The ‘Factories of the Future’ PPP

Continuation: Towards Horizon 2020

Paris, 1 June 2012

Chris Decubber
EFFRA Research Programme Manager
The European Factories of the Future Research Association

EFFRA

- Industry-driven European association
- Created by MANUFUTURE TP & industry associations
- Aims to strengthen research in production technologies and mobilise private investments in European research
- More than 100 members from across Europe
Factories of the Future PPP under FP7

Strategic Multi-annual Roadmap

Implemented through 4 Calls for proposals (Call 2010 – Call 2013)
Involving 645 Meuro funding from DG Research & Innovation & DG INFSO

Four strategic sub-domains:

- Sustainable manufacturing
- ICT-enabled intelligent manufacturing
- High performance manufacturing
- Exploiting new materials through manufacturing
The ‘Factories of the Future’ PPP & EFFRA: Governance

Roles and Responsibilities

Cooperation between

- Commission representatives from relevant departments &
- Industry and research leaders delegated by EFFRA

EC - “public”
- Coordination with respective Programme Committees
- Call administration
- Evaluation process
- Project negotiation
- Financial administration
- Internal audits

EFFRA - “private”
- Roadmapping for 2010 - 2013 & 2014 - 2020
- Establishing annual priorities
- Suggesting expert evaluators
- Monitoring RDI projects
- Clustering projects and dissemination of programme

Joint decision-making on strategic objectives
The European Factories of the Future Research Association

Large Industry Members
The European Factories of the Future Research Association
Small and Medium-Sized Members

- Bazigos
- C2i2
- CASP
- CEI
- Convergent
- Correa Anayak
- Dallara
- DELCAM
- Doppelmayr Seilbahnen
- EXALCO
- FEAMM
- Fidas
- GEMA Medical
- Gesco
- Gizelis
- Gorenje Orodjarna
- Ibermoldes
- INDO
- Industria de Turbo Propulsores
- Lmaplast
- Manas
- Microelectronica
- RU Robots
- SAPA Operaciones
- SCM Group
- Sintesi
- SOLMATES
- Synesis
The European Factories of the Future Research Association

Research members

- AICE-ITC
- AIJU
- Aimen
- Arts et Métiers
- CARTIF
- CEIT
- DCU
- Eindhoven University of Technology
- FIR
- FMTC
- Fraunhofer
- Ideko IK4
- Ikerlan
- Inescop
- INESC Porto
- Instituto de Biomecánica de Valencia
- ITIA
- Katholieke Universiteit Leuven
- Koniker S.Coop
- Leitat
- Limerick Institute of Technology
- Loughbourough University
- MGEP
- Profactor
- Politecnico di Milano
- SINTEF Raufoss
- SIF
- Swerea IVF
- Tampere University of Technology
- Technische Universität Dresden
- Tecnalia
- Tekniker
- TNO
- TUV
- TWI Ltd
- Universidad del País Vasco
- University of Patras
- VITO
- VTT
- Wroclaw University of Technology
- Zurich University
The European Factories of the Future Research Association

Association Members
EFFRA

EFFRA Services in a nutshell

- Information dissemination
  - Technical content & outcome of FoF Projects
- Networking
  - Creating a community of industrial companies and research organisations in the area of ‘Factories of the Future’
- Roadmapping
  - Involving all members and creating a sense of ownership of the programme
- Representing our common interest to public services & authorities
  - Having an integrated approach to the FoF PPP within the European Commission
  - Obtaining support from the Programme Committee Members and Members of the European Parliament.
The European Factories of the Future Research Association

Activities

Communications
- New projects brochure in production
- Use of social media (Twitter, Facebook etc) to promote the FoF PPP & our membership
- Members’ area on website
- Regular members’ e-newsletter

Research
- Research prioritisation: consultation
- Implementation of project and roadmap database

EFFRA
EFFRA is a non-profit industry driven association, promoting the development of new and innovative production technologies. #EFFRA
Brussels  http://www.effra.eu
The Factories of the Future PPP

Positive outcome so far

Industry re-engaged in EU projects
• statistics show industrial participation has doubled compared to average FP 7 (50% in FoF vs 25% in FP)
• IRAG and AIAG work well and ensure that roadmap reflects industrial needs

Political support for PPPs
• interim assessment confirms that PPP is the right approach
• PPPs are part of the Horizon 2020 proposal + will get legal status
New: Demo-Targeted Projects

• Increase the Impact and Visibility of the PPP results
• Get closer to Innovation activities, but still within FP7
• Ensure that research results developed in PPP projects are taken up by EU industry and support competitiveness
• Increase the attractiveness of PPP projects to SMEs
• Increase the leverage effect on private sector funding
• No change to FP7 definition of CP and Demonstration
NMP Observations on DEMO projects

- Good response to the two Demo-targeted topics
- Good understanding among the stakeholders
- 52% of costs are Demonstration
  - In other FoF topics: 17% of costs are demonstration
- Average project cost is 6.5 M€
- Good participation of SMEs (~30%)
- Good link between Demonstration and Research activities
- Share of industry is 71% in the Demonstration activities

Source: DG Research & Innovation
Call 2013: FoF-NMP Call Topics

1. Improved use of renewable resources at factory level (DEMO-targeted CP)
2. Innovative re-use of modular equipment based on integrated factory design (DEMO-targeted CP)
3. Workplaces of the future: the new people-centred production site (Small or medium-sized CP)
4. Innovative methodologies addressing social sustainability in manufacturing (CSA (Support action))
5. Innovative design of personalised product-services and of their production processes based on collaborative environments (Large-scale integrated CP)
6. Mini-factories for customised products using local flexible production (DEMO-targeted CP)
7. New hybrid production systems in advanced factory environments based on new human-robot interactive cooperation (Large-scale integrated CP)
8. Innovative strategies for renovation and repair in manufacturing systems (Large-scale integrated CP)
9. Advanced concepts for technology-based business approaches addressing product-services and their manufacturing in globalised markets (Small or medium-sized CP)
10. Manufacturing processes for products made of composites or engineered metallic materials (Small or medium-sized CP)
11. Manufacturing of highly miniaturised components (SME-targeted CP)

See ‘Orientation Paper’ call 2013: http://ec.europa.eu/research/participants/portal/page/fp7_documentation
Call 2013: FoF-ICT Call Topics

• **Application experiments for robotics and simulation**
  - Robot solutions for new manufacturing applications
  - Simulation services for engineering and manufacturing
  - Constituency building and road-mapping (CSA)
    - analytics, simulation, and forecasting technologies deployed in manufacturing and engineering;
    - architectures and services integrating agile and flexible manufacturing processes into distributed, interoperable, "green", and context aware enterprises of the future

• **Equipment assessment for sensor and laser based applications**
  - Intelligent equipment solutions in custom manufacturing and/or remanufacturing
  - Innovative laser applications in manufacturing
  - Establish a network of innovation multipliers in the manufacturing sectors across all take-up projects (CSA)
  - Support a rapid build-up of new manufacturing skills (CSA)
The H2020 Challenge

Exploring opportunities in Horizon 2020:

- Beyond “technological research”, supporting “innovation value chain”, from science & technology to products & production
- Use of different funding mechanisms (e.g. venture capital & structural funds)
- Launch “physical pilot line” projects
- Higher focus on education
- New EIT KIC on ‘Added-Value Manufacturing’
Roadmap: ‘Factories of the Future 2020’

RD&I Roadmap 2014-2020

• Roadmap will cover R&D and innovation activities

• Guiding principles: industry competitiveness, from research to industrial application and market uptake

• Ongoing comprehensive multi-sector consultation process: MF ETP, related ETPs and other interested parties
Building on a broad & open consultation process; 2 years in development

- Identify challenges
- Identify technologies that could lead to solutions
- Identify priorities (match between technologies and challenges)
- Research and call topics
Roadmap: ‘Factories of the Future 2020’

Baselines

Challenges & opportunities

- Economical
- Social sustainability
- Environmental
- New products markets

Technologies & enablers

- Advanced manufacturing processes
- Mechatronics for advanced manufacturing systems
- ICT for manufacturing enterprises
- Modeling, simulation and forecasting
- Manufacturing strategies
- Knowledge workers
Roadmap: ‘Factories of the Future 2020’

The right technologies for the right challenges or opportunities: the R&I priorities

Challenges & opportunities

- Economical
- Social
- Environmental
- Future products and markets

Research & innovation priorities

Technologies & enablers

- Advanced manufacturing processes
- Mechatronics for advanced manufacturing systems
- ICT for manufacturing enterprises
- Manufacturing strategies
- Modeling, simulation and forecasting
- Knowledge workers

+ Measuring the (potential) impact of technologies
Research & innovation priorities

Domain 1: Advanced Manufacturing processes
Innovative processing for both new and current materials or products

Domain 2: Adaptive and smart manufacturing systems
Innovative manufacturing equipment at component and system level, including mechatronics, control and monitoring systems

Domain 3: Digital, virtual and resource-efficient factories
Factory design, data collection and management, operation and planning, from real-time to long term optimisation approaches

Domain 4: Collaborative and mobile enterprises
Networked factories and dynamic supply chains

Domain 5: Human-centric manufacturing
Enhancing the role of people in factories

Domain 6: Customer-focused manufacturing
Involving customers in manufacturing value chain, from product-process design to manufacturing associated innovative services

Roadmap: ‘Factories of the Future 2020’
Research Priority Domains
Innovation Through Dissemination & Demonstration

- FoF PPP: Going from research activities to exploitation
  - long, non-linear process that can be described in a simplified way using the Technology Readiness Level (TRL) scheme
- Closing the gap through two complementary levels
  - Industrial Lab
  - Industrial Production
    which have a significant role as education & training environments
- Moreover:
  - Understanding the context within which the technology operates
    - regulations, standards, barriers to adoption and just simply market awareness of the value the technology will deliver.
  - User driven Innovation should therefore become a business model in itself and a continuously run business process *the factory innovation*
  - More effective ways of monitoring and evaluating projects and programmes results and impacts, especially after their financial execution

Roadmap: ‘Factories of the Future 2020’
Roadmap: ‘Factories of the Future 2020’

Considering the ActionPlanT Draft Roadmap

Information and Communication Technologies

- Towards agile manufacturing systems and processes
- The new seamless factory lifecycle management
- People at the forefront
- Fostering collaborative supply networks
- Aiming at customer centric design and manufacturing

New seamless factory lifecycle management: Product lifecycle management is well understood, but manufacturers struggle to put factory lifecycle management into practice. Enhanced information management will be applied for control and holistic planning in future factories. In Manufacturing 2.0 enterprises, assets and inventories together with assembly lines and machinery would be dynamically monitored, configured and maintained. As a prerequisite for advanced factory lifecycle management, visibility, real-time tracking and predictive maintenance information would be made available to plant managers and operators. Furthermore, managers would be able to drill down into any prediction area and observe throughout, use and consumption through intuitive key performance indicators (KPIs) even when on the move.

People at the forefront: Human-centric ambition will become a reality in Manufacturing 2.0 enterprises with workers and managers alike given more opportunity for continuous development of skills and competences through
**MEGATRENDS**

- Ageing
- Urbanisation
- Disruptive events

**VALUE and SUSTAINABILITY**

- Advanced manufacturing processes
- Mechatronics for advanced manufacturing systems
- ICT for manufacturing enterprises
- Manufacturing strategies
- Modelling, simulation and forecasting methods and tools
- Knowledge workers

**TECHNOLOGIES AND ENABLERS**

- Factory and nature: Green Sustainable
- Knowledge workers: Economic sustainability
- Social sustainability
- Environmental sustainability
- Manufacturing the products of the future

**MANUFACTURING CHALLENGES AND OPPORTUNITIES**

- Factories as a good neighbour: Human-centered
- Factories in the value chain: Collaborative

**Connected to a Long Term Vision**

Factories of the Future 2020
# EFFRA Roadmap: ‘Factories of the Future 2020’

## Contents

1. **INTRODUCTION**
2. **EXECUTIVE SUMMARY**
3. **THE MANUFACTURE STRATEGIC APPROACH**
4. **MANUFACTURING CHALLENGES AND OPPORTUNITIES**
   4.1 **ECONOMIC SUSTAINABILITY OF MANUFACTURING**
   4.2 **SOCIAL SUSTAINABILITY OF MANUFACTURING**
   4.3 **ENVIRONMENTAL SUSTAINABILITY OF MANUFACTURING**
   4.4 **MANUFACTURING THE PRODUCTS OF THE FUTURE**
5. **KEY TECHNOLOGIES AND ENABLERS**
   5.1 **ADVANCED MANUFACTURING PROCESSES**
   5.2 **MECHATRONICS FOR ADVANCED MANUFACTURING SYSTEMS**
   5.3 **ICT FOR MANUFACTURING ENTERPRISES**
   5.4 **MANUFACTURING STRATEGIES**
   5.5 **MODELLING, SIMULATION AND FORECASTING METHODS AND TOOLS**
   5.6 **KNOWLEDGE-WORKERS**
6. **RESEARCH & INNOVATION PRIORITIES**
   6.1 **DOMAIN 1: ADVANCED MANUFACTURING PROCESSES**
   6.2 **DOMAIN 2: ADAPTIVE AND SMART MANUFACTURING SYSTEMS**
   6.3 **DOMAIN 3: DIGITAL, VIRTUAL AND RESOURCE-EFFICIENT FACTORIES**
   6.4 **DOMAIN 4: COLLABORATIVE AND MOBILE ENTERPRISES**
   6.5 **DOMAIN 5: HUMAN-CENTRIC MANUFACTURING**
   6.6 **DOMAIN 6: CUSTOMER-FOCUSED MANUFACTURING**
7. **INNOVATION THROUGH DISSEMINATION AND DEMONSTRATION**
8. **CONCLUSIONS AND OUTLOOK**
Roadmap: ‘Factories of the Future 2020’

Timeline

- **May**: Discussion at EFFRA GA & collection of input
- **June**: Wide consultation through MANUFUTURE
- **June**: Presentation and discussion at FoF AIAG
- **9-10 July**: Launch of public consultation at PPP Info Days
- **December 2012**: Finalisation
- **Spring-End 2013**: Preliminary work on calls
- **January 2014**: First calls
Thank You!

Contact

chris.decubber@effra.eu

www.effra.eu