

Digitising European Industry

EU strategy to mainstream digital innovation
across all sectors of European industry



Sandro D'Elia
European Commission DG CONNECT

What is this about?

- Measures that enable **all sectors** to benefit from digital innovation
 - For higher value products with "digital inside"
 - Increased efficiency of processes
 - Adapted and reshaped business models including relevant services
- A set of **coherent measures**
 - EU cloud initiative, Standardisation strategy, Forthcoming free flow of data, skills and jobs, European Fund for Strategic Investment (EFSI), Regional policies (ESIF), eGov action plan, Telecom review, Innovrefit.
- **Coordination** of various initiatives from **Member States, regions, EU**
 - Pool resources, avoid fragmentation and support DSM (Digital Single Market)

Many EU companies are well advanced in digitisation we want to extend the benefits to all industry sectors

"Digital inside": Innovations **in products** (all types)



~40 % AV growth



~50%

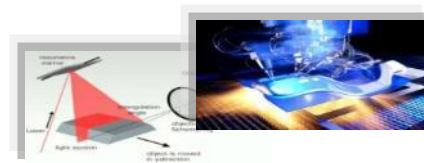
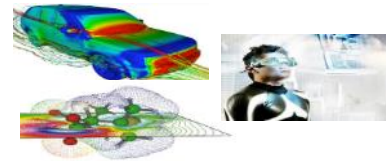


~40%

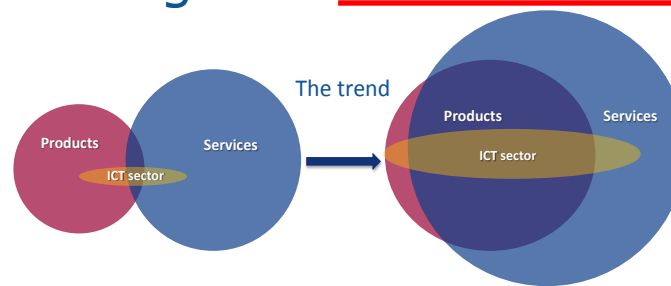


~80%

Digital transformations of **processes**



Radical/disruptive changes in **business models** ("servitisation")



DEI: the elements of the strategy

**Innovation Hubs +
Platforms +
Skills +
Regulation =**

Digitising European Industry

*(also known as "**DEI**")*



Word cloud 1: Digital Innovation Hubs, smart platforms, in regulation, the skills, filling leadership, gap.



Word cloud 2: Platforms, smart, hubs, the, Leadership, regulation, digital, innovation, skills, in, filling, gap.



Word cloud 3: Skills, platforms, regulation, leadership, innovation, hubs, smart, in, Filling, the, Gap, digital.



Word cloud 4: Smart, Regulation, filling, the, digital, hubs, gap, skills, leadership, in, innovation, platforms.

Complementary
Comprehensive
Collaborative

EUROPEAN
UNION



ONE SIZE

~~FITS ALL~~

@graphicrecorder

THE DIGITIZATION
BUS IS LEAVING!



SOCIAL COHESION

CITIZENS

GOVERNMENT

ACADEMIA

UNIONS

BUSINESS

RESPECTING
NATIONAL
SPECIFICITIES

COMPLEMENTARITY

ALIGNMENT

PLATFORMS

ALL
ABOARD

Comprehensive

ANY BUSINESS
WHERE
SIZE
SECTOR

DIGITISING EUROPEAN INDUSTRY

the context

Digitising European Industry

To facilitate coordination of European, national & regional initiatives
such as Industrie 4.0 (DE), Smart Industry (NL) (SK), Industrie du Futur (FR)

Mainstreaming digital innovation across all sectors:

Setting up a pan-European network
of Digital Innovation Hubs

Strengthening leadership in digital technologies

- Public-Private Partnerships
- Industrial platforms
- Large scale pilots & test beds

Preparing People for the digital age: Skills & Training

Regulatory framework:

- Free flow of data & data ownership
- Safety & liability of autonomous systems & Internet of Things

Challenges & opportunities of the Internet of Things

CLOUD



European Cloud Initiative in a data-driven economy:

- European Open Science Cloud
- European Data Infrastructure
- Widening access & building trust

High
Performance
Computing

Quantum

STANDARDS



Fast development in 5 priority areas:

- 5G
- Cloud Computing
- Internet of Things
- Data Technologies
- Cybersecurity

DIGITAL PUBLIC SERVICES



eGovernment Action Plan:

- New Digital Single Gateway
- eJustice Portal
- "Once-only" principle in Administrations
- Cross-border Health services
- eProcurement & "Once-only" in public procurement

To focus investments

(Horizon 2020, EU Investment Plan, EU Structural & Investment Funds,
national & regional funds, private sector)

MOBILISING €50bn of public & private investments

 #DigitiseEU
@DSMeu

 DigitalSingleMarket

bit.ly/DigitiseEU

At the core of DEI:

- Innovation hubs
- Platforms and technologies
- Skills
- Regulation

DIGITISING EUROPEAN INDUSTRY

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platforms regulation
leadership innovation
Skills
hubs smart
Filling
in
the Gap
digital

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Setting up a pan-European network of Digital Innovation Hubs

smart platforms
the Digital in
skills innovation
gap filling
leadership

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hubs smart
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Leadership in
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hubs gap filling the digital
skills Smart
Regulation
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@DSMeu

DigitalSingleMarket

bit.ly/DigitiseEU

Why do we need this?

For a smooth transition
to a smart economy

To prepare the next generation
of products & services

To boost innovation capacity
across industry

To increase EU GDP
by €110bn/year

European Industrial Strengths

EU companies are world leaders in



Manufacturing



Electronics
for automotive
& aerospace



Electronics for
security & energy



Robotics



Telecom
equipment



Business &
professional
software



Laser & sensor
technologies

World-class Research & Technology institutions



Traditional sectors & SMEs



Construction



Food & beverage



Textiles



Publishing & printing



Craft industries

*They can all
benefit
from
Digital
opportunities*

**Digitisation builds on well-recognised
strengths of EU industry in several sectors**

What's going on

20 national initiative by end 2017



National and Regional Initiatives

EU-level Initiatives

Application PPPs: FoF, SPIRE
ICT Innovation for Manufacturing
SMEsb(I4MS)
Smart Anything Everywhere
Digital Sector PPPs

Multi-region Initiatives

Vanguard

United Kingdom

- High Value Manufacturing Catapult
- Innovate UK
- EPSRC Manufacturing the Future
- Action Plan for Manufacturing (Scotland)

Belgium

- Made Different
- Flanders Make/iMinds(Flanders)
- Marshall 4.0 (Wallonia)

France

- Nouvelle France Industrielle
- Industrie du Futur
- Transition Numérique
- Le Programme des Investissements d'Avenir
- Plan Industries Ile-de-France

Portugal

Industria 4.0
PRODUTECH

Spain

- Industria Conectada 4.0
- Basque Industry 4.0 (TECNALIA)

Sweden

Produktion 2030

Denmark

MADE

Netherlands

Smart Industry

Finland

- FIMECC PPP Programmes
- DIGILE
- TEKES

Latvia

- Demola Latvia

Poland

- INNOMED
- INNOLOT
- CuBR
- BIOSTRATEG

Germany

- Plattform Industrie 4.0
- Mittelstand 4.0
- Smart Service World
- Autonomik für Industrie 4.0
- It's OWL (Ostwestfalen-Lippe)
- Allianz Industrie 4.0 (Baden-Württemberg)

Slovakia

- Smart Industry

Czech Republic

- Průmysl 4.0

Austria

Produktion der Zukunft

Italy

- Piano Nazionale Industria 4.0
- Fabbrica Intelligente
- Associazione Fabbrica Intelligente Lombardia

Greece

Operational Programme in Region Western Greece

European initiatives
National Initiatives
Regional initiatives

- At the **Digital Day** in Rome we are launching the European Platform of national initiatives on digitising industry, or **European Industry 4.0 (EUI4.0)**
- EUI4.0 objectives:
 - Complement existing initiatives.
 - Welcome and support new upcoming national initiatives.
 - Share experiences
 - Trigger collaboration and joint investments
 - Explore common approaches to regulatory problems
 - Exchange means for re-skilling of the workforce
- Where individual action at Member State or regional level is not sufficient the EU will add value by building a critical size of initiatives and investments for digitising our industry across the Union.

A word cloud on a white background with a red border. The words are arranged in a circular pattern. The largest word is 'Digital' in red. Other large words include 'Innovation' in green and 'Hubs' in blue. Smaller words include 'smart', 'platforms', 'in', 'regulation', 'the', 'skills', 'gap', 'filling', and 'leadership'.

**Mainstreaming Digital Innovation
across all Sectors**

A word cloud on a grey background with a red border. The words are arranged in a circular pattern. The largest word is 'Platforms' in blue. Other large words include 'Leadership' in dark green and 'in' in green. Smaller words include 'hubs', 'the', 'regulation', 'digital', 'innovation', 'skills', 'filling', and 'gap'.

**Leadership in digital technologies value chains
and platforms**

A word cloud on a grey background with a red border. The words are arranged in a circular pattern. The largest word is 'Skills' in dark green. Other large words include 'Filling' in green and 'the' in black. Smaller words include 'platforms', 'regulation', 'leadership', 'innovation', 'hubs', 'smart', 'in', and 'digital'.

**Strengthen human capital,
employability and competitiveness**

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Appropriate regulatory framework conditions

INNOVATION HUBS

industry 4.0

GOVERNMENTS SHOULD
BRING PLAYERS TOGETHER

many small companies still struggle with 1st steps

COMPETENCE
CENTER

Today, systems
build themselves.
You just have to
help creating trust.

UNIVERSITIES
INVESTORS
SKILLS
COMPANIES
TRAINERS
COMPETENCE

INVOLVE
VISIONARY
& PASSIONATE
PEOPLE

LESS
BARRIERS
TO
DIGITAL
TECHNOLOGY



MAKE
THINGS
WORK

Innovation hub = competence center + business

Digital Innovation Hubs: starting position

Variable geometry of the innovation infrastructure in Europe

- Competence Centers and Innovation Hubs
- Sector- and application oriented
- Technology oriented
- User oriented
- Location oriented

Mittelstand-Digital



I4MS European Factories of the Future PPP



SUPERCOMPUTING EXPERTISE FOR
SMALL & MEDIUM ENTERPRISE NETWORK



Netherlands Field Labs



VANGUARD
INITIATIVE

Regional Innovation Hubs:

- Digital Hub Cologne
- Bayern Innovativ
- ...

- Make latest digital technologies available for all industry anywhere in Europe (wherever, whichever size)
 - Test, experiment products, processes, business models
- Targeting notably SMEs, start-ups, non-tech industry,...
- Through networks of "digital innovation hubs"
 - Based on "Competence centres" (RTOs*, University labs,...)
 - Complementary expertise to offer one stop shop
- Stimulating a wave of bottom-up digital innovations
 - across regions and in all industrial sectors

*RTO: Research & Technology Organisation

Organic growth of digital innovation infrastructure

Member states and regions: build-up and strengthening of national and regional structures of digital innovation hubs

- Innovation programme (e.g. German Mittelstand-Digital, Bayern Innovativ, ...)
- Structural funds (e.g. ESIF)
- Funding programmes (e.g. KfW, EFSI - Juncker Plan)

European Commission: Complementary added value oriented measures

- Map of competences, best practices, demonstrators,...
- Pan-European network of Digital Innovation Hubs (DIH)
- Support for cross-border innovation experiments
- Preparatory measures for DIHs in less developed regions
- Frameworks for pooling of resources (H2020, ESIF, EFSI, ...)

Financing

- 500 M€ for network of Innovation Hubs in Horizon 2020
→ 5 B€ regional and national funding, including when possible ESIF, EFSI, ...

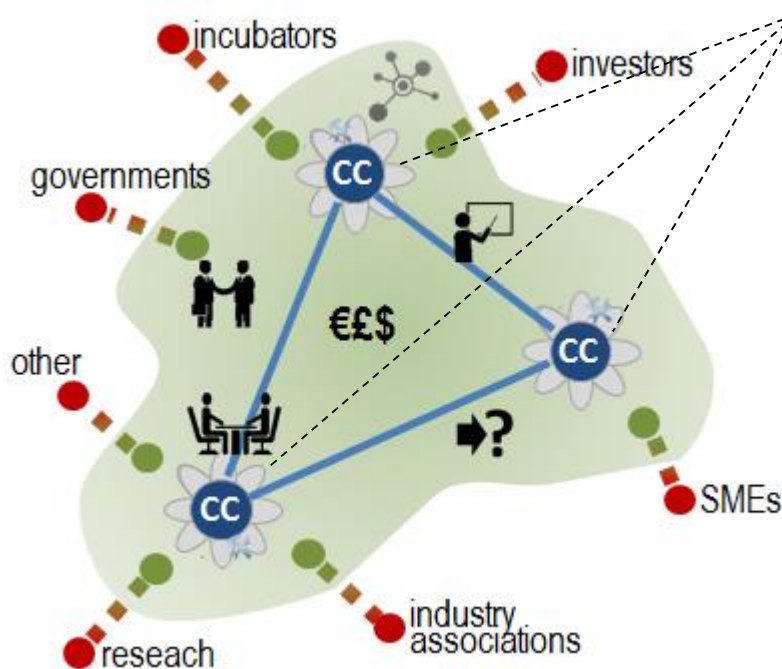
Competence Centres are the core of Digital Innovation Hubs

Digital Innovation Hubs focus on mixing technological competences within an ecosystem delivering innovation services

DIGITAL INNOVATION HUB

Organised to provide services to industry

- Access to competence centres
- Development of innovation ecosystem
- Brokerage
- Access to finance
- Market intelligence
- Training and education
- Incubator/mentoring services



COMPETENCE CENTRE

Competences in Digital Technologies

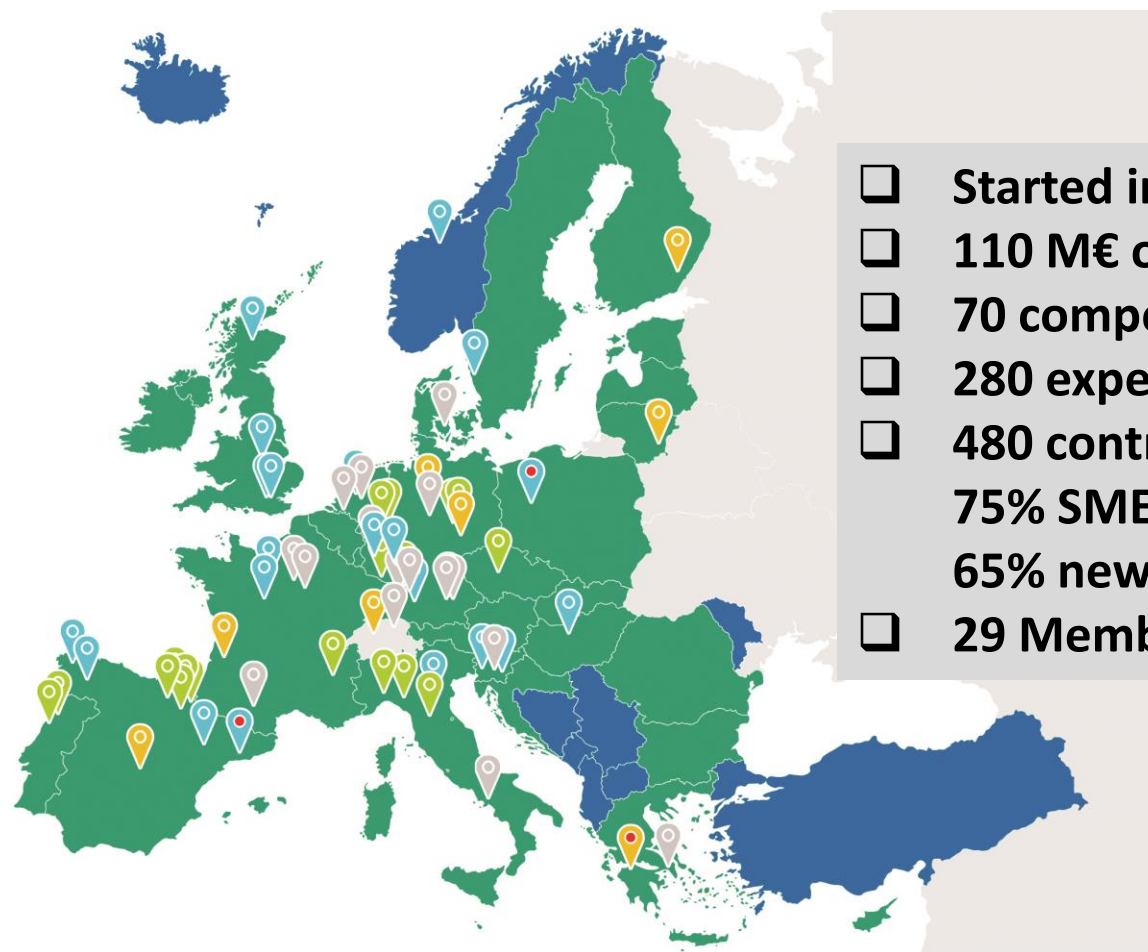
- Provide access to infrastructure and technology platforms
- Provide digitisation and application expertise
- Support experimentation in real-life environments
- Support fabrication of new products
- Demonstrate best practices
- Showcase technologies in pilot factories, fab-labs

Building on and expanding successful actions

Example: ICT Innovation for Manufacturing SMEs

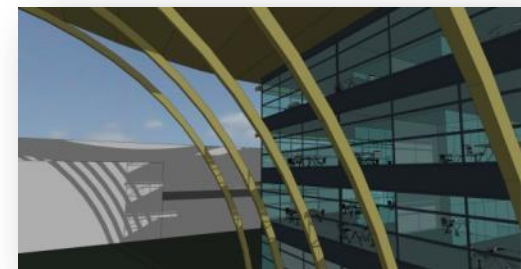
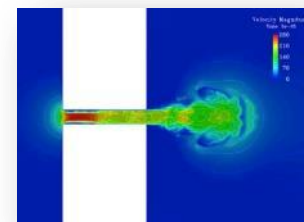


Factories of the Future PPP



- ☐ Started in 2013
- ☐ 110 M€ of EU funding - 11 networks
- ☐ 70 competence centres
- ☐ 280 experiments: 75% cross-border
- ☐ 480 contractors/340 industrial:
75% SMEs and mid-caps, 50% users,
65% new in EU R&I Programmes
- ☐ 29 Members States + Ass. Countries

- **Goal:** Provide SMEs with easy and cost-effective access to **advanced simulation, visualisation and data analytics**
- **How:** provide expertise, tools and means to tap into a European Cloud of HPC resources & software applications
- 16 innovation hubs – 94 experiments so far
- Fortissimo 1+2: €26m >100 SMEs



Cloud-based CFD simulation for hypercars

- CFD aerodynamics simulation needed - but in house HPC resources not affordable
Solution: Cloud-based pay-per-use HPC
- Impressive results
 - 30% saving in design costs plus 50% reduction in wind tunnel and physical testing
 - Development savings of €90K per year
 - 30% decrease in time to market
- **250k€ Funding**
→ **4M€ benefit to company over 5 years using cloud-based Pay-per-use HPC and simulation software**



Partners:

End-user SME: KOENIGSEGG – SE
ISV-SME: ICONCFD – UK
HPC centre: CINECA – IT
HPC centre: EPCC - UK

Tailor made shoes for customers with feet anomalies

- 3D insole scan & design is processed on HPC resources via the cloud
 - Paving the way for 3D printing of soles/shoes in the back-shop in Europe
- **Benefits for the shoe industry:**
 - No need for specialised CAD knowledge
 - No hassle with SW licenses
 - Immediate validation and perfect fit
- **Benefits for the customer:**
 - Faster availability of the shoe
 - Lower cost for special shoes
- **250k€ Funding**
 - **Tripling Base Protection's turnover within 3 years**



Partners:

End-user SME: BASE PROTECTION – IT
End user SME: PODOACTIVA -ES
Technology provider SME: INGECON - ES

The footwear industry ecosystem in PT Norte

- **Successful industry in PT:** 40% growth/ 4 years, 90% export
- **Experiment**
 - Improving all processes involved in footwear production by use of CPS and IoT solutions (platforms: OpenIoT, FITMAN)
 - Expanding the ecosystem to other
 - footwear SMEs (also outside PT Norte)
 - and other sectors (e.g. furniture)

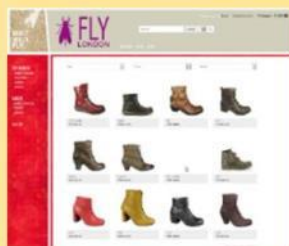
Partners:

End-user SMEs: KYAIA (600workers) - PT
Technology providers: INESC Porto – PT,
Centro Tecnológico do Calçado de PT

E-SALES



E-VIRTUAL STORE



E-CUT



E-LOG PROD



E- DISTRIBUTION



Example from robotics (ECHORD++)

Innovation in products: Green asparagus harvesting robot

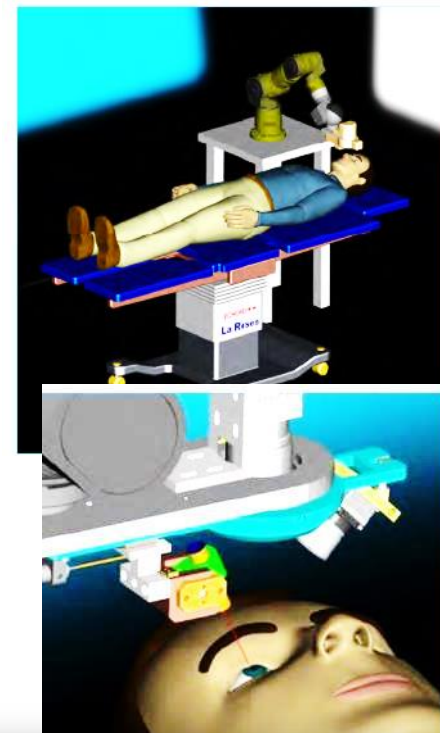
- Robotics for precision farming
 - Cost effective robotic solutions, reducing costs & waste
 - Addressing lack of workers problem
- Results:
 - Integration and testing of full systems
 - Increasing detection and harvesting rate
- **<300 K€ funding**
 - Competitive positioning in a large market
 - Reduce hard physical efforts for workers
 - Reduce cost of harvesting which is today one third of total cost



Partners in experiment:
Strauss Verpackung (DE)
C Wright &son LTD (UK)
Univ. of Bremen (DE)

Example from robotics (ECHORD++)

- Laser assisted robotics surgery
 - Vision guided robotic for all-laser corneal transplantation
- Results:
 - Robotic arm with laser light for the welding site in the eye
 - Increasing efficacy and precision by 150 %
- **<300 K€ funding**
 - Impact on several types of surgery
 - Neurosurgery, Spinal surgery, Urology, Eye surgery



Partners in experiment:
Ekymed SPA (IT)
CNR (IT)
Fastenica (IT)
Partners in ECHORD ++:
TUM (DE), CEA (FR), Bristol
robotics lab (UK), UPC (ES)
Univ. of Pisa (IT)



**Mainstreaming Digital Innovation
across all Sectors**



**Leadership in digital technologies value chains
and platforms**

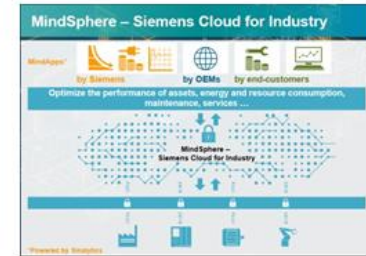
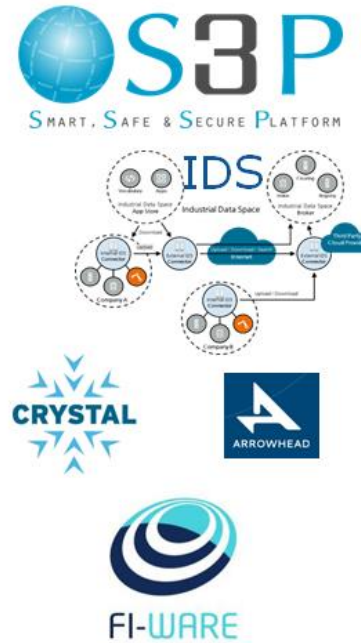
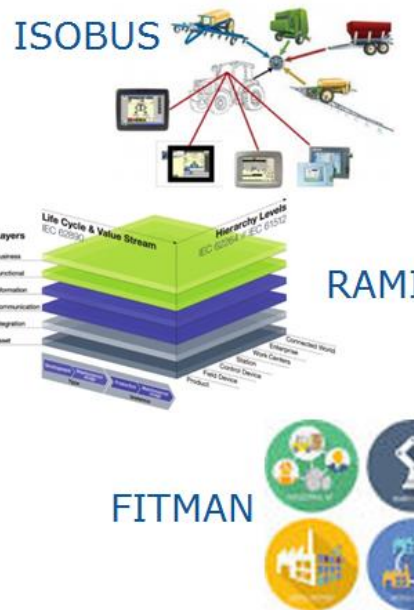


**Strengthen human capital,
employability and competitiveness**

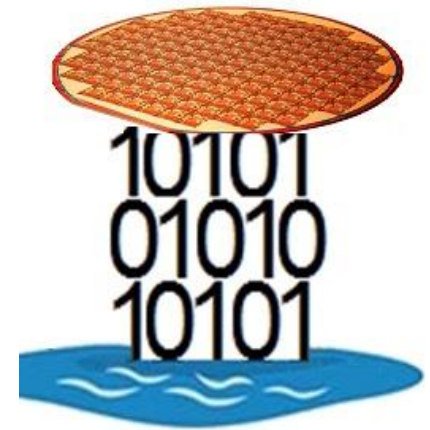
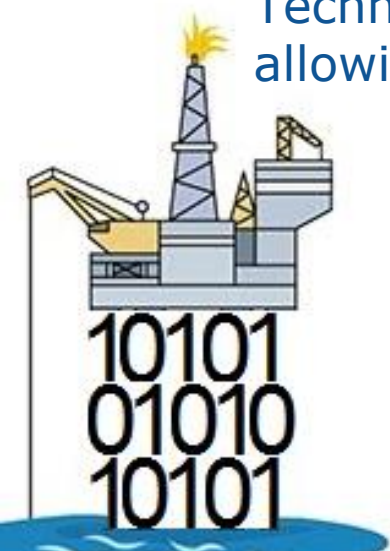


Appropriate regulatory framework conditions

What is a platform?



Technical environments (standards, templates, support, specs...) allowing different actors to make business out of it.



What is a platform?

Just think of a big tree

Different actors in the value chain
(insects, birds, squirrels, mushrooms)

Selfish and profit-based behaviour

Co-competition

Sharing of resources

Social community

Common roots

What is a "digital value chain?"

A few examples here



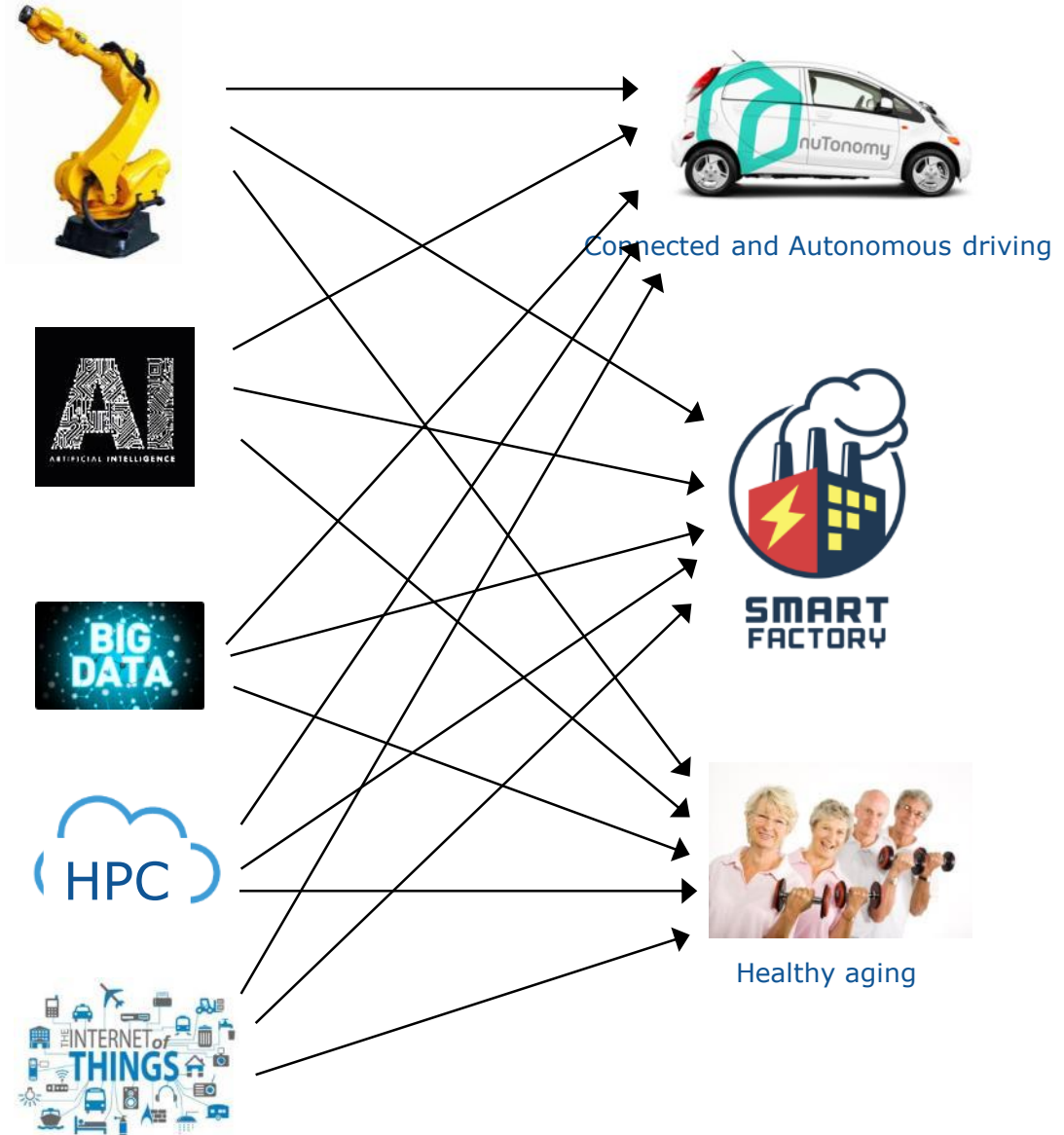
Connected and Autonomous driving



Healthy aging

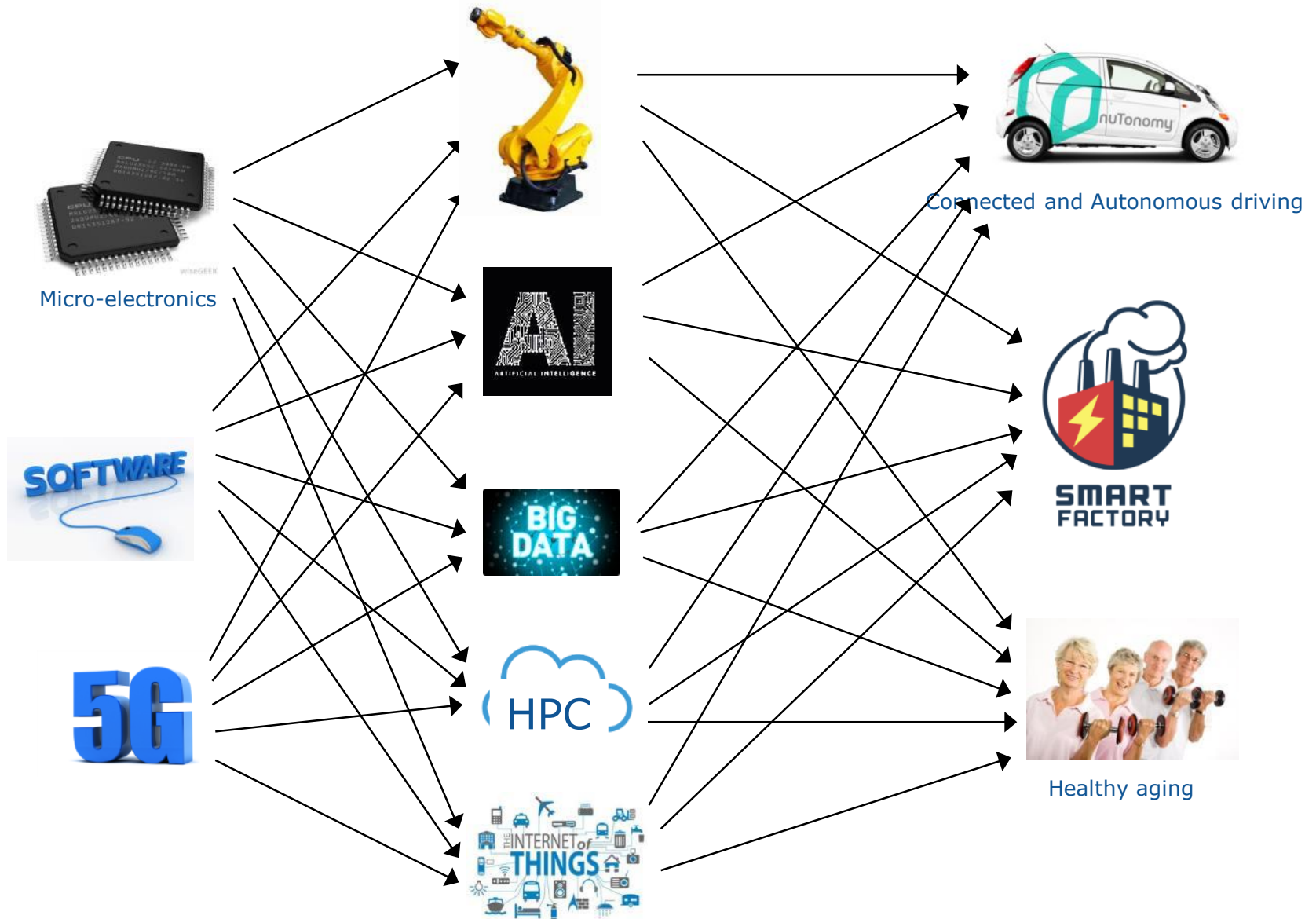
Digital value chains

Some examples

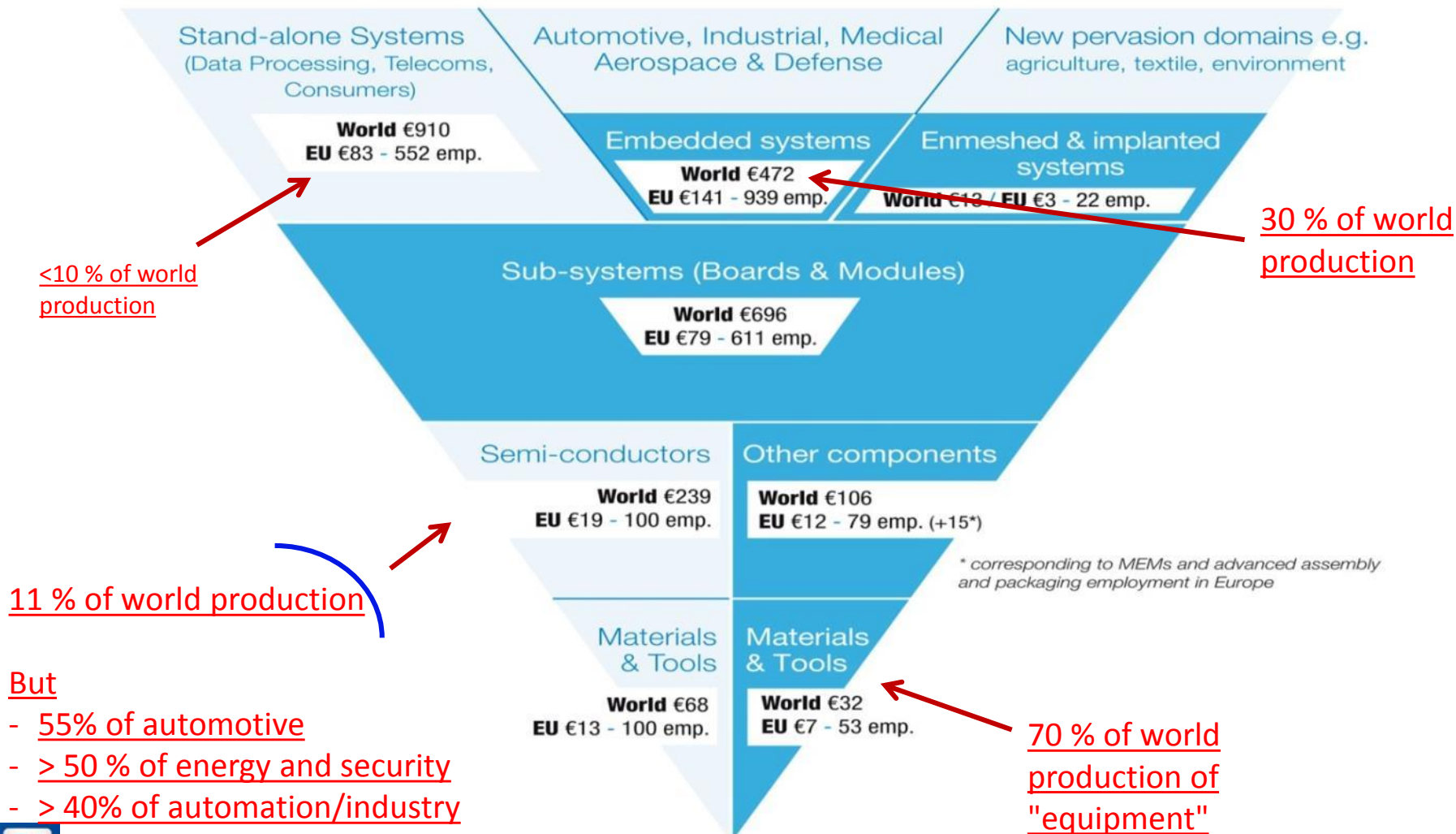


Digital value chains

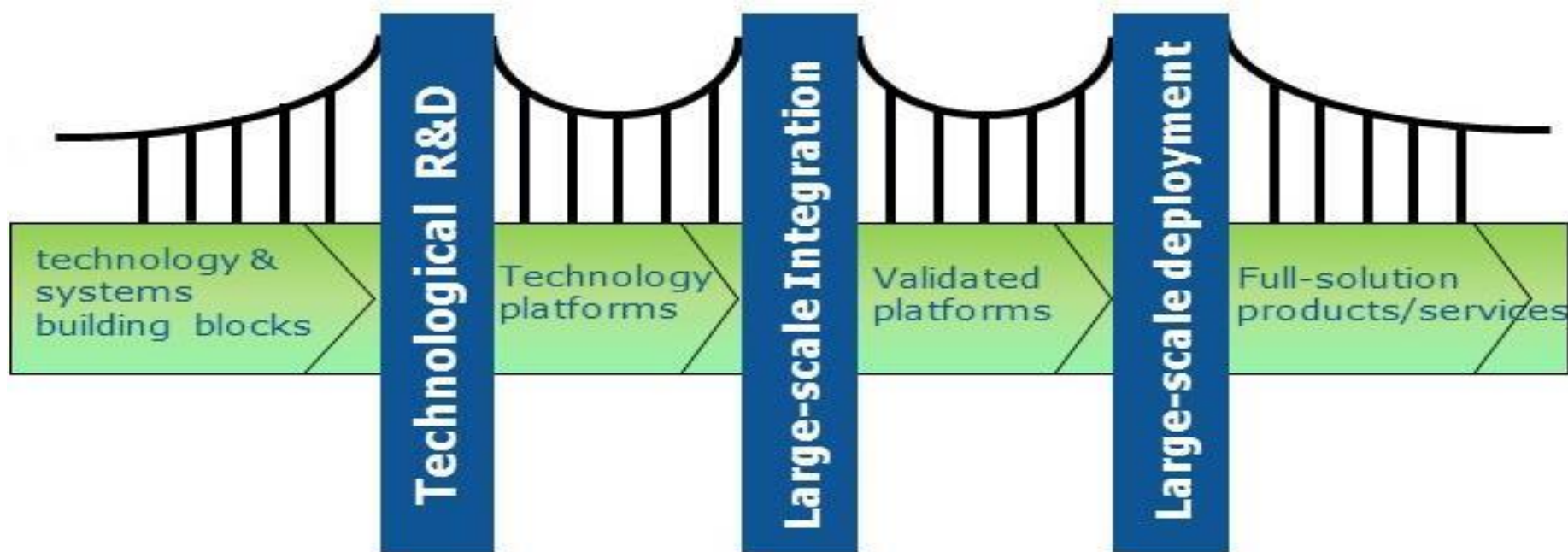
Some examples



Fuelling digital innovation: Where is Europe in the value chain



Align our efforts in different development stages –
Example of microelectronics and embedded software



R&D projects on micro-/nano-electronics

- FP7, Horizon 2020
- TRL 2-5
- National programmes

x 10

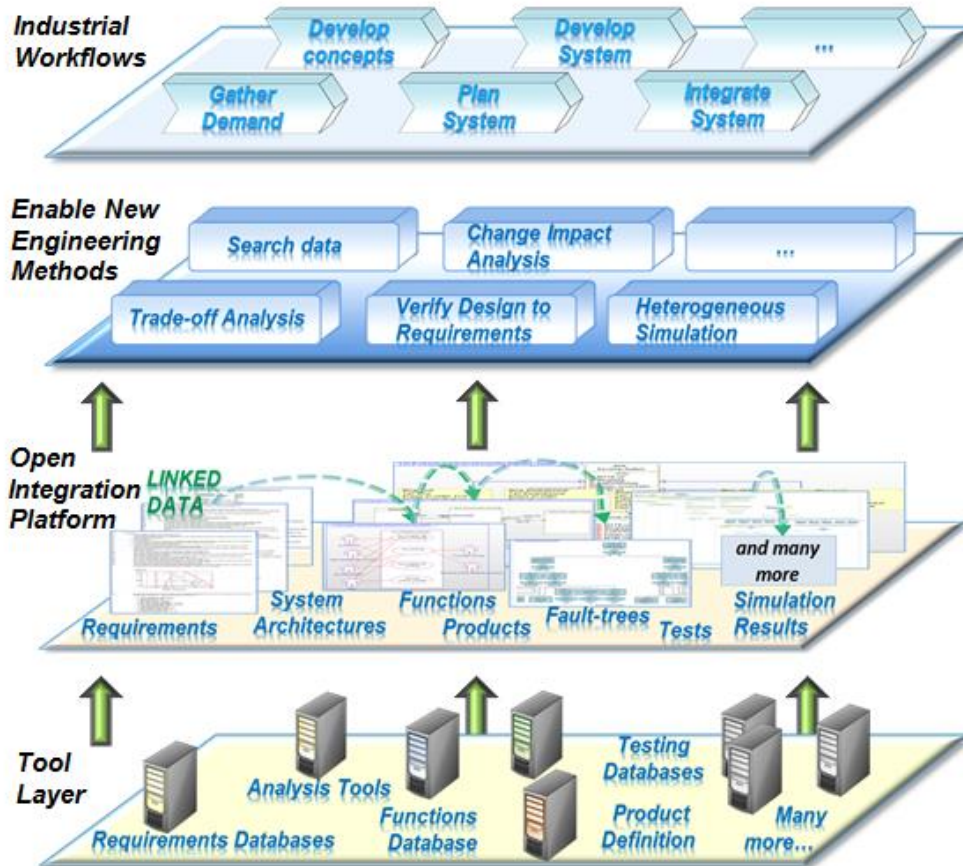
Pilot lines

- FP7, Horizon 2020, MS, industry
- E.g. 400 M€ for power semi-con pilot lines
- TRL 5-8

IPCEI

- MS, industry
- E.g. microelectronics IPCEI
- TRL 8-9

x 10



Crystal

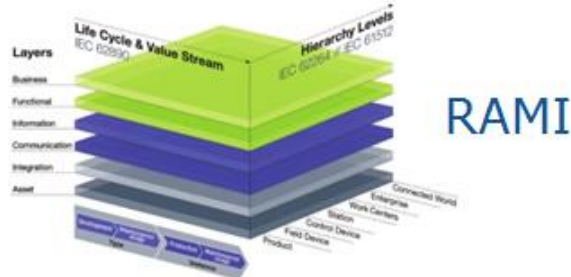
- ARTEMIS
- 82 MEuro, 71 partners
- Technology platform for safety-critical systems, with reference solutions

Cooperation in core platforms: examples

European
Commission

Community-led sector-specific (vertical)

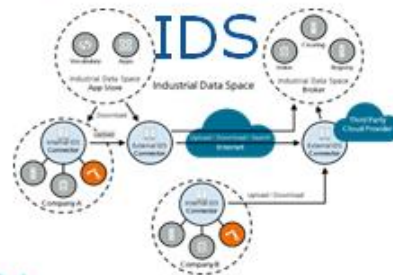
AUTOSAR



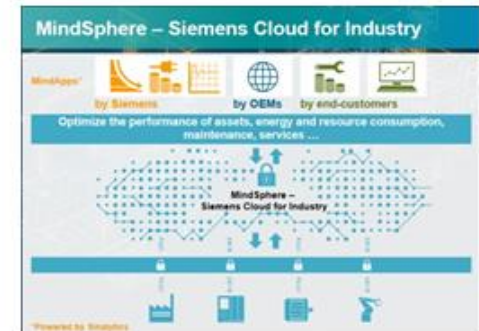
FITMAN



Community-led cross-sector (horizontal)



Proprietary with open interfaces

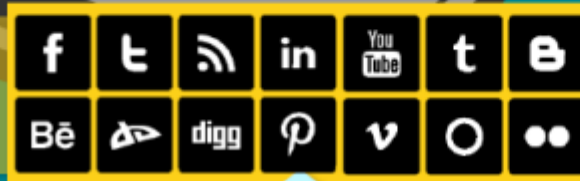


DASSAULT SYSTEMES



Smart Phone

Applications



Platform /
Operating
System



Sensors /
Connection with
physical world

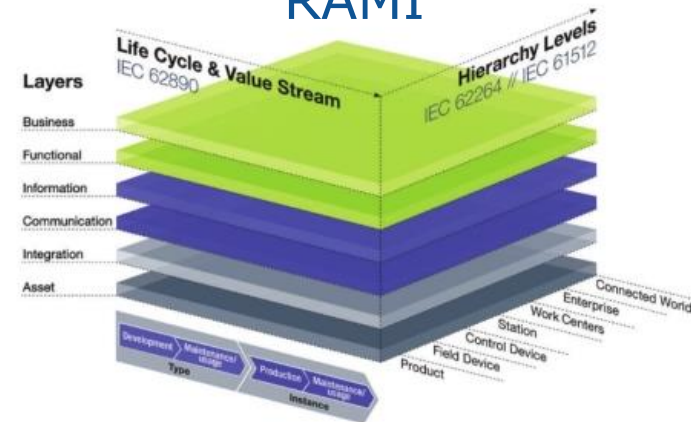


Smart Factory

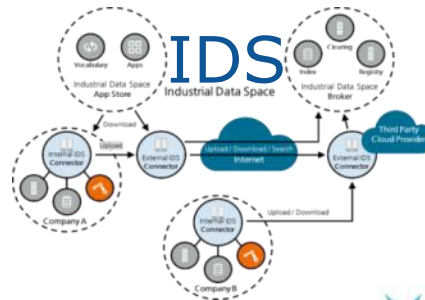


Community-led sector-specific (vertical)

RAMI



Community-led cross-sector (horizontal)

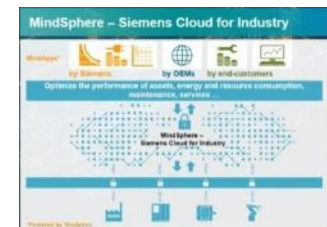


AIOTI



Proprietary with open interfaces

SIEMENS



DASSAULT SYSTEMES



SAP HANA for Supply Chain and Manufacturing



CODE OF PLM OPENESS



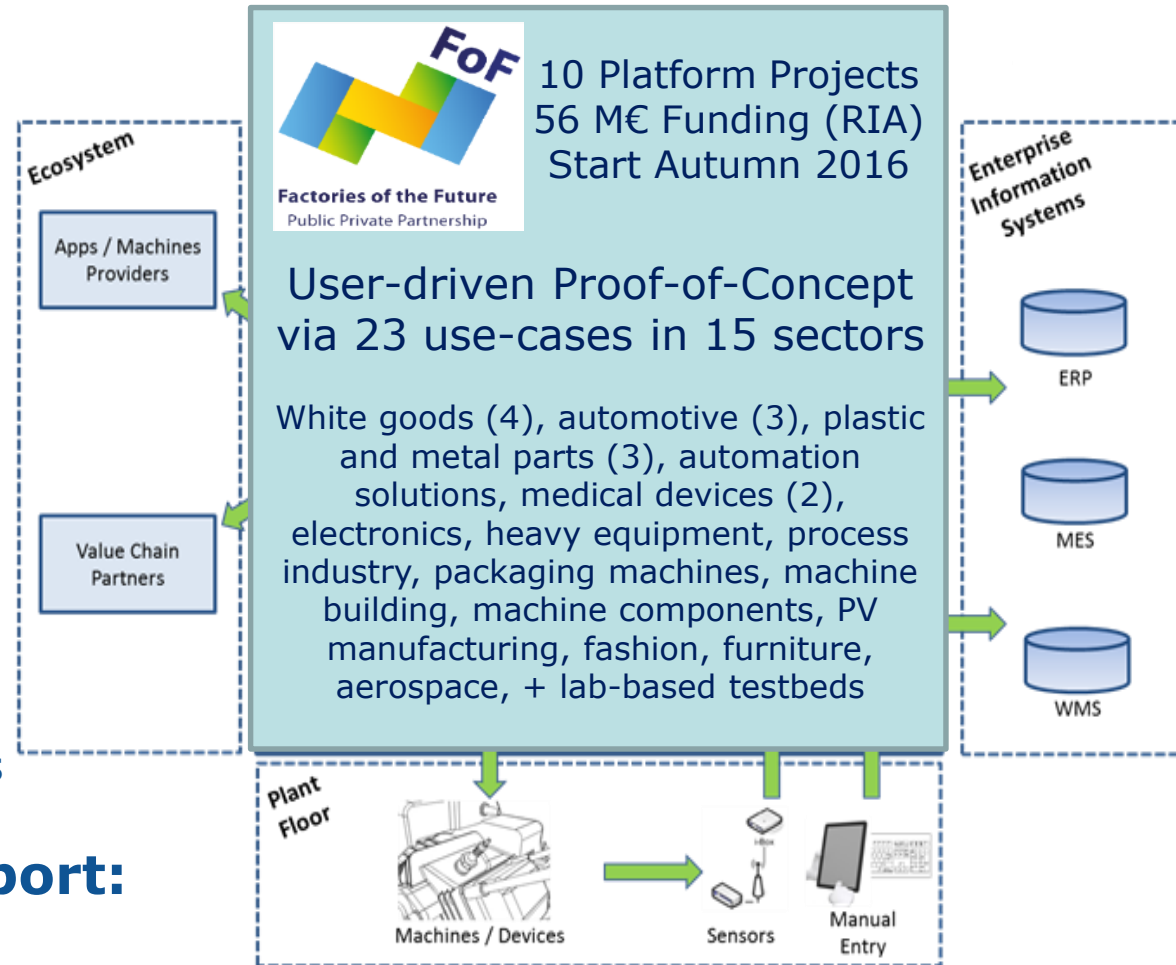
Starting point (2): PPP FoF Digital Industrial Platform Projects

In essence:

- Connecting manufacturing services through platforms
- Building on running platform initiatives
- Integrating digital technologies
- Focus on:
 - Collaborative manufacturing
 - And/or factory automation
- Reference Implementations
- Ecosystem building
- Compatibility with legacy information systems
- Open to 3rd party innovations

Co-ordination and support:

- ConnectedFactories Project
- EFFRA with major EU RTOs in digital manufacturing
- Exploit synergies across projects
- Derive future-looking concepts and strategies for platforms



And what about cyber security?

In essence:

- (cyber) security is so important that it is not a separate component of the strategy: it is "mainstreamed" (like e.g. user safety)
- Security is primarily linked to technical platforms, which have to be secure by design
- Security can be enhanced by specific regulation / certification
- Security has to be taught (relevance for skills)
- Security is especially relevant in manufacturing, because the factory of the future has to be open to data





**Mainstreaming Digital Innovation
across all Sectors**



**Leadership in digital technologies value chains
and platforms**



**Strengthen human capital,
employability and competitiveness**



Appropriate regulatory framework conditions

Do we need to care
about skills?

The Telegraph

HOME | NEWS |

Technology

News | Reviews | Opinion | Internet security | Social media | Apple | Google



The Telegraph

HOME | NEWS

Technology

News | Reviews | Opinion | Internet security | Social media | Apple | Google

Home > Technology

Pay a universal income because robots will take all our jobs, says Elon Musk



0 Comments

maybe yes



Grand Coalition for digital jobs

multi-stakeholder partnership to tackle:

the lack of digital skills in Europe

the unfilled ICT-related vacancies across all industry sector

- identify and share best practices
- improve the dissemination of information about available EU funds
- explore possible funding opportunities for example through voucher mechanisms



The way forward: "Upscaling" and networking EU-wide digital innovation hubs

- **Member states, regions:** Build-up and strengthen national and regional structures of digital innovation hubs
 - Innovation programmes
 - Structural funds, ESIF: Smart specialisation..
 - Access to finance (e.g. KfW, BPI, EFSI , ...)
- **European Commission:** Complementary focused measures
 - Map of competences, best practices, demonstrators,...
 - Pan-European network of Digital Innovation Hubs (DIH)
 - Support for cross-border innovation experiments (I4MS, ...)
 - Preparatory measures for DIHs in less developed regions
- **Financing**
 - 500 M€ for network of Innovation Hubs in Horizon 2020
→ 5 B€ regional and national funding including when possible ESIF,...



**Mainstreaming Digital Innovation
across all Sectors**



**Leadership in digital technologies value chains
and platforms**



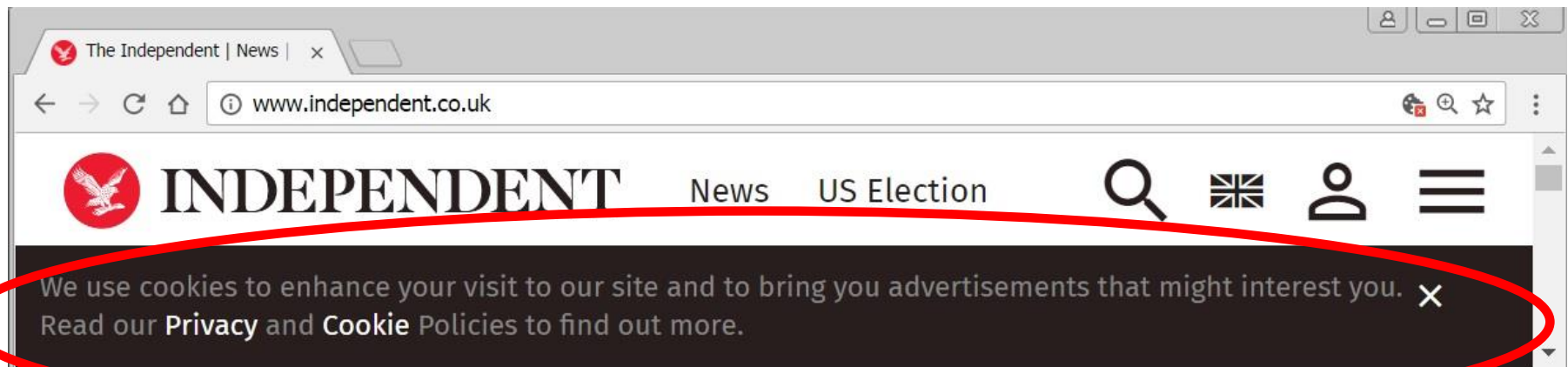
**Strengthen human capital,
employability and competitiveness**



Appropriate regulatory framework conditions

Providing the appropriate regulatory framework conditions

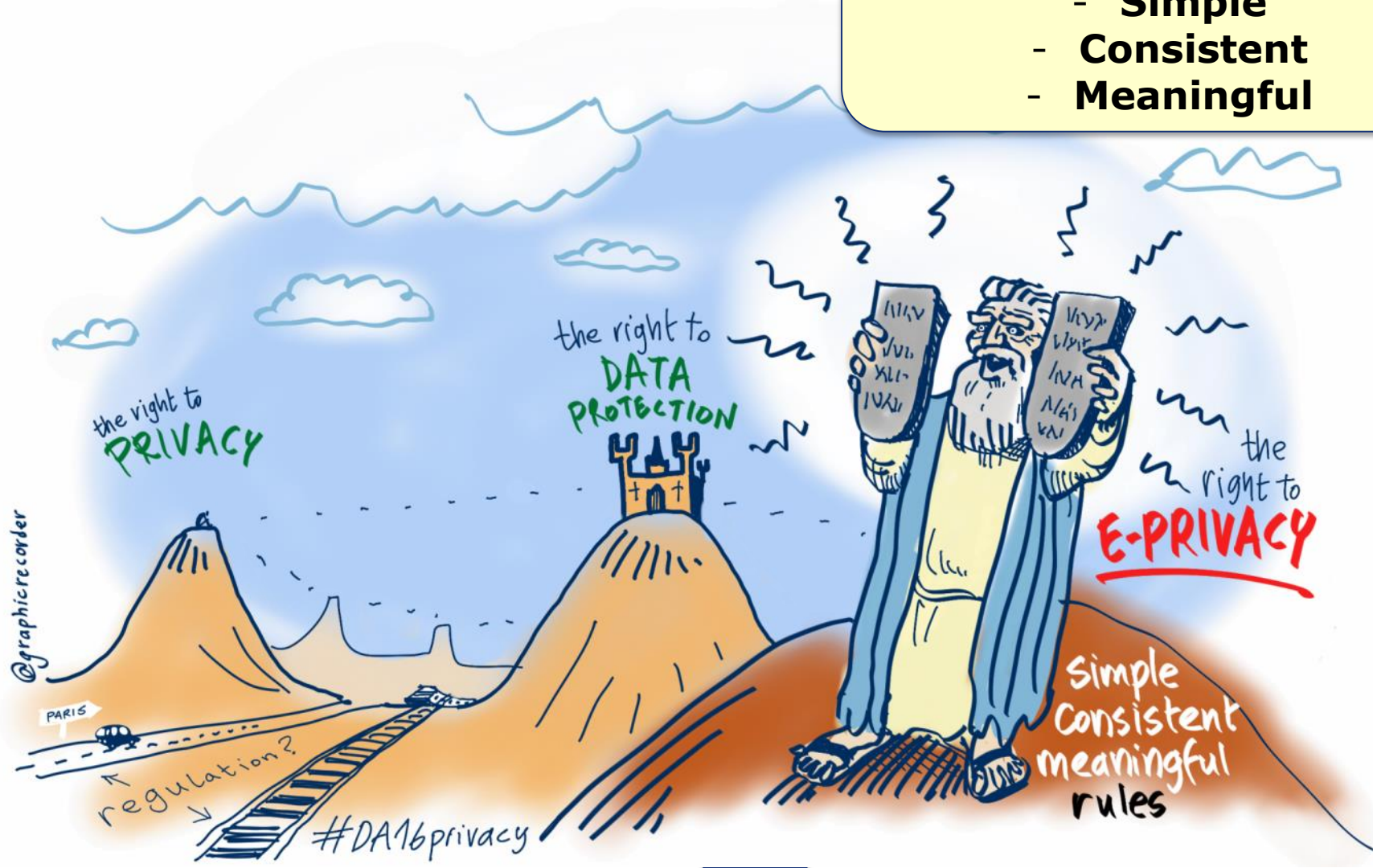
- "Building a European data economy" initiative coupled with a legislative instrument on unjustified localisation requirements
- Provide a comprehensive analysis of the legal framework on the European level related to liability and prepare possible legislative actions in 2017
- Review of Product Liability Directive



No, this is not an example of smart regulation
We need rules designed for the digital world

Rules for the digital world:

- Simple
- Consistent
- Meaningful



Digital single market strategy

Free flow of data

- Tackling data location restrictions
- Launching a European Cloud initiative
- Clarifying emerging issues of data ownership, access and liability
- Encouraging access to public data

DIGITISING EUROPEAN INDUSTRY

Summary

Summary

Digitising European Industry

To facilitate coordination of European, national & regional initiatives
such as Industrie 4.0 (DE), Smart Industry (NL) (SK), Industrie du Futur (FR)

Mainstreaming digital innovation across all sectors:

Setting up a pan-European network
of Digital Innovation Hubs

Strengthening leadership in digital technologies

- Public-Private Partnerships
- Industrial platforms
- Large scale pilots & test beds

Preparing People for the digital age: Skills & Training

Regulatory framework:

- Free flow of data & data ownership
- Safety & liability of autonomous systems & Internet of Things

Challenges &
opportunities of the
**Internet
of Things**

CLOUD



European Cloud Initiative in a data-driven economy:

- European Open Science Cloud
- European Data Infrastructure
- Widening access & building trust

High
Performance
Computing

Quantum

STANDARDS



Fast development in 5 priority areas:

- 5G
- Cloud Computing
- Internet of Things
- Data Technologies
- Cybersecurity

DIGITAL PUBLIC SERVICES



eGovernment Action Plan:

- New Digital Single Gateway
- eJustice Portal
- “Once-only” principle in Administrations
- Cross-border Health services
- eProcurement & “Once-only” in public procurement

To focus investments

(Horizon 2020, EU Investment Plan, EU Structural & Investment Funds,
national & regional funds, private sector)

MOBILISING €50bn of public & private investments

#DigitiseEU
@DSMeu

DigitalSingleMarket

bit.ly/DigitiseEU

A framework for co-ordination of initiatives for digitising industry

Two high-level **roundtables** per year
(20/9/2016 Brussels – next in spring 2017)

One large-scale public event "**stakeholder forum**" per year (31/1-1/2/2017 Essen)

Working groups

(frequent meetings e.g.: October and December 2016)

The European Platform of National Initiatives EUI4.0

Co-investing in boosting Europe's digital innovation capacities (digital innovation hubs)

- €500 million in the H2020 workprogramme 2016-2020 for digital innovation hubs
- Pooling 5B€ from different financial instruments: (H2020, ESIF, EFSI, national programmes, ...)
 - **Mobilising policy and decision makers**
 - **Engaging with private sector**
 - **Connecting to investment community**
- Creating a dynamic map of digital innovation hubs

Partnerships for leadership in digital technologies value chains and platforms

- Aligning strategic research agendas of PPPs with programmes in Member States (TRL 1-5)
- Select a first batch of platform-related projects and large-scale testing and experimentation pilots (TRL 5-7) in 2017

*TRL: Technology Readiness Level

Partnerships for leadership in digital technologies value chains and platforms

- Prepare and implement large scale testing and experimentation pilots under WP 2018-20 (TRLs 5-7) ('Digitalisation' Focus Area):
 - Connected smart factory
 - Connected and automated driving
 - Robotics and AI for smart living and healthy ageing
 - Smart farming
 - Smart cities/smart rural communities
- Support the full roll-out of digital innovations (TRL 7-9): HPC, microelectronics

Digitising European Industry

<https://ec.europa.eu/futurium/en/content/implementing-digitising-european-industry-actions>

or: bit.ly/futuriumdei

<https://ec.europa.eu/digital-single-market/digitising-european-industry>

or: bit.ly/europadei