Contractual Public Private Partnerships to Stimulate Innovation in the European Manufacturing Industry

OECD Workshop
7 July 2016
Seoul, South Korea

Paolo Caridi
Head of Trade Section
EU Delegation to Republic of Korea

HORIZON 2020

Policy Context

EU strategy

Five of the Priority areas from Juncker's Agenda:

- To boost jobs, growth and investment;
- To realise a connected digital single market;
- To implement a resilient Energy Union with a forward looking climate change policy;
- To develop a deeper and fairer internal market with a strengthened industrial base;
- To make Europe a stronger global actor

The Framework Programme Horizon 2020

- Excellent science, Competitiveness, Better society

The future

New R&I Strategic Priorities

- **Open Innovation**
  - Reforming the Regulatory Environment
  - Boosting Private Investment in R&I
  - Maximising impacts of Horizon 2020
- **Open Science**
  - Better Science through openness
  - A research Integrity Initiative
- **Open to the World**
  - International Cooperation for Global Challenges
  - Science Diplomacy

Horizon 2020

Priority 1: Excellent Science

Priority 2: Industrial Leadership

Leadership in enabling and industrial technologies (LEIT) *(i) ICT including micro- and nano-electronics and photonics* **(ii) Nanotechnologies** **(iii) Advanced Materials** **(iv) Biotechnology** **(v) Advanced Manufacturing & Processing** *(vi) Space*	**This part of the Work Programme**
Access to risk finance *Leveraging private finance and venture capital for R&I*	
Innovation in SMEs *Fostering all forms of innovation in all types of SMEs*	

Priority 3: Societal Challenges

Leadership in Enabling and Industrial Technologies (LEIT)

- Key enabling technologies and support to innovative SMEs to exit the economic crisis
- Emphasis on R&D and innovation areas with strong industrial dimension and based on industrial needs
- Involvement of industrial participants and SMEs to maximise expected impact
- LEIT projects should be outcome oriented and should bring close to application the technologies developed

Industrial mastering and deployment of Key Enabling Technologies (KETs)

What are KETs?

- Six strategic technologies
- Driving competitiveness and growth opportunities
- Contributions to solving societal challenges
- Knowledge- and Capital-intensive
- Cut across many sectors

- Nanotechnologies
- Advanced Materials
- Micro- and nano-electronics
- Photonics
- Biotechnology
- Advanced Manufacturing

European KET Strategy:

- EC Communications (2009)512 & (2012)341
- KET High-level Group

Why Public-Private Partnerships in Horizon 2020?

- To solve problems together with industry
- To strengthen European industrial leadership
- To facilitate prioritisation of R&I in line with the Europe 2020 objectives and industry needs
- To leverage research and innovation elements
- To strongly commit industry to joint objectives

PPPs in Horizon 2020

Institutionalised PPPs	Contractual PPPs
• Innovative Medicines (IMI) • Clean Sky • Single European Sky ATM Research (SESAR) • Fuel Cells and Hydrogen (FCH) • Electronic Components and Systems (ECSEL - old ARTEMIS + ENIAC) **New:** • Bio-based Industries (BBI) • Shift2Rail	• **Factories of the Future (FoF)** • Energy-efficient Buildings (EeB) • Green Vehicles (EGVI) • Future internet (5G) **New:** • **Sustainable Process Industry (SPIRE)** • Robotics • Photonics • High Performance Computing • Big Data

Contractual arrangement

- **Main roles in a contractual PPP**
  - Private sector partners advise the Commission on R&I priorities for the Horizon 2020 work programmes
  - Implementation via Commission WPs for R&I using Horizon 2020 Rules for Participation and with comitology
- **Content of the document:**
  - Scope and Specific Objectives,
  - Activities, investment and outputs,
  - Governance and openness,
  - Specific commitments of each side,
  - Monitoring and Key Performance Indicators,
  - Duration and review
  - The Multi-annual roadmap is an Annex

Factories of the Future PPP

- **Manufacturing sector**
  - 23% of European jobs (over 30 million)
  - The vast majority are in SMEs
  - Manufacturing gives 80% of EU exports
  - Complex R&D-intensive activity
  - R&D costs and risks are high
- **Technological capabilities and supply chains are dispersed across the EU**
- **Critical mass of stakeholders at EU level is needed to go beyond the capacity of individual Member States**

Goals of the FoF PPP

- **Strengthen EU industrial competitiveness and sustainability**
- **Reduce energy consumption up to 30%**
- **Reduce use of material up to 20%**
- **20% less waste generation**
- **Increase the share of manufacturing in EU GDP to 20% by 2020**

Specific objectives of FoF

R&I to integrate and demonstrate at least 40 innovative manufacturing technologies in:

- 8 in High-tech manufacturing processes and systems (e.g. 3D printing)
- 10 in Adaptive and smart manufacturing equipment (e.g. robots for SMEs)
- 10 in Intelligent and holistic processes to increase performance using ICT
- 4 in Collaborative and mobile enterprises (e.g. locally-adapted production)
- 6 in Human-centred manufacturing (e. g. the workplaces of the future)
- 2 in Customer-focused manufacturing (e.g. personalised products)

Implementation of the FoF PPP

FP7 *(2010-2013)*

€665 million of EU contribution => 151 successful projects

Horizon 2020 *(2014-2020)*

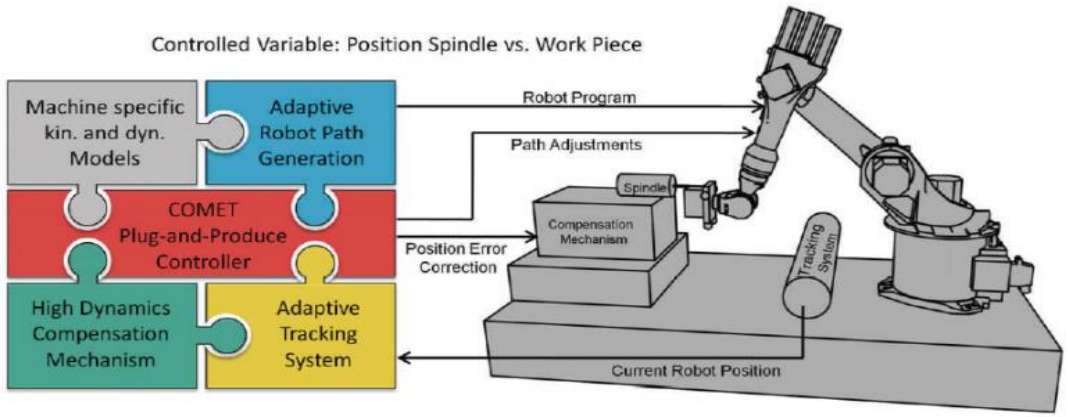
€1150 million of indicative EU contribution

2014-2015:

- **57 successful projects for an EU contribution of €263 million**
- **60% of Industrial partners**
- **36% of SME partners**

Project COMET

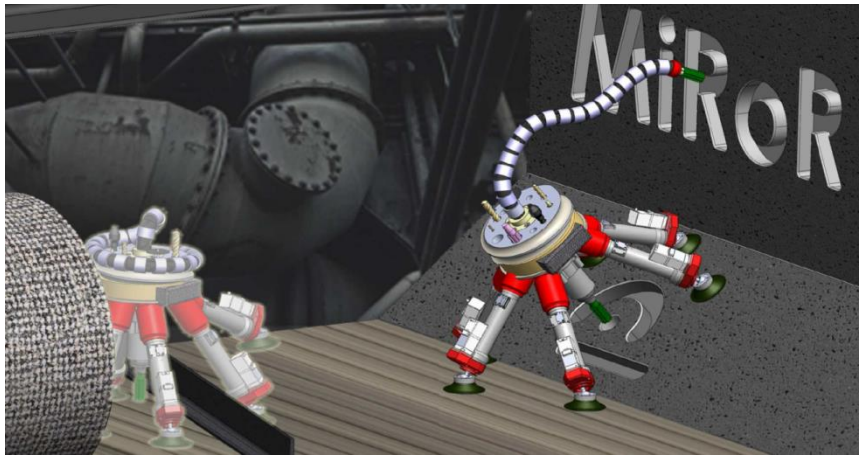
- Plug-and-produce COmponents and METhods for adaptive control of industrial robots enabling cost effective, high precision manufacturing in factories of the future
- http://www.cometproject.eu/
- Start: September 2010
- End: June 2013
- €5.4 m in EC funding



- Achievements:
  - It can do the handling and the machining in one go
  - High-precision machining 2 to 5 times more cost-effective
  - Increased flexibility

Project MiRoR

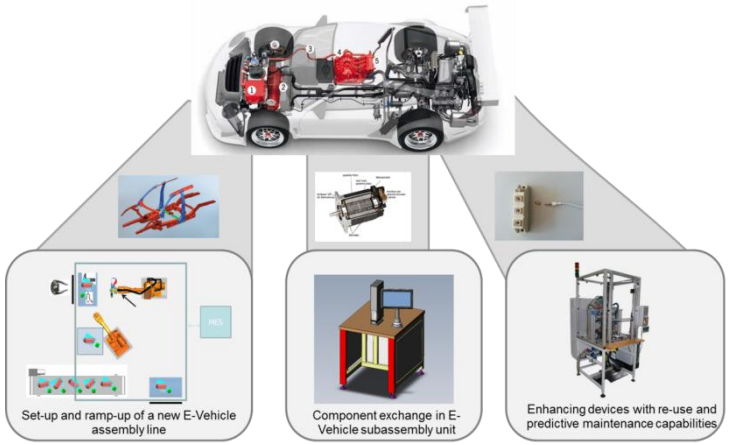
- Miniaturised Robotic systems for holistic in-situ Repair and maintenance works in restrained and hazardous environments
- https://www.nottingham.ac.uk/miror/index.aspx
- Start: February 2012
- End: January 2016
- €3.4 m in EC funding



- Achievements
  - Reduction of life-cycle costs of serviced installations
  - Shorten intervention times on capital intensive industrial installations

Project I-Ramp^3

- Intelligent Reconfigurable Machines for Smart Plug&Produce Production
- http://www.i-ramp3.eu/
- Start: October 2012
- End: September 2015
- €5.0 m in EC funding



- Achievements:
  - Conversion of equipment into network-enabled devices
  - 50% decrease of ramp-up time for joining technologies
  - 90% decrease of ramp-up time for specialized assembly systems

Sustainable Process Industry PPP

- **Process industries**
- Eight EU industrial sectors: chemical, steel, cement, ceramics, minerals, non-ferrous metals, industrial water and process engineering
- 6.8 million jobs in 450,000 enterprises
- Turnover of over €1,600 billion/year
- At the core of the value chains and highly dependent on resources
- **Striving for competitiveness and sustainability**
- **High risks and long-term investments**
- **Need for co-operation along the value chains**

Goals of the SPIRE PPP

- **Integration and demonstration of innovative processes and systems for increased resource efficiency**
- **Reduction of fossil energy intensity up to 30% by 2030**
- **Reduction of up to 20% in non-renewable, primary raw material intensity by 2030**
- **Reduction in GHG of up to 40% by 2030 compared to 1999 levels**

Implementation of the SPIRE PPP

Horizon 2020 *(2014-2020)*

€900 million of indicative EU contribution

2014-2015:

- **34 successful projects for an EU contribution of €201 million**
- **58% of Industrial partners**
- **26% of SME partners**

Project E4Water

Economically and ecologically efficient water management in the European chemical industry

- http://www.e4water.eu/
- Start: May 2012
- End: April 2016
- 11 m€ EC funding

- Impact :
  - 45% in water use
  - 65% in wastewater production
  - 15% reduction in energy use

Project Consens

Integrated Control and Sensing for Sustainable Operation of Flexible Intensified Processes

- http://www.consens-spire.eu/
- Start: January 2015
- End: December 2017
- 6 m€ EC funding
- Impact targets :
  - Reduction of CO2 emission
    - 230,000 t/year in polymer
    - 170,000 t/year in pharmaceutical & specialty industry
  - Less consumption of non-renewable raw material
    - 176,000 t/year less in use of solvents in pharmaceutical & specialty industry

Horizon 2020 Rules

Types of action

- **RIA: Research and innovation actions** –> Core activities in research
- **IA: Innovation actions** –> Core activities in innovation
- **CSA: Coordination and support actions**

Simplified funding rates

- Up to 100 % of the eligible costs; but up to 70% in IA if profit-seeking organisations
- Single indirect cost model: 25% flat rate for all

Evaluation criteria

- Excellence – Impact – Quality and efficiency of the action (similar with FP7)
- Thresholds are depending on the call conditions

Time to Grant shortened

- Maximum 8 months to Grant Agreement (and evaluation results before 5)
- Grant preparation rather than negotiation
  (proposals are evaluated "as is" and not "what could be")

Factories of the Future PPP

FOF-6: New product functionalities through advanced surface manufacturing processes for mass production, RIA

FOF-7: Integration of unconventional technologies for multi-material processing into manufacturing systems RIA

FOF-8: In-line measurement and control for micro-/nano-enabled high-volume manufacturing for enhanced reliability, IA

FOF-9: Novel design and predictive maintenance technologies for increased operating life of production systems, IA

FOF-10: New technologies and life cycle management for reconfigurable and reusable customised products, IA

FOF-12: ICT Innovation for Manufacturing SMEs (I4MS) (IA+CSA)

Sustainable Process Industry PPP

SPIRE-7: Integrated approach to process optimisation for raw material resources efficiency, excluding recovery technologies of waste streams, IA

SPIRE-8: Carbon dioxide utilisation to produce added value chemicals, RIA

SPIRE-9: Pilot lines based on more flexible and down-scaled high performance processing, IA

SPIRE-10: New electrochemical solutions for industrial processing, which contribute to a reduction of carbon dioxide emissions, RIA

SPIRE-11: Support for the enhancement of the impact of SPIRE PPP projects, CSA

SPIRE-12: Assessment of standardisation needs and ways to overcome regulatory bottlenecks in the process industry, CSA

Sustainable Process Industry PPP (topics outside NMBP support)

EE 17: Valorisation of waste heat in industrial systems, IA

CIRC-01: Systemic, eco-innovative approaches for the circular economy: large-scale demonstration projects

b) Systemic services for the circular economy (2017), *IA*

Thank you for your attention

More information:

HORIZON 2020:
http://ec.europa.eu/research/participants/portal/desktop/en/home.html

Contractual Public-Private Partnerships in research and innovation:
http://ec.europa.eu/research/industrial_technologies/ppp-in-research_en.html

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