

MARIE CURIE ACTIONS AND THE RESULTS OF THE EC WORKSHOP ON "RESEARCH-TRAINING IN NANOSCIENCES AND NANOTECHNOLOGIES: CURRENT STATUS AND FUTURE NEEDS"

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Abstract – The presentation handles the Marie Curie Actions and the results of the EC Workshop on "Research-Training in Nanosciences and Nanotechnologies: Current Status and Future Needs". First ERA, FP6 and MC actions are shortly reviewed, then the policy objectives and related issues are presented, as well as the principal elements of EU strategy. The financial support measures are outlined and it is explained which countries and organisations can participate. Some policy-related Initiatives are presented. The importance of research/training in Nanoscience is stressed. The results of the EC Workshop on "Research-Training in Nanosciences and Nanotechnologies" are finally presented. This document consists of reformed material from the presentation slides and is for record only, not to be taken as official reference document.

1. INTRODUCTION

- The European Research Area (ERA)
- The EC Framework Programme (FP) for Research (6th FP: 17,5 Billions EURO over Years)
- Marie Curie (MC) Actions (1,6 Billions EURO over 4 years) – about 70% increase from FP5

Human Resources in FP6

- Part of «Structuring the European Research Area» (one of the two Horizontal Specific Programmes; besides the Thematic Priorities)
- Policy Background (2010 objectives):
 - «Making Europe the most dynamic and competitive knowledge-based economy in the world» (Lisbon, 2000)
 - «Devote 3% of GDP to research» (Barcelona, 2002)
- Principal Overall Aim: Increase the number of well qualified researchers in Europe and open up their career perspectives

Main Issues of Concern

- Increasing the number of well qualified researchers in Europe
- Raising the interest of young people for scientific studies and revisiting the educational and research "system"
- Obstacles to researchers' mobility (geographically, between sectors, between disciplines)
- Lack of recognition of research as a profession

Principal Elements of EU "Strategy" on Researchers Mobility

- Financial support for training, transfer of knowledge and career development of researchers (12 Marie Curie actions)
- Improvement of information and practical assistance to mobile researchers (Portal and ERA-MORE)
- Researchers career and the social visibility of researchers
- Also Improvement of the legislative, regulatory and administrative environment and Improved understanding of the issues (Statistics)

Marie Curie Actions in FP6 : Main Features

- Training / transfer of knowledge / excellence promotion / career development - Opportunities provided for researchers at all stages of their career
- Based on financing international mobility for researchers – But, not considering mobility as an end in itself
- "Bottom-up" approach i.e. all fields of science and technological of interest for the European Community (no thematic priorities)
- Interdisciplinary & intersectorial projects encouraged
- Facilitating female participation (practical measures)
- Open to 3rd country nationals

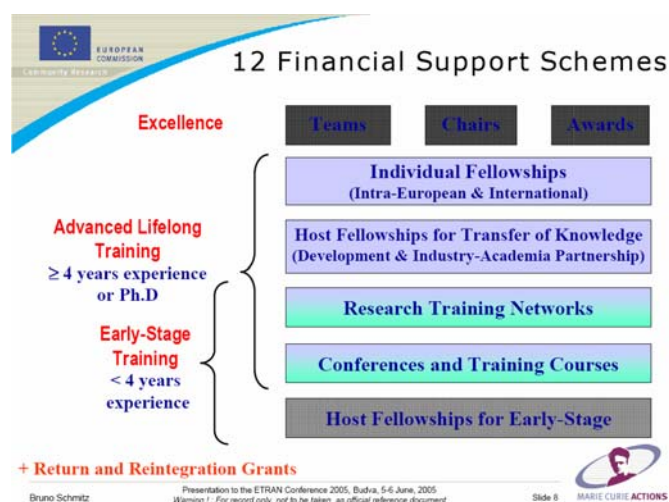


Fig. 1. Twelve financial support schemes

Which Countries can participate in Marie Curie Actions?

- Member States (25)
- Candidate (Associated) Countries (5+3)
- Any other Country = “Third Countries”

Host-driven actions excl. intra-European fellowships (30% limit; funding IF “essential” for the implementation of the project); Incoming Fellowships (origin); Outgoing Fellowships (destination).

+ Joint Research centres and International Organisations

Which Organisations can participate in Marie Curie Actions?

- Public research organisations (e.g. universities, institutes, etc);
- Commercial enterprises, especially Small and Medium Sized Enterprises (SME’s);
- Non-profit making organisations (e.g. hospitals, NGOs, etc);
- IEIO – International European Interest Organisations (e.g. ESO, EMBL);
- IO – International Organisations (e.g. WHO, UNESCO)

Researcher’s Mobility Portal

<http://europa.eu.int/eracareers>

- General information about research fellowships/grants
- Available opportunities and job offers
- Information about legal and administrative issues (entry, social security, tax, etc)
- Access to European Network of Mobility Centres
- Cross-linked to similar sites /initiatives

Researcher’s career

- Opening up of national grants, fellowships and research positions
- Communication adopted in July 2003
- “Researchers in the ERA: one profession, multiple careers”
- Open structured dialogue between the different actors, including on:
 - European researcher’s charter as framework for the career management of human resources in RTD
 - Code of conduct for recruitment of researchers
- Essentially based on best practices

Increasing the number of highly qualified researchers

- EC Action Plan linked to Barcelona objective (3%, 2010) estimates that Europe must train ~1.2 million new researchers (1/2 to replace the rapidly ageing research workforce, and 1/2 to reinforce to the current workforce)
- Other studies estimate that the pool of researchers needed in Europe to meet the challenge of nanotechnology alone would be of ~350.000 by 2010-15

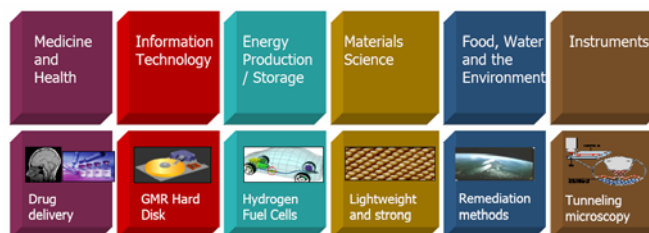


Fig. 2. Problem Solving Potential in Nanotechnology and Nanotechnology and Nanosciences

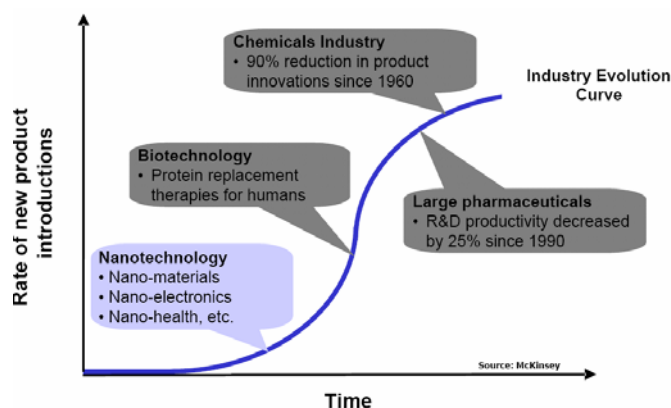
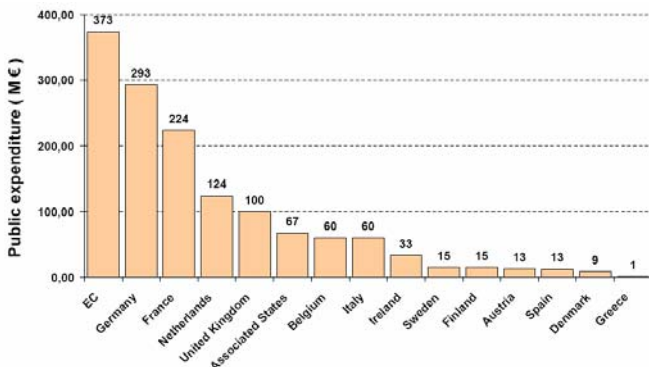


Fig. 3. Where are we now?

European Activities in European Activities in Nanotechnology R&D Nanotechnology R&D

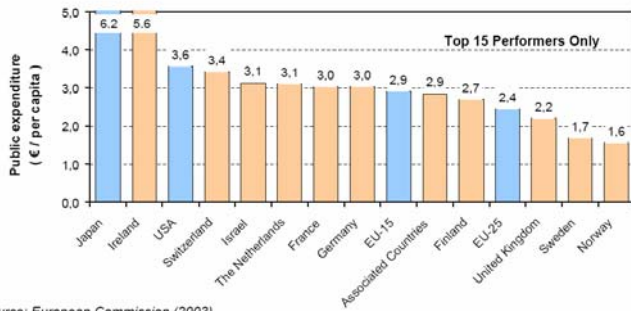
- Several countries started national nanotechnology between the mid-1980’s and mid-1990’s
- Overall investment of around 200 million € in 1997 has risen to around 1300 million € in 2004
- Levels of public investment vary considerably between 0.3 and 8.5 € per citizen in 2004
- Transnational projects in the EU’s 4th (~30M€/year) and 5th (~45M€/year) Framework Programmes
- Nanotechnology identified as a main priority area in the 6th Framework Programme (~250M€/year)
- Proposed for Seventh Framework Programme...



Source: European Commission (2005)

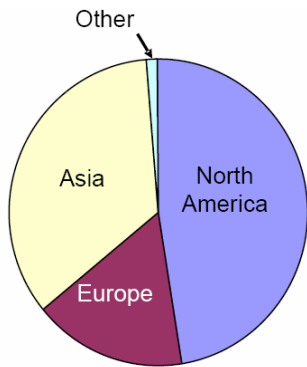
Fig. 4. EU Public Funding in 2004 in Nano

• Per capita public expenditure during 2003



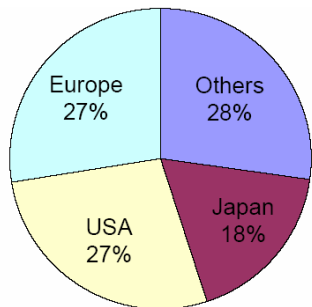
Source: European Commission (2003)

Fig. 5. Worldwide Activities in Worldwide Activities in Nanotechnology R&D



Private (Corp. + VC)
Total = \$4 billion

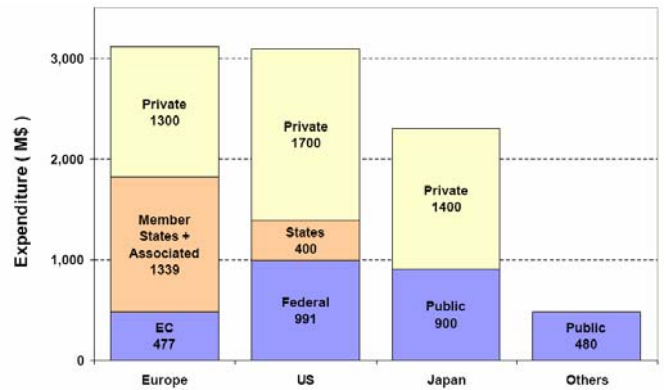
Source: Lux Research (2004)



Public (National, regional, state)
Total = \$5.5 billion

Source: European Commission (2005)

Fig. 6. Overall Funding in 2004



Source: European Commission (2005) : Private figures based upon Lux Research

Fig. 7. Worldwide Investment in 2004

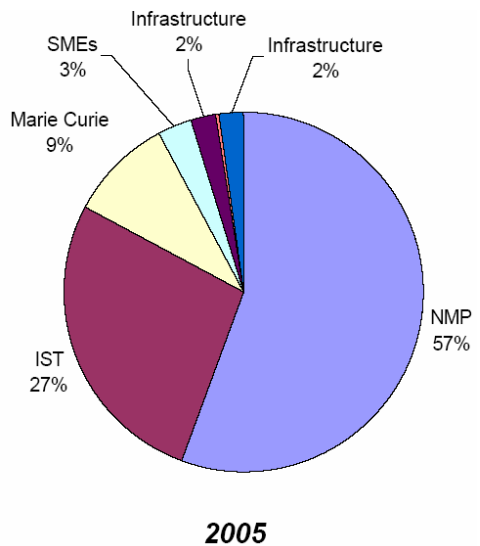
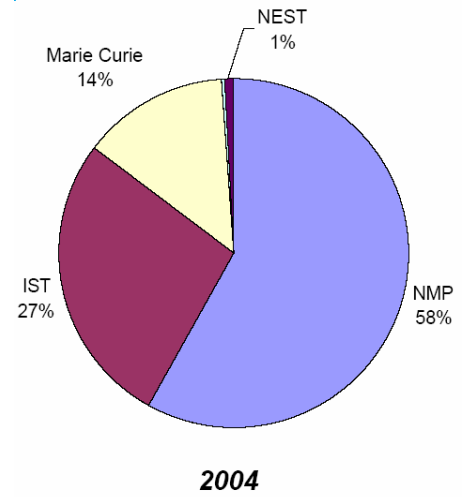
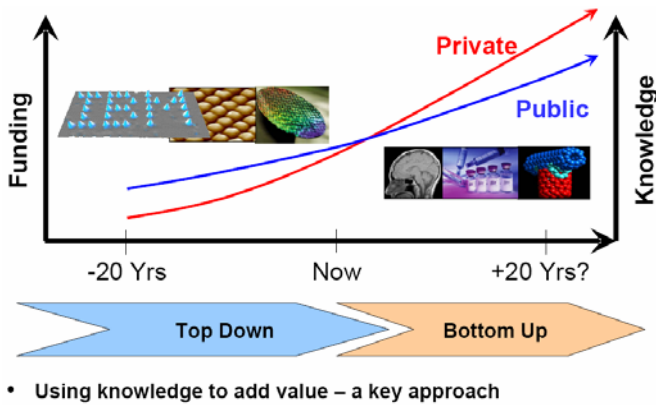


Fig. 8. Nanotechnology R&D in the EU Nanotechnology R&D in the EU Sixth Framework



- Using knowledge to add value – a key approach

Fig. 9. Making the Transition

The European Landscape

- Enjoys strong public R&D investment in nano mostly at national/regional level but....
- While there is much knowledge generated in terms of publications the impact is less clear
- EU countries have very disparate ranges of R&D intensity and specialisations
- Overall lower level of private R&D investment and less intensive commercial activities (start-ups)
- Evidence that Europe is proportionately weaker in protecting knowledge via patents
- How can we help to maximise the impact and efficiency of European research?

- Communication Towards a European Strategy for Nanotechnology adopted 12 May 2004



Fig. 10. Europe's integrated and Europe's integrated and responsible approach

Investing in Human Resources Investing in Human Resources in Nano– A Key Point

- Identify the educational needs of nanotechnology and provide examples of best practice
- Encourage the definition and implementation of new courses and curricula for nanotechnology
- Promote the integration of complementary skills into research training e.g. entrepreneurship
- Create a “European award in nanotechnology” to encourage young researchers

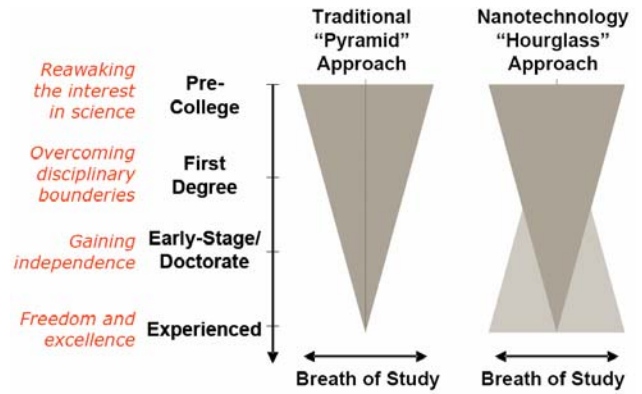


Fig. 11. Hourglass Model

Training activities may be integrated into Integrated Projects, Networks of Excellence, etc.

- Marie Curie Actions aim at research-training
- Technology Platforms may also play a valuable role



MARIE CURIE ACTIONS



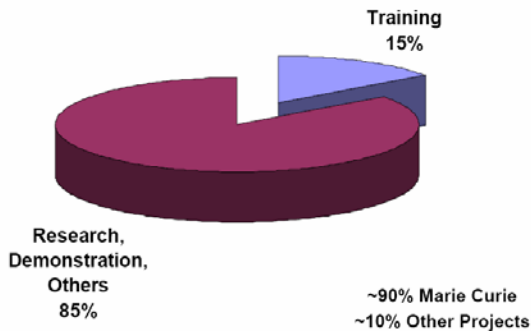
Fig. 12. Avenues for Research-Training

	Number of Projects	Budget (millions €)	Person-Years (*)
FP4 (1994-1998)	11	14,4	216
FP5 (1998-2002)	36	49,1	737
FP6 (2002-2006) First Call only !	13	28,4	426
TOTAL	60	91,9	1379

(*) Based on an average of 15 person-years per million

Fig. 13. Nanotechnology in Marie Curie Actions: RTN as an Example

- In 2004 around 15% (55M€) was invested in nano research-training via the Framework Programme



- Similar trend emerging for 2005 around 10% (26M€) already invested in nano research-training

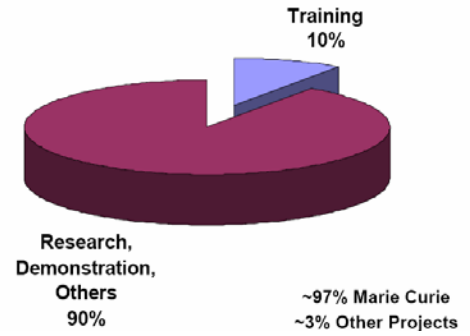


Fig. 14. *Our Investment in People*

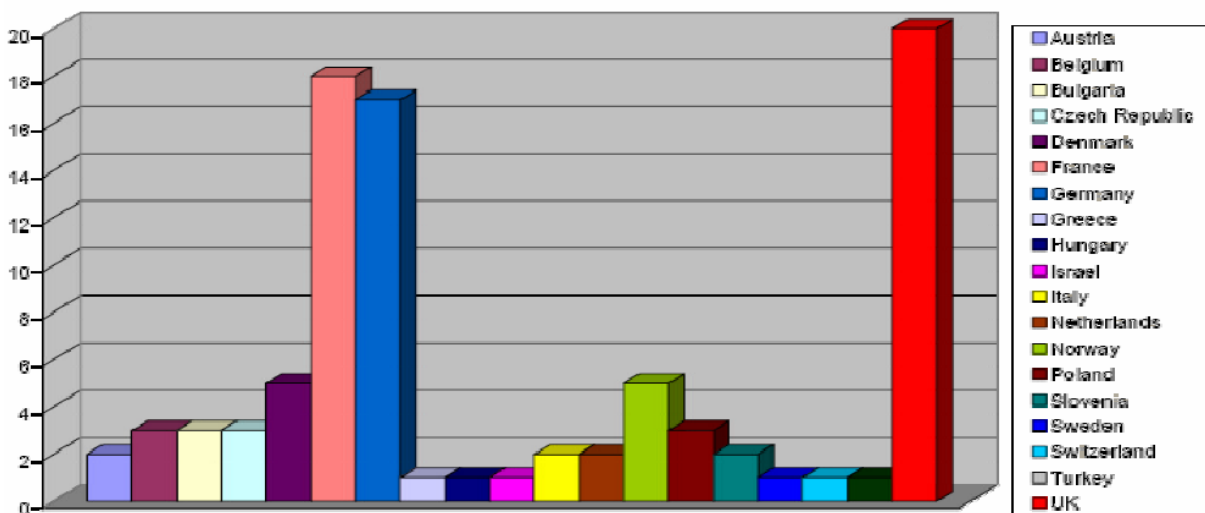


Fig. 15. *Education and Training – Nanoforum (Dec.2003, Trieste) and Nanoforum Network: catalogue of 91 specialised degrees, of which 28 in 21 Europ. countries*

Aims of the Workshop Research Training in Nanosciences and Nanotechnologies: Current Status and Future Needs, 14 – 15 April 2005, Brussels

- To review the current state-of-the-art in nanotechnology research-training,
- to facilitate an effective exchange of information and “best practice”;
- to assess the current and future needs for research organisations and industry; and finally;
- to develop proposals for possible follow-up initiatives at European level.

Workshop - Four Sessions

1. Nanotechnology training for and through research: are we keeping up with the pace?
2. Interdisciplinary needs of nanotechnology: do we need a new approach?
3. Practitioners and users: how to foster intersectorial cooperation in training and career development

4. The broader picture: raising awareness of the young generation and addressing the concerns of the citizens

Workshop - Some outcomes

- Develop initiatives for introducing nanosciences to schools.
- Promote production of pedagogical materials in mother tongue languages.
- Introduce ‘nanoscience’ or ‘nanotechnology’ as master degree, while maintaining a solid largely discipline – based grounding education.
- Spread best practice and promote common European Masters courses and joint PhDs, incorporating a broader training profile to include also ethical, societal and dissemination competencies.
- Promote “mobility”, not only geographically, but also between disciplines and sectors (e.g. industry to/from academia).

- Support for facilities, and for researchers' travel/access, for "hands on" practical training.
- In parallel, promote transnational collaborative projects in order to strengthen links particularly with countries/regions less advanced in nanosciences.
- Further dialogue between academia and industry in order to identify future training needs, perhaps in the form of a roadmap.
- Establishing mutually understandable vocabularies across disciplines was seen as an important aspect of interdisciplinary work.
- For further information:

<http://www.cordis.lu/nanotechnology/src/educationworkshop.htm>

Communicating Nano

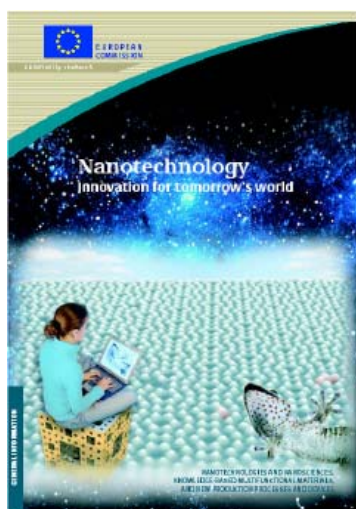


Fig. 16. Brochure: "Nanotechnology: Innovation for tomorrow's world" soon in 23 languages

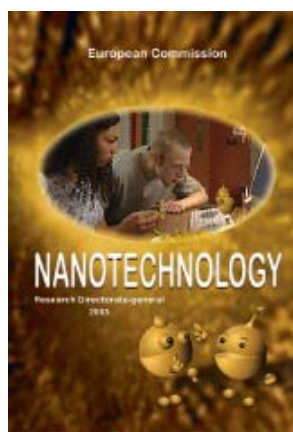


Fig. 17. Film (for younger people): "Nanotechnology" in 20 languages

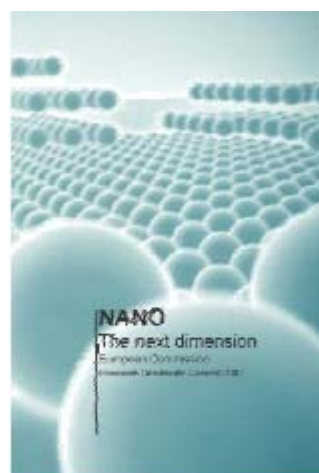


Fig. 18. Film: "Nano: The next dimension"

Available on:

www.cordis.lu/nanotechnology/src/pressroom.htm

Further information

- General information on research: <http://europa.eu.int/comm/research>
- General information on the Sixth Framework Programme : <http://europa.eu.int/comm/research/nfp.html>
- International Scientific Cooperation Policy: http://europa.eu.int/comm/research/iscp/index_en.html
- Information on nanotechnology in Europe: <http://www.cordis.lu/nanotechnology>
- General information requests: research@cec.eu.int
- INCO infodesk (for third countries): inco@cec.eu.int