



EUROPEAN
COMMISSION

Community research

Leveraging European Investment in Nanotechnologies R&D and Innovation

Georgios Katalagarianakis

DG RTD/G4

Nanoscience – Nanotechnologies

Georgios.katalagarianakis@ec.europa.eu

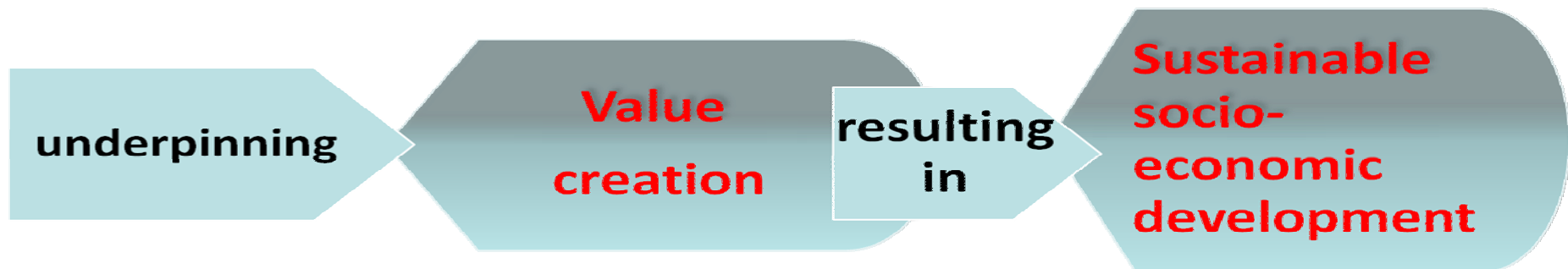


Leveraging European Investment in Nanotechnologies R&D and Innovation

Need

for a European Nanotechnology strategy

- **which supports the timely development of a broad portfolio of targeted nanotechnologies;**
- **in combination with responsible and supportive governance;**

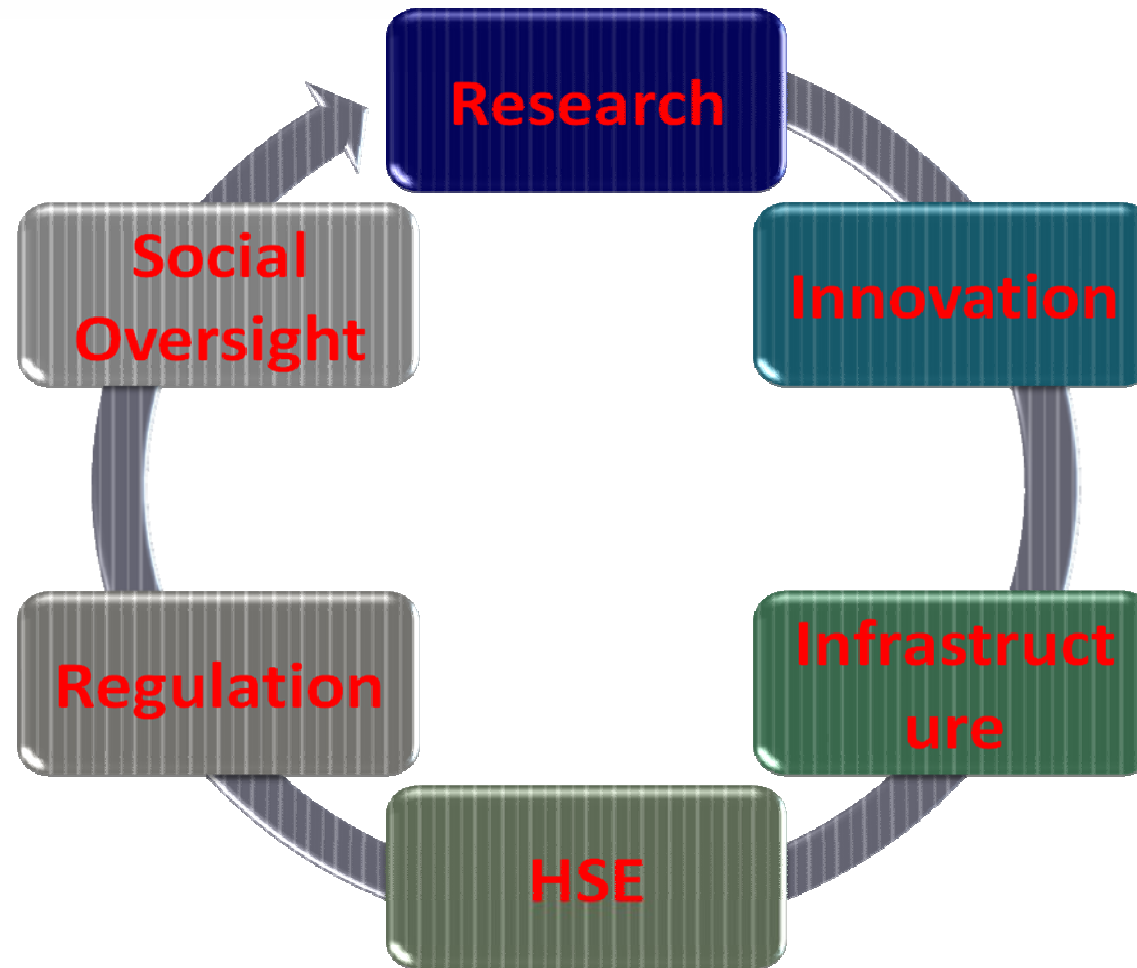




EUROPEAN
COMMISSION

Community research

***With* Resources for all phases of NT development for every part of the value creation network**





But certain conditions for investment must be in place

1. **barriers** for business growth need to be identified and removed
2. **real innovation** needs must guide R&D output
3. **fragmentation in R&D and Innovation** efforts has to be eliminated
4. **market fragmentation** for Nano-based Innovations has to be combated
5. **opportunities** for European leadership must be identified and seized
6. Strategic role of Nanotechnology in **recovery** from the economic downturn must be rationalised
7. **funding** mechanisms have to be simplified



1. Identifying and removing the **barriers** that need to be removed for business growth

Some of the major barriers...

- The inefficiency of the current technology transfer process;
- The necessity of risk assessment guides and risk protocols for industry;
- The costs for environmental, health, life-cycle analysis and safety testing;
- The commercial viability question related to nanotechnology-based products;
- Consumer issues, media and public perception;
- Unmet training needs;
- Gaps in policy and infrastructure;
- Gaps in support mechanisms (financing, IP, etc.);
- Gaps in metrology, standards, and investment into tools.

...identification is the easy part



EUROPEAN
COMMISSION

Community research

1. Identifying and removing the **barriers** that need to be removed for business growth

The European approach of integrated, safe and responsible development of Nanotechnology is the right one, but progress must be accelerated in many areas !



2. Link R&D output to **real innovation** needs

Nanotechnology innovation process is complex and therefore:

- **Long lead times to market threatens their adoption**
- **Infrastructure investment supportive of growing business is delayed**
- **Dominant position of traditional technologies and actors**
- **Diverse market incentives**
- **Supply network challenges**

And the nature of the technologies themselves:

- **enabling, indirect market appetite**
- **expensive but with big benefits**
- **accrual of benefits take long for companies but even longer for society**



EUROPEAN
COMMISSION

Community research

2. Link R&D output to **real innovation** needs

*We need a seamless link
between research and the innovation process
for bringing out flagship nano applications
to lead the way...*



3. Eliminating fragmentation in R&D and Innovation efforts

- Better co-ordination of policies; concentration and specialisation of resources –emergence of world class poles of excellence; not only for research but ...
- Stronger collaboration between Community, MS, Regions, industry, academia with Community as facilitator



3. Eliminating fragmentation in R&D and Innovation efforts

- ❑ *First level of co-operation is the development of shared strategies and policies across EU;*
- ❑ *Second level is strengthening collaboration of stakeholder groups;*
- ❑ *Third level is pooling of resources together to solve problems demanded by grand challenges.*



4. Tackling **market fragmentation** for Nanotechnology Innovation

- ❑ **Incomplete or ill-defined value creation networks**
- ❑ **Unstable market conditions and support schemes**
- ❑ **Isolated attempts at first entry to gain market share early**

Lead to

- **Incoherent business strategies and target setting**
- **Un-coordinated innovation plans for product launch**



4. Tackling **market fragmentation** for Nanotechnology Innovation

We need:

- *More intense collaborations to open up new EU-wide markets for innovations with dedicated infrastructure;*
- *General policy measures creating more favourable conditions for business developments (single stop shop for research and innovation e.g. Safety);*
- *Streamlining Commission's plans with that of Member states in collaboration with industry and social partners.*



5. New opportunities for European leadership, if...

- ❖ both public and private investments efficiency is improved, level raised and their use better targeted
- ❖ the setting-up of dedicated Nanotechnology infrastructure/assets is accelerated
- ❖ regulatory initiatives and environment are streamlined
- ❖ the level of social awareness and engagement is raised; consumer protection is reinforced
- ❖ international Co-operation is strengthened

Billion €	2005-2006			2007-2008		
	public	private	TOTAL	public	private	TOTAL
EU	3.4	1.9	5.3	3.8	2.5	6.3
US	2.8	3.1	5.9	2.6	4.1	6.7
Japan	1.5	2.4	3.9	2.5	5.8	11.4
Others	1.5	0.9	2.4	1.5		
Russia				0.8		
China				0.8		
TOTAL	9.2	8.3	17.5	12.0	~13	~25

Global nanotechnology research funding (public and private) in 2005-2006 and 2007-2008



6. Assisting the **recovery** from the economic downturn

- ❏ **Stressing Nanotechnologies role as a vital tool for bringing efficiencies and cut rising costs**
- ❏ **Considering that the combination of shrinking user markets and protracted adoption cycles devalue research and innovation plans in emerging technologies such as NT**
- ❏ **Realising that economic downturn effects remain longer after recovery**
- ❏ **Public policies must assist in the markets RTD effort to stay on course maintaining their innovation momentum**



7. Simplifying **funding** mechanisms and schemes

- **Variety of funding sources**
 - **Community, MS, Industry**
- **Variety of funding schemes**
 - **Community, MS, Industry**
- **Simplification and streamlining of mechanisms and schemes across Europe would attract further investment especially if the rest of the issues are in place**

First Nanotechnology Action Plan Conclusions of the Second Implementation report 2007-2009(i)

Progress has been achieved in most areas. Future emphasis is on:

- Deepening the research efforts and roadmaps for key nanotechnology sectors, to enhance innovation, competitiveness and safety. Life-cycle approaches should be taken into account.
- Developing infrastructures and the educational system further, consistent with the multidisciplinary character of nanotechnology.
- Strengthening the mechanisms available for industrial innovation, stressing the concept of open innovation and facilitating technology transfer.

First Nanotechnology Action Plan 2005-2009 Conclusions of the Second Implementation report 2007-2009 (II)

- Implementing a more direct, focused and continuous societal dialogue; and monitoring public opinion and the issues related to consumer, environmental and worker protection.
- Continuing to review the adequacy of regulation, building where possible on international developments.
- Surveying the market for products of nanotechnology, including safety aspects.
- Stepping up the research effort on safety assessment throughout the product life-cycle, including the further development and validation of nanomaterial characterisation and test methods.

***The Commission is considering proposing
a new Nanotechnology Action Plan 2010-2015***

Roadmap for the Impact Assessment of a renewed Nanotechnology Action Plan for 2010-2015

- *Initial IA screening & planning of further work*
 - A. Context and problem definition
 - B. Objectives of EU initiative
 - C. Options
 - D. Initial assessment of impacts
 - E. Planning of further impact assessment work



EUROPEAN
COMMISSION

Community research

Input from Member States for the Impact Assessment of the new Nano Action Plan (i)

- *Organisation*
- *Strategy*
- *Objectives*
- *Funding*
- *Policy instruments*
- *Policy challenges*
- *Regulation*
- *Awareness and perception*



EUROPEAN
COMMISSION

Community research

Input from Member States for the Impact Assessment of the new Nano Action Plan (ii)

- *International Cooperation*
- *Human resources*
- *Infrastructure*
- *Consumer Protection*
- *IPR*
- *Business related policy needs*
- *Business incentive programmes*
- *Evaluation of business incentive programmes*
- *Innovative approach for commercialisation*
- *Financing issues*



EUROPEAN
COMMISSION

Community research

Socio-economic issues for Nano-enabled products

- *Socio-economic issues*

- What are the country's national development needs and strategies and how can Nanotechnology play a role?*

- Will the technology function as a complement or substitute for existing technologies /industries?*

- How equipped are producers and markets to predict and adjust to market changes precipitated by technology?*

- How, if at all, will the technology affect the socio-economic position of workers and communities involved in the production, trade, or consumption of future products?**

- *Product research and development*

- What Nano-products and what is the Nanotechnology's stage of development (e.g., on the market, field tested, lab tested, or in early research stages)?**

- *What will it take for the technology to move from the lab to the market?*

- *For which industries does the technology support is directed?*

- *Is the research and development aimed at meeting sustainable development needs?*

- *What incentives, if any, is/ should be provided to encourage responsible research and development, as well as adoption of new technologies?*



EUROPEAN
COMMISSION

Community research

EHS; Ethics; Public

- *Environmental, human health, and safety (EHS) risks (for each type of Nanotechnology).*
What are the technology's potential EHS risks?
How extensively have the EHS risks been evaluated and how can EHS information be accessed?
What is the need for EHS risk studies and development of risk management approaches?
- *Ethics*
Will the benefits and/or risks disproportionately effect a segment of the population?
Are the potential human enhancement, privacy, and other ethical implications of the technology assessed?
- *Public participation and engagement*
Who should be involved in discussions on nanotechnology?
What information is needed for an informed public dialogue?
How can access to information about the technology and its potential implications be maximized?
What are the infrastructure and human capacity challenges to public participation and engagement?



EUROPEAN
COMMISSION

Community research

Governance

- What are the roles of key stakeholders (e.g., government, industry, NGO, academia, etc.) in nanotechnology governance?
- Should nanotechnology applications be regulated and, if so, by whom?
- How and by whom should research efforts be guided to meet national sustainable and human development needs and goals?
- Who should fund and conduct nanotechnology risk assessments?
- How and by whom should the opportunities and risks be communicated to industry, workers, and the public?
- What mechanisms (e.g., monitoring, forecasting, research, policy development, and other strategies) exist or are needed to help industry and producers anticipate and adjust to changes that may result from technology-induced changes in demand for Nano-enabled products?



EUROPEAN
COMMISSION

Community research

Capacity building

- *What are the needs and potential strategies for ensuring that the country has the educated and trained workforce and access to information to evaluate technologies and select the best available option(s) to meet its near- and long-term needs?*
- *What are the appropriate roles of communities, governments, researchers, companies, and other groups in capacity building processes?*
- *How can international collaborations and cooperation best be used to enhance research and development capacity building, and other issues?*
- *Scalability, delivery, and sustainability*

How can scale-up, distribution, and business sustainability be ensured so Nano-products reach the people that need them?

How can the public and private sector work together to distribute and facilitate use of the Nanotechnologies ?

- *Intellectual property rights and access*

What are the potential impacts of patents (e.g., scope type (product or process), ownership, management) on the ability of the country to access or develop Nanotechnologies and to benefit from them economically?

What are the potential effects of the Nanotechnology and the patents it generates on issues of consolidation, buy-outs and the levels of horizontal and vertical integration that the country offers for start-ups?

With whom and to what degree is ownership of the technology concentrated and how will that affect the ability for producers and other producing countries to benefit from the technology?



EUROPEAN
COMMISSION

Community research

Information on Nanotechnology in EU

- **Commission Nanotechnologies homepage**

<http://cordis.europa.eu/nanotechnology>

http://ec.europa.eu/nanotechnology/index_en.html

- [Second Implementation Report](#)
- [Staff working document](#)
- [Public consultation](#)