#### Factory of the future, enabling KETs. Advanced Manufacturing Systems as transversal KET



Speaker: Paolo Calefati Prima Industrie SpA



## EFFRA: Who We Are Representing Factories of the Future

- Established by *ManuFuture* ETP & leading European industrial associations
- Objective is to promote and facilitate precompetitive research on production technologies in Europe
- Non profit, industry-driven European association
- 145+ members
- Members:
  - Small, medium & large enterprises
  - RTOs & universities
  - European, national & regional associations, platforms, innovation alliances etc
  - Members from across Europe
  - Serviced by full-time secretariat (i.e. EFFRA Team)





## EFFRA: Supporting Brokerage & Projects 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 selfanalysis
- 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: Background Manufacturing & Europe

How important is manufacturing?

 Despite the continued fall-out from crisis, manufacturing means a lot for Europe:

- 20 % Direct jobs
- 67 % Exports
- 65 % Business R&D Expenditure
- Manufacturing in Europe remains diverse

 Importance of manufacturing now recognised by EU and its member states...

....but also by Europe's competitors

 Development of more competitive & sustainable industry needs support = 'Factories of the Future'



By Claire Jones in Frankfurt and Tobias Buck in Madrid

Factory activity in the enrozone expanded for the eighth straight month and, although the pace of recovery slowed from January's two-and-a-half year high, there were further signs that the improvement in the region's core was spreading to the periphery.

The final estimate of a poll of purchasing managers confirmed that the region's manufacturers continued to contribute to the currency bloc's nascent recovery. The manufacturing purchasing managers' index, compiled by data company Markit, hit 53.2 in February, still above the crucial 50 mark that signals growth but below the January high of 54.



## Factories of the Future From FP7 to Horizon 2020 Manufacturing now on EU's Agenda

"I firmly believe that **we need to maintain and reinforce a strong and high-performing industrial base** for our internal market, as it would be naïve to believe that growth in Europe could be built on the basis of services alone. **We need to bring industry's weight in the EU's GDP back to 20% by 2020**, from less than 16% today"



Jean-Claude Juncker, 15 July 2014 President of the European Commission



## Factories of the Future: Background Delivering Through Partnership

- Public-private partnership supporting research & innovation in production technologies
- Launched in 2009
- 1,000+ organisations from across Europe
- High involvement of SMEs: 200+ to date
- Expanding increasing involvement from across all of Europe
- Majority of projects feature demo activities



Success = Continuation under Horizon 2020

Formal agreement between EU & EFFRA = €1.15 billion

'Factories of the Future 2020' - strategic research roadmap



## Factories of the Future in FP7 Progress Achieved

#### 150+ PROJECTS

- Majority of projects feature demo activities
- 20+ projects are complete & have delivered results. More projects are close to completion
- Projects incorporated KETs
- Close to the market exploitation of project results
- Project results also enhancing existing products

All project information on EFFRA Innovation Portal: www.effra.eu/portal





## Factories of the Future: Enabling Technologies Cross Technology Partnership

- Factories of the Future partnership is not sector-specific
- Emphasis on collaborative research
- Use of multiple technologies

 'Factories of the Future partnership implemented aspects of KETs through projects supported under EU's FP7 research programme (2010-2014)

 Factories of the Future 2020 incorporates key enabling technologies (both Commission-identified ones & others)

 Advanced manufacturing unique KET required for exploitation of other KETs





#### EFFRA Roadmap: 'Factories of the Future 2020'

## One Roadmap, 6 Priority Domains

• 'Factories of the Future' strategic research agenda = 'Factories of the Future 2020'

Covers the period 2014-2020

 Six research priorities (or 'domains') using the technologies and enablers identified to overcome challenges facing European manufacturing

 Annual research call topics issued by European Commission are based upon this

- Developed by EFFRA in cooperation with the Commission
  - Input from small, medium & large European manufacturing companies & research organisations
  - Two public consultations

Download from www.effra.eu



#### EFFRA Roadmap: 'Factories of the Future 2020'

## One Roadmap, 6 Priority Domains

**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

#### Technologies & Enablers

 Advanced Manufacturing Processes

-

-

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





#### **Preparing for Integrated Factories**

## **ICT & Factories of the Future**

#### **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  Vital role & potential roles of ICT in advanced manufacturing key aspect of partnership

- Factories of the Future 2020 identifies research priority areas (or domains)
- Each domain contains more specific sub-domains
- ICT features under each domain with specific ICT/-related subdomains

 In addition, research priorities have been developed with the input of SMEs

#### **Preparing for Integrated Factories**

## ICT & Factories of the Future 2020

	<b>Research &amp; Innovation Priorities</b>	
Manufacturing for custom-made parts	Domain 1: Advanced Manufacturing Processes     Innovative processing for both new & current     materials or products	
M2M Cloud connectivity for future manufacturing enterprises	Domain 2: Adaptive and Smart Manufacturing Systems Innovative manufacturing equipment at compo- nent & 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	Integrated high- performance computing
'Plug-and-play' interfaces for factory workers in dynamic work environments	<ul> <li>optimisation approaches</li> <li>Domain 4: Collaborative &amp; Mobile Enterprises</li> <li>Networked factories &amp; dynamic supply chains</li> <li>Domain 5: Human-Centred Manufacturing</li> <li>Enhancing the role of people in factories</li> </ul>	<ul> <li>Collaborative demand &amp; supply planning, traceability &amp; execution</li> </ul>
ICT solutions for energy-efficient product life cycles	Domain 6: Customer-Focused Manufacturing Involving customers in manufacturing value chain, from product process design to manufacturing associated innovative services	EFFRA ENGOVANINCTORES OF THE MUTURE A MANUFED TURE AN INTERVIEW

# Factories of the Future: Initiative Supporting SMEs

#### ICT Innovation for Manufacturing SMEs

 Initiative within 'Factories of the Future' aimed at encouraging uptake of ICT innovation in manufacturing SMEs.

- 7 Factories of the Future projects participating (known as Integrated Projects or IPs)
- 2 Roadmapping projects
- Each IP issues small 'open calls' aimed at SMEs for experiments, evaluation activities etc
- Open calls have taken place in 2013, 2014 & will take place in 2015
- Calls run for shorter period & provide good introduction to European collaborative research



More information: www.i4ms.eu

## 'Factories of the Future 2020' Partnership Roadmap Impact



Doing More With Less Preserving the Environment Deepening Cooperation Strengthening Research & Innovation



# 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
- Continous skills improvements: multi-skilled jobs

## Photonics: White'R project

## WHITE ROOM BASED ON RECONFIGURABLE ROBOTIC ISLAND FOR OPTOELECTRONICS

white'R is a necessary action to translate this RTD excellence into future leadership in manufacturing high value added customized optoelectronic devices. The new manufacturing concept is based on the combination of fully automated, self contained, white room modules whose components – robots, end effectors, transport, handling and tooling systems – are conceived as Plugn-produce mechatronic sub-modules properly configured coherently with the production requirements.





#### Photonics: White'R project



Successful story: Prima Industrie invested in a diode fab where WHITE'R will be the first production module



Goals:

•Fully automated production of customized multi emitter laser diodes

- •Full flexible reconfiguration for diodes assembly and disassembly
- •Plug and produce complete production modules

© SUPSI

- •Energy efficiency improvement
- •Cost reduction -60%



#### Resources

Working station S - soldering Working station W - wire bonding Working Station B - optics bonding Operator Station O Robot R End-effector Buffer E Raw material buffer M





## Conclusions

- to reach Horizon 2020 goals strong support and cooperations among EU Commission, national and regional authorities is needed
- SMEs are vital for success of manufacturing, KET exploitation and job creation
- access to new technologies from SMEs is critical
- Horizon 2020 program is close to the market trough actions of technology pushing



### Thank you

## .. for more information

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