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EUROPEAN RESEARCH ADVISORY BOARD
FINAL REPORT

BOOSTING EUROPEAN PRIVATE R&D:
THE FOUNDATION STONE OF THE NEW LISBON STRATEGY

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Contents

Recommendations

Improve the financial environment for industrial RTD

- Establish better financial conditions, including appropriate financial incentives and tax credits, for the performance of industrial R&D in Europe.
- Put in place targeted guarantee schemes which encourages different financial institutions, such as banks and venture capital companies, to become familiar with and be able to evaluate the intellectual capital and the growth potential of businesses.
- As a market gap is detected, establish public-private partnerships to support small enterprises' access to finance, including financial instruments which promote venture capital and business-angel investments as the appropriate tools for the performance of industrial R&D in the EU
- Develop specialised venture capital platforms, which will trade and broker the spin-off / spin-out of orphan and non-strategic products and process from large companies.
- Promote demand-side activities to increase the investment readiness of potential entrepreneurs.

Develop a coherent European public support framework for industrial RTD

- A major, high-level effort in the "Europeanisation" of Member States' industrial RTD programmes.
- A bottom-up, "variable geometry" support for Member States' ongoing industrial activities which wish to join together at a European level.
- An order of magnitude increase in the finance available for ERANET.

Integrate knowledge-intensive SMEs into the RTD infrastructure

- Use innovation networks and technology transfer activities to link knowledge-intensive SMEs into mainstream research programmes. Use Marie Curie activities to accelerate the development of RTD within SMEs.
- Ensure the minimisation of regulations / administration which affect SME access of RTD support.

Link Global leadership in public research to industry development

- Support Europe's public research institutions in creating world-leading Research Centres linked to industrial development. At the same time, seek opportunities for the regional development of critical mass in innovation activities.
- Adjust administrative and financial regulations governing public research to ensure strong partnerships with industry.

Develop the community aspects of European industrial research.

- Develop a "Programme for European RTD Management & Communications".
- Emphasise the culture changing aspects of activities such as industrial research placements, joint public/private research education and training initiatives, etc.
- Pilot and explore the support of "Open Innovation" activities.

And, finally, these actions need to take place within a long-term, strategic EU plan for the development of industrial RTD which prioritises RTD to be kept in Europe, RTD to be attracted from outside, and RTD to be developed by ourselves for our future needs.

Introduction

The next decade will present major challenges in terms of demographics, economic growth and institutional renewal for Europe. The United States is younger, more economically coherent and technologically advanced. East Asia, advancing at a spectacular rate, contains the major new regions of growth.

Deregulation, liberalisation of markets and increasing free trade and developments in information and communications technologies (ICT), have accelerated trends towards globalisation of products, services, production facilities and now RTD investment[1]. European companies, large and small, are part of this global competition, whether they like it or not.

In terms of RTD, for the European Commission and, indeed, Member States, the question then becomes "Why should companies retain anything other than marketing and sales and some production in Europe – if the US is where the technology is and the East is where the markets, and increasingly the technology, will be?" Excellent researchers in Hyderabad or Shanghai cost one-fifth to one-tenth the price of the same researchers in Düsseldorf or Birmingham. When companies – European or otherwise - think about the next round of RTD investment, it is not at all obvious why they should choose Rotterdam or Lyon rather than Chennai or Guangzhou - or even Chicago or New Jersey.

We all recognise that industrial R&D is core to creating new products, services and wealth, so how can we ensure that European companies, both large and small, develop, maintain and extend their R&D, in Europe. And in addition, we should seek to retain and increase US RTD investment as well as encourage new countries such as China, Taiwan, and Japan in establishing research facilities in Europe.

EURAB foresees five key issues to be tackled:

1. Establishing better financial conditions, including appropriate financial incentives, for the performance of industrial R&D in Europe,
2. Incorporating EU, national and regional industrial support structures into a coherent and cooperating framework.
3. Integrating SMEs into the EU and Global innovation system,
4. Creating global leadership in public research and linking this resource to industrial growth.
5. Developing the community aspects of European industrial research.

Tackling these issues needs the European Commission to develop a long-term strategic framework which indicates 1) what industrial RTD do we need to retain in Europe, 2) what RTD do we wish to attract into Europe and 3) what areas do we need to develop ourselves for the future.

[1] For the first time, in 2004, in the ICT industries, the direct foreign investment by multinational corporations in the area of RTD exceeded investment in production facilities. OCO Consultants, 2005.

Further, EURAB recognises a number of fundamental issues which are essential in boosting industrial RTD but which go beyond the reach of EU R&D activities. There is a need for:

- The completion of the Single Market. For companies to invest in RTD, markets must be available from which the investment can be recovered. The highly differentiated national markets of the EU are a major barrier to RTD investment. Contrast the incentives to innovation in a homogeneous and accessible US health market of 300 million persons with those in an EU divided into 25 separate regulatory regimes and medical traditions.
- A legislative and regulatory environment attractive which is forward looking, but stable and unambiguous – as well as the elimination of inappropriate standards, regulations and legislative requirements, which slow or prevent access of newly developed products and services to markets across the EU.
- The development of coherent public procurement policies which are far-seeing and whose consistent technical requirements will induce innovative RTD by companies.

1 BETTER FINANCIAL CONDITIONS FOR DEVELOPING INDUSTRIAL RTD

Financing RTD is not like financing an apartment block or a new machine. For most financiers it is a particularly difficult and daunting process. Some of the main problems slowing RTD investment include:

- *Uncertainty:* Close-to-market RTD development work is manageable, but as it becomes longer term research, then uncertainties become large and risks difficult or impossible to calculate. And financiers will err well on the side of caution.
- *Asymmetric Understanding:* RTD is technical and difficult to understand, even for other researchers. External financiers, in all but the most specialised venture capital companies, are unlikely to understand the potential returns and benefits of a project. Again, financiers when confronted with their own lack of understanding will err on the side of caution.
- *Adjustment Costs.* Investing in RTD requires people (usually at least 50% of RTD costs) to be employed over a longish period of time. Adjustments in terms of building up RTD also take time; however adjustments in terms of halting RTD mean all investment is lost.
- *Intangible Assets*. Many companies, particularly SMEs, have few tangible assets – the traditional lending collateral. And worse, for financiers, the outcome of the RTD is often also intangible; knowledge, IPR, etc.
- *Appropriability:* The main output from RTD, particularly the research element, is knowledge. Even if the research is successful, competitors can often obtain or generate the same knowledge much more quickly and cheaply than the original firm. So the company's head of finance may not be that enthusiastic for RTD investment – no matter how strategically important it may seem to others.

Thus, for a financier, investing in RTD can mean investing in a project which he/she doesn't understand, where the risks cannot be adequately calculated, needing at least a medium term commitment and, then, a number of years later, the outcomes are often

intangible and the firm may not even be able to fully exploit the benefits of successful research – others will copy it and reduce its profitability.

To overcome reluctance to invest in RTD, improve RTD financial markets, and boost the level of industrial research undertaken in Europe (both by European and non-European firms), the European Commission, in conjunction with Member States, should develop:

- An EU-wide system of RTD financial incentives, including tax credits where they are appropriate to national and regional requirements, which recognise industrial development needs and investment practices.
- A guarantee scheme which encourages banks, financial institutions and venture capitalists to become familiar with and be able to evaluate the intellectual capital (patents, IP, R&D investments, etc.) of SMEs and start-up firms, and develop appropriate financial instruments which will fund the further development of such knowledge-based companies. The development of an FP7 Risk Sharing Finance Facility, in conjunction with the EIB, is a most welcome step forward in this area.
- Public-private partnerships which will support small enterprises' access to finance, as market opportunities arise. Such partnerships should include financial instruments which promote venture capital and business-angel investments as the appropriate tools for the performance of industrial R&D in the EU
- A specialist venture capital market which will support the spin-off of orphan or non-strategic products from large companies. Many large companies hold many non-strategic, unexploited patents and products which are most unlikely to be commercialised. A specialist venture capital system aimed at supporting SMEs or new-start up companies in moving these products and services out of large companies and into the market should be evaluated.
- Promote demand-side activities to increase the investment readiness of potential entrepreneurs.

2 A COHERENT SUPPORT FRAMEWORK FOR INDUSTRIAL RTD.

Direct funding of industrial RTD is carried out by all Member States through a mix of programmes aimed at different sectors, different types and sizes of companies, with different regional and institutional dimensions. These are important in developing industrial RTD but they are either regional or national in character. Much greater value could be extracted from this investment for the companies involved, as well as their regions and Member States.

The European Commission, in conjunction with Member States, should bring about:

- A major effort in the "Europeanisation" of Member States' industrial RTD programmes through mechanisms such as joint FP calls with Member States, supporting Member States in internationalising their programmes, encouraging "grouping" of national programmes' calls, and other useful programme-to-programme linkages (i.e. a top down approach). A major financial effort to engage Member States' Programmes to work with and participate in the new Joint Technology Initiatives would also be welcome. Avoiding unnecessary duplication of Member States' RTD efforts promises major increased in the overall efficiency of EU research.

- Leverage of Member States' own ongoing industrial RTD Programmes. In addition to the "top-down" Europeanisation of Member States' programmes, the sub-programmes and the projects which they support should be extended, where appropriate, and where contributing to EU objectives, by financial leveraging mechanisms (a bottom-up approach). For example, a number of Member States might wish to link together their own industrial research projects in a particular area of nanoelectronics: the additional costs could be met by the EU. These mechanisms would be developed so as to overcome some of the barriers to the financing of RTD activities discussed in Section 1.
- An order of magnitude increase in the finance available for ERANET[2]. ERANET supports the cooperation and coordination of research activities carried out at national or regional level in the Member States and Associated States through networking of research activities conducted at national or regional level, and the mutual opening of national and regional research programmes.

3 INTEGRATING KNOWLEDGE-INTENSIVE SMES INTO THE RTD INFRASTRUCTURE

Many knowledge-intensive SMEs are already strong investors in RTD and active at an international level: the great majority are not, have weak innovation abilities and are limited to local or regional markets. Given the trends of the last decade or more towards "Open Innovation[3]" and co-operation between companies and between companies and public research seeking new products and services, the support and integration of Europe's SMEs into the European industrial innovation system becomes a pressing issue – but they face particular challenges.

- In financing RTD, SMEs rely far more on external sources than large firms, which have better access to retained profits, cash flow and equity based sources of finance. Then not only is the cost of external debt likely to be higher, but SMEs have the problem of servicing the debt from what is usually a less stable cash flow.
- Legislation and regulations can present a disproportionately large barrier to SME undertaking and exploiting the results of RTD investment. EU and Member States' RTD initiatives often take for granted large administrative resources in applicants, long RTD time frames and deferred payments for cost incurred. All are particularly difficult for SMEs to overcome.
- Difficulties in accessing the innovation system – universities, government research institutes, research actors abroad, etc. – and difficulties in using such networks once accessed. This may be due not only to their size but also to the need for internal RTD personnel.

To integrate SMEs into a European innovation framework, and accelerating their technological and RTD development, the European Commission, in conjunction with Member States, should:

[2] http://www.cordis.lu/coordination/era-net.htm

[3] "Open Innovation; the new Imperative for Creating and Profiting from Technology", Henri Chesbrough, Harvard Business School Press, 2003.

- Set up, possibly in conjunction with EU Competitiveness and Innovation Programme (CIP), an EU-wide system of financial incentives aimed at knowledge-intensive SMEs and start-up firms to support and encourage the undertaking of RTD.
- Develop innovation networks and technology transfer activities to link knowledge-intensive SMEs into mainstream research programmes.
- Develop mechanisms, appropriate to national and regional needs, through which Marie Curie activities can be used to support and accelerate RTD activities within all companies but with particular attention to the needs of SMEs.
- Ensure the minimisation of regulations / administration which affect the access of RTD support. While this is essential for all industry, SMEs suffer most from such barriers to development. Involve SME representatives in the drawing up such regulations and administrative procedures.

4 GLOBAL LEADERSHIP IN PUBLIC RESEARCH

Partnership with a vibrant, well structured, well funded public research system (universities, polytechnics, national and regional technology and research institutions, as well as European Research Council funding, etc.) is important in developing the European industrial R&D base. These institutions provide not only the highly trained researchers but also research knowledge. As the tradition differentiation between basic and applied research has ceased to be meaningful in many areas, much more public research is seen to have commercial possibilities. Indeed, more generally, as the costs of research have risen, companies have sought more and more cooperative agreements with such institutions, as well as with other companies. Proximity to such world class research institutions can be a valuable factor in the location and development of industrial R&D and can be a core element in the R&D location decisions of multinational corporations.

However, there are a number of challenges,

- Europe's public research institutions are often small and research resources dispersed across many sub-critical units. Often the more basic science in these institutions' laboratories is isolated from industry in too many Member States and in too many sectors. This limits the opportunities for knowledge sharing, efficient innovation and cooperation with industry.
- Many of these research institutions work within a framework of internal and external regulations which differ from Member State to Member State but which hamper both cooperation with industry and the commercialisation of their own research outputs.
- The institutional and individual incentives to cooperate with industry are often weak or non-existent. In fact, traditional incentives (from institutional career structures to the ways universities allocate finances) very often work against such cooperation.

To assist in overcoming these challenges, the European Commission, in conjunction with Member States, should:

- Support Europe's public research institutions, where appropriate, in tackling the dispersed organisation of research resources so as to develop truly Global

Research Centres, with the critical mass necessary to dominate global research and attract the best researchers worldwide. Objectives as ambitious as developing European "Silicon Valleys" should be countenanced. The activities of universities, industry and supportive public authorities in the Eindhoven – Leuven – Aachen Open Innovation ecosystem may well be an approach the Commission might wish to diffuse across the regions of Europe.

- Review and modernise the administrative, financial and taxation regulations governing public research and its interface with industrial research activities so as to encourage high-investment, long-term research partnerships between the two parties.
- Ensure the rapid exploitation – by the public research sector itself or through commercial firms – of newly generated research-based knowledge.

5 CREATING A EUROPEAN RTD COMMUNITY

Effective financial structures, correct government support programmes, protection for computer-implemented inventions are all necessary requirements for boosting industrial RTD. But many are now pointing to the wider issues of culture, values and commitment in which European industrial RTD takes place and the need to bind individuals, companies, institutions together into a community supportive of each other. Major companies are now calling for "restoring trust and introducing the notion of 'responsible partnering'" as a way of increasing the efficiency and reducing the red-tape of EU research programmes. Others decry the difficulties in communicating across the social divides between academia and industry. Still others see more major challenges in the perceptions a wider society has of industry and industrial research.

Addressing the needs for community building in European industrial RTD is probably more challenging than the more rational, contract or utility-based issues of IPR or finance. A number of particular issues, at different levels, emerged:

- While there are difficulties in all companies in bridging the researcher-financier divide, these are particularly acute in the New Member States. It is suggested that a "Programme for European RTD Management & Communications" should be developed, which would be aimed at improving and professionalising RTD in New Member States' companies and research institutions.
- Section 4 has already pointed to the need for cooperation between industry and public research, particularly academia. EU support for activities such as industrial placements, joint education and training activities, exchange of personnel should be strengthened, and the longer term cultural-change effects – as well as hard financial or research outputs - be given weight in evaluation.
- Pilot activities towards understanding and setting up "Open Innovation" systems could be developed by the Commission. In particular, the issue of communications across different cultures and institutions might be tackled.

6 CONCLUSIONS

If Europe is to achieve the "growth and jobs" of the New Lisbon Agenda then the level of industrial RTD undertaken must be boosted substantially. Industrial RTD is central to innovation and competitiveness – without which Europe will continue to lag behind the

United States and will be quickly passed by the rapidly industrialising Asian economies. In achieving increased industrial RTD investment, EURAB emphasises the necessity for completion of the Single Market, for a stable, forward-looking regulatory environment and coherent public procurement policies. Further, in terms of immediate RTD policy, EURAB emphasises five lines of action:

- Improve the financial environment for industrial RTD. In particular establish better financial conditions, including appropriate financial incentives and tax credits, for the performance of industrial R&D in Europe.
- Develop a coherent European public support framework for industrial RTD both in high-level "Europeanisation" of Member States' industrial RTD programmes and in bottom-up, "variable geometry" linking together industrial RTD in Member States
- Integrate knowledge-intensive SMEs into RTD infrastructure through innovation networks and technology transfer activities. And set up an EU-wide system of financial incentives aimed at SME RTD; especially in opportunities for the regional development of critical mass in such innovation activities.
- Link global leadership in public research to industrial development.
- Develop the community aspects of European industrial research through actions such as a "Programme for European RTD Management & Communications" and emphasising the culture changing aspects industrial research placements, joint public/private research education and training initiatives, etc.

Finally, such actions need a long-term strategic framework which indicates 1) what industrial RTD do we need to retain in Europe, 2) what RTD do we wish to attract into Europe and 3) what areas do we need to develop ourselves for the future.