



**RESEARCH**

European Research Advisory Board

## **EUROPEAN RESEARCH ADVISORY BOARD –**

# **BOOSTING JOINT INVESTMENT IN RESEARCH: TOWARDS 3% OF GDP**

**December 2002**

## SUMMARY OF RECOMMENDATIONS

European Research Advisory Board position on “Boosting Joint Investment in R&D” is focused on developing three key areas:

- A Supportive Environment for Industrial R&D (Recommendation 1 & 2),
- A Coherent R&D Policy Approach across Europe (Recommendation 3 & 4) and
- A Strong and Vibrant Public Research Sector (Recommendation 5)

### **1) A legislative and regulatory environment attractive for Private R&D investment.**

- The creation of a forward looking, but stable regulatory environment to encourage industrial research investment.
- The reduction of barriers to market development: inappropriate standards, regulations and legislative requirements, which slow or prevent access of newly developed products and services to markets across the EU.
- The Commission should invite Member States to an analysis of “The Legislative and Regulatory Environment - Barriers to R&D Investment”. An EU Action Plan for a stable and R&D friendly legislative and regulatory environment should then be drawn up and implemented.

### **2) Financial Instruments for the Promotion of Private R&D Investment**

- The Commission should engage Member States in an analysis of direct, indirect and background financial instruments for the promotion of R&D. Appropriate and effective measures to enhance investment should then be implemented with Commission support. A growth-oriented environment is needed.
- Where national tax credits are now given to companies to encourage R&D contracts in research institutes, such schemes could be extended to R&D undertaken by institutes in any EU Member State.

### **3) The Coordination of Research Policies across the EU**

- Individual Member States should set realistic and viable R&D investment targets to support their own development ambitions.
- Member States, on a periodic basis, should submit their research programme priorities, financial instruments, budget distribution and R&D investment targets to The Competitiveness Council for discussion and advice.

### **4) Coherence between Research and Related Policies**

- Reorient existing EC and Member State budget expenditures towards areas, such as education and research including all sectors – exploratory, applied research and demonstration activities - which will provide for future economic and employment growth, and away from traditional, *status quo* spending patterns of allocating major resources to areas such as agriculture or coal.
- Develop regional policy which similarly moves resources to areas of economic growth and supports associated R&D investment.
- As policies are generated in other areas (e.g. transport, health, energy, environment), an assessment of their implications for R&D policy should be made. The R&D implications of specific laws, regulations and directives – positive and negative - should be clearly signalled to the research community in industry and academia. The

Commission should initiate the development of such mechanisms in Member States as well as in the Commission itself.

**5) Supportive Actions for Public Research & Human Resources:**

The Commission should initiate with Member States

- Within the overall 1% of GDP goal for EU public research investment, the setting of realistic and viable targets for individual Member States. Within this budget, increased investment in discovery-oriented research is needed, as the foundation stone of knowledge creation for innovation.
- Strengthening the education role of universities to overcome the potential bottlenecks in various disciplines needed for technological research and innovation and the opening up of EU research positions to non-EU researchers.
- Increasing levels and efficiency of university and public research institutes' cooperation with industry – including public-private partnerships.

## 1 INTRODUCTION:

Europe's future economic and social development is closely linked to its competitiveness. To improve this competitiveness, the European Commission has proposed increasing the ratio of R&D investment to GDP to 3% by 2010, with the intention that such investment will enhance European innovation – and hence strengthen competitiveness and economic growth, as well as provide the research base and new scientific knowledge necessary to respond to Europe's social, health and environmental needs.

European Union R&D investment is particularly weak compared to the US - or even Japan and South Korea. The US has 50% more researchers per thousand workers than the EU and this gap is steadily widening<sup>1</sup>. US business is increasingly dominating global R&D in the industries of the future.

Given the urgency of these issues, The European Research Advisory Board has developed an action agenda to help “Boosting Joint Investment in R&D”. The objective is not simply to strengthen the input of resources to R&D. In times of limited resources and budget, we must increase the output, providing higher economic output and greater social benefit. Therefore we must increase the efficiency with which we use our R&D investment. This report is a first step towards this agenda.

The European Research Advisory Board believes three key issues must be addressed:

- **A Supportive Environment for Industrial R&D:** Creating a forward-looking, stable and reliable fiscal and legislative environment in which companies can take R&D business decisions with the expectation of a reasonable return on investment – a growth-oriented environment.
- **A Coherent Approach across the EU:** For EU R&D to grow, there must be: A coherence between the R&D policies of the 15 Member States as well as the EC - across research funding agencies, universities, research Institutions, etc. Greater thought must be given to ensuring that EU R&D policy on the one hand relates to other policies such as competition and education on the other.
- **A Strong and Vibrant Public Research Sector.** No modern country or region has experienced sustained economic growth without a strong and vibrant public research foundation underpinning its industrial development. Developing a strong, competitive university and government base in scientific education and discovery-orientated research is essential in order to initiate and feed knowledge creation as a prerequisite for innovation.

As we shall see, these three issues are closely linked to and reliant on other European Research Advisory Board position papers in areas such as “Improving Innovation”, “The Role of Universities”, “Scientific Careers” and, particularly, “ERA Scope and Vision”.

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<sup>1</sup> See OECD, *Science & Technology Indicators*

## 2 A SUPPORTIVE ENVIRONMENT FOR INDUSTRIAL R&D

If we are to be realistic about increasing European R&D investment, a number of facts have to be faced.

- The great majority of R&D is financed and undertaken by industry and this is a growing trend. Indeed, in the US and Europe, the proportion of Government R&D funding in the total, has been consistently falling. If R&D investment is to increase, there must be increases in both government and industry funding and the great majority must be industrial driven, financed and performed.
- The great majority of R&D is industrial development work rather than scientific research, thus, the major expansion of R&D will have to be development focused.
- Development work is “directed towards the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes”. It is totally geared to developing marketable products and services. If a company is unsure of being able to enter and develop markets - of having “a license to operate” - then levels of development work falls and R&D investment is low. Or it may seek to relocate its R&D activities elsewhere. Equally, as R&D becomes more global, industry will acquire its technology from wherever it appears.

Industry accepts ambitious, forward looking standards and regulations in health, safety, environment, energy, transport, etc. Indeed such requirements can stimulate research investment. An unclear or unstable regulatory environment, however, restricts industrial R&D investment decisions because companies are uncertain whether they will have “a license to operate” any new product or service. Industry is driven by the demands of the market. In that context, the powerful role of government public procurement in shaping and providing incentive for R&D and for introducing new technologies to the market must also be considered. In the US, public procurement in, for example, energy, transport and defence has had a major impact on R&D investment and growth.

Recommendation 1:

**A legislative and regulatory environment attractive for Private R&D investment.**

- The creation of a forward looking, but stable regulatory environment to encourage industrial research investment.
- The reduction of barriers to market development: inappropriate standards, regulations and legislative requirements, which slow or prevent access of newly developed products and services to markets across the EU.
- The Commission should invite Member States to an analysis of “The Legislative and Regulatory Environment - Barriers to R&D Investment”. An EU Action Plan for a stable and R&D friendly legislative and regulatory environment should then be drawn up and implemented.

While regulatory clarity and market access are key issues in the sustainable increase of development work, the fiscal environment is also important – the more so since US governmental support to industrial R&D exceeds EU support to its own companies by

nearly 50%. The actual financial volume is the key to meeting the 3% Barcelona objective.

- Direct Government funded R&D is important in catalysing industrial R&D investment. As such, it should be carefully targeted to leverage increased innovation, as much as gross R&D investment. Equally, the EU regulations on State aid for research need to be reviewed in order to make State Aid in Europe more effective in stimulating R&D in a globally competitive environment. Public authorities have a range of financing instruments at their disposal, in particular fiscal incentives, guarantee schemes and public support for venture capital. A mix of instruments is needed, as no single instrument is able to provide the full range of required incentives as described in the European Research Advisory Board position paper on “Improving Innovation”.
- Indirect mechanisms, such as tax relief, in those Member States where appropriate, have an important role to play in encouraging innovative R&D investment. The possibility of tax breaks for industrial sponsorship of EU university R&D should be considered. For example, as the European Research Advisory Board position paper “Improving Innovation” has recommended: where national tax credits are now given to companies to encourage R&D contracts with Universities or other research labs, such schemes could be extended to R&D undertaken for the company by institutes in *any* EU Member State.
- Background support for R&D investment are also of great importance as more EU companies emerge onto the global stage to compete with firms receiving concealed domestic R&D support.

Recommendation 2:

**Financial Instruments for the Promotion of Private R&D Investment**

- The Commission should engage Member States in an analysis of direct, indirect and background financial instruments for the promotion of R&D. Appropriate and effective measures to enhance investment should then be implemented with Commission support. A growth-oriented environment is needed.
- Where national tax credits are now given to companies to encourage R&D contracts in research institutes, such schemes could be extended to R&D undertaken by institutes in any EU Member State.

### 3 A COHERENT APPROACH ACROSS EUROPE

#### **Coherence Across Europe in Research: The 15 Member States and the EC**

Currently, each Member State, as well as the European Commission, operates its own independent, differentiated national research policy. This means unnecessary duplication is taking place and opportunities for major synergies are being lost. It is important to strengthen the opportunities for the Member States to benefit from more coherent research policies across Europe and from direct cooperation, when appropriate. The

European Research Area will be an important platform for such activities and it might be strengthened by the direct involvement of The Competitiveness Council .

Firstly, however, it should be recognised that, because of the heterogeneous nature of the EU's research capacity, all Member States may not reach the level of 3% of GDP spending on R&D by 2010. It is important that Member States set their own realistic and viable quantitative R&D investment targets, which will support their own development ambitions.

It is then proposed that Member States, on a periodic basis, say annually or bi-annually, should submit their research programme priorities, financial instruments, budget distribution and targets to The Competitiveness Council for discussion and advice . The objective would be to alert Member States to unnecessary duplication and to provide for concrete discussions in appropriate areas for bi- or multi-lateral cooperation. For competitive reasons, some duplication will always be necessary. Submitting research policy "for information" alone is seen as insufficient to involve Member States actively in the process. Such processes are now well established within the EU and research policy should adopt such measures or procedures. Since 1997, Member States have successfully coordinated their employment and labour market policies through the "Luxembourg Process". Under this process, The Economic and Financial Affairs Council, ECOFIN, develops annual Economic Policy Guidelines and Member States submit National Action Plans.

Recommendation 3:

**The Coordination of Research Policies across the EU**

- Individual Member States should set realistic and viable R&D investment targets to support their own development ambitions.
- Member States, on a periodic basis , should submit their research programme priorities, financial instruments, budget distribution and R&D investment targets to The Competitiveness Council for discussion and advice.

**Coherence between research policies and other related policies**

To be effective and sustainable, increased R&D efforts must be coherent with other related policies.

- Horizontal policies such as education and regional policy have major implications for boosting R&D investment. For example, increasing R&D spending implies increasing the number of available researchers by training more within the EU and opening up research positions to non-EU researchers – see the European Research Advisory Board position paper on the "Attractiveness of Scientific Careers". The realigning of funding in regional policy and the structural funds with developing industries of the future, for example, would have a major impact on R&D investment. Equally, in innovation policy, R&D investment must be supported by an appropriate and responsive Intellectual Property Rights (IPR) environment.

- Sectoral policies such as in Health, Agriculture, Transport, Environment or Energy have equally important implications for our ability to boost R&D investment. Obvious examples are in the acceptability of innovations in the life sciences into mainstream medicine or of genetic modification of foods into agriculture and consumer diets. Similarly, research on renewable energies face markets which are long established and regulated to favour fossil fuels.

Overall, there is a need to ensure that new policies do not restrict or undermine R&D investment. Or if such policies cannot be avoided, then at least that they are explicit on their negative implications for certain types of R&D investment – then companies and research funders can act accordingly. A short statement on “Implications for R&D Investment” might be attached to new policies.

Recommendation 4:

#### **Coherence between Research and Related Policies**

- Reorient existing EC and Member State budget expenditures towards areas, such as education and research including all sectors – exploratory, applied research and demonstration activities - which will provide for future economic and employment growth, and away from traditional, *status quo* spending patterns of allocating major resources to areas such as agriculture or coal.
- Develop regional policy which similarly moves resources to areas of economic growth and supports associated R&D investment.
- As policies are generated in other areas (e.g. transport, health, energy, environment), an assessment of their implications for R&D policy should be made. The R&D implications of specific laws, regulations and directives – positive and negative - should be clearly signalled to the research community in industry and academia. The Commission should initiate the development of such mechanisms in Member States as well as in the Commission itself.

#### **4 A STRONG AND VIBRANT PUBLIC RESEARCH SECTOR**

As has been said, all successful nations have a strong, well established public science research base. From such a base come the new scientific discoveries, which are the foundations, the first step in the knowledge production needed for innovation. The universities and research institutions in the research base are in addition the source of highly trained researchers, as well as a major factor in the R&D location decisions of companies. With the globalisation of communications and the changes to large corporate laboratories, longer term research work is ripe for placing with European universities so that they become engines for long term innovation.

- Universities have an essential role in undertaking quality research and research training. The European Research Advisory Board position paper on “The Role of the Universities in ERA” emphasises the importance of strengthening university management, developing performance measures, the opportunities for universities to achieve research excellence, and improving and creating innovative links between

academic and industrial R&D. It is essential Governments should support such developments.

- The 2010 goal of public sector R&D investment of 1% of GDP averaged across the EU is set. Within this goal, individual Member States should set an appropriate viable target for minimum R&D investment. These targets should be achieved by the transfer of funds from budget lines which provide static support and do not have a future-oriented economic profile.
- Human resources are a particularly important issue since the availability of trained personnel may be a major bottleneck in achieving the 3% Barcelona goal.

Recommendation 5:

#### **Supportive Actions for Public Research & Human Resources**

The Commission should initiate with Member States

- Within the overall 1% of GDP goal for EU public research investment, the setting of realistic and viable targets for individual Member States. Within this budget, increased investment in discovery-oriented research is needed, as the foundation stone of knowledge creation for innovation.
- Strengthening the education role of universities to overcome the potential bottlenecks in various disciplines needed for technological research and innovation and the opening up of EU research positions to non-EU researchers.
- Increasing levels and efficiency of university and public research institutes' cooperation with industry - including public-private partnerships.

## **5 IN SUMMARY**

If we are to increase R&D investment to 3% of GDP, 2/3 from the private sector and 1/3 from the public sector, we must ensure:

1. **A Supportive Environment for Industrial R&D:** Not only must inappropriate barriers to R&D based innovation be removed, but a forward-looking, stable, regulatory environment must be established. A financial environment must also be developed which supports industrial R&D investment both through direct and indirectly measures, as well as providing the more general background supports which will permit EU firms to compete at a global level.
2. **A Coherent Approach across the EU:** A concerted research policy should be developed across the EU through the submission of Member States' annual research budgets to the Competitiveness Council for discussion and advice. There is also a need for a coherence between research policy and other related policies, at a Commission and Member State level.
3. **A Strong and Vibrant Public Research Sector.** Member States need to make a commitment to increasing investment in public research and the university education needed to support future R&D activities. The links between industry and academic R&D are critical and ways should be sought for improving knowledge creation and innovation from this source.