

Fabbriche del Futuro

Idee e strumenti per l'industria manifatturiera del domani



Speaker:

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Chairman



EFFRA

EUROPEAN FACTORIES OF THE FUTURE
RESEARCH ASSOCIATION

a MANUFUTURE initiative

Factories of the Future

Manufacturing: Key to our Economy

- Since some years the important of manufacturing has been recognised by EU and its member states but also in the US
- Despite the crisis, manufacturing means a lot for Europe:
 - 14 % Direct jobs
 - 67 % Exports
 - 65 % Business R&D Expenditure
- Development of more competitive & sustainable industry needs support => 'Factories of the Future' contractual Public-Private Partnership (cPPP)



Financial Times, March 2014

What is a cPPP?

- European level cPPPs in the area of R&D&I are a cooperation by the EU & private partners
- Aim to strengthen European industrial base, create sustainable industry in Europe & secure jobs in Europe
- cPPPs represent a pragmatic shift from previous programmes: focus on industry relevant research roadmaps & pre-competitive co-operation
- European Commission launched European Recovery Plan in 2008/09 & originally created PPPs in manufacturing, automotive & construction sectors
- Horizon 2020: These continue along with 5 new cPPPs ([Sustainable Process Industry](#), [5G Future Internet](#), [Robotics](#), [Photonics](#) & [High-Performance Computing](#))

Factories of the Future in Horizon 2020

A Contractual Partnership (cPPP)

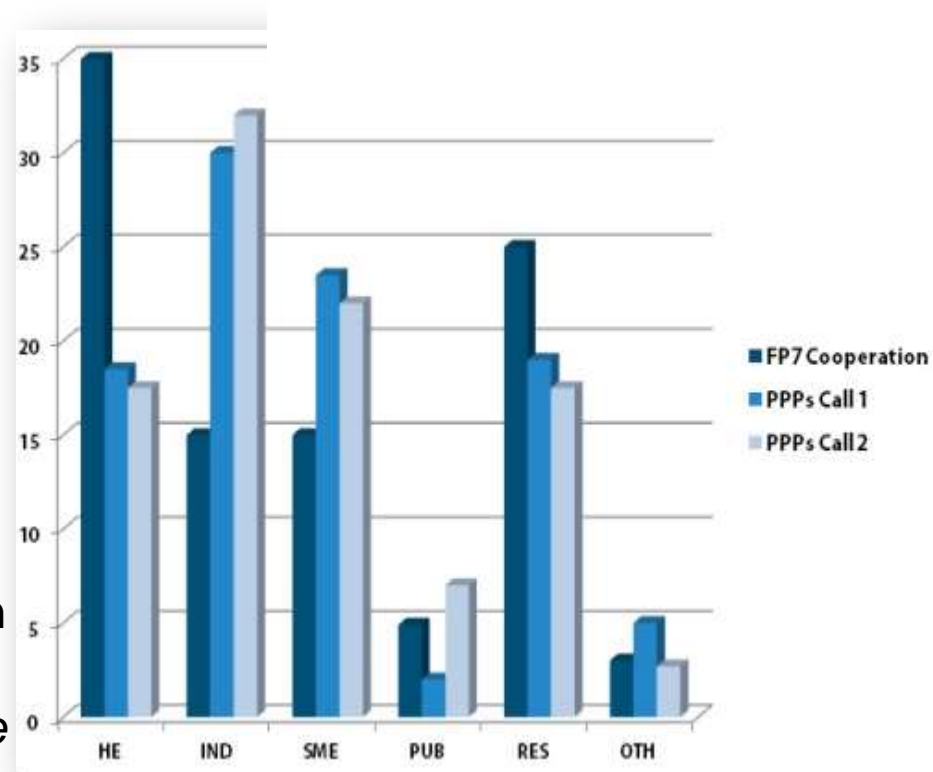


- Success of partnership = continuation under new EU research programme (Horizon 2020)
- Budget secured by official legal act (Commission decision) and by signed Contractual Arrangement
- Clearly **defines roles** of partners
- Sets out **specific objectives**
- Formal recognition of EFFRA's role as **representative of private side**
- Establishes **Partnership Board**
- Agreement to better **monitor progress**, also with the use of KPIs

Factories of the Future = Largest cPPP in terms of budget & network

Factories of the Future Background

- Public-private partnerships have introduced industry-relevant roadmaps
- Co-operation of experts from industry, SMEs, research organisations & public entities
- Industry re-engaged in FP projects:
 - Industry participation of more than **50%** in PPPs
 - *compared to some 20-30% for the total FP7*



Factories of the Future Partnership



Increased industrial participation

Why?

- Leading role in development of research priorities
- Call topics industry-relevant
- Collaborative: access to new knowledge & expertise
- 'Factories of the Future' has record of success in FP7
- Need for pre-competitive cooperation to overcome common challenges

Factories of the Future Background

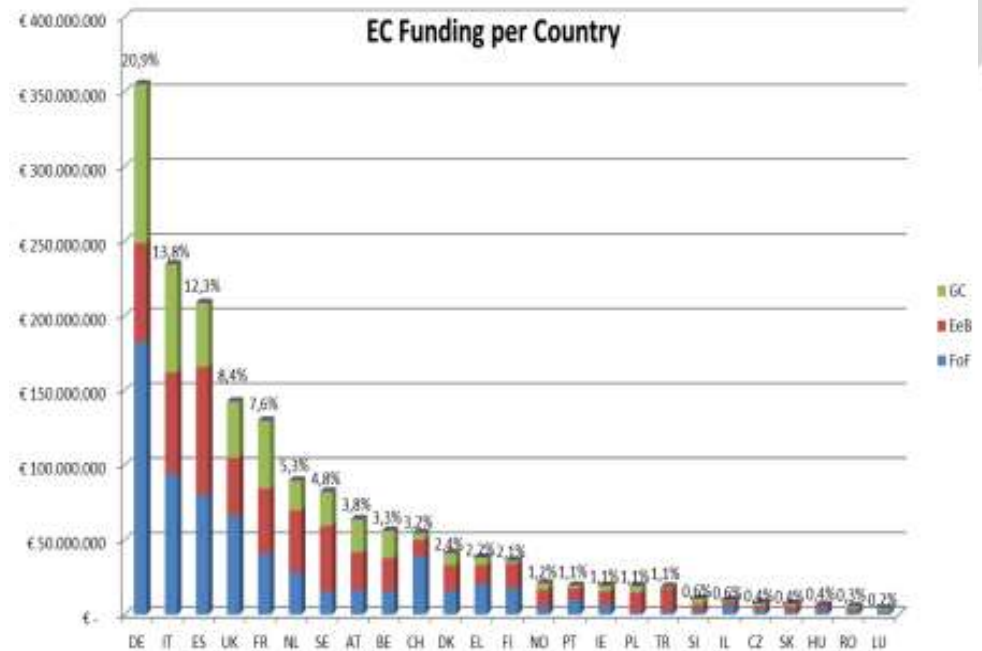
150+ PROJECTS

- High involvement of SMEs: 200+ to date (of 500+ industrial enterprises overall)
- Majority of projects feature demo activities
- 151 Projects to date. 20+ projects are complete & have delivered results. More projects are close to completion
- Close to the market exploitation of project results
- Project results also enhancing existing products



Italian Participation

- FP7: Italy contributed 14% & received 8.7%
- However received about €90m (~14%) in Factories of the Future
- 119 Italian enterprises & organisations participating to date



Factories of the Future

Success Stories: COMET

Plug-and-produce CComponents and METHods for adaptive control of industrial robots enabling cost effective, high precision manufacturing in factories of the future

Exploitable results:

- PowerMILL Robot Interface, a programming & simulation platform for industrial robots
- A spin-off company [Cognibotics](#) commercialising the device to obtain the kinematic & dynamic models for industrial robots.
- Adaptive tracking system for dynamic tracking
- High dynamic compensation mechanism, including how to manufacture it, capable of reaching machining accuracies below 50 μm .
- Extensive training material on using robots for machining & how to compensate common robot errors using technology developed in the project.
- Extensive knowledge on robot cell integration for machining purposes available through two of the project robot integrators.



www.effra.eu/portal

Factories of the Future

COMET

- Delcam plc (UK)
- AMRC Manufacturing Ltd (UK)
- Artis Gesellschaft fuer Angewandte Messtechnik Mbh (DE)
- Brandenburgische Technische Universitat (DE)
- Debbache-Lagios EE - Gizelis Robotics (GR)
- Democenter (Sipe Centro Servizi Perl'Innovazione e il Trasferimento Tecnologico SCRL (IT)
- Fraunhofer IPA (DE)
- Lunds Universitet (SE)
- N. Bazigos (GR)
- Nikon Metrology (B)
- Nisaform SRO (CZ)
- SIR SPA (IT)
- Stamatis Gizelis AE (GR)
- TEKS Sarl (FR)
- University of Patras (GR)
- Artis GmbH (DE)

Factories of the Future

Success Stories: DYNXPERTS

Plug and Produce Components for Optimum Dynamic Performance Manufacturing Systems

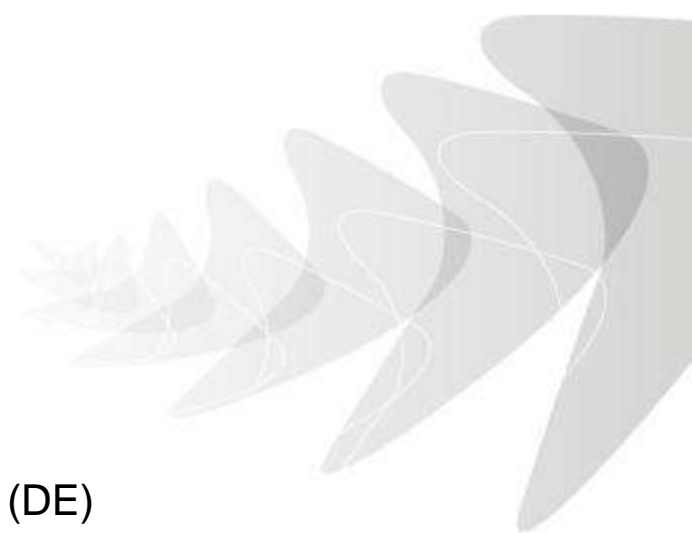
- DYNXPERTS project has focused on the development of a new generation of plug and produce adaptive components. These components are able to improve the dynamic behaviour of machine tools in several aspects and increase their productivity introducing new features in existing machines.
- Project results include:
 - Two patents
 - Two products
 - Moving Iron Controllable Actuators
 - UC65 digital controller



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Factories of the Future

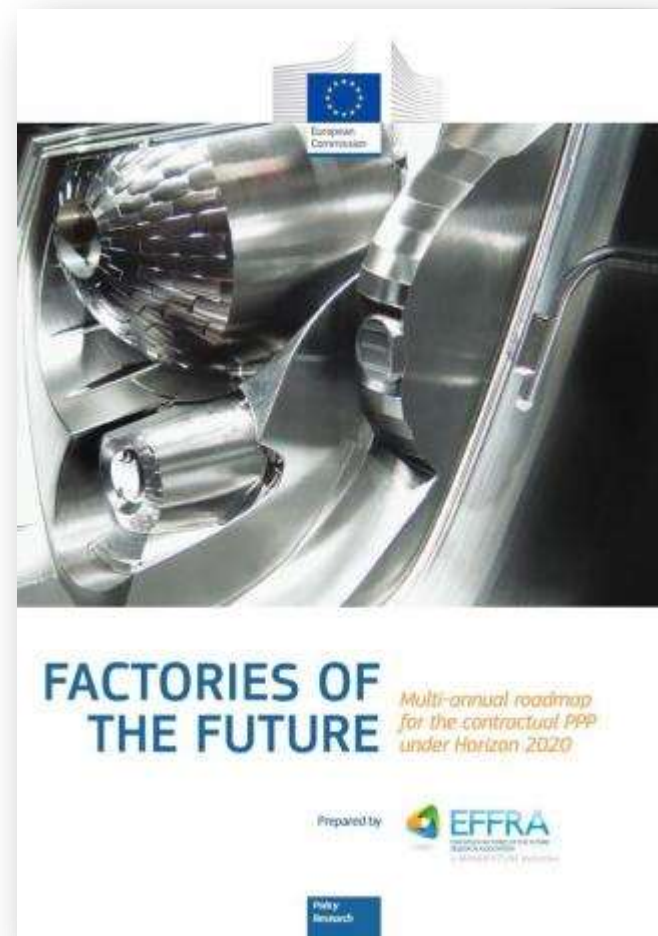
DYNXPERTS: Consortium



- IK4-IDEKO (ES)
- Budapest University of Technology and Economics (HY)
- Cedrat Technologies sa (FR)
- CNRS (FR)
- DR MATZAT & CO GMBH Spenn und Fertigungstechnik (DE)
- FIDIA spa (IT)
- GOI-ALDE High Speed SL (ES)
- IK4-Tekniker (ES)
- Planlauf GmbH (DE)
- Rheinisch-Westfaelische Technische Hochschule Aachen (DE)
- Soraluze S.Coop (ES)
- Universidad del País Vasco, Bilbao (ES)

Factories of the Future 2020 Strategic Roadmap

- One document covering the period 2014-2020
- Developed by EFFRA & through broad, public consultation
- Identifies megatrends which drive structural changes in manufacturing sectors
- Establishes research priorities which will allow industry to meet these challenges
- Priorities focus on development, application & integration of enablers & technologies
- 'Factories of the Future' call topics based upon research priorities = industry relevant



Factories of the Future 2020

Strategic Roadmap

Research & Innovation Priorities

Domain 1: Advanced Manufacturing Processes
Innovative processing for both new & current materials or products

Domain 2: Adaptive and Smart Manufacturing Systems
Innovative manufacturing equipment at component & system level, including mechatronics, control & monitoring systems

Domain 3: Digital, Virtual & Resource Efficient Factories
Factory design, data collection & management, operation & planning, from real-time to long term optimisation approaches

Domain 4: Collaborative & Mobile Enterprises
Networked factories & dynamic supply chains

Domain 5: Human-Centred 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

Challenges & Opportunities

- Manufacturing Future Products
- Economic
- Social
- Environmental

Sustainability

Technologies & Enablers

- Advanced Manufacturing Processes
- Mechatronics for Advanced Manufacturing Systems
- Information & Communication Technologies
- Manufacturing Strategies
- Knowledge Workers
- Modelling, Simulation & Forecasting

Factories of the Future in Horizon 2020

After projects

What we want:

- That researchers stay committed within the running or completed FoF projects
- That FoF projects results & demonstrators are widely disseminated & exploited
- That FoF project coordinators & project participants have great ideas for possible follow ups & find the right person to speak to



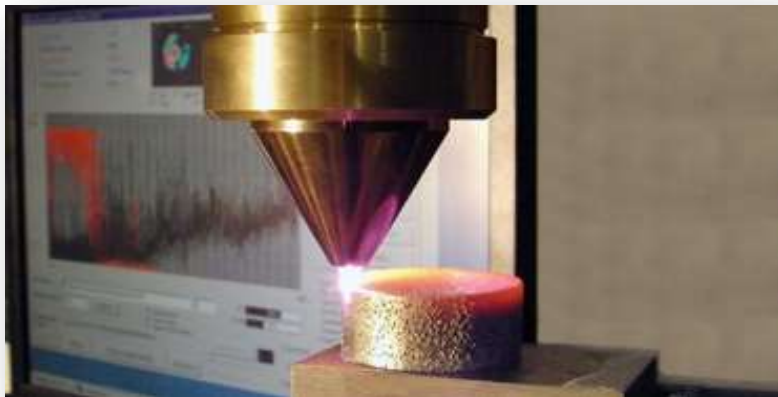
Factories of the Future is an opportunity:

- To make things different from the past
- To develop an eco-system that fosters market uptake

Factories of the Future: Horizon 2020 & Beyond

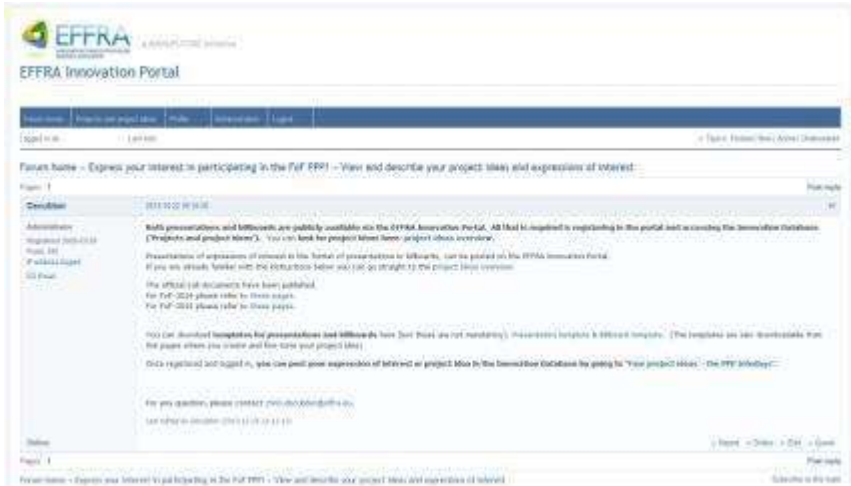
The Future

- Innovative SMEs
- High-level of customisation & quality
- Rapid adaptable production lines
- Re-manufacturing
- Focused on zero defects
- Interconnectivity, communication & data storage via cloud



- Factories closer to customers
- Energy & resource efficient
- Adaptable workplaces for changing worker demographic
- Continuous skills improvements: multi-skilled jobs

Factories of the Future EFFRA Innovation Portal



- Supports growth of experienced network
- Open to the public
- Stakeholders can upload their interest in FoF call topics & find potential project partners

- Information on all FoF projects & consortia
- Connects projects
- Input from projects – enables self-analysis
- Map projects and project results on the Factories of the Future 2020 challenges, technologies & application area
- Helps to avoid potential IPR conflict

www.effra.eu/portal

Factories of the Future

I4MS – Factories of the Future ICT Initiative for Manufacturing SMEs

ICT Innovation for Manufacturing SMEs

Why?

- Furthering the promotion of 'Factories of the Future' to SMEs
- Initiative within Factories of the Future partnership
- Encouraging involvement: [Calls within projects](#)
- Developing resources for SMEs to complement existing (such as EFFRA Innovation Portal)
- One-stop-shop for brokerage amongst innovative SMEs regarding ICT

The I4MS logo features the letters 'I4MS' in a stylized font. The 'I' is a vertical bar with a green-to-yellow gradient. The '4' is a grey square with a green cross inside. The 'M' is a dark teal shape, and the 'S' is a dark blue shape. The background shows a faint, grey silhouette of a hand holding a leaf.

www.i4ms.eu

'Factories of the Future' Call 2014/2015

2015 Call Deadline
February 2015

FoF 8 – 2015: ICT-enabled modelling, simulation, analytics and forecasting technologies

- Innovative modelling, simulation, analytics & forecasting tools for manufacturing at large
- Integrated modelling, simulation & information management systems
- Support Actions: 'Road mapping' & constituency building for novel ICT-enabled concepts in manufacturing

FoF 9 – 2015: ICT Innovation for Manufacturing SMEs (I4MS)

- Phase 2 of I4MS this objective addresses the adoption of the next generation of ICT advances in the manufacturing domain. Focus is on emerging innovative technologies & processes

FoF 10 – 2015: Manufacturing of custom made parts for personalised products

- Development & integration of advanced design & manufacturing technologies able to transform new product-service data descriptions & protocols into manufacturing operations & processes exploiting
- Development of new machines & processes integrating advanced materials for the manufacturing of personalised products
- Seamless data integration across the process and supply chains for the fast production and distribution of custom made parts and products
- Methodologies & tools for management & running of effective value chains for fast production & delivery of personalised products

'Factories of the Future' Call 2014/2015

FoF 11 – 2015: Flexible production systems based on integrated tools for rapid reconfiguration of machinery and robots.

- Integrated tools for management of agile production systems as a whole & fast reconfigurable individual machines & robots, optimising changeover times & costs
- Standardisation of communication protocols & data structures fitting plug & produce philosophy
- Protocols for interconnecting production system information with higher level plant management systems
- Integration of automatic monitoring & optimisation of energy usage in production system
- Demonstration of integrated solution in at least one existing production environment

FoF 12 – 2015: Industrial technologies for advanced joining and assembly processes of multi-materials

- Joining & assembly processes that will lead to maximise performance of the joints &/or to facilitate recycling
- Implementation of numerical simulation techniques, including computational multi-scale modelling
- Development of high efficient, cost-effective & flexible surface condition solutions (e.g. surface modification, thermal treatments, gap avoidance) to provide joints with the maximum performance
- Implementation & set up of reliable, efficient & automated non-destructive inspection techniques for joint quality evaluation, together with in-situ monitoring & control systems for critical variables of the joining operations

'Factories of the Future' Call 2014/2015

FoF 13 – 2015: Re-use and re-manufacturing technologies and equipment for sustainable product lifecycle management

- Eco-innovative approaches for product design which are capable to take into account re-use & re-manufacturing aspects for enhanced product recovery and spare parts/services support.
- New manufacturing and equipment concepts for re-use & re-manufacturing, with improved resource efficiency & service lifetime
- New technologies & automation solutions for effective disassembly/separation & recovery of advanced materials
- Generation & validation of new business models to improve economic viability of closed-loop life cycles which make use of systemic approaches for product life-cycle management.

FoF 14 – 2015: Integrated design and management of production machinery and processes

- RTD & innovation activities should aim at developing & testing suitable model-based approaches for production machinery & at demonstrating power of model-driven approaches
- Development of integrated & accurate simulation models & algorithms for model-based control of production machinery based on cross-disciplinary input & actual machine lifecycle parameters
- Tool programming strategies that are easy to use & can be rapidly modified or re-adapted by workers on the machine
- Demonstration of reliability of model-based machines with respect to production accuracy/quality, maintainability & lifecycle return-on-investment

European Factories of the Future Research Association (EFFRA)

Who We Are

- Industry-led association representing private side in the 'Factories of the Future' public-private partnership
- 130+ members from across Europe
- Members include large, small & medium industrial enterprises, research organisations & universities
- Full time secretariat: Connecting with members, coordinating research agenda & liaising with the European Commission



European Factories of the Future Research Association (EFFRA)

What we do

- Promote the partnership, participation & the work of projects: Encourage participation
- Represent the private side in the partnership & cooperate with the European Commission
- Coordinate input by industry
- Support members:
 - One stop shop for information
 - Monthly newsletter
 - Enhanced access to Innovation Portal
 - Member-only events & workshops
- Build & develop links with national/regional initiatives & clusters to enhance impact & future activities



Factories of the Future Work Programme 2016/2017 Consultation Open

YOUR opportunity to provide your expert input on FoF PPP & the 2016/2017 call topics!!

- EFFRA has opened an on-line consultation on the fine-tuning of the 'Factories of the Future 2020' roadmap and the identification of priorities for the work programme 2016-2017.
- The consultation asks you to indicate the research priorities from the 'Factories of the Future 2020' roadmap that according to your opinion should be used to compile the call topics for the 'Factories of the Future' 2015-2016 work programme.

This consultation is available through the EFFRA [Innovation Portal](#)

Deadline: 2nd July 2014

www.effra.eu/portal

Thank You

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