



FOURTH IRIMA WORKSHOP INDUSTRIAL RESEARCH AND INNOVATION MONITORING AND ANALYSIS

Leading R&D Investors and the European Manufacturing Industry

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SUMMARY REPORT

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IRIMA Workshops aim at supporting the evidence-based policy development at European level and at contributing to the development of an innovation-driven EU economy. In the constant effort to support an interactive dialogue between the industrial representatives and policy makers, the 4th IRIMA Workshop brought together high-level corporate representatives from the world largest R&D investors³, EU policy makers and scientific experts, and senior academics.

Set against the background of the 2014 edition of the 'Industrial R&D Scoreboard', the 4th IRIMA Workshop mainly aimed at:

- enhancing the understanding of large companies' practices and strategies in the organisation of R&D and the development of new technologies;
- obtaining feed-back from industrial representatives and from policy makers on the relevance of experts' research questions and results, and;
- identifying the key issues where further evidence is required to support the needs of both practitioners (companies) and policy makers.

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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 The background note, agenda and presentations can be downloaded from the IRI website, at <http://iri.jrc.ec.europa.eu/seminars.html>

Bringing together presentations on IRIMA evidence and by industry representatives, the 4th IRIMA workshop was structured around two thematic sessions and a round table. The keynote presentation of Pr. Fredrik Tell addressed the main dimensions and challenges of the knowledge integration relying on his latest research projects on the internationalisation of R&D by Swedish MNCs. The session - **Understanding R&D investment decisions in strategic industrial sectors** - aimed at getting, from representatives of leading R&D investing companies, more insights on their strategic R&D investment decisions (R&D investments, location and networks). The second session - **Corporate R&D investments and key technologies** - aimed at a better understanding of the relationship between corporate R&D investments and the development of key technologies (knowledge sources, critical technologies, EU industry performances).

Each session has been introduced by the presentation of recent evidence from the IRIMA project by members of the IRI team. The round table has opened a policy-oriented debate focusing on the main challenges faced by companies from the strategic knowledge-intensive manufacturing sectors and the most prominent framework conditions to address in order to foster their R&D investments.

The summary is organised around key messages, focusing on main policy relevant issues and main research avenues to be considered:

1. Knowledge integration: a fundamental mechanism of corporate knowledge search and innovative strategies

The process of innovation relies on the integration of different knowledge and technologies. As underlined by the companies' presenters (e.g. Air Liquide, Volvo, Fincantieri), knowledge integration constitutes a key mechanism of their innovation strategies, which require the reliance on and the management of interdisciplinary knowledge. The knowledge creation and innovation in companies become more and more sophisticated and specialised, and are increasingly carried out in collaboration with universities, other companies (e.g. search intermediaries), and sometimes competitors. In this respect, companies underlined the positive impacts of collaborative schemes such as the European framework programmes and Horizon2020.

In this process of knowledge integration, companies pursue different strategies according to their core competences and technological capabilities. They rely on knowledge sources mixes and may also develop their know-how using the knowledge embodied in suppliers' and competitors' products.

The increased complexity of innovation processes has come with a more project-oriented R&D management and may require, as underlined by Philips and Bayer, the separation of innovation-knowledge fields. The distinction of life sciences and material

sciences is an example of such processes. Although companies are splitting fields/businesses, the resulting entities are expected to grow for instance through mergers and acquisitions. Besides firms are also setting up or participate in the development of **dedicated venture capital funds** (e.g. Air Liquide, Bayer, Boehringer Ingelheim) **and incubators**.

The integration of ICTs in the whole innovation process has become unavoidable and this goes far beyond the use of technologies as it impacts on the whole business models of companies (Air Liquide stressed this point).

The rapid changes in the corporate knowledge integration strategies point out the need for more investigation on the underlying mechanisms and of their implications for the corporate management strategies and performances (see F. Tell keynote speech).

2. Innovation Ecosystems: a key driver of R&D location and collaboration

In the context of this integrative approach, the concept of "**ecosystem**" has been repeatedly mentioned by companies **as a key factor determining the location of companies R&D activities**. It points to the need for companies to locate close to the knowledge sources and knowledge creation partners, preferably alongside with excellence science centres, and universities. The innovation ecosystems can either be stimulated by policies or be created by the companies (and here history plays a major role for large and "old" multinationals such as Philips or Bayer). The companies have also underlined the collaborative opportunities provided by the innovation ecosystems. In this respect, the importance of win-win collaboration with competitors, with start-ups and the increased reliance on cross-functional collaborations (e.g. Bayer example for medical, crop science and animal research) have been mentioned.

International knowledge sourcing is increasing although co-location with headquarters remains an important feature. **Research has become a global process and reverse innovation is a reality**. The knowledge created in subsidiaries can benefit headquarters activities and other subsidiaries. Nevertheless it is important to stress that companies presenting at the workshop confirmed the still strong importance of headquarters in the location of R&D activities. This confirms the evidence we have from the Survey. However, companies increasingly rely on international knowledge outsourcing (in line with findings of the third IRIMA workshop on the Pharmaceutical industry).

A better understanding of the drivers and impacts of innovation ecosystems would allow for better-suited policy measures to facilitate their development, and to maintain and increase their efficacy.

3. Framework conditions should be further enhanced to foster the generation of innovations

Key dimensions of the framework conditions necessary to favour R&D investments mentioned in the workshop include:

- ✓ The importance of macroeconomic stability
- ✓ The importance of the predictability, stability and flexibility of the regulatory framework
- ✓ The importance of strengthening the knowledge base and favouring a more proactive commitment of European Universities in the collaborations with business actors
- ✓ The importance of demand in pulling innovation from the business sector
- ✓ The need for mechanisms to overcome the multiple market fragmentations
- ✓ The importance of policy coherence and of harmonised regulation across policy fields

The Volvo representative mentioned that the main obstacle for adequate policy intervention lies at Member States, as the EU is already taken measures in the right direction. Furthermore companies have also underlined the more risk-averse attitude of the EU, as compared to the US, which in some cases may hamper the development of EU industrial capacities in particular domains (e.g. biosecurity).

4. The use of public procurement as a driver of innovation

Companies have underlined the importance of public procurement as a relevant demand-based stimulus to bring innovation into the markets. Some cases of public-private partnerships were mentioned such as the "green contracts" in the Netherlands to promote sustainability projects. References were also made to the Swedish Transport Innovation Forum as an interesting example of public-private dialogue. Tiit Jurimae (DG RTD) mentioned the interest of getting feed-back from companies on their future innovation activities and on how they see their regulatory needs in 4- 5 years as this is normally the timeframe for EU and MS measures to have an effect.

There seems to be a **consensus on the lag of EU in innovation-oriented public procurement**. In this respect, it has been underlined that the EU could beneficiate from the long-lasting experience of the US in this domain.

Further research on the criteria, targets and impacts of public procurement on the innovations performances of companies is required. A special attention should also be dedicated to the synergies they can create.

5. The need for an inclusive approach to promote an innovation-driven economy

Mr Christensen (Novo Nordisk Foundation) stressed the **importance of the kind of tacit social contract established between the companies of the group and the host country**, Denmark. He mentioned the example of a Foundation which objective is "establishing a stable basis for the commercial and research activities conducted by the companies within the Novo Group to support scientific and humanitarian purposes".

The development of an innovation-driven EU economy should rely on the involvement of a larger society basis. In this respect Bonifacio Garcia Porras suggested that a greater involvement of citizens in innovation activities and the implementation of concepts such as social and societal innovations could help to overcome such obstacles (reference to the German government's dialogue with citizens entitled "Living well in Germany"⁴).

6. R&D budget are driven by sector specificities

R&D budgets are largely driven by sector specific needs and are broadly set as a percentage of sales. According to Phillips, this is one of the ratios to which financial analysts pay attention for R&D intensive companies. Profits do not seem to be an indicator to fix R&D budgets as most times profits are not reinvested in R&D.

As underlined by Alex Coad more research is needed on *what drive the R&D investments of firms* as well as a more realistic approach of the innovation processes of firms.

7. The need for a more systematic use of impact analyses

Among the policies to favour R&D investment, reference was made by DG TAXUD to a recent study on R&D tax incentives (<http://ec.europa.eu/DocsRoom/documents/8032>). In such study there are a number of good practices identified to make these schemes effective. **Patent boxes appear to be one of the least effective measures in terms of impact on innovation and tend to amplify the strategic use of IPR.** They have rather negative impacts, both on Member States not having such scheme but also on the ones establishing it given the high amount of foregone fiscal revenues.

There is a need for further reflections on the methods to analyse the impact and the success of R&D investments. In this respect assessments should account for the benefits that cannot be captured in pure financial analyses, as for instance the environmental and social returns. Appropriate medium and long-term timeframes need also to be considered. As a related issue is the need to improve data collection and the access to data for researchers in Europe. The good practices in Denmark and other Nordic countries have been mentioned (T. Christensen).

⁴ http://www.bundesregierung.de/Content/EN/Artikel/2015/01_en/2015-01-20-merkel-internationales-deutschlandforum_en.html