



**Presentation to the
TIP Workshop on Benchmarking
Science and Technology Policy**

**Results from the First Cycle of
Benchmarking RTD Policies**

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Structure of Presentation

Outcome of First Cycle

Lessons Learnt from Process

Current and Future Steps



Implementation of RTD Benchmarking

First cycle: July 2000 - June 2002

Focussed on five themes:

- **public and private investment in RTD;**
- **human resources in RTD;**
- **scientific and technological productivity;**
- **impact of RTD on economic competitiveness and employment;**
- **promotion of RTD culture and public understanding of science.**



Public and Private Investment in RTD

Key Findings

- **Globalisation is changing the organisation of R&D investment**
- **Trends in public funding of R&D are evolving significantly**
- **A high quality education system producing an adaptable labour force is crucial**
- **The legal framework for Intellectual Property Rights is increasingly important**
- **Simply increasing R&D investment does not necessarily increase its efficiency**



Public and Private Investment in RTD

Recommendations

- **Strengthen co-ordination with other policy areas**
- **Heighten public policy focus on human resources**
- **Increase involvement of all stakeholders in priority-setting and policy development**
- **Devolve greater responsibility for public R&D to local and regional governments**
- **Strengthen public technology appraisal capacity**
- **Increase emphasis on evaluation**



Human Resources in RTD

Key Findings

- **The proportion of researchers in the EU is falling increasingly behind the US and Japan**
- **Scientific careers no longer command sufficient interest**
- **Able research talent is being lost to other countries and to non-scientific activities**
- **Key recruitment barriers include gender imbalances and unattractive working conditions**
- **Life-long learning is being under-utilised for career development in research**



Human Resources in RTD

Recommendations

- **Address Limitations in the Education System**
 - **increase the recruitment base in scientific subjects from the secondary school system**
 - **increase availability of scientific teachers**

- **Increase the Attractiveness of Research as a Career**
 - **enhance resources and working conditions in research**
 - **give special attention to first destinations of graduate researchers**
 - **utilise experienced researchers efficiently throughout the whole career period**



Scientific and Technological Productivity

Methodological Considerations

- **Application of the concept of productivity to science and technology is not straightforward**
- **Level of aggregation of indicators does not facilitate identification of good practices**
 - **e.g. publications and citations are only intermediate outputs of research (only partial proxy for knowledge advancement and social and economic progress)**



Scientific and Technological Productivity

Key Findings

- **No clear evidence that EU is lagging vis-à-vis US and Japan**
 - compares favourably on publications and citations
 - in “triad patents”, some EU Member States ahead

- **Wide variations exist within EU**



Scientific and Technological Productivity

Conclusions

- **Need for more advanced indicators**
- **Careful and systematic international comparisons can be a driver to improve performance**
 - e.g. Nordic countries
- **Long-term approach required to build capacity**



Impact of RTD on Competitiveness and Employment

Methodological Considerations

- **Complexity of innovation systems limits understanding of causal links between R&D inputs and competitiveness and employment outputs**
- **Isolating role of policy initiatives challenging**
- **Limited scope for formulating generic policy lessons and prescriptions**



Impact of RTD on Competitiveness and Employment

Key Concepts

- **Social and Human Capital**
 - innovation performance is in part a function of general educational standards, levels and attainments
- **Research Capacity**
 - long-term strength of a country's research system is a function of researcher calibre and research quality
- **Technological Innovation Performance**
 - BERD/GDP, patents per capita and innovation expenditure /sales reflect technological innovation performance
- **Absorptive Capacity**
 - ability to exploit technology is an important reflection of overall innovation performance



Impact of RTD on Competitiveness and Employment

Conclusions

- **Close correlations between country performances on social and human capital, research capacity and technological innovation performance so policies must tackle all simultaneously**
- **Weak correlation between absorptive capacity and other three concepts so need for concerted focus on absorptive capacity**
- **Need for benchmarking approach which concentrates on systemic interactions**



Promotion of RTD Culture and Public Understanding of Science

Focus of Exercise

- **Qualitative approach: proxy indicators**
- **Two groups of actors:**
 - **short-term responsive: governments, scientific community and industry**
 - **long-term proactive: science museums, media and education system**



Promotion of RTD Culture and Public Understanding of Science

Recommendations

Government: Establish dedicated teams to provide leadership in promoting public understanding of science and associated programmes

Scientific Community: Career progression should take account of scientists' contributions to public understanding

Education Authorities: Provide teachers with resources to facilitate development of schools networks



Promotion of RTD Culture and Public Understanding of Science

Recommendations

Science Museums: Give priority to co-operative projects between institutions

Media: promote the presence of science issues in public television

Industry: Support the development of educational projects



Benchmarking RTD Policies

Key Lessons from Process

- **Benchmarking of R&D policies is feasible and desirable**
- **Need to identify more focused topics with high policy relevance**
- **Definition phase vital in developing a benchmarking exercise**
- **Active involvement of Member and Associated States in design and implementation essential**



Benchmarking RTD Policies

Current and Future Steps

- **Dissemination and Evaluation Underway**
- **Consideration of Process and Topics for Second Cycle**
- **Wide Consultation Taking Place**
 - **High Level Group on Benchmarking**
 - **Workshops with Member States' Experts**
 - **Conference Organised with Greek Presidency**