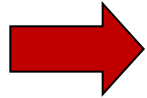




Digitising European industry

Europeanising Industrie 4.0, smart industry, Industrie du futur, ...

Khalil Rouhana
DG CONNECT, European Commission



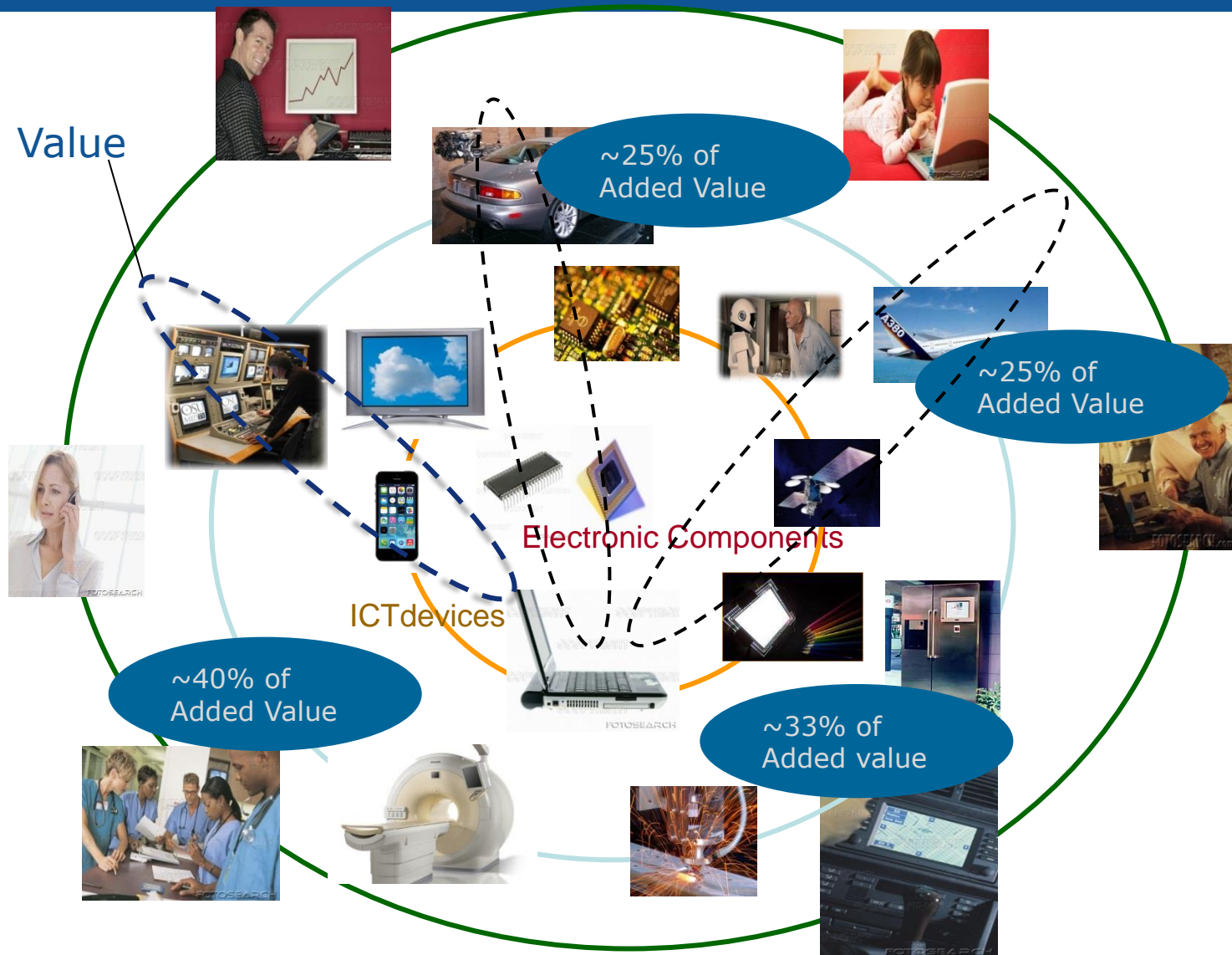
- Digital innovations: What is at stake?
- Where does Europe stand?
 - Digital industry and digitisation of industry
- What are we doing about it?
- Concluding remarks

Value creation from digitisation: Products, Processes and Business models

- "Digital inside": Innovations in all types of products
 - Smart connected objects (or IoT) powered by e.g.
 - Sensors, wearables, embedded software, Connectivity, Big data, Cloud ...
 - Large opportunities in all sectors (Non-tech, high-tech, SMEs, etc)
- Digital transformations of processes
 - From logistics and product design to shop floor automations and CRM
 - Increasing resource efficiency, productivity, ..
 - Built on IoT, digital design, robotics, laser technologies, big data,..
- Radical/disruptive changes in business models
 - Blurring the boundaries (products-services), reshuffling value chains
 - XaaS, 3D Printing & customisation, CRMs, maintenance, A Value services
 - Built on real time information, data analytics, etc..

The 'digital inside' value chain

Critical Value chains

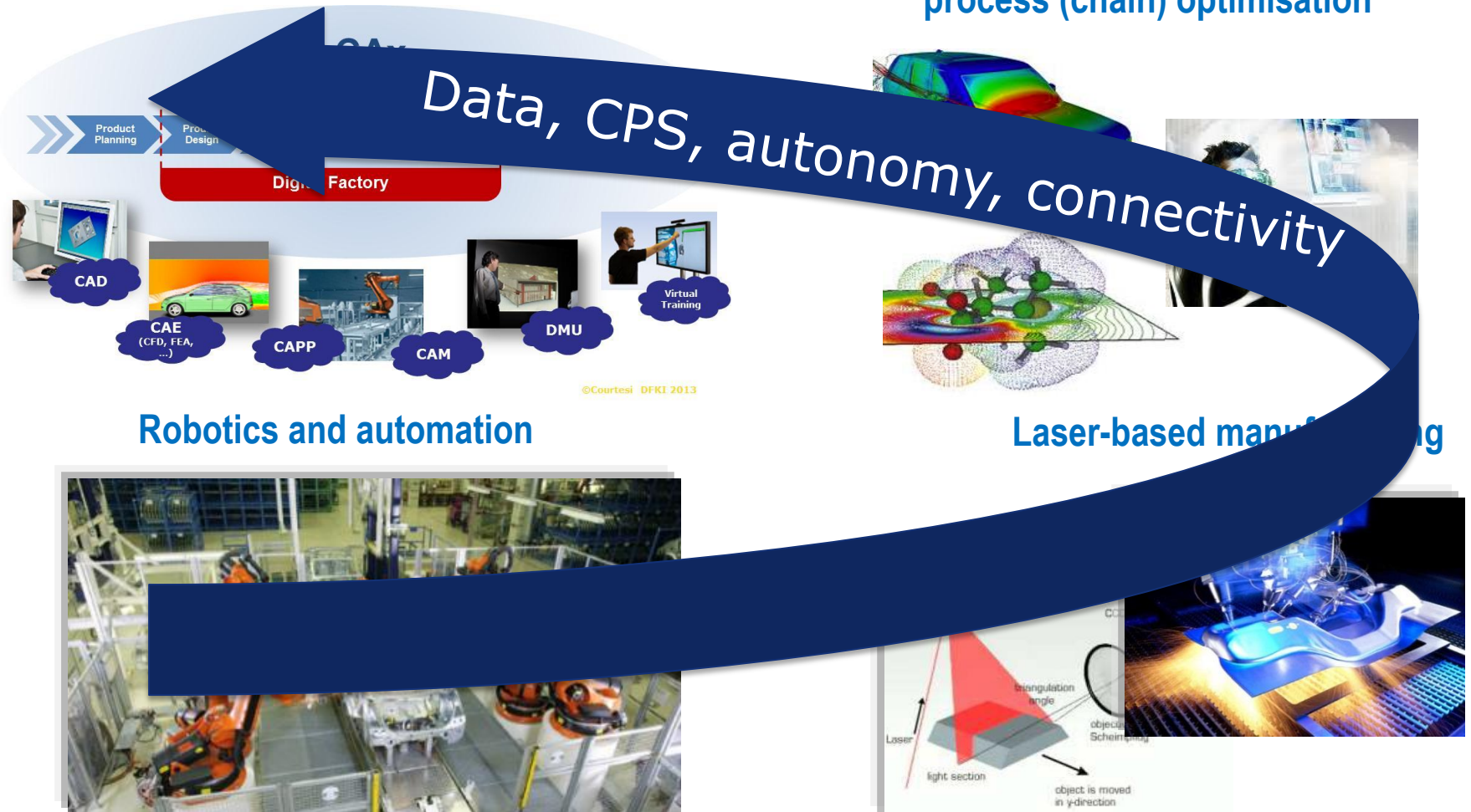


	R&D spending B€	% on ICT
Aerospace and defence	150	37
Automotive	700	38
Electrical equipment	160	75
Healthcare equipment/services	65	55
Industrial manufacturing	240	55

Digital process innovation in manufacturing

Modelling, Simulation, Analytics and big data

Cyber-physical systems for
process (chain) optimisation



Transforming the business model

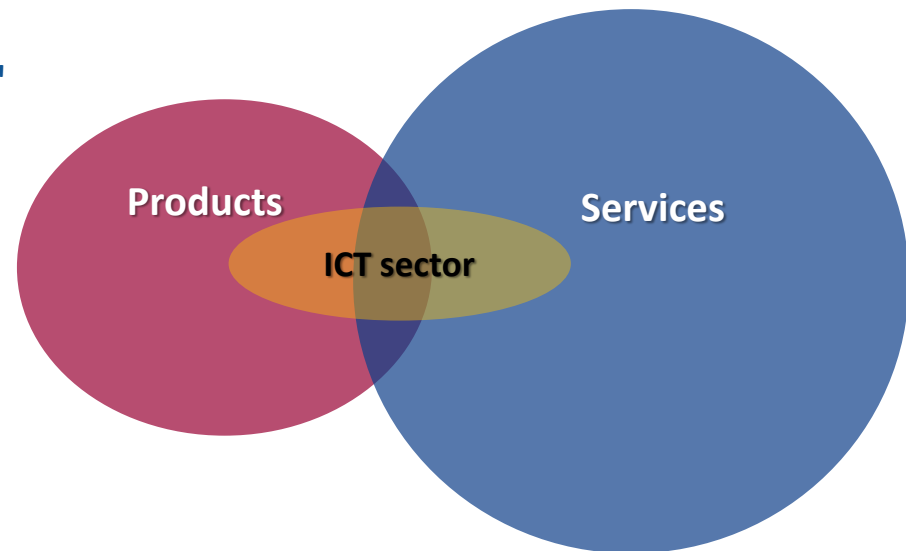
Blurring boundaries: products-services



Blurring of boundaries in value creation

Trends in business models

- "Reintegration" across the value chain
- XaaS, Expansion to services
- Expansion to "systems of systems"
- "Sharing" economy
- Des-intermediation

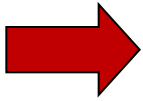


Technology

- Sensors, μ controllers, low power μ processors, μ actuators, MEMS,..
- Embedded Operating systems, embedded applications software, control software
- Networking (local, Internet,..)
- Applications on the Cloud (Data analytics, CRM on Clouds, Maintenance software,..)

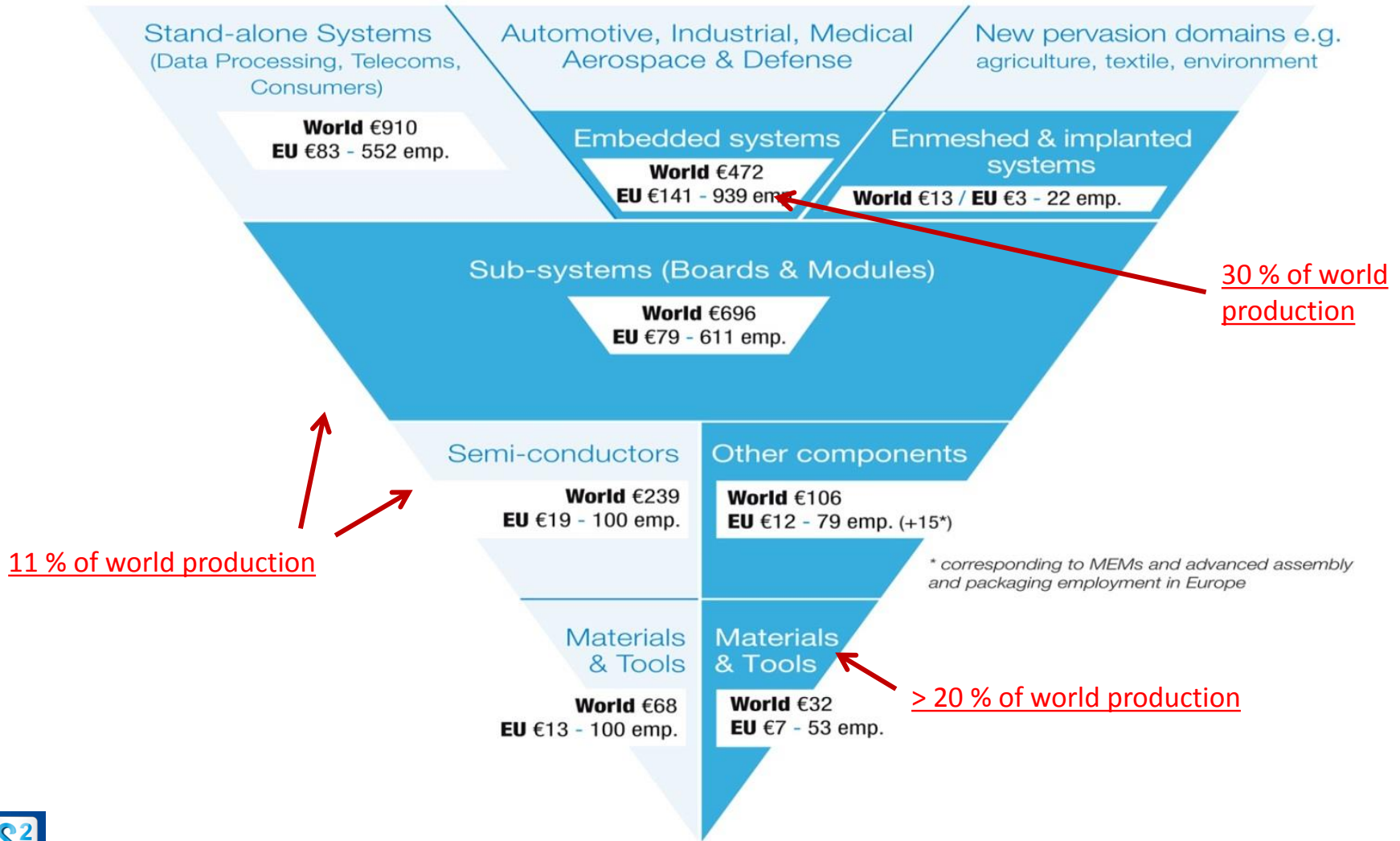
- Five main converging innovation tracks
 - Big Data and Cloud
 - Cyber Physical Systems, Smart connected objects and IoT
 - Hyper connectivity, BB and wireless
 - Robotics, Autonomous systems and automation
 - Laser based manufacturing, additive manuf. (3D printing)
- Areas of business opportunities
 - High growth "Smart X" and IoT markets
 - Mobility, society (smart homes, smart cities, wearables,..), manufacturing, health, energy, etc..
 - High growth of vertical markets!!
 - Automotive, energy, security, etc.
 - Next digital champions may come from "non-digital" industries
 - And vice versa!!

- Digital innovations: What is at stake?
- Where does Europe stand?
 - Digital industry and digitisation of industry
- What are we doing about it?
- Concluding remarks



- **Strengths**
 - **Professional and vertical markets (products and services)**
 - Components, software, systems (robotics, engineering), networking
 - **World class R&D hubs**
 - **Good infrastructure**
 - **Size of EU market (~27% of world ICT market)**
- **Weaknesses**
 - **Consumer markets, Internet and web products and services**
 - From components to applications, Data platforms' ownership
 - **Structural weaknesses**
 - No DSM yet (substantial impact on attractiveness to investment including VCs, BAs, etc..)
 - Lagging in investment in R&D

EU strengths: Professional and vertical markets



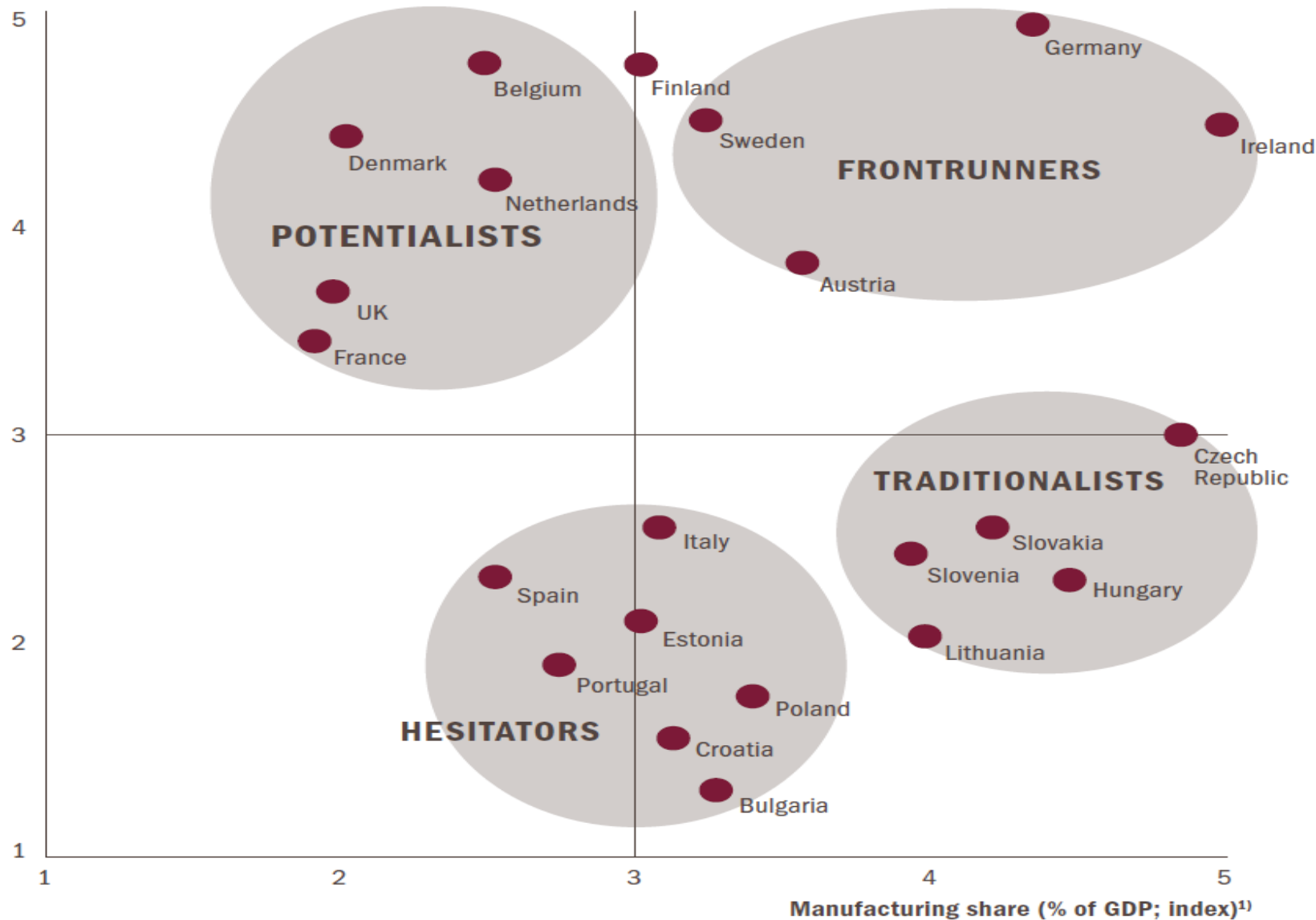
Digitised industry: What is the situation?

- Strong digitisation in high tech industries and in some MSs.
- But:
 - **Slowness and disparities in adopting digital solutions across industries and regions**
 - Mainly SMEs and non tech sectors lagging behind
 - Less than 2% of SMEs use advanced digital technologies
 - **New competition from non-EU digital platform owners**
 - E.g. OS, Web and Data platform owners
 - **Lack of standards and interoperable solutions**
 - **Skills and re-skilling of work force**
 - **Legislative and regulatory gaps**
 - **Fragmentation of effort in Europe**

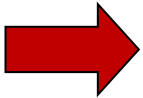


Digitisation readiness: disparities in Europe

European Commission
RB Industry 4.0
Readiness Index¹⁾²⁾



- Digital innovations: What is at stake?
- Where does Europe stand?
 - Digital industry and digitisation of industry
- What are we doing about it?
- Concluding remarks





Diversity of efforts across Europe

EU-level Initiatives

- Application PPPs: FoF, SPIRE
- I4MS
- Smart Anything Everywhere
- ICT PPPs

Multi-region Initiatives

- Vanguard

United Kingdom

- High Value Manufacturing
- Innovate UK
- Action Plan for Manufacturing (Scotland)

Belgium

- Made Different
- Flanders Make/iMinds (Flanders)

France

- Usine du Futur
- FoF Ile-de-France

Portugal

Produtech

Sweden

Produktion 2030

Netherlands

Smart Industry

Finland

- FIMECC PPP Programmes (MANU, S-STEP, SIMP, S4Fleet)
- Industrial Internet Business Revolution
- IoT pilot Factory (IoT PFF)

Poland

- INNOMOTO
- INNOLOT
- Digital manufacturing for the SME (Mazovia)

Germany

- Industrie 4,0
- Smart Service World
- Autonomik für Industrie 4.0
- It's OWL (Ostwestfalen-Lippe)
- Allianz Industrie 4.0 (Baden-Württemberg)

Austria

Produktion der Zukunft

Italy

- Fabbrica Intelligente
- Ass. Fabbr. Intell. Lombardia

Greece

Operational Programme in Region Western Greece

Spain

Estrategia Fabricacion Avanzada (Basque region)

European initiatives are in red
 National initiatives are in blue
 Regional initiatives are in green

Speech of Commissioner Oettinger at Hannover Fair 14 April 2015

Objective: Making sure that any industry in Europe, wherever it is located, can make the best use of digital technologies while adapting our workforce to the change

1. Wide-spread adoption: access to technology and knowledge
2. Leadership in digital platforms for industry
3. Closing the digital skills gap
4. Smart regulation for smart industry

An EU wide strategy for digitisation can ensure "scale", mobilise actors with value chains spreading across Europe and support interoperability and standardisation.

Four lines of actions for digitising European industry



- Wide-spread adoption and best use of digital technologies
 - In **all** industrial sectors
 - Focus on key digital technologies ("The musts")
 - Components, CPS and IoT, robotics, 3D printing, data analytics
- Leadership in digital platforms for industry
 - Platforms on which value is created
 - E.g. embedded OSs, Cloud platforms, data, security
 - Openness, Interoperability, security
- Filling the skills gap and preparing the workforce for change
 - Essential!
- Providing the best framework conditions
 - Regulation: DSM, Data protection, Liability, safety
 - Access to finance: EIB, EIF, etc..

- **Goal:** Provide any business in EU access to the digital "Musts"
- **What's new:** Combine resources from H2020, ESIF, EFSI, MSs
 - building "digital innovation hubs in every region"
- **EU added value:** Upscale, network EU digital innovation initiatives
- **New EU-level actions:**
 - Upscale EU networks of competence centres as "glue"
 - ✓ Support innovation hubs in the regions', smart specialisation (ESIF)
- **Expected complementary actions:**
 - MSs: invest in regl/natl competence ctrs, innovation hubs, fab-labs
 - Industry: Match public funding through private investment
- **Estimated investments:**
 - 0.5B€ through H2020
 - Up to 5B€ in total through ESIF etc..

- **Goal:** Access to the digital "Must" technology for any business in Europe
- **What's new:** Combine resources from H2020, ESIF, EFSI, MSs and regions for building "digital innovation hubs in every region"
 - Reinforcing existing competence centres (e.g. RTOs such as FhGs, CEAs, TNOS, Catapults, etc..) and building new ones, when needed
 - Support testing, demonstrations, fab-labs, etc..
 - Networking between centres to ensure specialisation and excellence
 - A one stop shop for any industry to access the "must" technologies
- **Starting Point:** EU Innovation Schemes e.g.

I4MS

Smart Anything
Everywhere

From design
and logistics to
shop floor & 3D
printing,..

ICT inside of
products and
services

Others: Data,
Photonics,
Robotics,..

Already in the pipeline: ~500 M€ for the next 5 years in H2020
as a leverage to a target of more than 5 B€ from ESIF, etc..

Starting Point: I4MS Innovation initiative Phase 1 and Phase 2



European
Commission

I4MS under the PPP
Factories of the Future

- ✓ About 111 M€ of EU funding
- ✓ 11 large projects
- ✓ 72 competence centres
- ✓ 220 experiments

Technology areas

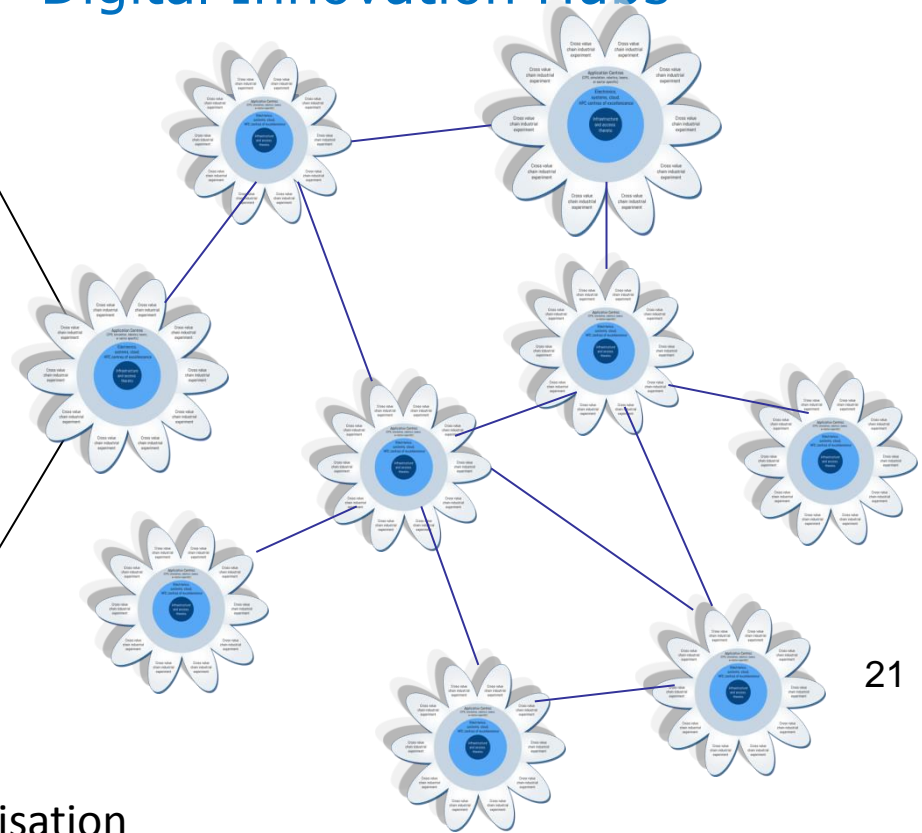
- ✓ HPC cloud-based modelling and simulation services
- ✓ Industrial robotics systems
- ✓ Laser-based manufacturing
- ✓ Smart sensors systems, CPS and IoT



EU-wide networks of competence centres Acting as the heart of Digital Innovation Hubs

Regional Nodes/Projects

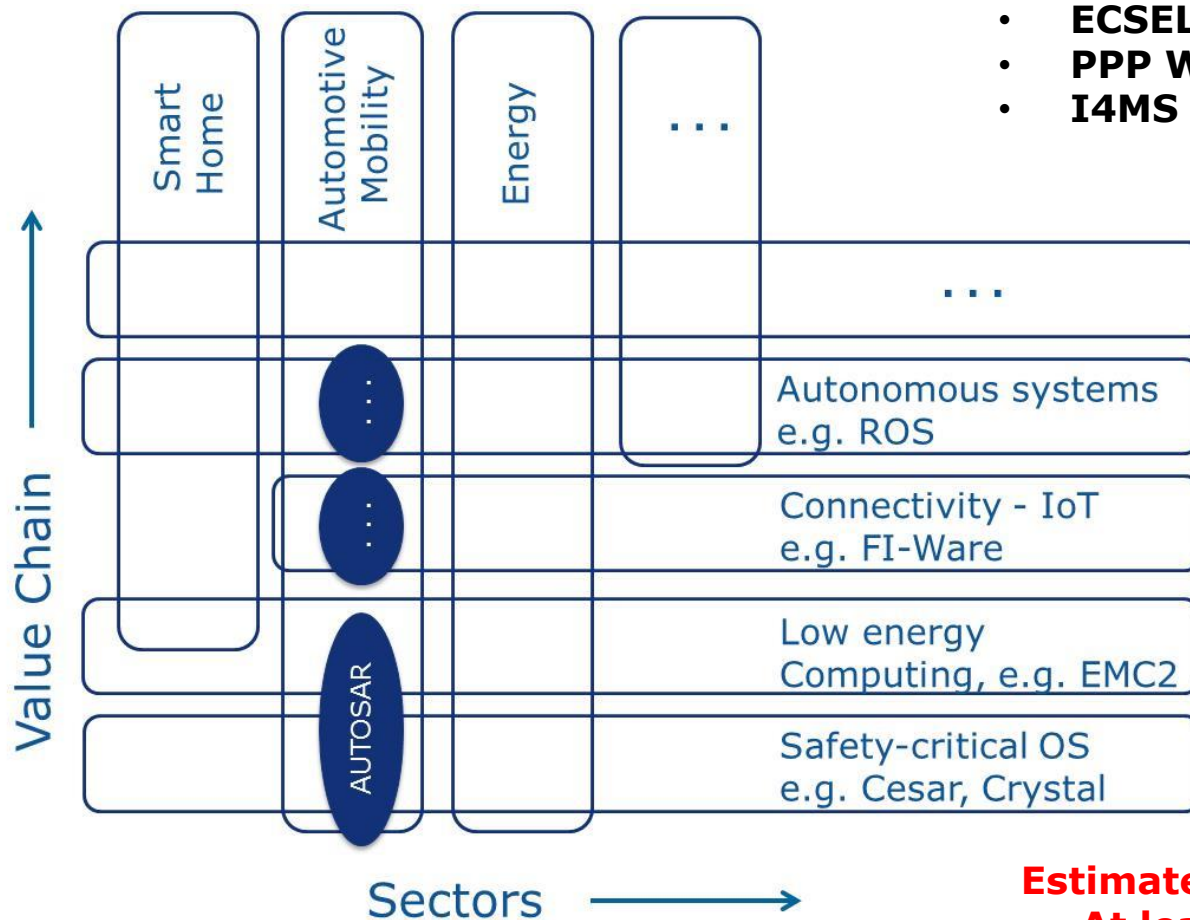
- Feasibility studies
- Best practice experiments
- Local dissemination
- Skills development
- Infrastructure provisioning



21

- H2020 Funding augmented through
 - regional/structural funds, e.g. ESIF
- Focus on regional strengths/smart specialisation
- Flexibility/little synchronisation needs

+ access to finance
for SMEs and Mid-Caps



Appropriate Instruments:

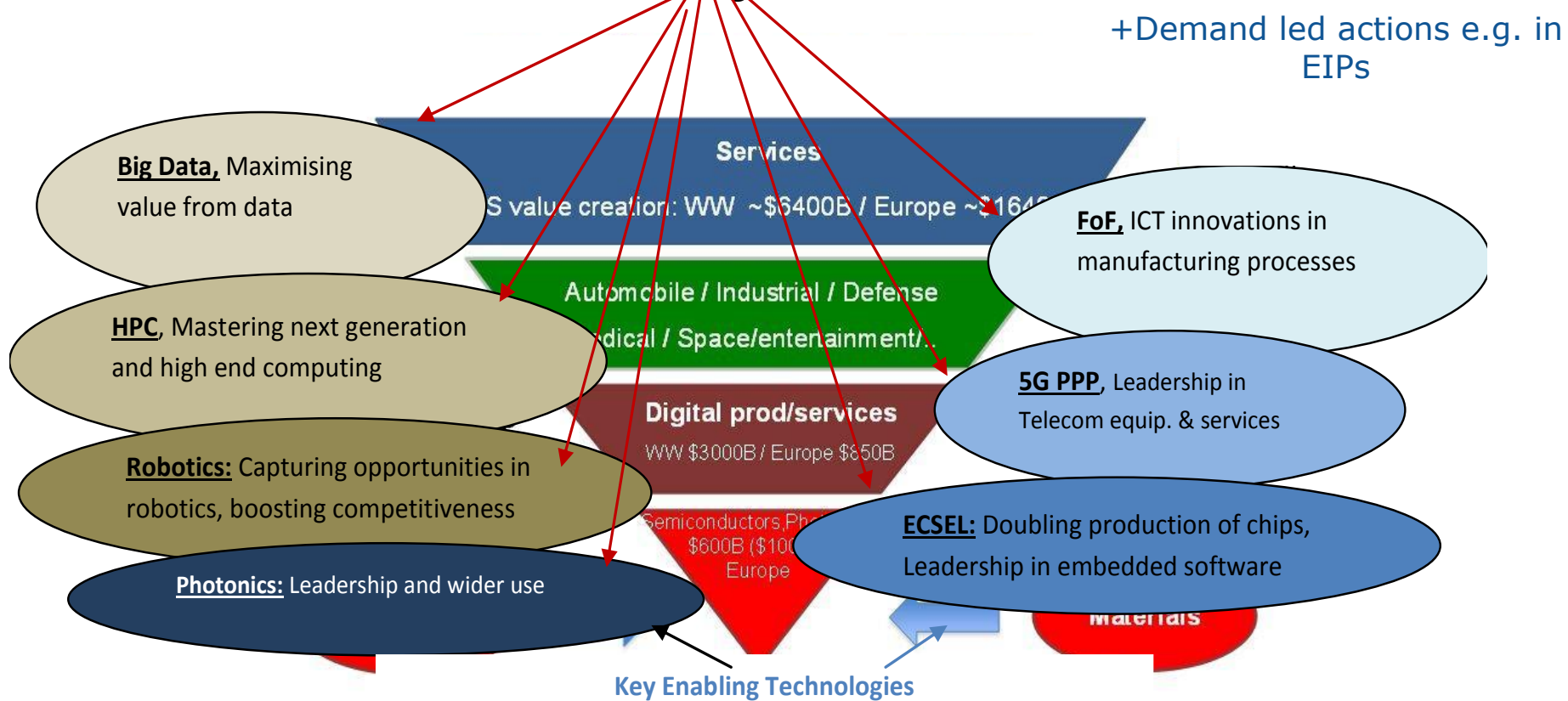
- ECSEL Pilot Projects
- PPP Work Programmes – FoF, ...
- I4MS and alike

Estimated EU-level investment:

- At least 1 B€ through H2020
- Leveraging up to 3B€ in total

Leadership in platforms: Role of the partnerships

PPPs across the Digital Value Chain

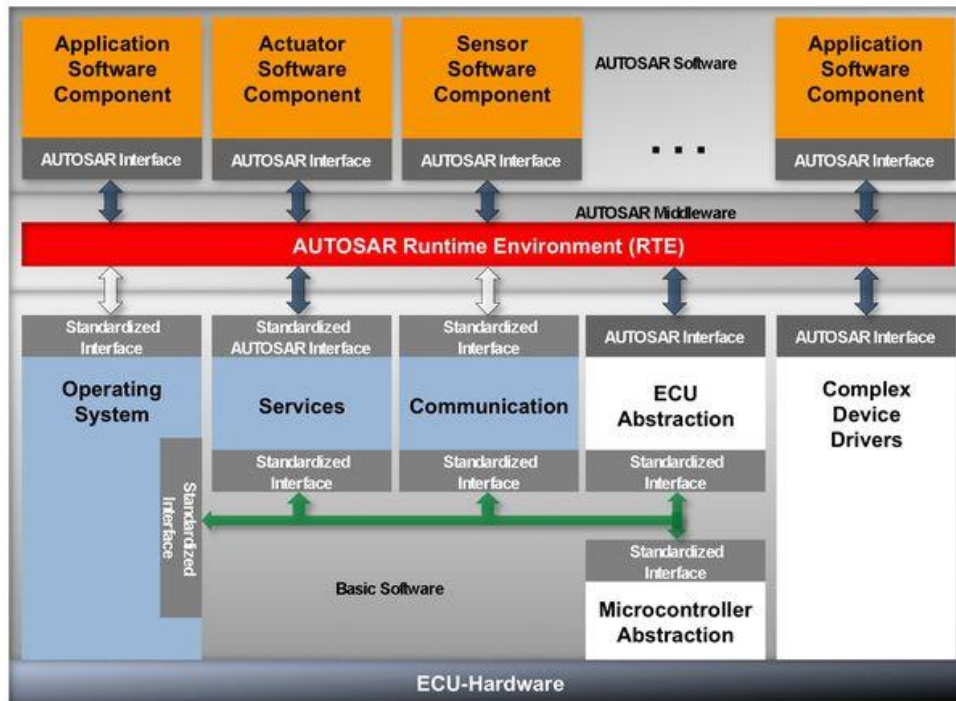


Industry - academia- EC- Public sector

Co-engagement to support roadmaps to reinforce/build leadership

Example of digital platform : AUTOSAR

European
Commission

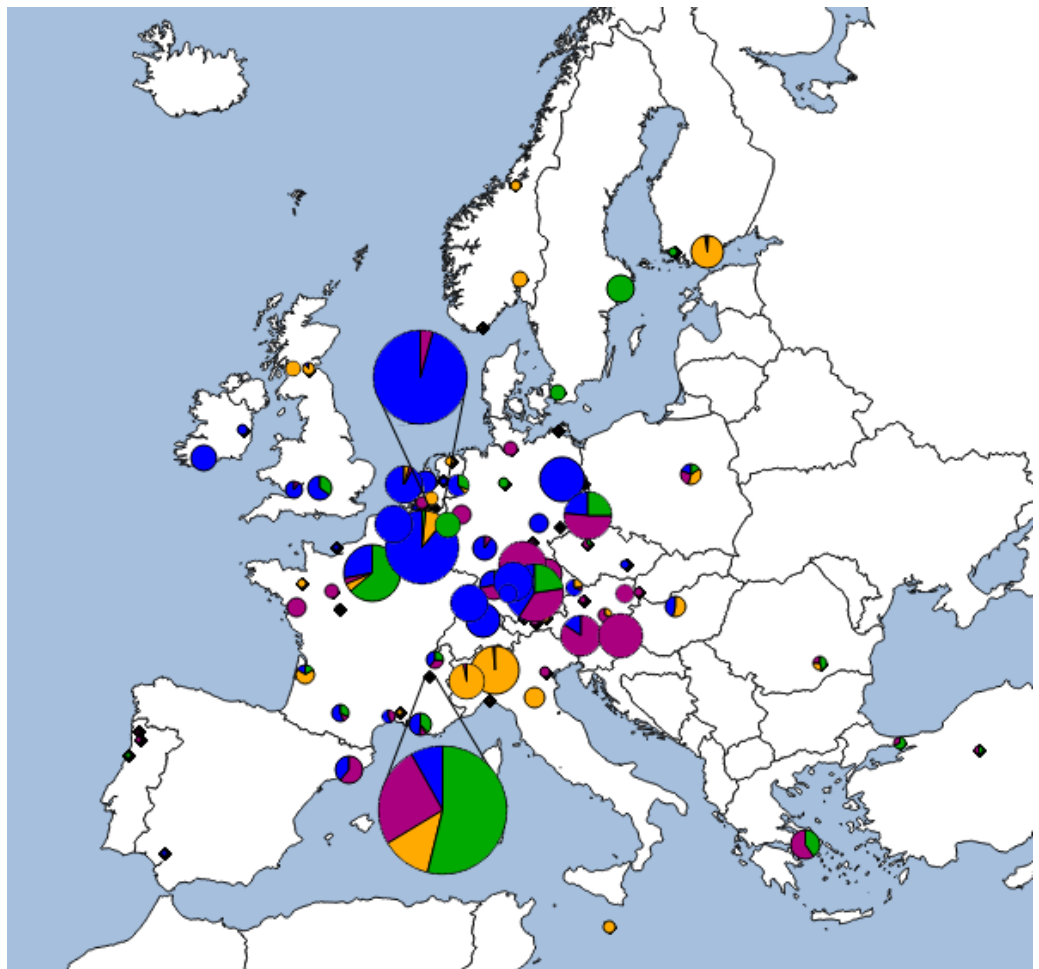


Standardized architecture for automotive software

- Eases cooperation of automobile manufacturers, suppliers and tool developers
- Facilitates innovation through open standards
- *"Cooperate on standards, compete on implementation"*

Example of Joint investments (Pilot lines)

- Around 2 B€ of investment in 2 years
- A dozen of pilot lines
 - ~350 M€ from EU
 - ~350 M€ from MSs
 - > 1.2 B€ from industry



Materials & Equipment

Power & embedded electronics

MEMS & sensors

Next generation CMOS

- **Goal:** Concerted effort to promote digital skills
- **What's new:** Get commitment from Industry, MSs on a roadmap
- **EU added value:** Act as catalyst across MSs and regions

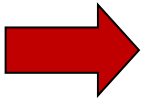
- **New EU-level actions:**
Work as catalyst for "digital" education, reskilling and learning
 - ✓ Agree on a charter of actions across EU, MSs, regions
 - ✓ Promote exchange of Best Practices
 - ✓ Launch a new EIT-KIC

- **Starting Point:** Grand coalition for digital jobs

- **Expected complementary actions:**
 - MSs: Stimulate national and regional initiatives
 - Industry: identify essential components of a digital skills set

- **Goal:** Make regulation fit for the digital world
- **What's new:** Explore further "emerging" regulatory issues
- **EU added value:** Stimulate regulatory dialogue on smart digitisation issues towards a single EU-level playing field
- **New EU-level actions:**
Start dialogue with stakeholders on:
 - ✓ Liability issues for autonomously acting digital systems
 - ✓ Safety issues for autonomous cars, robots, ... working with humans
 - ✓ Big data issues: ownership, data and IPR protection, innovative use
- **Starting Point:**
 - **Digital Single Market Package**
 - EP working group on a legal framework for robotics and automation

- Digital innovations: What is at stake?
- Where does Europe stand?
 - Digital industry and digitisation of industry
- What are we doing about it?
- Concluding remarks



Concluding Remarks

- Towards an EU-Wide digital industrial strategy
 - Digital industry and digitising industry
 - Develop the strategy in partnership with PPPs: FoF, SPARC, ...
- Cover full value and innovation chains
 - Special emphasis on innovative manufacturing SMEs – supply and demand
- Capitalize on the size of EU markets & diversity of strengths
 - Smart specialization, co-operation, ...
- Align policies and resources
 - EU, Member States, Regions
 - Horizon 2020, ESIF, national and regional programmes

THANK YOU

DG CONNECT (Communications Networks, Content and Technology):
http://ec.europa.eu/dgs/connect/index_en.htm

Cyber-Physical Systems
<http://ec.europa.eu/digital-agenda/en/cyber-physical-systems>

Horizon 2020 on the web:
http://ec.europa.eu/research/horizon2020/index_en.cfm