



**5th IRIMA WORKSHOP
INDUSTRIAL RESEARCH AND INNOVATION
MONITORING AND ANALYSIS
Top R&D investors: Productivity gains and technological profiles
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SUMMARY REPORT

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Workshops organised in the framework of the IRIMA project serve two purposes:

- Present empirical evidences emerging from the analyses conducted within the project³
- alongside their implications in terms of policy recommendations - and discuss them with academics, firm representatives and policy makers.
- Constitute an open forum to identify present and future analytical needs of the European industrial research and innovation policy agenda and discuss how the IRIMA project can contribute to them.

In line with this, the 5th IRIMA workshop had the following main goals: i) present and discuss the work done on the link between R&D investments and productivity at firm level; ii) present and discuss the ongoing attempt to better define the location decision of Scoreboard companies by analysing the innovation and technological profiles of EU regions; iii) discuss with policy makers, industry representatives and experts the elaboration of a policy relevant research agenda for the continuation of the IRIMA activities in 2016-2017.

The workshop was organised in 2 sessions – both introduced by a key note presentation to set the scene - and a final round table. The agenda and a background note setting the scene of the topics to be discussed are available at: <http://iri.jrc.ec.europa.eu/seminars.html>

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² The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission

³ More information in the IRI scientific project and on the evidences produced in the context of the IRIMA are available at <http://iri.jrc.ec.europa.eu/home>

This report summarises the key messages discussed in each of the sessions and the final roundtable, focusing on main policy relevant issues and main research avenues to be considered.

SESSION 1 - Productivity and R&D: evidence from top R&D investors

The session was opened by a key note presentation by Prof. van Pottelsberghe⁴ ([link](#)). The speech provided a broad overview of the results from the literature confirming that doing R&D is important for productivity and economic growth, and tackling many factors at stake that could influence how knowledge is transformed into productivity gains. In particular, he highlighted how different measurements, different policies (competition policy/IP policy) and different sources of knowledge (business, public and foreign R&D capital) potentially enhance or reduce the estimated impact of R&D on growth.

In light of the broad results from the literature, main policy messages concerning what governments could do to foster economic growth through R&D are: i) review the mechanisms through which they provide funds for R&D to firms; ii) improve the reactivity of the public research system; iii) support basic research performed in the higher education sector, and allow for the establishment of free research agendas; and iv) ensure the openness of the economy to foreign sources of knowledge.

This session continued with the presentation of a draft contribution to the up-coming 2015 Innovation Union Competitiveness Report : “Do research and other sources of innovation drive productivity gains in European top R&D investors?” by Sara Amoroso and Fernando Hervás ([link](#)).

From this session, the following main messages emerged:

1) R&D is an important factor to close the trans-Atlantic productivity gap

R&D investment can play a crucial role in the attempt to close the productivity gap between EU and US. Moreover, there is an emerging general consensus on the (overall) positive impact of R&D on growth (via productivity), but the question on how this mechanism works exactly and the quantification of this impact still need further investigation.

2) The trans-Atlantic productivity gap is not only a matter of R&D investment levels but also of different responses of productivity to such investments (elasticities).

The different elasticities between R&D investment and productivity growth on the two sides of the Atlantic can derive from a whole range of factors, internal and external to the firm (e.g. skills, organisational factors/corporate governance, business conditions,

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regulatory framework). Understanding how these factors interact and explain the differences in the R&D productivity link deserve additional research.

3) The differences in productivity are not only trans-Atlantic but also intra-European.

Apart from the focus on the EU-US productivity gap, a new focus should be put on the differences among companies located in different EU countries. Countries and industrial sectors closer to the technological frontier, benefit more in terms of productivity gains from R&D investments. Policies should therefore aim at promoting an industrial shift in Europe towards more knowledge based and technological intensive sectors. This will require to look at the reasons behind lower levels of high-tech entrepreneurship in most EU Member States.

Also in this case, differences in the R&D-growth elasticity and in the north-south EU productivity gap can be due to external factors (like context-environmental factors) which are worth exploring in future research. This includes the analysis of the impact of macro-economic conditions on individual firm behaviours.

4) The Scoreboard dataset may benefit from the inclusion of additional variables and/or from an enlargement of the sample.

Scoreboard data constitute a unique source of information. Nevertheless the dataset can profit from both the inclusion of new variables (e.g. M&A variables) and an enlarged sample (e.g. including firms similar in size and activities but not R&D active; improving the coverage of EU Member States, etc.).

It was also suggested to use Scoreboard data to complement studies carried-out in other institutions on similar topics (e.g. on-going study of the OECD comparing performance of companies at the global technological frontier with those of companies at the national technological frontier).

SESSION 2 - Revealed technological advantages of EU regions and top R&D investors

This session aimed at exploring the possibilities to better define the location decision of Scoreboard companies by analysing the innovation and technological profiles of EU regions. The introductory note by Professor Ron Boschma ([link](#)) set the scene for the discussion by presenting the latest literature findings on the topic of regional technological profile in the context of smart specialisation. The note presented the concept of smart specialisation - a policy concept still looking for a theory and empirical evidences, according to professor Boschma - and highlighted how smart specialisation is mainly about selecting and prioritising research and innovation investments, in view of developing new specialisations. Smart specialisation is in this respect an opportunity for regions to diversify and strengthen their technological profile (therefore attracting

investments). Looking at the role played by specific technologies (such as general purpose technologies or key enabling technologies) in the capacity of regions to implement such diversification is a very interesting and relevant research question. He pointed as particularly interesting some results showing that a good endowment of KETs in regions can be a good basis for an industrial diversification based in new (un-related) activities. Institutional factors (e.g. liberal market economies) seem also to play an important factor in the capacity of regions to move to new/unrelated industrial activities.

The rest of the session was centred on the presentations of two working papers: i) “Technological profile of SB companies and R&D location” (by Antonio Vezzani [link](#)) ii) “The technological specialization of EU regions: patterns, trends and economic effect” (by Rinaldo Evangelista and Valentina Meliciani [link](#)).

During this session, the following main messages emerged:

1) The technological endowment of a country plays a crucial role in attracting high-tech level investment.

The technological endowment of a country is a pull factor for high R&D intensity investments. This assumption can be investigated using Scoreboard data in combination with patent data. Attempts in this direction are already ongoing, using the technological proximity between a company and the host country technological profile to estimate the probability of the same company to locate in the specific host country.

2) We can map regions according to the level of their technological development but we have little idea of the technological trajectory these regions are on.

Studying the patent activity of regions over time can help to understand the evolution of their technological profile. Some initial evidences suggest two general trends at EU level: i) patent activity is concentrated in few countries in Europe, with Germany accounting for the relative majority of it; ii) at the same time, there is lot of heterogeneity in the technological profile of EU regions (this can be due to the kind of technological classification used).

3) There is not so much overlap between KETs (Key enabling technologies)⁵ and FGT (Fast growing technologies).

Studying KETs and FGTs at EU region level, it emerges there is not much overlap (in general) between the two categories. From the ongoing research on this topic it seems to emerge:

i) FGTs have a positive effect on the growth of patent, while this is not the case for KETs;

⁵ For a definition of KETs, see <http://ec.europa.eu/growth/industry/key-enabling-technologies/>

ii) If we look at GDP growth, what matters are KETs and FGTs do not have a (direct) effect;

iii) In particular, the lower the technological level of the region, the higher the impact of KETs on GDP growth. KETs seem therefore to help more catching up regions than regions on the technological frontier.

These results deserve further explorations and interpretations (especially in policy terms).

Final Round table – discussing IRIMA future research agenda

During the final round table, many of the topics already discussed in the previous two sessions were further analysed. The general discussion on the future of IRIMA was centred on two points: i) how to further exploit/expand Scoreboard data; ii) which new topics should be included in the IRIMA research agenda and which topics already included are worth of further analysis.

On the first point - how to further exploit/expand Scoreboard data – the following suggestions (other than those already made in the previous sessions) were made:

i) to further exploit the subsidiary structure of Scoreboard companies and study if and how it changes over the years;

ii) to pair patent data of Scoreboard companies with those on publications. Indicators built using publication data can be both a complementary innovation output measure and a way to reconstruct the links among Scoreboard companies and other firms and/or institutions (i.e. universities);

iii) look more in detail into individual firm's R&D and innovation activities to try to disentangle the consolidated R&D investment figures of large multinationals. Understand to what extent companies are entering into new activities, new technologies.

iv) add information on firm's history, corporate governance, age.

iv) to grant open access to the full set of Scoreboard data and linked databases (i.e. subsidiaries data, patent data, etc.) to the academic community, in order to foster the exploitation of their potential on a larger scale.

On the second point - which new topics should be included in the IRIMA research agenda and which topics already included are worth of further analysis - the following suggestions (other than those already made in the previous sessions) were made:

- i) to push further the investigation of the R&D- growth of employment link, maybe including skills and their role in terms of absorptive capacity;
- ii) to dig more on the relationship between regional characteristics and firm location choices;
- iii) to do some country based studies focusing on those EU countries where Scoreboard database lacks coverage;
- iv) to put (if possible) international trade (and international trade agreements) into the picture and investigate the strategic decision making process of Scoreboard companies in responds to changes in trade agreements;
- v) to explore the collaboration networks of Scoreboard firms (using for example patent network, publication networks, and other database on company networks);
- vi) to study the entry-exit dynamic of firms in the Scoreboard (with a focus at sector level) to try to identify specific firm characteristics driving it;
- vii) to deep the analysis on productivity and the trade-off between productivity and employment.