

PPP InfoDay
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The Factories of the Future
ICT Objectives 7.3 and 7.4

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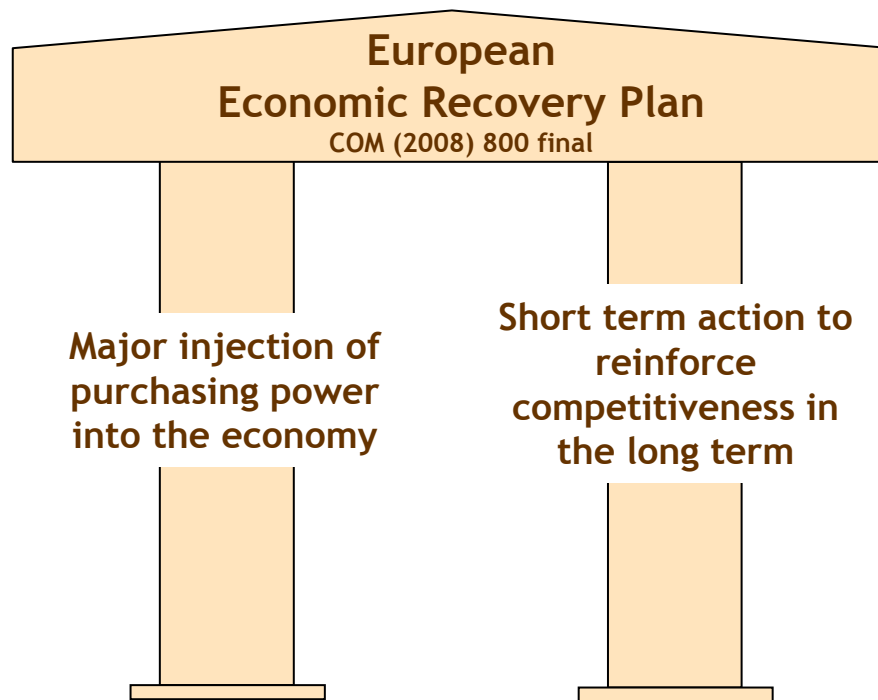


Outline

- FoF: Background & Rationale
- Outcome of first FoF ICT Call in 2009
- The FoF ICT Call in 2010
- Useful links



Recovery Plan: Strategic Aims



- Stimulate demand, boost consumer confidence
- Maintain jobs
- Increase competitiveness
- Speed up shift towards low carbon economy



Factories of the Future (FoF): Context

- **What:**
 - Part of the Recovery Plan
 - To help manufacturing, in particular SMEs, across a broad range of sectors be competitive after the crisis is over
- **How:**
 - Industry-driven R&D projects
 - 4 annual co-ordinated calls until 2013 between the two relevant FP7 Themes, ICT and NMP
 - Total FP7 budget (2010-2013): 245 M€ (ICT) + 400 M€ (NMP)
- **Who:**
 - Industry in the lead:
 - R&D priority setting
 - Experts to evaluate proposals
 - Implementation of industry-driven projects
 - Technology providers & industrial users (large & SME), academic researchers



FoF in ICT: Expected Impact

- Technology leaders to gain market share, e.g.
 - Automation/industrial robotics & laser technology solutions for factory environments
 - Product/production design tools (eg software for modelling, simulation, visualisation)
 - Software for enterprise/supply-chain management
- European industrial end users to
 - Integrate latest technology into their production environments
 - Build on new competencies (knowledge, organisation, skills, business models)
 - Use technologies that enable energy-efficient and “waste-less” production



Factories of the Future Multi-Annual Roadmap 2010-2013

Sub-Domains:

1. Sustainable Manufacturing
2. ICT-enabled intelligent manufacturing
3. High-performance manufacturing
4. Exploiting new materials through manufacturing



http://ec.europa.eu/research/industrial_technologies/pdf/ppp-factories-of-the-future-strategic-multiannual-roadmap-info-day_en.pdf



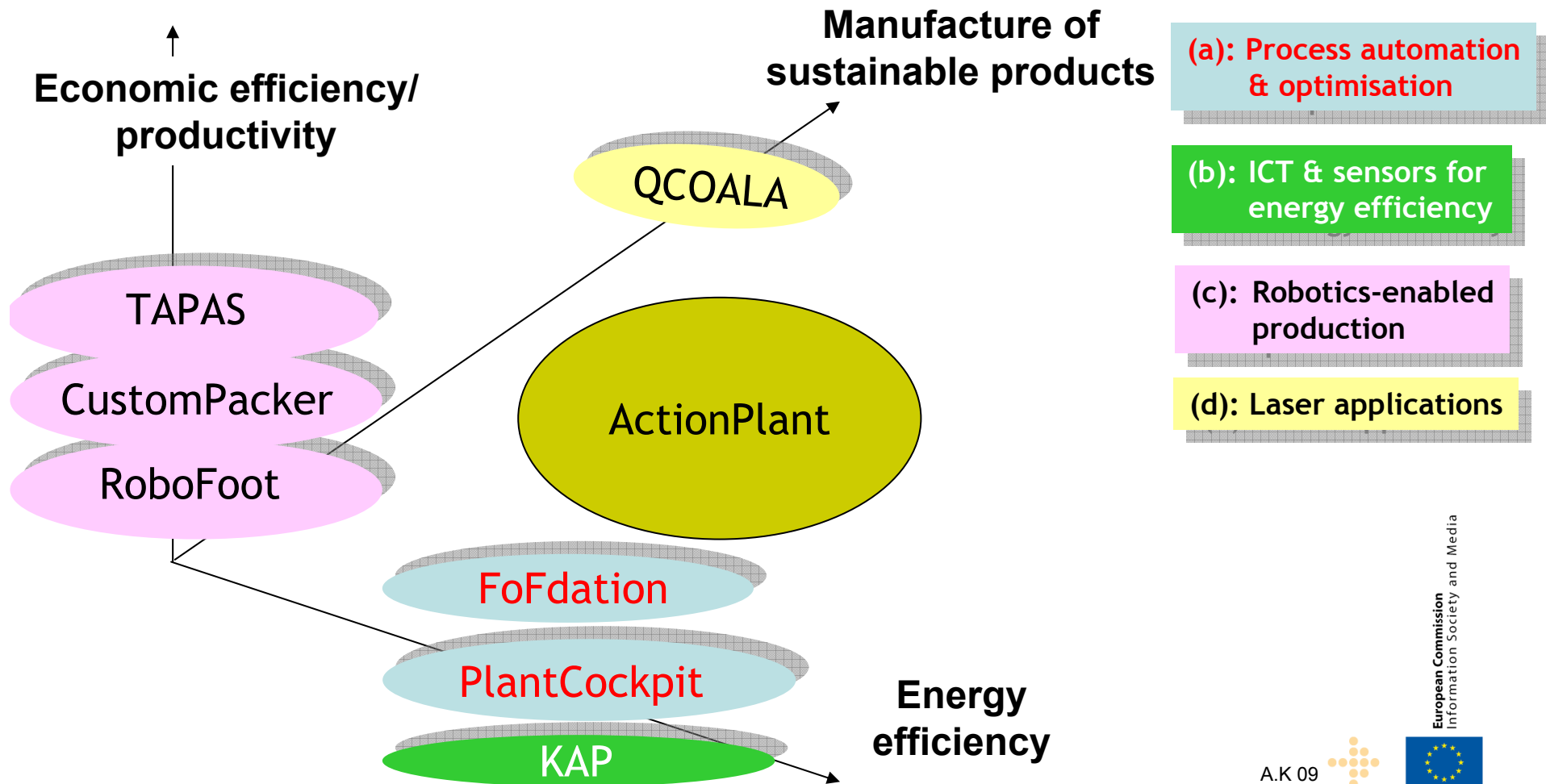
First FoF ICT Call (2009)

Key Figures & Essentials

- Focus on “Smart Factories”
- Proposals were expected to:
 - use advanced ICT-based technologies in production
 - be industry-driven
 - Have a strong validation element with quantifiable targets
- 34 eligible proposals received
- Requested funding ca. € 160 million (vs. € 35 million available)
(-> ratio 1:5)
- “Downstream research”: Industrial implementation horizon 2013-15

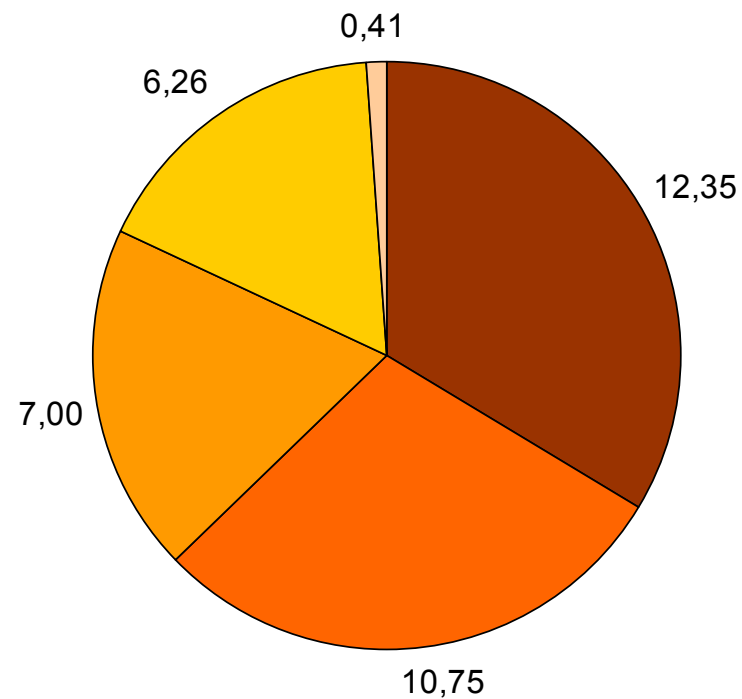


2009 FoF ICT Call on “Smart Factories”: Successful Proposals



FoF ICT Call 2009: Funding per Organisation Type

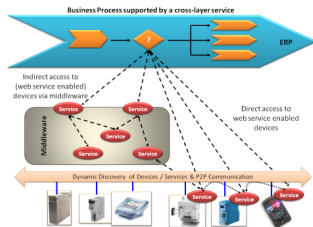
Funding (M€) of the selected proposals



■ Private commercial ■ Research organisations ■ HES ■ SME ■ Other



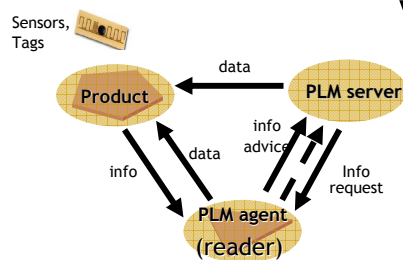
Vision: ICT is key to Factories of the Future



Smart Factories:

- Goal:
More automation, better control & optimisation of factory processes
- Means:
Software, lasers & intelligent devices embedded in machines & factory infrastructure

- Less waste
- Less energy use
- Faster time-to-market
- Better quality



Virtual Factories:

- Goal:
To manage supply chains; to create value by integrating products & services
- Means:
Software to holistically interconnect & manage distributed factory assets; new business models & value propositions

- High-value products
- Keep jobs in Europe
- Process transparency
- IPR security
- Lower CO₂ footprint



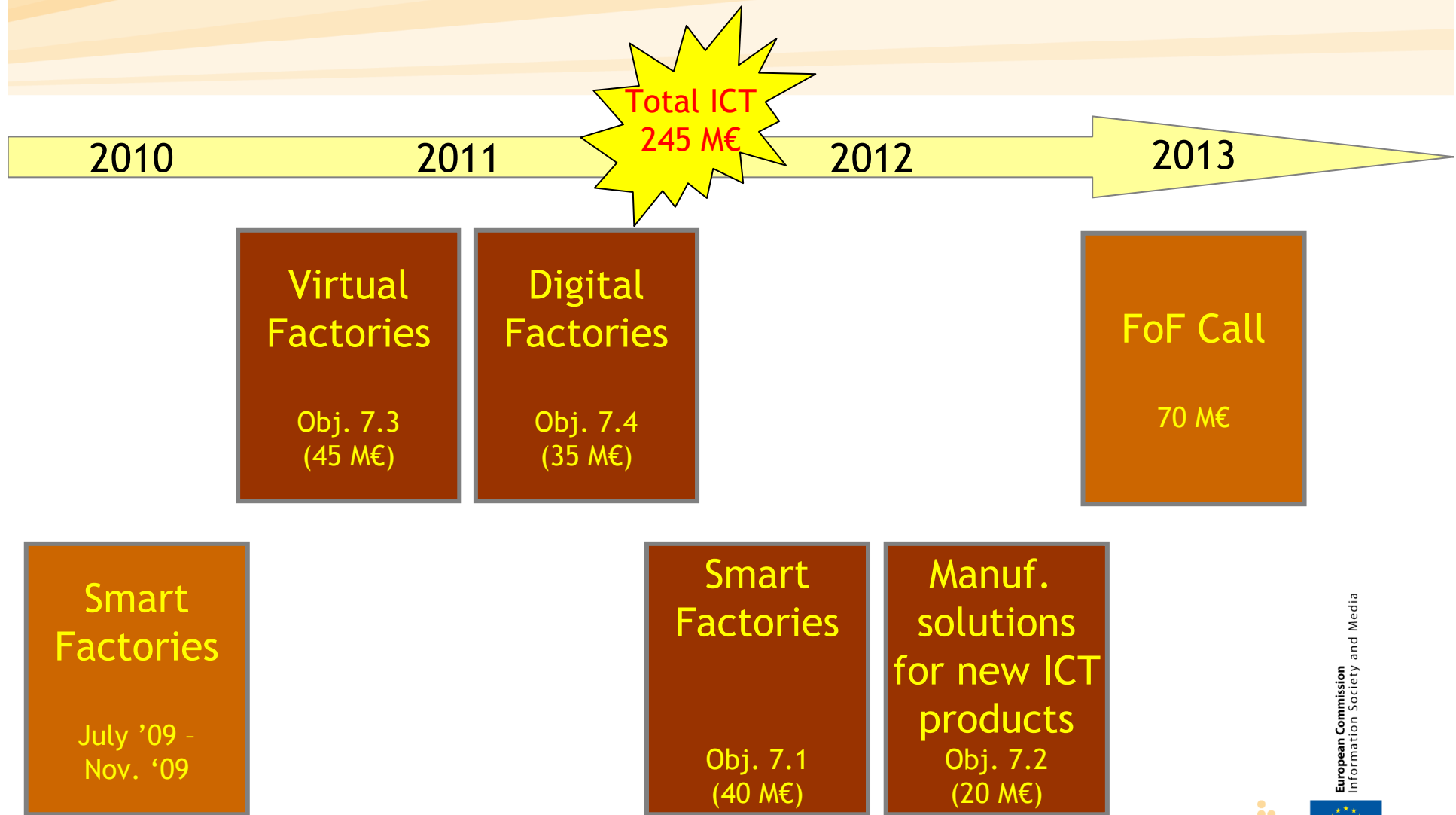
Digital Factories:

- Goal:
To “see” the product before it is produced
- Means:
Software for the digital representation & test of products & processes prior to their manufacture & use

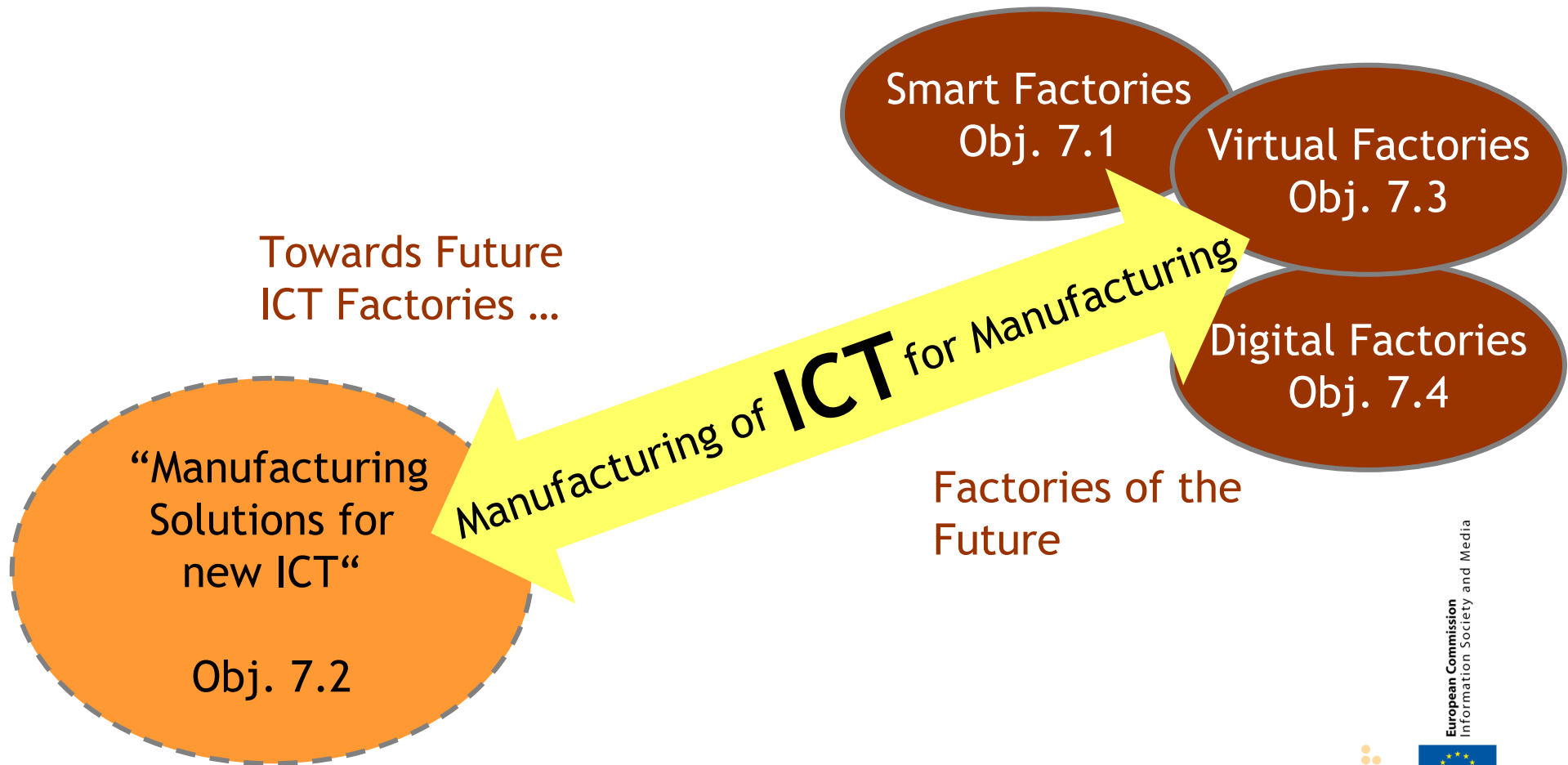
- Reduce design errors
- Better & efficient products
- Less waste + rework
- Faster time-to-market



Factories of the Future & ICT Work Programme



ICT Work Programme 2011-12: Challenge 7



Objective 7.3

Virtual Factories & Enterprises

Where do we stand?

- Manufacturing is undergoing radical change:
From the simple provision of products towards a provision of product-enabled functionality
- Key industry players:
SAP, Alcatel-Lucent, ATOS Origin, BT, Telefonica, France Telecom, T-Systems, ...
- Intelligent products offer opportunities for value creation & jobs
- Fragmented markets

What do we want to achieve & why?

- End-to-end integrated ICT for distributed enterprise/factory productivity
- Better management efficiency & environmental sustainability of supply chains
- Improve product/service integration: New business models; value proposition
- Carbon-tracing of products from “cradle-to-grave”:
Towards an energy-transparent product lifecycle



Vision: the (Future) Internet is the Enterprise

- **Continuous Internet:** connected to anyone, anywhere, anytime
 - Continuously evolving **ecosystems** of enterprises in the future
-
- A new participative web, hosting a new wave of services, using user-friendly technologies is **empowering the enterprise** of the future
 - For the enterprise, the Internet becomes the platform through which knowledge is manipulated dynamically, experienced in the business context and *re-presented* in a radically different way to **create new value**
 - The Internet blurs the boundaries between the intra and extra-muros enterprise domain; collaboration becomes rooted in the **essence of entrepreneurship**
 - Web-based applications become as rich as the desktop: it is the emanation of **the WYSIWYG enterprise**



Objective 7.3

Virtual Factories & Enterprises

Target outcomes

- a) Distributed, adaptive, interoperable virtual enterprise environments
 - Integration of novel management methods & ICT to help virtual factories/enterprises move beyond existing operational capability
- b) Real-time management of volatile manufacturing assets
 - Manage inventories, stakeholder relationships, product configurations, knowledge & skills across the value chain
- c) Component-based tools & architectures enabling innovative & dynamic composition of services
 - Sustainable lifecycle management of product-based services
- d) Internet-based user-centric collaboration, sharing and/or mixed reality tools
 - Incl. new manufacturing business models & practices to enhance & sustain product-based services across the value chain

Call FoF in 2010

45 M€

IPs/STREPs



Objective 7.4: Digital Factories

Manufacturing design & product lifecycle management

Where do we stand?

- PLM market size: 15 B\$/yr
- Market dominated by “island solutions”
- Key industry players: Dassault Systèmes, Delcam, Siemens PLM Systems, SAP, Eigner+Partner, many high-tech SMEs
- EU leadership threatened by competitors from the USA & India
- Today’s complex products (e.g. avionics) require thorough testing at early (digital) prototype stage

What do we want to achieve & why?

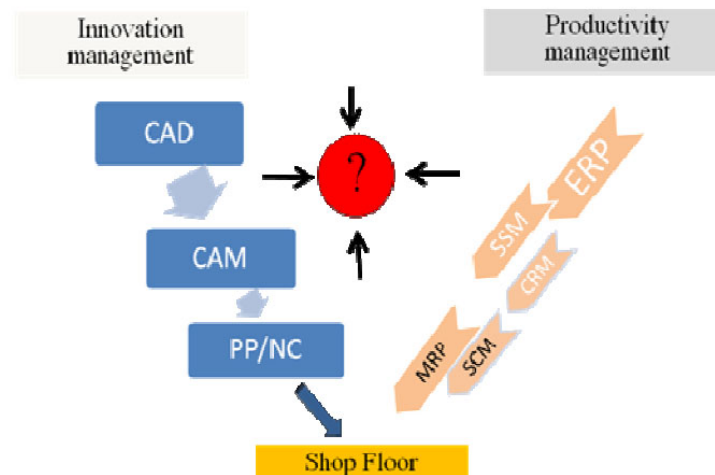
- Strengthen EU competence
- Reinforce EU leadership in knowledge-driven platforms, tools, methodologies, product development & manufacturing design
- New products to be realised with shorter time-to-market, shorter time-to-production
- Improve drastically accuracy, reliability & speed of products/process simulation techniques, permitting design decisions earlier (thus reducing costs)



FoFdation: The Foundation for the Smart Factory of the Future

Engineering platform and standards to bridge
PLM, SCM, ERP and SCADA automation

- Aerospace (Airbus) & automotive domain (FIAT)
- A universal manufacturing information system based on open data exchange standards (e.g. STEP-related) for CNC automation

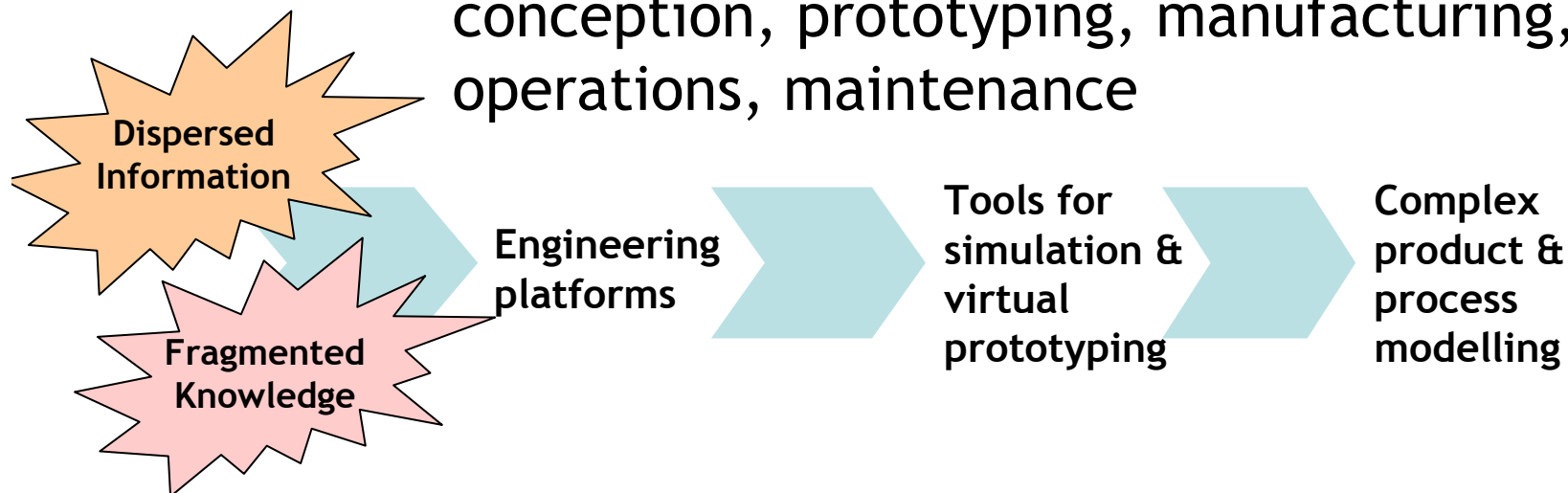


Courtesy: FoFdation project

Objective 7.4: Digital Factories: Manufacturing Design and PLM

Objective:

- Better knowledge creation & design of manufacturing systems
- Bridging simulation, modelling, lifecycle & knowledge management from product conception, prototyping, manufacturing, operations, maintenance



Objective 7.4: Digital Factories

Manufacturing design & product lifecycle management

Target outcomes

a. Comprehensive engineering platforms

- Cross-disciplinary information sharing, workflow integration, knowledge capture

b. Simulation & virtual prototyping tools for product/process design

- E.g. better models with forward & backward compatibility, model auto-generation, meshing, optimisation
- Combination of cross-disciplinary models such as CAD, CAE, VR, volume, fluid, structure, polygonal and process models

c. Holistic modelling & simulation of full complex products/processes

- With multi-physics features, allowing tolerance changes
- Product/process behaviour simulation from micro to macro scale

Call FoF/2010 35 M€ IPs/STREPs/CSA

- CP 33,5 M€ of which 50% to IPs; 30% to STREPs
- CSA 1,5 M€ for c. only



FoF ICT Objectives 7.3 & 7.4

Must Have

- “Virtual Factories” (7.3) focus:
 - Integration of the distributed manufacturing enterprise (incl. supply chains)
 - Integration of products & services
 - Management of volatile manufacturing assets
- “Digital Factories” (7.4) focus:
 - Engineering platforms
 - Tools for simulation & virtual prototyping
 - Tools for complex products & process modelling & simulation

- **Proposals must:**
 - use advanced ICT-based technologies in production
 - be industry-driven
 - have a strong validation element with quantifiable targets
- “Downstream research”:
 - Industrial implementation horizon 2013-15



Thank you

FoF on the web:

http://ec.europa.eu/research/industrial_technologies/lists/factories-of-the-future_en.html

FoF ICT projects launched in 2010:

http://cordis.europa.eu/fp7/ict/micro-nanosystems/docs/ict-fof-project-summaries-2010_en.pdf

FoF at the ICT 2010 Conference in Brussels

http://ec.europa.eu/information_society/events/ict/2010/

FoF call & contacts:

<http://cordis.europa.eu/fp7/dc/index.cfm>

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