14.9
Variable	14.3	12.5	12.8
Total	100	100	100

N= 47
P-value 0.98

Table 3. Ways of bringing about the relationship

	Small	Medium	All	P-value
Deliberately brought about by the entrepreneur	57.1	37.5	40.4	0.33
Deliberately brought about by the institution	28.6	27.5	27.7	0.95
Through a third party	0.0	17.5	14.9	0.23
Coincidence	14.3	12.5	12.8	0.90
Through graduates	0.0	12.5	10.6	0.32
Other	0.0	15.0	12.8	0.27

N= 47

Table 4. Forms of the relationship

	Small	Medium	All	P-value
Internships	42.9	60.0	57.4	0.39
Training & development	28.6	22.5	23.4	0.73
Joint innovation	14.3	12.5	12.8	0.90
Contract students	0.0	12.5	10.6	0.32
Contract research	14.3	2.5	4.3	0.15
Alumni days	0.0	5.0	4.3	0.55
Other	0.0	20.0	17.0	0.19

N= 47

Table 5. Substance of the relationship

	Small	Medium	All	P-value
Marketing	42.9	26.7	31.8	0.54
Quality	50.0	23.3	31.8	0.20
Strategy	28.6	16.7	20.5	0.57
Finance	14.3	13.3	13.6	0.87
Working circumstances	7.1	10.0	9.1	0.62
Environment	0.0	3.3	2.3	0.44
Export	0.0	0.0	0.0	--
Other	35.7	26.7	29.5	0.85

N= 44

Table 6. Purpose of relationship

	Small	Medium	All	P-value
Quality improvement	42.9	54.1	52.3	0.59
Efficiency increase	42.9	37.8	38.6	0.80
Sustainability contribution	14.3	27.0	25.0	0.48
Facilitating innovations	28.6	13.5	15.9	0.32
Other	14.3	27.0	25.0	0.48

N= 44

Table 7. Satisfaction with the relationship with knowledge institutions

	Small	Medium	All
Very dissatisfied	0.0	2.6	2.2
Dissatisfied	0.0	2.6	2.2
Neutral	14.3	10.3	10.9
Satisfied	71.4	71.8	71.7
Very satisfied	14.3	10.3	10.9
Varying	0.0	2.6	2.2
Total	100	100	100

N= 46

P-value .98

Table 8. Subsidized firms

	Small	Medium	All
Yes	14.3	5.3	6.7
No	85.7	94.7	93.3
Total	100.0	100.0	100.0

N= 45

P-value 0.38

Table 9. Problems perceived in relationships with knowledge institutions

	Small	Medium	All	P-value
Service assortment unknown	35.0	37.4	36.5	.63
Procedures unknown	27.1	31.1	29.6	.42
Too time-consuming	7.9	14.9	12.3	.04
Not able to find the right person	5.0	11.1	8.8	.05
Too expensive	6.4	3.0	4.3	.11
Unclear recommendation	2.9	3.4	3.2	.77
Lack of understanding	0.7	3.4	2.4	.10
Secrecy	0.0	0.4	0.3	.44
Other	12.9	10.6	11.5	.51
None	38.6	34.0	35.7	.38

N=375

Table 10. Problems perceived by establishing and maintaining a relationship with knowledge institutions

	Users	Non-users	All	P-value
Service assortment unknown	23.5	39.0	36.9	.03
Procedures unknown	19.6	31.3	29.7	.09
Too time-consuming	19.6	11.0	12.2	.08
Not able to the find right person	15.7	7.7	8.8	.10
Too expensive	3.9	4.3	4.2	1.00
Unclear recommendation	7.8	2.5	3.2	.06
Lack of understanding	2.0	2.5	2.4	1.00
Secrecy	2.0	0.4	0.3	.14
Other	9.8	11.7	11.4	.70
None	49.0	33.4	35.5	.03

N=375

Table 11. How innovative do you consider your firm?

	%
Very	29.6
Rather	51.9
Hardly	11.1
Not	7.4
All	100

Table 12. Kind of innovations

	%
New products	76.0
Improved products	72.0
Improved processes	60.0
New services	52.0
New processes	44.0
Improved services	36.0
Other	12.0

Table 13. Opinion on the supervising lecturers

(very) positive	%
Expertise	51.9
Personal contact	51.9
Effectiveness	44.4
Practical experience	40.7
Collaboration	37.0
Flexibility	37.0
Empathy	33.3
Customer orientation	33.3
Coaching	29.6
Innovativeness	7.4

Table 14. When did you get the idea to become an entrepreneur?

	N	%
During period of study	23	51.1
Other	11	24.4
While working as an employee	10	22.2
During unemployment	1	2.2
Total	45	100

Table 15. What made you decide to start your own company?

	N	%
An idea I wanted to realize	27	60.0
Freedom	16	35.6
Entrepreneurship in family	10	22.2
Other	8	17.8
Years of study	6	13.3

Table 16. What was the contribution of your education?

		Knowledge	Capabilities	Networks
Very little	N	4	2	16
	%	8.9	4.4	35.6
Little	N	6	7	14
	%	13.3	15.6	31.1
Neutral	N	10	12	8
	%	22.2	26.7	17.8
Much	N	20	20	6
	%	44.4	44.4	13.3
Very much	N	5	4	1
	%	11.1	8.9	2.2
Total	N	45	45	45
	%	100	100	100

Table 17. What can the university do for the entrepreneurs?

	N	%
Networks	17	38.6
Nothing	12	27.3
Specific training	6	13.6
Other	6	13.6
Coaching	3	6.8
Internships	1	2.3
Total	45	100

Table 18. What the can entrepreneurs do for the university?

	N	%
Guest-speaker	19	42.2
Nothing	12	22.2
Give business advice	7	15.6
Internships	5	11.1
Other	3	6.7
Workshops	1	2.2
Total	45	100.0