

Title: ***R&D-intensive SMEs in Europe: What do we know about?***
- Evidence from the 2007 EU Industrial R&D Investment Scoreboard -

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ABSTRACT

Regarding R&D and innovation policies in Europe, the European Commission has two broad objectives in order to achieve the goals set in the 3% Action Plan¹: (1) increase the total amount of creative work undertaken in the EU, and (2) raise the productivity of (new/existing) knowledge. In order to achieve that, commonly a mix of policy measures is applied. However, taking into account the diversity of business environments as well as the importance of Small and Medium size Enterprises [SME] for the European economy², the general principle '*think small first*' has been adopted as a policy maxim. In contrast, "The recent situation in European Member States can be characterized by the general absence of specific policies that discriminate and exclusively address R&D activities in SMEs," as pointed out by an Expert Group³ on SME in 2004. In fact "...most programmes, measures and initiatives in Member States's R&D and innovation policies already address SMEs as part of the national business enterprise sector".

This situation is about to change. From a situation in which a specific R&D policy strategy for SMEs was absent, these companies are becoming an explicit target group for R&D promoting policies. Hence, research- (respective R&D-) intensive SMEs, in general, appear to be key for R&D and technology policy.⁴ However, the existing knowledge about such R&D-intensive SMEs is fairly limited. Empirically it refers mainly to anecdotal evidence, captures certain very specific regional and/or sub-sectoral cases or, contrarily, suggests rather broad trajectories. This is partly because of a lack of comprehensive data and partly because of the enormous variety among SMEs. Providing insights into systematic problems, obstacles and the determinants of such companies' development is crucial for improving the common understanding of the economics of R&D, innovation and technology policy.

In this paper we discuss what it implies to be an R&D-intensive SME in the EU. In fact, what kind of companies in Europe is small and/or medium-sized and base their innovations on research and development; i.e. are R&D-intensive SMEs? What is known about their business strategies? And, taking into account all this, does it really help to consider R&D-intensive SMEs as such "erga omnes" as one of the major target group for R&D policy making?

These questions are addressed, using the data from the 2007 EU Industrial R&D Investment Scoreboard, covering the top R&D investors in Europe as well as in the rest of the world. Thus, the R&D investments, number of R&D employees, fixed assets, sales, profits, etc. of 133 European research intensive SMEs will be investigated for the period 2002–2006, distinguished by sector of economic activity (with particular emphasis on Pharma & Biotech and Software Industries & Computer Services). Finally, implications for R&D policies focusing on SME support are discussed.

¹ See http://europa.eu.int/comm/research/era/3pct/index_en.html for information on the 3% Action Plan. However, the 3% target set up in Barcelona should not be seen in isolation, but as one key component in achieving the overarching objective set in Lisbon, of Europe becoming the most competitive and dynamic knowledge-based economic region in the world.

² In EU-25, about 23 million SMEs provide employment for 66% of the private sector. Thus, small firms (< 50 employees) constitute at least 95% of the total jobs in SMEs and 50% of the total value added in EU-25 (OECD, 2005).

³ The *Expert Group* has undertaken analyses of the situation and problems SMEs in Europe are facing. The results are outlined in two reports: *SME and Research* (Gallup Organization, 2006); *Design Measures to Promote growth of young research-intensive SMEs and start-ups* (OMC-SME Expert Group, 2006).

⁴ See: EC (2006): *Reporting Intellectual Capital to Augment Research, Development and Innovation in SMEs* [RICARDIS].

General structure of the paper

Introduction

- Making the link to the general topic and objectives of the Workshop: **Drivers and Impacts of Corporate R&D in SMEs** → putting the contribution in the context
- To be discussed in brief (general intro): what dynamics of R&D in terms of the world's macro-regions are obvious? Why does this matter?
- Why SMEs are concerned in particular? What indeed is specific in terms of SMEs compared to R&D activities in large scale companies?

Data

- Outlining data needs for a comprehensive analysis of R&D activities in SMEs (micro-data) and stressing what kind of data is commonly / explicitly available (EUROSTAT, OECD, ..., CIS and other surveys, comprehensive company data bases as COMPUSTAT, Amadeus, etc. → individual case studies)
- 2007 EU Industrial RD Investment Scoreboard [SB] → strength and limitations,
- Linking this to other possibly relevant sources of data (as mentioned above).
- Synthesising what generally can be said about (European) SMEs in the 2007 SB (how many, sector affiliations, etc.). Moreover, discussing why there is only a negligible amount of SMEs among the non-European companies (sample size bias), which impedes a direct comparison of the EU vs. the rest of the world. Point also out the general bias in terms of R&D intensity of the considered SB companies (sample selection bias)

Empirical Analysis

→ Conceptual structure of the analysis & key research questions to be addressed...

- **Firm dynamics:** Outlining the dynamics of those SMEs that appear to be among the SB companies; in general over all companies as well as exemplary disaggregated for two emerging sectors (biotech and software). Thus, time series data have to be analysed in order to observe how many companies from the sample have developed from being an SME towards >SME companies (any bias possibly caused by mergers/acquisitions needs to be taken into account and the track records have to be adjusted accordingly). Moreover, based on cross section / time series data it has to be investigated whether there is a traceable link between corporate R&D in SMEs and their business performance (approximated by output growth) and whether this might be different across sectors and/or along different periods of an SME life cycle?
- Illustrating (graphically) the **R&D investment trajectories:** in general (all SB firms), per sector, per SMEs. This may indicate whether the considered SME are somewhat special in terms of R&D investments. In fact, do they invest significantly more (H0 hypothesis due to the sample bias) compared to the corresponding (sector) benchmark? Thus, it has to be tested statistically whether the mean values of the two corresponding samples (SMEs vs. >SMEs) differ significantly. The same test has to be performed with respect to R&D expenditures as well as to the number of / share of R&D employees.
- **Spatial Dimension:** Is there an SME country bias obvious? In this context, level as well as growth rates of R&D spending in SMEs should be regressed over the corresponding company characteristics, including country dummies. Evidence of such a regional bias may suggest concentrating any supportive measures in some places only. In this respect, the current debate on spatial specialisation and its implications on the corresponding policy making process should be stressed in brief.

Policy perspective

- What appear to be the main determinants of SMEs in terms of their corporate R&D activities, in general (as e.g. outlined in the Annual Digest of Industrial R&D; EC (2008), forthcoming), and how does this apply for R&D intensive SMEs in particular as evidence from SB data may suggest?
- Consideration of common R&D support measures in the light of the limiting factors for the company's development as pointed out in terms of R&D intensive SMEs (structured with respect to R&D policy measures along the *Patterns of Public Support Policies for Industrial R&D* (EC (2008): ERAWATCH) and with respect to relevant innovation policy instruments and objectives structured along the MPRA Paper No. 2009, 11/2007)

Conclusions;

- What do we generally know about R&D intensive SMEs, what knowledge did we add, and what blind spots do remain? What are possible ways forward?
- Making the link to the intro: general deficit in Europe / general deficit in terms of SMEs?
- Coming back to the initially raised questions and – so far finally possible – providing the answers accordingly.
- With respect to the policy perspective: Does it make sense to put more emphasis on either (i) SMEs in general or (ii) R&D performing SMEs in particular?

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(to be complemented...)

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