

Foreword

The development of new products and services depends strongly on the capability to exploit in a more advanced manner the physical and chemical properties of materials. Thus, the investigation of matter and its control at the nano-scale present a huge potential that can bring benefits to society as a whole and in the framework of sustainable development. It could also greatly increase industrial competitiveness.

Research and technology on the nano-level represent a great intellectual and scientific challenge where the traditional scientific disciplines converge. New inter-disciplinary approaches and curricula need to be developed.

To succeed in the challenging world of nanotechnology, research excellence is, however, not enough. Successful strategies for companies and research organisations must include both industrial innovation and attention to environmental and social issues. New manufacturing tools and appropriate standards are also required as well as a novel entrepreneurial attitude.

Considerable resources and efforts are required to meet these challenges in a positive and timely manner. Furthermore, a careful analysis of the current situation has to be carried out. Future initiatives will greatly benefit from co-ordination and focusing, in order to achieve the maximum impact on industry, improve the quality of life of the citizens and enable the new discoveries to generate wealth and employment.

This Forum, organised by the European Commission in the framework of the Italian Presidency of the European Union, has successfully prepared the ground to respond to these challenges, by examining the present situation of the development of nanosciences and nanotechnologies in Europe. This has been done in the context of the international state of the art, and in line with the objectives of the European Research Area, the forthcoming enlargement of the European Union, the international dimension and the integrating character of the 6th Framework Programme.

The Forum's programme has been structured to address the main obstacles towards the expansion and reinforcement of nanosciences in general, and to the development and use of nanotechnology-based products and services. Their potential applications and the possible risks have also been analysed.

The Forum aimed to gather key players and specialists in research, education, industry, finance, social sciences, journalism and public administration, with the participation of many top-level scientists and stakeholders. Participants from all over the world were given the possibility to exchange ideas and opinions, listen to Nobel prize-winners and leaders from industry, academia and public administration, build-up new research strategies and collaborations in the many research directions offered by nanotechnology.

The outcome of the Forum and the success of the integrated approach proposed have enabled the Commission to define, at the beginning of 2004, the key elements for a common strategy for the future of nanotechnology research in an enlarged Europe supported by a strengthened international co-operation.

Nanotechnology is thus the subject of a Communication, “*Towards a European strategy for nanotechnology*”, COM(2004)338, adopted by the European Commission on 12th May 2004 (www.cordis.lu/nanotechnology).

In this Communication, not only is it proposed that research in nanosciences and nanotechnologies should be boosted, but that several other interdependent dynamics must be taken into account, such as a greater coordination of national research programmes and investments to ensure that Europe has teams and infrastructures (“poles of excellence”) that can compete at international-level. In parallel, collaboration between research organisations in the public and private sector across Europe is essential for achieving sufficient critical mass. Other competitiveness factors should not be overlooked, such as adequate metrology, regulations, and intellectual property rights so as to pave the way for industrial innovation to be carried out and lead to competitive advantages, both for large and small- and medium-sized companies. Activities related to education and training are also of great importance; in particular, there is scope in Europe to improve the entrepreneurial character of researchers as well as the production engineers’ positive attitude to change. The realisation of true interdisciplinary research in nanotechnology may also require new approaches to education and training for research and industry. Social aspects (such as public information and communication, health and environmental issues, and risk assessment) are further key factors to ensure the responsible development of nanotechnology and that it meets people’s expectations. Public and investors’ confidence in nanotechnology will be crucial for its long-term development and fruitful application.

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