



Strategic Multiannual Roadmap 2009-07-09 Factories of the Future PPP

FoF Ad-hoc Industrial Advisory Group



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Multi-annual Roadmap. Proposed content

- Strategy document of around 30 pages
- Time focused on the period 2010 to 2013
- Challenge and target oriented: leading to impacts
- Coherent approach: addressing Themes in a complementary way
- Realistic estimation of funds for each priority area
- Consensus-based to generate stakeholders support
- Not so detailed as to define the specific call topics





Structure

1. Background
2. Vision and strategic objectives
3. Main industrial needs and related R&D challenges
 - 3.1 Sustainable Manufacturing
 - 3.2 ICT enabled Intelligent Manufacturing
 - 3.3 High Performance manufacturing
 - 3.4 Exploiting new materials through manufacturing
4. Timeline and budget
5. Expected impact of the Factories of the Future Initiative
6. Implementation through stakeholders involvement
7. Other relevant issues





Introduction

- Factories of the Future: next generation of production technologies for 2010 onwards.
- The Roadmap: research priorities defined in a partnership between the European Commission and the EFFRA
- Overall budget: €1.200 million between 2010 and 2013,
- Strategic Roadmap (2011-13) based on stakeholders consultation process, including the European Technology Platforms
- The Strategic Roadmap (2011-13) consists of four domains
- The Strategic Roadmap (2011-13) supports collaborative research projects oriented towards industrial application.





Background

- strategic roadmap developed considering the main social, technological, environmental, economical and political (STEER) and market drivers.
- The “Factories of the Future” initiative: the European response to the crisis, addressing simultaneously competitiveness and sustainability.
- Impacts directly in the sustainability of the European manufacturing industry and in keeping manufacturing related jobs in Europe.
- European manufacturing industry needs a shift in paradigm, from cost cutting to value adding, in order to achieve a sustainable and competitive system.
- A successful strategic development has to incorporate the main pillars such as:
 - Sustainable Manufacturing
 - ICT enabled Intelligent Manufacturing
 - High Performance Manufacturing
 - Exploiting new materials through manufacturing
- the aim of this roadmap to inspire industries to develop and demonstrate innovations leading to its sustained competitiveness.





Vision and Strategic Objectives

- Europe is a main player globally, manufacturing industries contribute to it
- In the globalised world, social, technological, environmental, economical and political factors are the main drivers for the current and future economy
- The base of enterprises is technical innovation and customer-orientation.
- They need to be orientated to the future vision and strategic development of factories as well as to their concrete plans for specific changes.
- From the R&D perspective, the global drivers lead to a key challenge and a proactive response: **COMPETITIVE and SUSTAINABLE MANUFACTURING.**
- **Competitive Sustainable Manufacturing (CSM),**
 - interacts with the STEEP context
 - generates wealth, sustains jobs, manages resources
 - concerns High Added Value products/services,
 - relies on: Industry, Research Institutes, Universities, Public Authorities
 - sustains the Knowledge generation, diffusion, use process
- The pursuit of CSM is fundamental for relaunching “real economy”





Vision and Strategic Objectives

The objective of the Factories of the Future Initiative is to help EU manufacturers across sectors, in particular SMEs, to adapt to global competitive pressures by increasing the technological base through the development and integration of enabling technologies.





Main industrial needs and R&D challenges

- European industry will concentrate on factors enhancing competitive advantage.
- A key factor in strengthening the European leadership will be the ability to achieve cost efficiency, performance and robustness of manufacturing systems, within the increasing product variability and changing production volumes.
- In the actual scenario, main industrial needs and challenges to achieve a higher competitiveness may be described in terms of general drivers, as follows:
 - cost efficiency
 - low Time To Market,
 - enabling processing technologies and materials, with embedded intelligence
 - convertibility/re-configurability (brown-field approach);
 - product quality
 - higher productivity under better safety and ergonomics conditions;
 - energy efficient machinery,
- Manufacturing related R&D shall focus on transformation of the main characteristics of the competitive scenario, towards “sustainable life-cycle cost”: re-usable, flexible, modular, intelligent, digital, virtual, affordable, easy-to-use, easy-to-maintain and highly reliable “Factory of the Future”.





Basic content and structure of the multi-annual roadmap: 2011-2013

- SD1 Sustainable Manufacturing
- SD2 ICT enabled Intelligent Manufacturing
- SD3 High performance manufacturing
- SD4 Exploiting new materials through manufacturing





SD1 Sustainable Manufacturing

New Eco-factory model

- optimised utilisation of energy streams, the environmental impact reduction and the improvement of resource efficiency will be the basis of the new advanced green manufacturing.

Green Products Manufacturing

- application of an integrated preventive environmental strategy to processes and products to increase the overall efficiency by the conservation of resources and energy, the elimination of emissions and wastes by point source treatment and recycling.





SD2 ICT enabled Intelligent Manufacturing

- Smart Factories:
Agile manufacturing & customisation:
Process automation, control & optimisation technologies, robotics & tools for sustainable manufacturing
- Virtual Factories:
Value creation from global networked operations:
global supply chain management, product/service linkage, management of distributed manufacturing assets
- Digital Factories:
Better understanding & design of manufacturing systems: simulation, modelling, lifecycle & knowledge management from product conception, manufacturing, operations, maintenance, disposal





SD3 High performance manufacturing

- Flexible machines and systems for rapid (re)configurations
- High precision manufacturing by plug and play
- Planning tools for open reconfigurable and adaptive manufacturing systems
- In-Situ Process Simulation
- Adaptiveness of production systems for optimal energy consumption





SD4 Exploiting new materials through manufacturing

- Net shape manufacturing for advanced structural and functional materials
- New material functionalities through manufacturing processes
- Rejuvenation and repair
- Sustainable material processing technologies and associated sustainable product design.





Timeline and tentative budget

Table: Budget distribution per sub-domains (SD)

	%
SD1	30
SD2	30
SD3	25
SD4	15
TOTAL	100

Table: Yearly budgetary scenario for the Factories of the Future PPP (in €million)

	2011	2012	2013	TOTAL
2010				
150	290	350	410	1200





Expected impacts

- Stimulate the innovation activities in more European manufacturing related companies, specially SMEs
- Cooperation between the academia and the industry. with the industry as a driver.
- Focusing in the manufacturing SMEs in Europe, close link with regional clusters with an important amount of jobs.
- European manufacturing equipment builders' export share, will increase
- The use of this equipment will also lead to ecological and economical advantages.





Basic content and structure of the multi-annual roadmap

Criteria to select the topics in the future calls of FoF:

Eligibility criteria: innovative enabling technologies, Factory-oriented technologies, complementary and not overlapping

Impact criteria: cross sectorial application fields, clear impact on sustainable growth and competitiveness, perspective for the creation of high added value jobs, societal impact: Health, Environment and safety





Multi-annual Roadmap Proposed milestones

- July 2009: Complete Draft of the MR
- September-October 2009: Input from the wider range of stakeholders and from the Member States representatives
- Meeting of the AIAG in late October
- Mid November 2009: Final version of the MR is ready





Links:

www.manufuture.org

www.effra.eu

Factories of the Future AIAG members:

INESC, PATRAS UNIV., AGORIA, TWI, FESTO, TNO,
DAIMLER, VDMA, SAP, COMAU, TRUMPF, RUROBOTS,
CRF, CETIM, FATRONIK-TECNALIA

Involved European Commission members:

DG RTD G2, DG INFSO G2 & G5



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