Bernd REICHERT*

FOSTERING SME INNOVATION THROUGH CROSS-BORDER COOPERATION

Abstract: Small and medium-sized Enterprises (SMEs) are key drivers of innovation serving as an important conduit for knowledge spill-overs. The past 20 years have shown that entire sectors have been renewed and new industries created driven by innovative SMEs. They form a more important part of the EU economy than of other world region. They can contribute significantly to achieving the objectives of the EU 2020 strategy, and notably the Innovation Union. This presentation looks into improved innovation capacity building through internationalisation and cross-border collaboration.

SMEs AND THEIR RESEARCH AND DEVELOPMENT ACTIVITY

The European Union Research Advisory Board (EURAB) had suggested in its 2004 report „SMEs and ERA"[1] a classification of SMEs according to their degree of R&D activities (Fig. 1).

This classification had been used for the design of the SME support measures under the 6th (2002-2006) and 7th R&D Framework Programme (2007-2013). They were conceived to (a) involve technology pioneers and part of the technology users directly into transnational research collaborations and (b) permit technology adopting companies and other technology users to obtain knowledge through an outsourcing scheme. However, as recent assessments[2,3] have shown this stringent separation in research-active and not research-active enterprises is too simplistic and a more elaborated system to understand the interest of SMEs to participate in

* Dr. Bernd Reichert, Head of Unit „Small and Medium-Sized Enterprises", Research Directorate General, European Commission

[1] EURAB has been a high-level, independent, advisory committee created by the Commission to provide advice on the design and implementation of EU research policy. The full report „SMEs and ERA" (EURAB 04.028-final)can be found under http://ec.europa.eu/research/eurab/pdf/eurab_04_028_sme_era.pdf

[2] Impact assessment of the SME-specific measures FP 5 and FP 6, 2009, EUR 24290

[3] Impact assessment of the participation in the „themes" of FP 5 and FP 6, 2009, EUR 24448

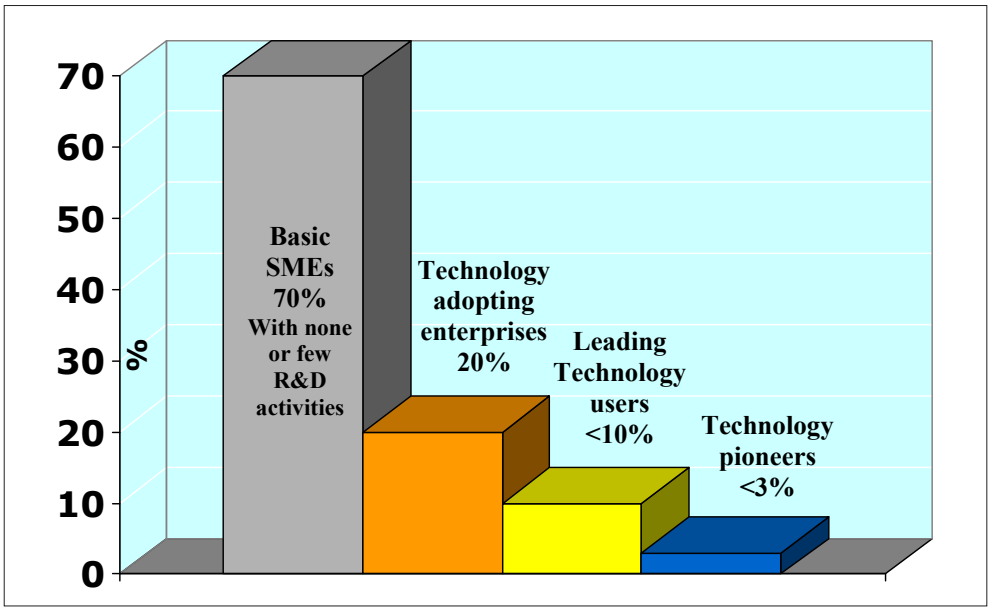

Fig. 1. Classification of SME according to their R&D activity

research support programmes is needed. Such a better model might help to design future programmes better adapted to the needs and expectations of SMEs. It will be discussed in the chapter „Typology of SMEs supported through the European R&D Framework Programmes" below.

SMEs AND INNOVATION PATTERNS[4]

Small firms do not innovate by themselves but in collaboration with suppliers, customers, competitors, universities, research organisations and others. Their networks help them to overcome some of the obstacles to innovation linked to their small size.

The quality of their local entrepreneurship environments, i. e. the strength of local technology partners, the quality of local science-industry linkages, and so on, is critical to generating local knowledge spill-overs that can promote their growth.

The focus should not be entirely on the local, however. It is also important to connect small firms to global knowledge flows.

INTERNATIONALISATION OF SMEs

A study on internationalisation pattern and strategies in small firms produced for the European Commission and released July 2010,[5] found that SMEs that are internationally active are more likely to report higher employment growth than non-active

[4] SMEs, Entrepreneurship and Innovation, OECD study 2010

[5] Internationalisation of European SMEs, EIM Business & Policy Research, 2009

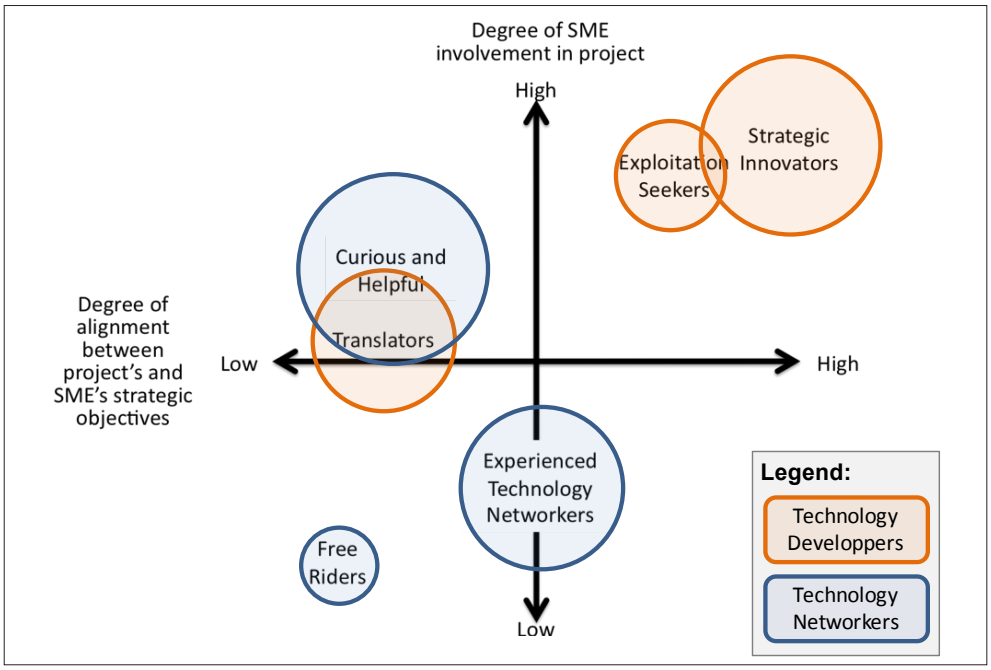

Fig. 2. Typology of SMEs participating in the EU Framework Programmes

SMEs. Furthermore, being internationally active is strongly related to higher growth in turnover, and last but not least a strong relationship exists between the importance internationalisation plays in the growth strategy of a company and its ability to innovate.

However, the same study found that SMEs in general are not aware of internationalisation support programmes. The information available is not tailor-made for SMEs and/or the information channels use to publicise such programmes are not suitable to reach SMEs.

Another aspect which plays a role in whether companies can successfully use R&D as innovation tools is the fact that less than 50% of publicly funded applied research projects are handled strategically by industrial partners.[6]

TYPOLOGY OF SMEs SUPPORTED THROUGH THE EUROPEAN R&D FRAMEWORK PROGRAMMES

As stated above a recent assessment of the participation of SMEs in previous Framework Programmes[7] asked companies for their motivation to embark in

[6] Estimates by the Swiss Agency for Innovation (CTI), in C. Meier: Business innovation through collaborative creation, 14th International Conference on Machine Design and Production, 2010

[7] Impact assessment of the participation in the „themes" of FP 5 and FP 6, 2009, EUR 24448

trans-national collaborative R&D projects and subsequently tried to create a typology model from the data obtained. The various answers were plotted against the degree of alignment between the project's and the SME's strategic innovation objectives as one dimension and the degree of the actual involvement of the company in the project as a second dimension. The result is shown in fig. 2, whereby the size of a sphere represents the relative frequency of a given type of SME.

The study finds two main groups: the „Technology Developer", companies which are genuinely interested in the project results attempting to use them within their businesses to various degrees, and the „Technology Networker" who use the project consortia to form new alliances, to find new business partners or to learn about a technology field in general. They are generally less interested in the actual results of the research collaboration.

TECHNOLOGY DEVELOPERS

Strategic Innovators: It is estimated that about 22% of all SMEs participating in the Framework Programmes belong to this group. They tend to be micro or small enterprises. Strategic innovators consider the R&D projects as important and highly aligned with the strategy of the company. These SMEs play an important role in the projects, often making a substantial contribution to the project as a technology provider. In general, the technology output is very or highly competitive and the level of exploitation is also high.

Exploitation Seekers: Some 12% of SMEs could be categorized as exploitation seekers. These SMEs join projects with the explicit aim of exploiting the results of the project. The projects are important for them since these SMEs tend to be micro to small size and have limited funding and resources. They tend to have a lower level of R&D intensity, i. e. less than 10%, indicating that they may lean more towards exploitation on the exploration to exploitation continuum than Strategic Innovators. However, due to a misalignment between the project's objectives (more towards exploration) and the SME's strategy (more towards exploitation), the project does not have that high a level of impact on the SME.

Translators: about 18% of SMEs are estimated to fall within this group. These SMEs generally are asked to join R&D projects in order to play the role of the translator between research and the market. Translators are focused on the technology and tend to be of medium R&D intensity (>10% and <30%). The projects are important but not critical for them, thus the degree of alignment between the project's objectives and the SME's strategy is less than that of the Strategic Innovators and Exploitation Seekers. As a result, while the SME has a moderate to high impact on the project, there are mixed results in terms of the impact of the FP project on the SME.

TECHNOLOGY NETWORKERS

Experienced Technology Networkers: 20% of SMEs under consideration can be classed as such. SMEs in general are less able to shape their external environment

than larger firms due to their small size; therefore, they must be proactive in their approach to learning about technological developments in their industry. However, due to limited resources smaller firms have difficulty in establishing and maintaining relationships outside of their everyday external activities and local regions as well as going beyond incremental innovation. Thus, Experienced Technology Networkers join projects for the purpose of technology intelligence and network development. They tend to have a high level of R&D intensity (<30%) and they are well-established (primarily of 10 years age or older). These SMEs play the role of technology provider or advisor; however, they tend to be at the periphery of the project. Whereas there is no to moderate business impact, the project has a high impact on the SME's networking.

Curious and Helpful: Slightly more than 20% of SMEs belong to this group. This sub-group of SMEs comprise good networkers in that they have joined collaborative R&D projects due to their curious nature and willingness to help out despite the project not being closely aligned with the company's strategy. These SMEs tend to have a relatively low level of R&D intensity and one reason for joining a project is that it enables the SME to broaden its horizons outside of their local region or country as well as engage in a challenging task.

Free Riders: Only 5% of SMEs can be classified as „free riders". This sub-group of SMEs is thus a relatively small sub-group with only a handful of companies. They are generally asked to join FP projects so that the project can „fulfill the SME quota". They were generally found through one of the project partner's networks. Free-riders tend to be medium-sized, which enables them to allocate the necessary resources on a project that is not aligned with the SME's strategy (i. e. peripheral or limited interest in the project). Due to this limited interest by either the project or the SME, these SMEs tend to have low or no impact on the project while the project has no impact on the SME.

SMEs AND ACADEMIC-INDUSTRIAL COLLABORATION

At the overall level, the literature is very positive about academic-industrial collaboration. Firms with a greater number of links to highly research-oriented universities invest more in R&D. The cooperation depends strongly on the persons involved and the strength of their network. Several obstacles have been identified setting hurdles to the collaboration. On the one hand, companies are not in the position to translate their market oriented demands and needs into R&D projects. Here concepts like mentoring and coaching come into play (see below) as well as intermediary services (e. g. technology consultants, innovation audits, etc.). On the other hand most academics engage with industry to further their research rather than to commercialise their knowledge.

OUR UNDERSTANDING ON INNOVATION HAS CHANGED

With research and knowledge production being already truly global and knowledge and information readily available at any moment anywhere in the world due

to ever advancing and information and communication technology, innovation moves from a 'closed' (in-house) model to an 'open' innovation model: Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology. The boundaries between a firm and its environment have become more permeable; innovations can easily transfer inward and outward. The central idea behind open innovation is that in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should instead take information, knowledge, processes or inventions from outside sources. In addition, internal inventions not being used in a firm's business should be taken outside the company (e. g., through licensing, joint ventures, spin-offs).[8]

Innovation was and is often seen as merely the application of new technologies in production systems or the development of new products. Meanwhile „innovation" is understood as a broad concept which comprises non-technology components (like services, design, business models or company values). Especially in Europe, where competition with other parts of the world cannot be won through lower wages or the monopoly of raw materials, the use of all forms on innovation is indispensible. Furthermore in a world where local proximity is less and less an advantage and where customers can easily choose where and when to buy, innovation becomes a constant business feature requiring to take into account customer needs and desires before producing new products.

MENTORING AND COACHING OF SMEs[9]

Various studies have shown that between the definition of an innovation need of a small firm and the establishment of a corresponding R&D project involving higher education or research institutions some kind translational step is necessary.[10] The frames in which the different actors operate in are so different that an easy transfer of research knowledge into the business world or the re-formulation of business needs into a collaborative research projects is often not possible. The above mentioned assessments of the European SME support schemes have shown that whereas the research organisations are generally very satisfied with the scientific results of the projects, the companies were often not able to enter into an exploitation phase and to benefit from these results.

[8] Based on: Chesbrough, H. W., The era of open innovation. MIT Sloan Management Review, 44 (3) 2003

[9] The author is grateful to C. Meier, platinn, Fribourg (Switzerland) for extensive discussion on this subject

[10] See e. g. Crepon, Duguet and Mairesse: Research, innovation, and productivity: an econometric analysis at the firm level, National Bureau of Economic Research, Working Paper 6696, Cambridge, MA, 1998

Experiences from a number of national, often regional, initiatives have shown that mentoring and coaching improve the innovation activity of SMEs.[11] Such mentoring and coaching can be undertaken in order to identify and develop innovation needs and opportunities or in order to establish research projects and to broker collaborations with academic partners. There are at least two lessons to learn from these initiatives:

a) they have to be continuous over a certain period; a single session providing information is insufficient; the firms need to accompanied in order to develop innovation needs; often management structures are effected which require analyses and changes over time; supporting the firms with resources, mostly human, to develop their needs into a feasible project idea,

b) they depend heavily on the abilities of the mentors and coaches; successful mentors are experienced in both academic project work and industrial processes; a successful mentoring process is always based on mutual trust between coach and SME.

CONCLUSIONS

Innovativeness and internationalisation of SMEs are strongly correlated.

SMEs often are not aware of support programmes. The usual information channels do not work. Small firms do not come only for information, new forms of communication are necessary. It must be a two-way process (mentoring, coaching) and over a certain period.

For most of the industrial sectors, a direct application of research results into business is not possible, a dedicated innovation step is necessary. Trans-national collaborative projects are more successful when the exploitation is included as an integral and determining part of the project from the very beginning.

[11] Examples are for instance the SMEmpower initiative (http://www.sme-mpower.net/), the programme „Innoveren in Limburg" Limburg (The Netherlands), or the Industrial Research Assistance Programme (IRAP) in Canada