

Manufacturing R&D through Int'l Cooperation

NIST, Gaithersburg, February 26, 2008

IMS in the 7th Framework Program

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"Intelligent Manufacturing Systems"
Information Society and Media Directorate-General
European Commission



- European Union research programs
- The 7th R&D Framework Program (FP7)
- Key FP7 areas relevant to manufacturing
- Technology Platforms - some examples



The European Union

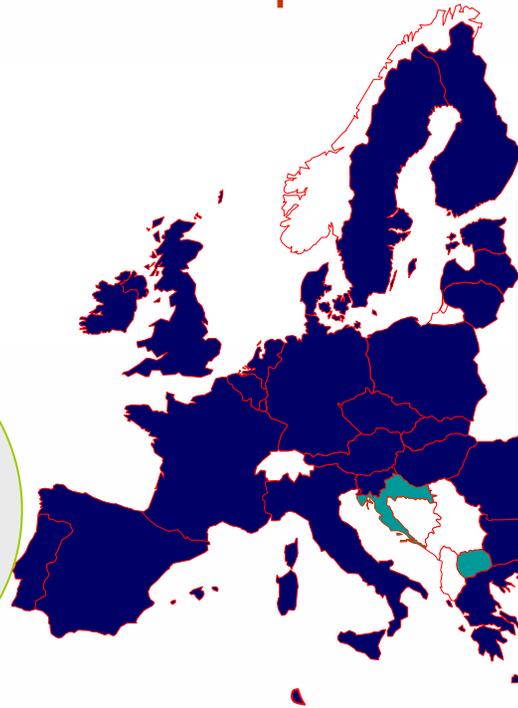


27 democratic countries, committed to working together for peace & prosperity

EU-27

Population:
493 million

GDP:
€ 10,917 bn

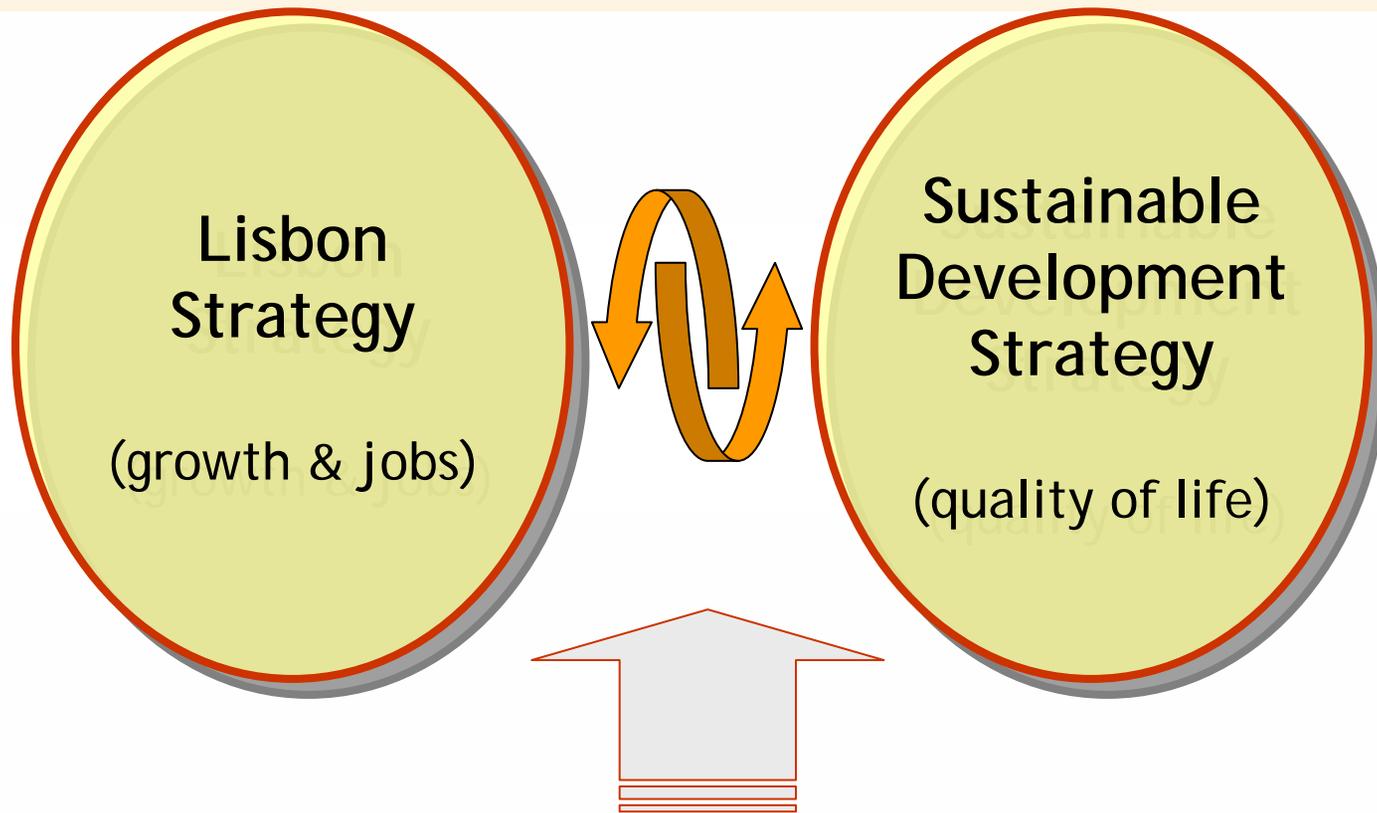


Austria, Belgium, Bulgaria, Cyprus, Czech Rep., Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Luxembourg, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, UK

Candidate countries
Croatia, FYR of Macedonia, Turkey

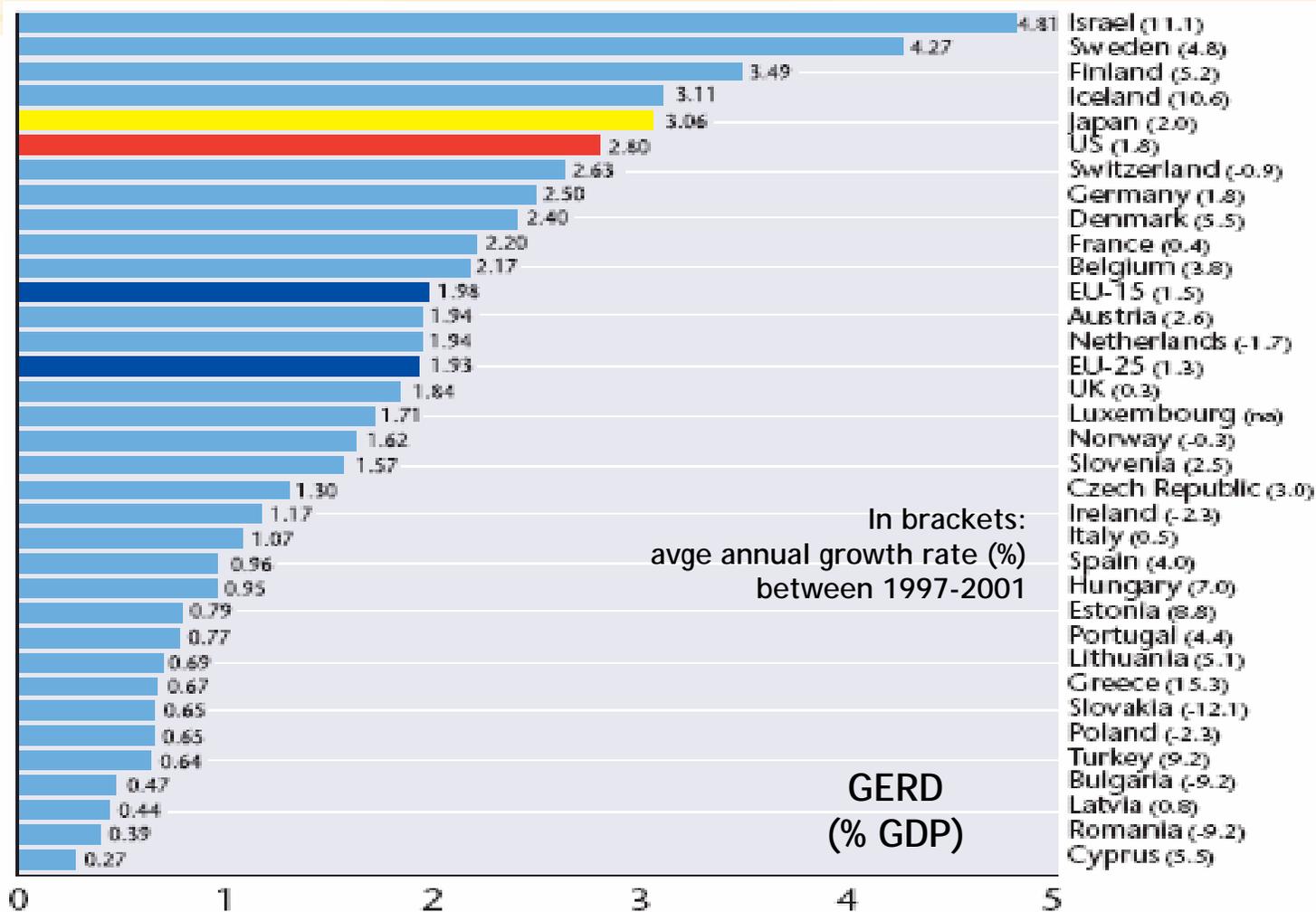


The European Policy Framework



7th Framework Program
for Research

Europe's R&D Pains: Low Investment, Fragmented Efforts



Building the “European Research Area”

Towards a “single market” for research

- An area for the free movement of knowledge, researchers & technology
- Aiming to increase co-operation, aggregate fragmented efforts, achieve better allocation of resources

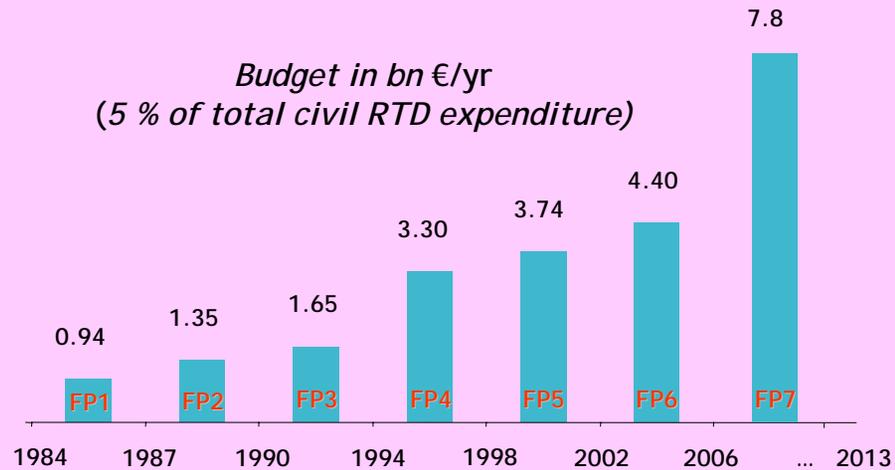
Nat'l R&D Programs

Framework Program

Inter-governmental Programs (Eureka, COST)



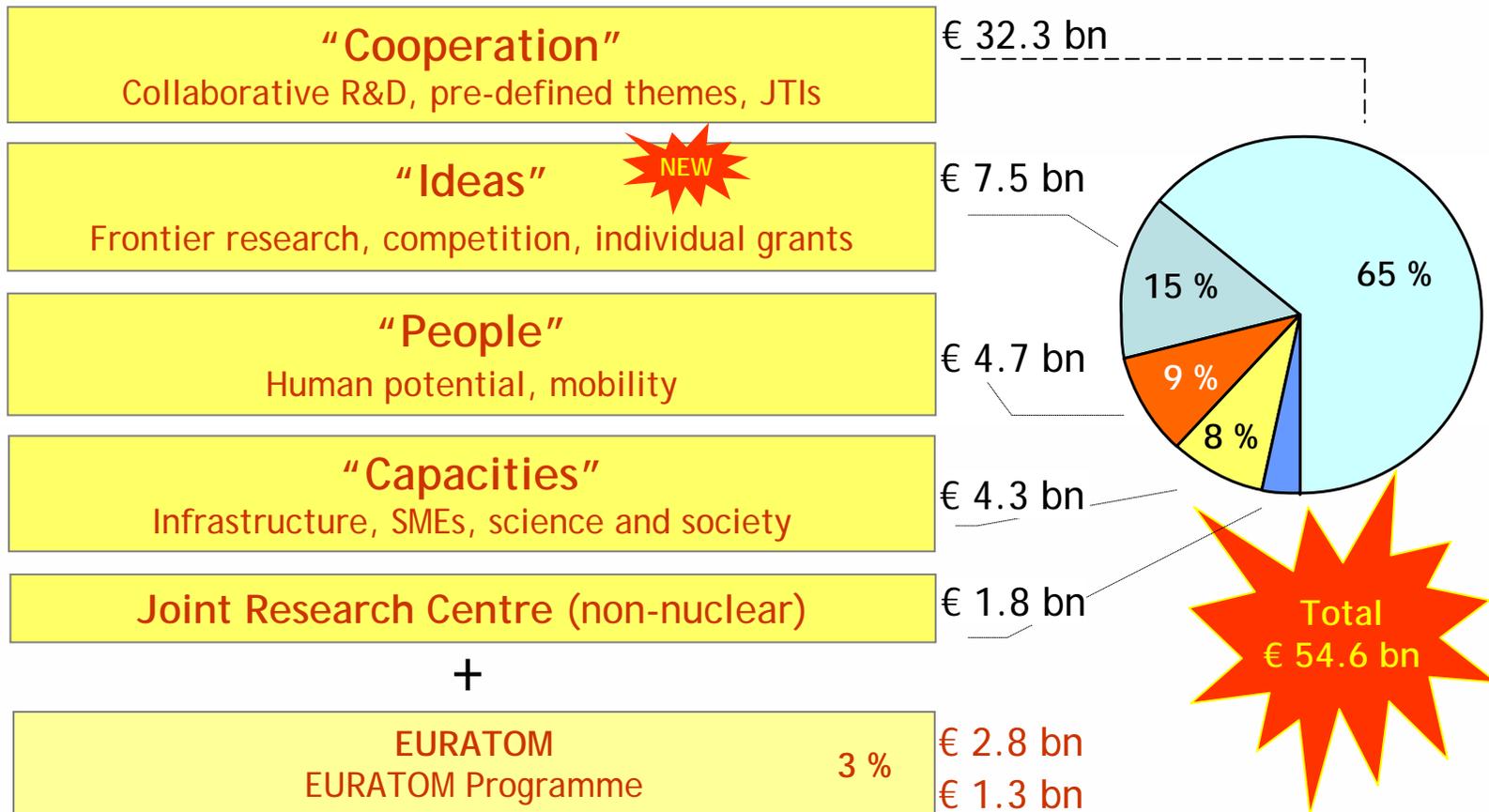
*Budget in bn €/yr
(5 % of total civil RTD expenditure)*



European Commission
Information Society and Media



The 7th Framework Program: 2007-2013



FP7 "Cooperation": Themes

		2007-2013 Budget [mn €]
IMS activities	1. Health	6,000
	2. Food, Agriculture & Biotechnology	1,935
	3. Information & Communication Technologies	9,120
	4. Nanosciences, Nanotechnologies, Materials & New Production Technologies	3,505
	5. Energy	2,300
	6. Environment (including Climate Change)	1,900
	7. Transport (including Aeronautics)	4,195
	8. Socio-Economic Sciences & the Humanities	610
	9. Space	1,430
	10. Security	1,320

32,315

... including

Joint Technology Initiatives

ERA-Nets

International Cooperation



European Collaborative R&D: An Experience of More than 20 Years

- **Collaboration is win-win**
 - Typical project: a multi-stakeholder partnership (multinationals, SMEs, research institutes & universities)
 - Provides value adding European perspective
- **Industry is ready to invest in collaborative research**
 - Public research expenditure stimulates equal amounts of private expenditure
 - Partners in collaborations are more ready to protect their knowledge
- **EU collaborative research is attractive to non-EU participants**
 - Iceland, Israel, Norway, Switzerland, Turkey are associated members in FP7

Source: „Impact Assessment & Ex-ante Evaluation“ of FP7, COM(2005)119 final, 6 April 2005



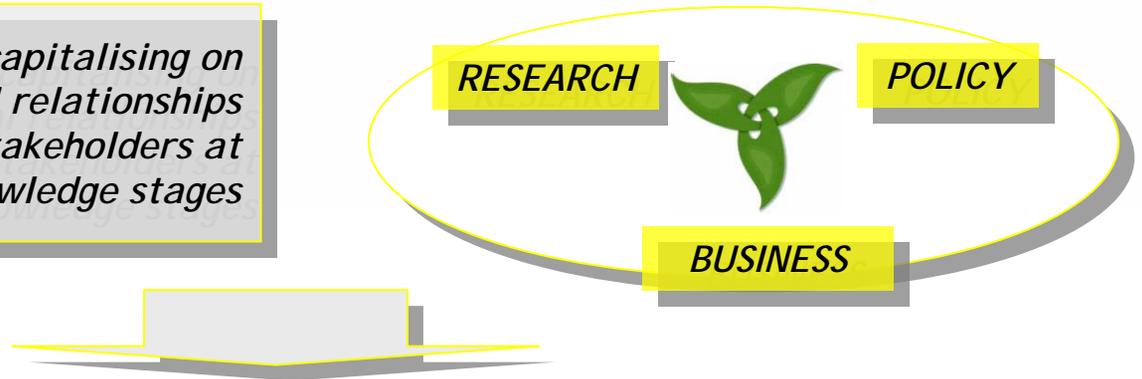
Collaborative R&D: A Way to Stimulate Private Investment

- “Crowding-in” effect on R&D investment
- 60-70 % research that would otherwise have not been undertaken
- Partners in collaborations show higher percentage of product/service innovations
 - German findings:
industrial participants patent 3 x more often than non-participants
 - UK 2000 econometric study:
contribution of Framework Program to UK’s industrial output is much higher than the UK govt’s contribution to the Framework Program



European Technology Platforms

A spiral model of innovation capitalising on the multiple reciprocal relationships between public & private stakeholders at various knowledge stages



30+ European Technology Platforms launched so far:

- Addressing major technological challenges in specific domains
- Aiming to leverage public & private investment for R&D & innovation
- Involving key R&D stakeholders
 - eg industry, the research community & public authorities
- Bundling fragmented R&D efforts towards agreed goals
 - Vision 2020 document & Strategic Research Agenda

cordis.europa.eu/technology-platforms

Nanoelectronics & Embedded Systems Technology Platforms

Nanoelectronics:

addressing the needs of silicon-based technologies & beyond

- shrinking of CMOS logic & memory devices
- development of value-added functions for system-on-chip or system-in-package solutions
- equipment & materials
- design automation



eniac.eu

Embedded Computing Systems:

ubiquitous, interoperable & cost-effective embedded systems

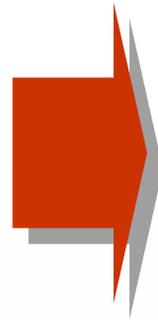
- reference designs and architectures
- middleware for interoperability and seamless connectivity
- integrated design software tools for rapid development & prototyping



artemis-office.org

Smart Systems Integration

- **A multi-disciplinary endeavour:**
Combining optics, mechanics, electronics, fluidics, thermodynamics, chemistry, biology
- **Converging scientific disciplines:**
Looking at the overlapping areas between nano-, bio-, information & cognitive sciences
- **Multi-material integration:**
Semiconductors, polymers (plastics), ceramics, glass, ...
- **Multi-technology integration:**
Monolithic, hybrid, multichip, large-area, ... miniaturisation techniques
- **Multi-functional integration:**
Combining sensing, processing, actuating



smart-systems-integration.org



Technology Platform ManuFuture

Engineering

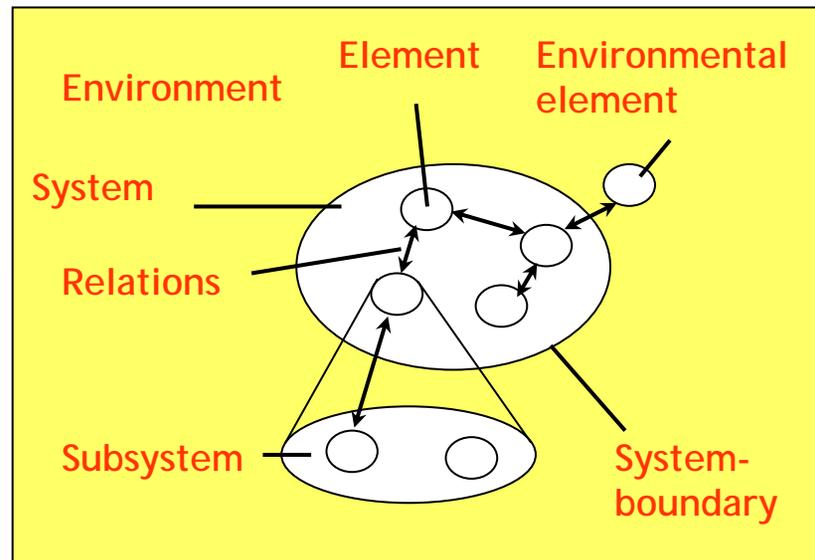
Manufacturing

Usage
Service

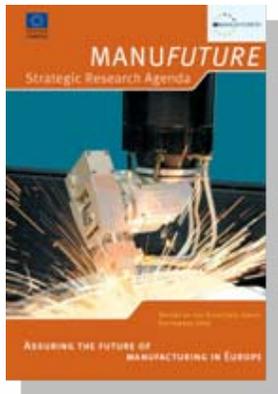
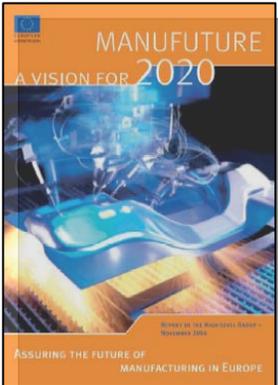
Recycling

R&D Key Challenges

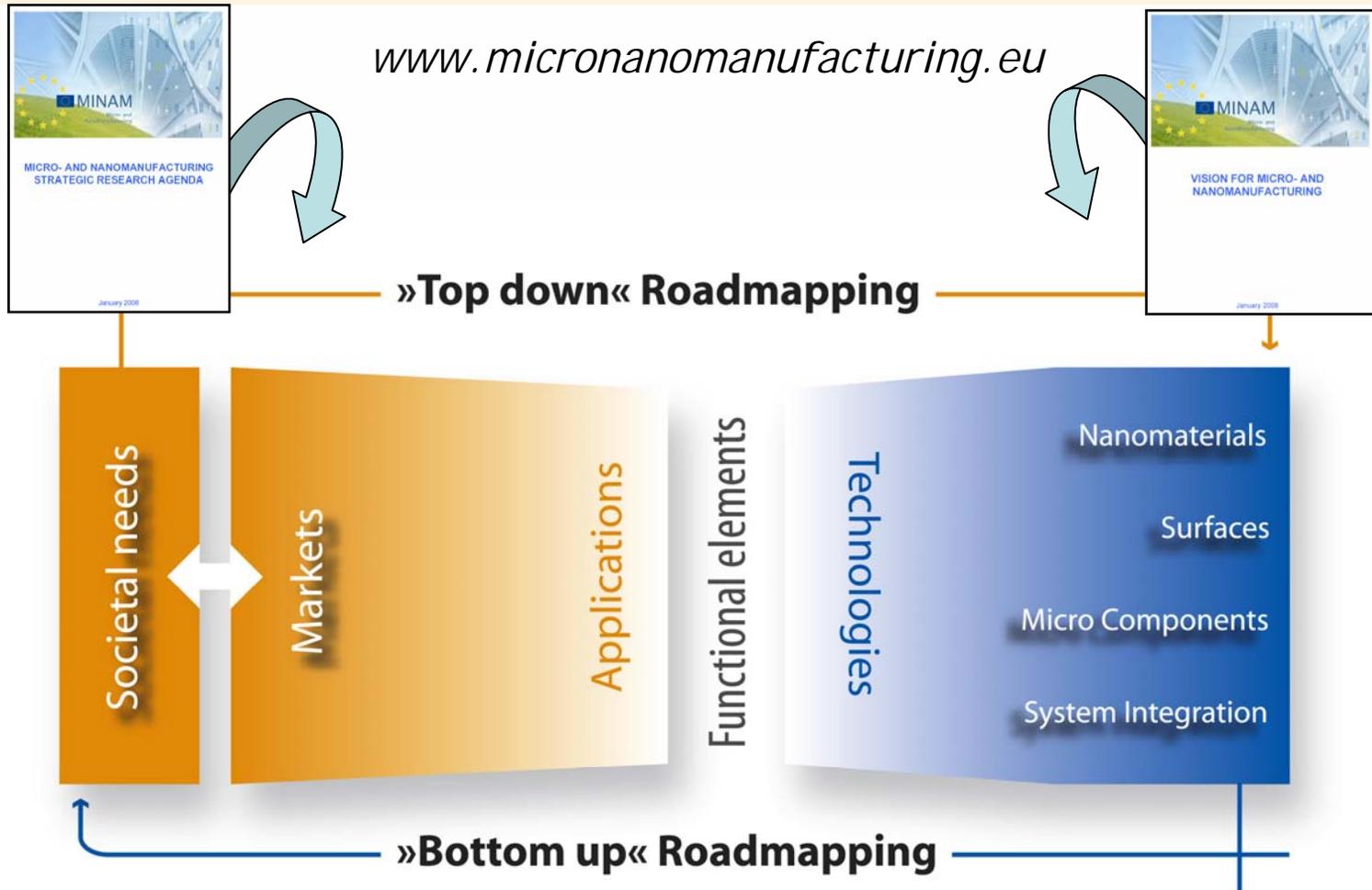
- Adaptive
- Digital and virtual
- Integrated
- Networked
- Knowledge-driven
- Highly performant
- Beyond „lean“
- New Taylorism



<http://www.manufuture.org/>



Micro-/Nanomanufacturing: Objectives

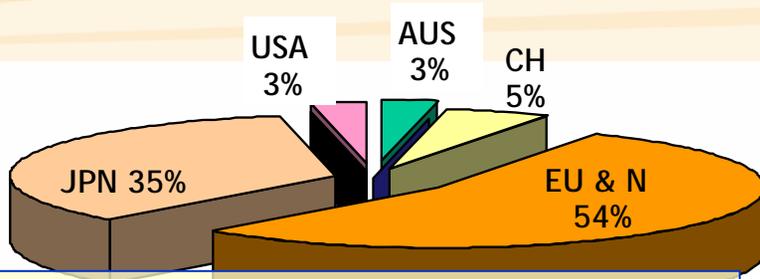


Intelligent Manufacturing Systems

- A win/win approach to int'l collaboration
 - Enabling our businesses to be competitive in world markets
 - including common terminology, standards, best practices, ...
 - Solving problems of global reach
 - e.g. climate change, more efficient resource use
 - Developing world-best technology (incl. best practices) for others to follow, too!
- A "safe" environment for int'l collaborative R&D
 - IPR regime protects the knowledge of IMS participants



The Future of IMS



*IMS project leaders by region in %
(2005 figures)*

*Not all problems of humanity
can be solved by technology ...
but many can!*

Europe's commitment to IMS:

- In 2007, the EU Council of Ministers decided to continue Europe's involvement in IMS
- The new IMS strategy helps reorient activities around sustainability & energy efficiency as overarching guidelines for global manufacturing & engineering
- Europe will continue to invest in IMS

For more information

The 7th Framework Program:

<http://cordis.europa.eu/fp7>

IMS Web sites:

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

<http://www.ims.org>

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