



ICT in HORIZON 2020

Focus on ICT in LEIT



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Horizon 2020

What is Horizon 2020



- **Over €70 billion research and innovation funding programme (2014-2020)**
 - ✓ (in 2011 Constant prices, ~78 B€ in current prices)
- **A core part of Europe 2020, Innovation Union & European Research Area:**
 - Responding to the economic crisis to invest in future jobs and growth
 - Addressing people's concerns about their livelihoods, safety and environment
 - Strengthening the EU's global position in research, innovation and technology

Three priorities



What's new



- **A single programme** bringing together three separate programmes/initiatives*
- **Coupling research to innovation** – from research to retail, all forms of innovation
- **Focus on societal challenges** facing EU society, e.g. health, clean energy and transport
- **Emphasises Key Enabling Technologies**
- **Simplified access**, for all companies, universities, institutes in all EU countries and beyond

□ The 7th Research Framework Programme (FP7), innovation aspects of Competitiveness and Innovation Framework Programme (CIP), EU contribution to the European Institute of Innovation and Technology (EIT)

Horizon 2020 and partnering



Public private partnerships:

- Through Joint Technology Initiatives or other formal structures (Art. 187)
- Through contractual agreements, which provide inputs for work programmes
- Only when criteria met, e.g. clear commitments from private partners

Public public partnerships:

- Through « ERA-Nets » for topping up individual calls/actions (replacing current ERA-Net, ERA-Net Plus, Inco-Net, Inno-net)
- Through participation in joint programmes between Member States (Art. 185)
- Supporting agendas of Joint Programming Initiatives when in line with Horizon 2020
- Only when criteria met, e.g. financial commitments of participating countries

European Innovation Partnerships:

- Not funding instruments, but for coordination with broader policies and programmes

Innovation Investment Package



€22 billion Innovation Investment Package

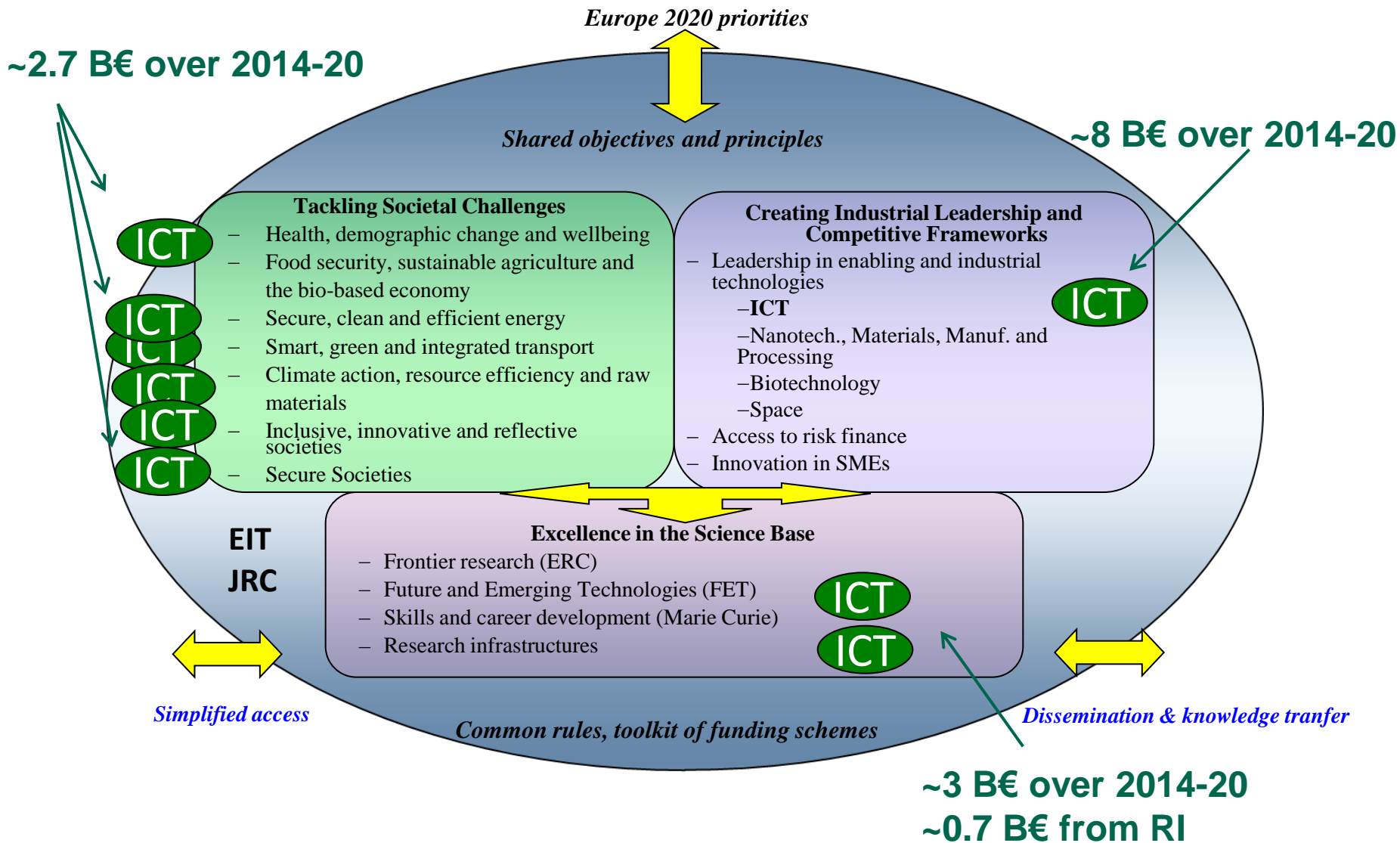
Joint Technology Initiatives (under Article 187)

- Innovative Medicines Initiative 2
- Clean Sky (Aeronautics) 2
- Fuel Cell and Hydrogen 2
- Bio-based Industries
- Electronic components and systems

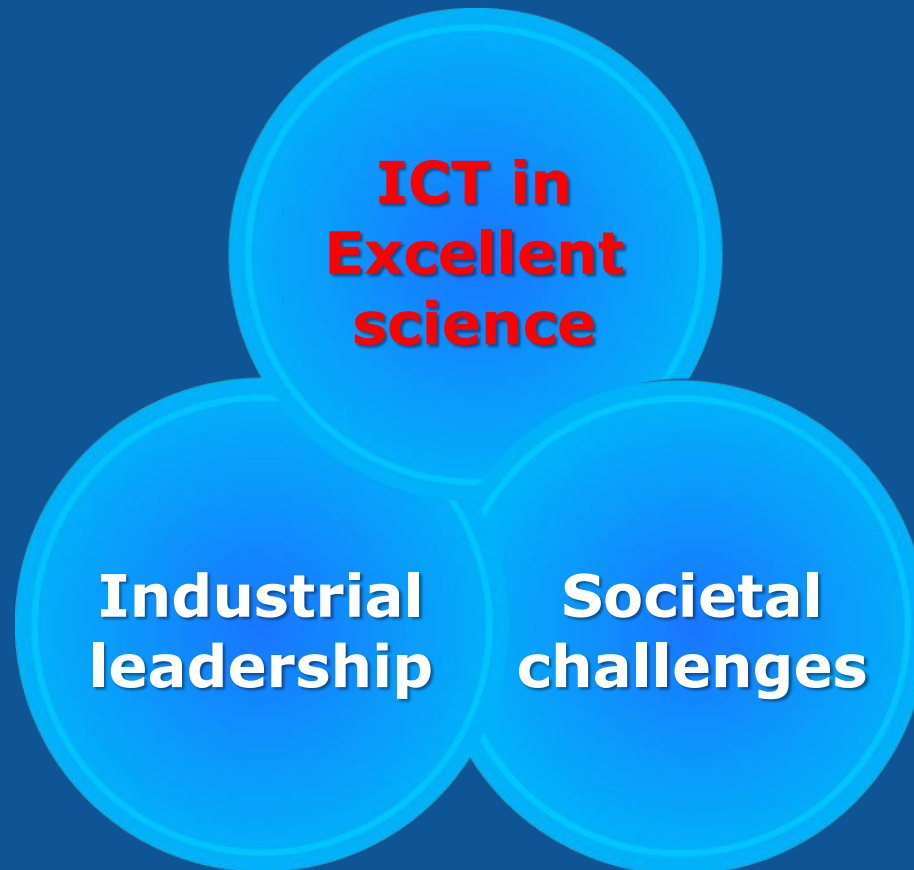
Joint programmes (under Article 185)

- European and Developing Countries Clinical Trials Partnership (EDCTP) 2
- European Metrology Research Programme 2
- Eurostars (for SMEs) 2
- Active and Assisted Living 2

ICT in Horizon 2020



ICT in Excellent Science



Excellent Science - ICT



- **Future and Emerging Technologies (FET)**

- **FET Open: fostering novel ideas**
- **FET Proactive: nurturing emerging themes and communities**
- **FET Flagships: pursuing grand interdisciplinary science and technology challenges**

- **Research infrastructures**

- Developing the European research infrastructure for 2020 and beyond
 - **Development, deployment and operation of ICT-based e-infrastructures**

Future and Emerging Technologies (FET) / 2014-2015 (overall budget 472 M€)

- **FET Open** (160 M€)

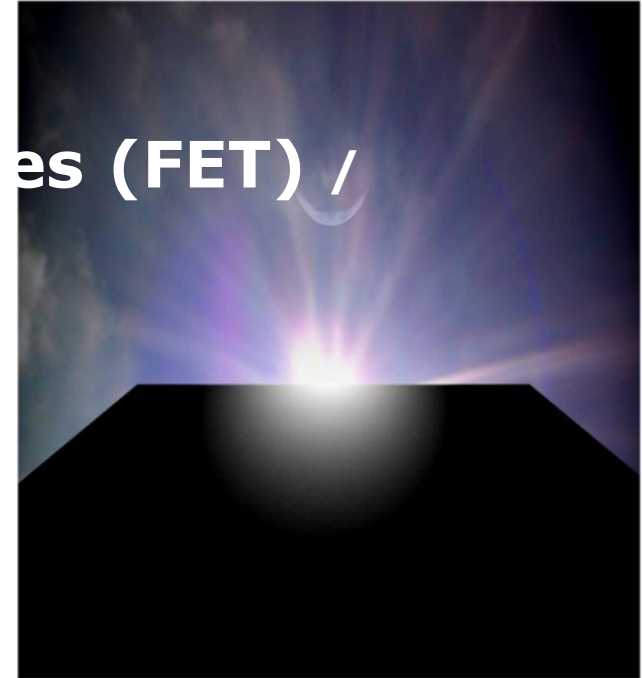
- **All technologies, no topical scope**
- **Light and fast scheme**
 - Several cut-off dates per year, one-step submission of ~15 pages
 - One stage evaluation

- **FET Proactive**

- **Global Systems Science (GSS)** (10 M€)
 - Improve the way in which scientific knowledge can stimulate, guide, and help evaluate policy and societal responses to global challenges
- **Knowing, doing, being: cognition beyond problem solving** (15 M€)
 - New approaches to cognitive systems
- **Quantum simulation** (10 M€)
 - Quantum technologies to ultimately address real world problems
- **Towards exascale high performance computing** (97,4 M€)
 - ➔ **HPC PPP**: To be coordinated with complementary work in LEIT and RI

- **FET Flagships** (179,6 M€)

- **Graphene**
- **Human Brain Project**



eInfrastructures / 2014-2015

(overall budget 177 M€)

- **ICT infrastructure resources and services for Research (48 M€)**

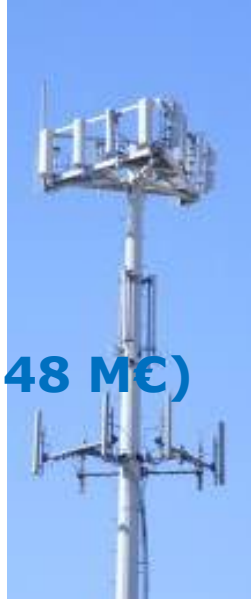
- Provision of core services across e-infrastructures
- Research and Education Networking – GEANT
- eInfrastructures for virtual research environments

- **Access to and management of scientific data (72 M€)**

- Managing, preserving and computing with big research data
- Towards global data e-infrastructures – Research Data Alliance
- eInfrastructure for Open Access

- **High Performance Computing (57 M€)**

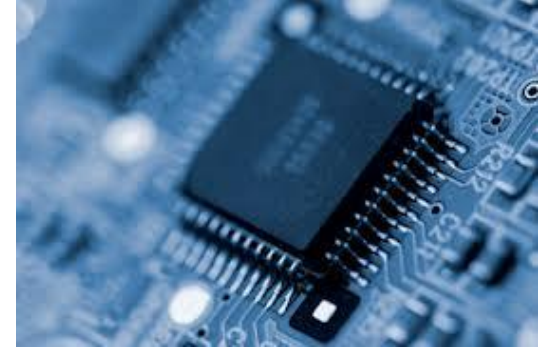
- Pan-European High Performance Computing infrastructure and services
- Centres of Excellence for computing applications
- Network of HPC competence centres for SMEs



ICT in Industrial Leadership (LEIT)



Industrial Leadership - ICT

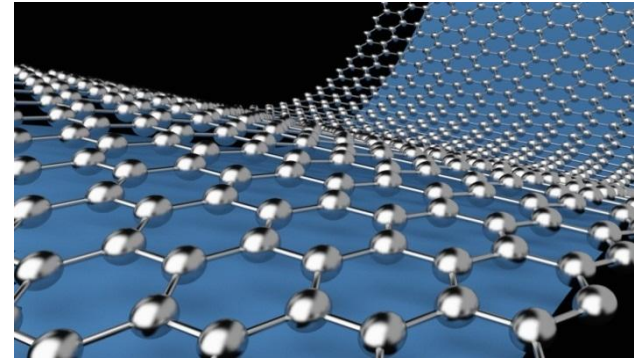


- **A new generation of components and systems:**
 - engineering of advanced embedded and resource efficient components and systems
- **Next generation computing:**
 - advanced and secure computing systems and technologies, including cloud computing
- **Future Internet:**
 - software, hardware, infrastructures, technologies and services
- **Content technologies and information management:**
 - ICT for digital content, cultural and creative industries
- **Advanced interfaces and robots:**
 - robotics and smart spaces
- **Micro- and nanoelectronics and photonics:**
 - key enabling technologies



Components and systems / 2014-2015

(overall budget ~227 M€)



- Covers systemic integration from smart integrated components to cyber-physical systems

Supported through:

1. Normal Calls in H2020

- **Organised in three related topics:**
 - Smart cyber-physical systems (56 M€)
 - Next generation embedded and connected systems
 - Smart system integration (48 M€)
 - Integration of heterogeneous micro- and nanotechnologies into smart systems
 - Advanced Thin, Organic and Large Area Electronics (38 M€)

2. In the Joint Technology Initiative (ECSEL)

- Focus on high TRLS and large scale federating projects
- "ARTEMIS and EPOSS" parts

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Warning: still subject to Commission Decision ◀

Advanced Computing /

2014-2015 (overall budget 57 M€)

- Reinforce and expand Europe's industrial and technology strengths in **low-power ICT**
- **Organised in one topic:**
 - Customised and low power computing
- Focus is on **integration of advanced components on all levels in computing systems**
- Complementary to and coordinated with work in the Future Internet area (on Cloud Computing) and in Excellence Science pillar under Research Infrastructures and FET (on High Performance Computing)

Future Internet / 2014-2015 (overall budget 395,5 M€)

- Focused on **network and computing infrastructures** addressing the most critical technical and use aspects of the Internet
- **Organised in ten topics:**
 - Smart networks and novel Internet **architectures** (24 M€)
 - Smart **optical** and **wireless network** technologies (30 M€)
 - Advanced **5G** Networks for the Future Internet (125 M€) → **5G PPP**
 - Advanced **cloud** infrastructures and services (73 M€)
 - Boosting public sector cloud computing services (22 M€)
 - Tools and methods for **Software Development** (25 M€)
 - **FIRE+ (Future Internet Research & Experimentation)** (31,5M€)
 - More Experimentation for the Future Internet (18 M€)
 - **Collective Awareness Platforms** (37 M€)
 - **Web Entrepreneurship** (10 M€)

Content technologies and information management / 2014-2015 (overall budget 260 M€)

- **Addresses:**

- **Big Data** with focus on both innovation and research
- **Tools for creative, media and learning industries**
- **Multimodal and natural computer interaction**

- **Organised in eight topics:**

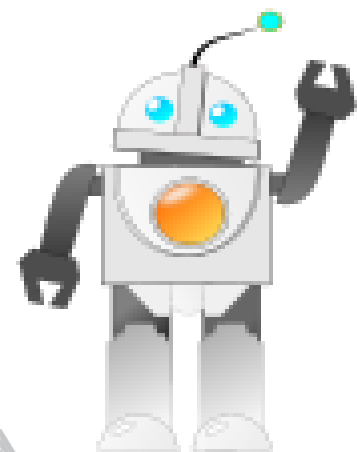
- Big data innovation and take-up (50 M€)
- Big data research (39 M€)
- Cracking the language barrier (15 M€)
- Support to the growth of ICT creative industries SMEs (15 M€)
- Technologies for creative industries and social media (41 M€)
- Technologies for better human learning and teaching (52 M€)
- Advanced digital gaming/gamification technologies (17 M€)
- Multimodal and natural computer interaction (31 M€)

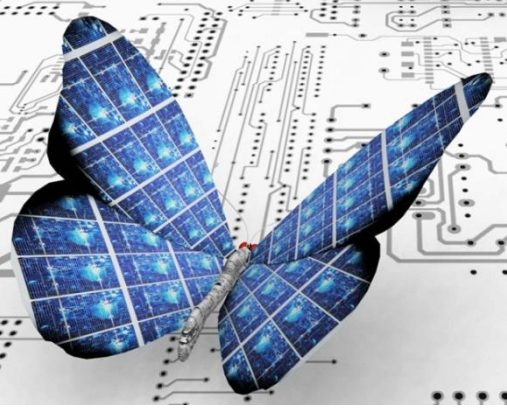




Robotics / 2014-2015 (overall budget 157 M€)

- **Roadmap-based research driven by application needs**
→ **Robotics PPP**
- Effort to close the innovation gap to **allow large scale deployment of robots and foster market take-up**: use-cases, pre-commercial procurement, industry-academia cross-fertilisation
- Additional activities: shared resources, performance evaluation & benchmarking, community building and robotic competitions
- **Organised in two annual calls**
(of 74 M€ and 83M€ respectively)





Key Enabling Technologies Micro- and nano-electronics 2014-2015 (overall budget ~230 M€)

Supported through

1. Normal H2020 calls

- Covers **generic technology developments on micro- and nano-electronics** focused on **advanced research** and lower Technology Readiness Levels (TRLs) (**50 M€**)

2. The Joint Technology Initiative (ECSEL)

- The micro-nano-electronics and SSI part of ECSEL
- Mainly High TRLs, **Pilot lines and large scale federating projects**

Warning: still subject to Commission Decision ◀



Key Enabling Technologies Photonics

2014-2015 (overall budget ~156 M€)

- **Addresses the full innovation and value chain**
 - in markets sectors where Europe is particularly strong
 - (optical communications, lighting, medical photonics, lasers, etc.)
- **Supports the Photonics PPP**
 - Photonics PPP 2014: 47 M€
 - **RTD:** Biophotonics, Sensing, Disruptive approaches
 - **Innovation:** Open system architectures for SSL
 - Includes calls for ERANETs as well as public procurement
 - Photonics PPP 2015: 44 M€
 - **RTD:** Optical Communication, PICS
 - Includes calls for ERANETs as well as public procurement
 - Cross cutting KETs (65 M€)
 - **Platforms for Health** together with SSI
 - **+ 3 Pilot lines:** OLED, MIR sensors and PICS for III-V



Factory of the Future / 2014-2015 (overall budget 102 M€)

- Focuses on **ICT components of innovative production systems in all sectors** (for more personalised, diversified and mass-produced product portfolio and for rapid adaptations to market changes)
- Supports the **FoF PPP**
- Organised in **three topics**:
 - Process optimisation of manufacturing assets (34 M€)
 - CPS for process control, ..
 - ICT-enabled modelling, simulation, analytics (32 M€)
 - ICT Innovation for Manufacturing SMEs (36 M€)
 - Robotics, laser based manufacturing, ..

ICT Cross-Cutting Activities / 2014-2015

- **Internet of Things and platforms for Connected Smart Objects (51 M€)**

- Cutting across several LEIT-ICT areas (smart systems integration, smart networks, big data)
- Bringing together different generic ICT technologies and their stakeholder constituencies



- **Human-centric Digital Age (7 M€)**

- Understanding technologies, networks and new digital and social media and how these are changing the way people behave, think, interact and socialise as persons, citizens, workers and consumers

- **Cyber-security, Trustworthy ICT (38 M€)**

- Focuses on security-by-design for end to end security and a specific activity on cryptography
- Complementary to Cyber-security in Societal Challenge 7



- **Trans-national co-operation among National Contact Points (4 M€)**

- Mechanisms for effective cross border partnership searches, identifying, understanding and sharing good practices among ICT NCPs

ICT horizontal innovation actions / 2014-2015

- **Open Disruptive Innovation Scheme (90 M€)**

- Support to a large set of **early stage high risk** innovations
- Implementation through the **SME instrument**
- > Continuously open calls with several (3) cut-off dates/year
- > 5% of LEIT budget

- **Support for access to finance (15 M€)**

- Pilot action for business angels to co-invest in ICT innovative companies
- Implemented by EIF and closely coordinated with "Access to risk finance" part of H2020



- **Innovation and Entrepreneurship Support (11 M€)**

- ICT business idea contests in universities and high schools
- ICT entrepreneurship summer academy
- ICT entrepreneurship labs
- Campaign on entrepreneurship culture in innovative ICT sectors
- Support for definition and implementation of inducement prizes
- European networks of procurers
- Pre-commercial procurement



Warning : still subject to Commission Decision ◀

International cooperation actions / 2014-2015

(overall budget 27 M€)

- **Coordinated calls**

- **EU-Brazil (7 M€)**

- Cloud computing, including security aspects
 - High performance computing
 - Experimental platforms

- **EU-Japan (6 M€)**

- Technologies combining big data, internet of things in the cloud
 - Optical communications
 - Access networks for densely located users
 - Experimentation and development on federated Japan-EU testbeds



- **International partnership building and support to dialogues with high income countries (USA, Canada, East Asia and Oceania) (3 M€)**
 - **International partnership building in low and middle income countries (11 M€)**

Call planning overview

- **LEIT**

- **H2020-ICT-2014 (ICT Call 1)**

- Publication date: 11 December 2013
 - Deadline: **23 April 2014** (all topics except 5G Future Internet)
 - Deadline for 5G Future Internet: **25 November 2014**

- **H2020-FoF-2014/2015 (Factory of the Future)**

- Publication date: 11 December 2013
 - Deadlines: **20 March 2014** and **9 December 2014**

- **H2020-EUJ-2014 (EU-Japan Call)**

- Publication date: 7 January 2014
 - Deadline: **10 April 2014**

- **H2020-ICT-2015 (ICT Call 2)**

- Publication date: 15 October 2014
 - Deadline: **14 April 2015**

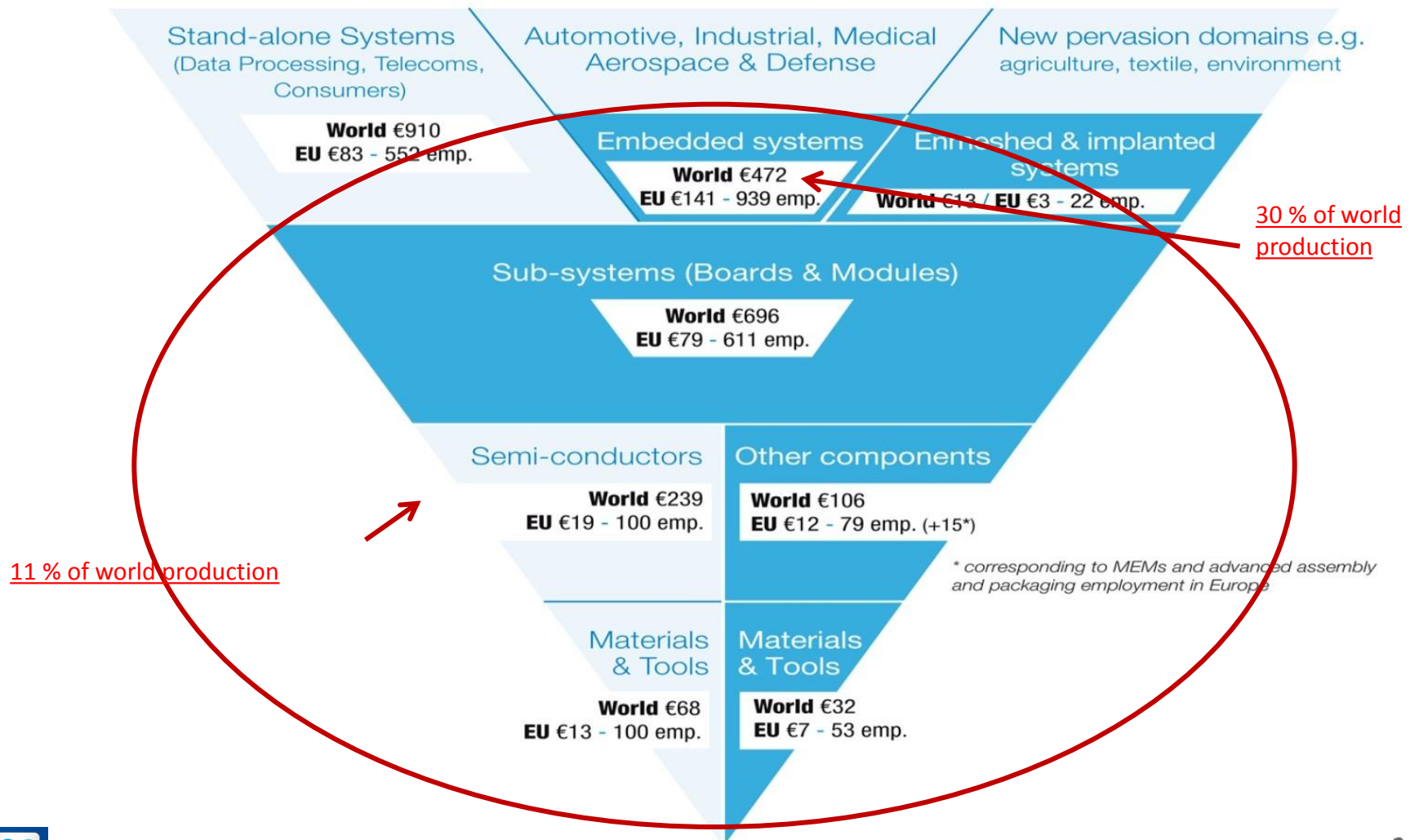
- **H2020-EUB-2015 (EU-Brazil Call)**

- Publication date: 15 October 2014
 - Deadline: **21 April 2015**

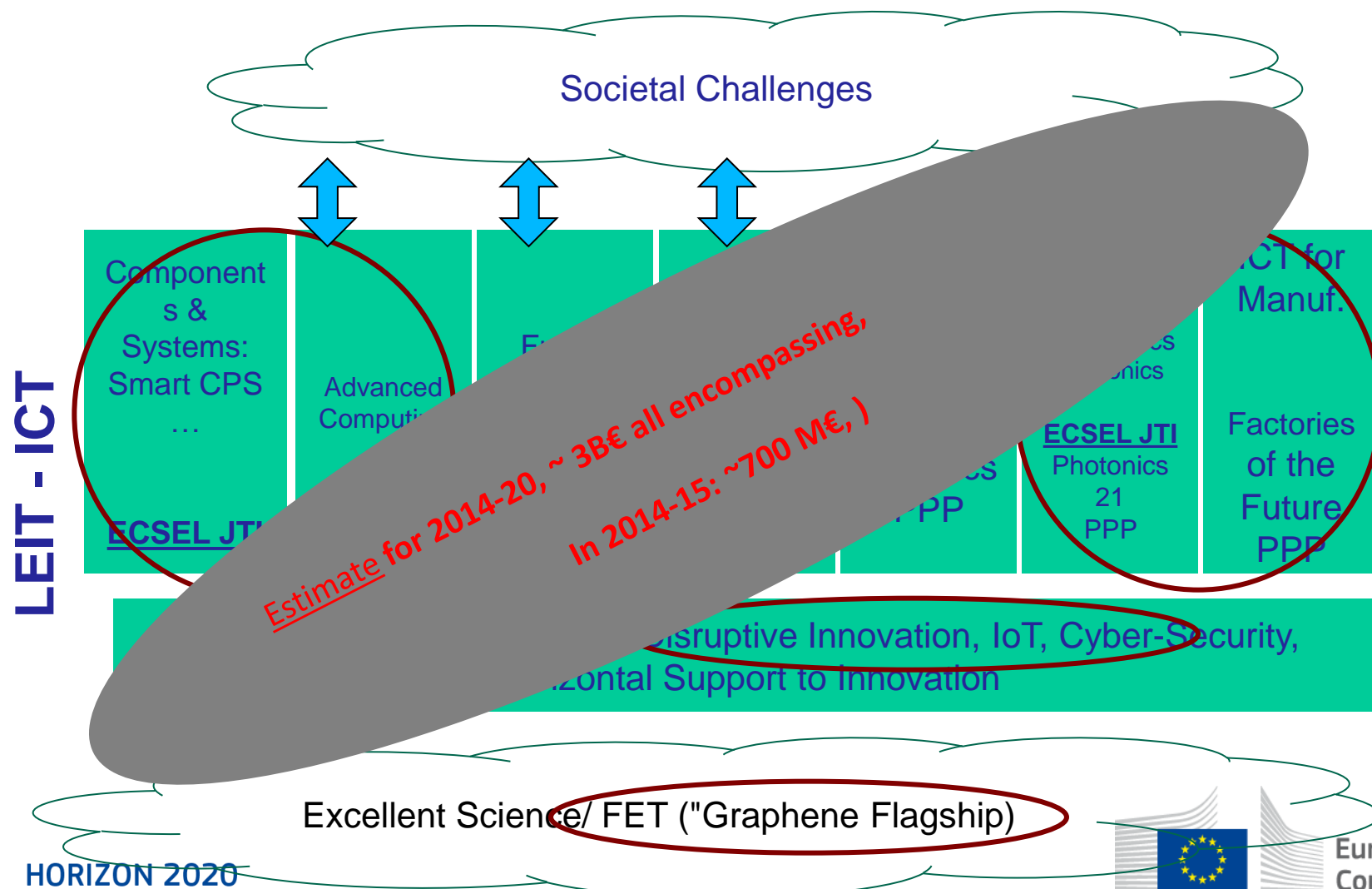
Towards Industrial Strategies boosting impact

Role of the PPPs (JTIs and cPPPs)

Example: Component and systems

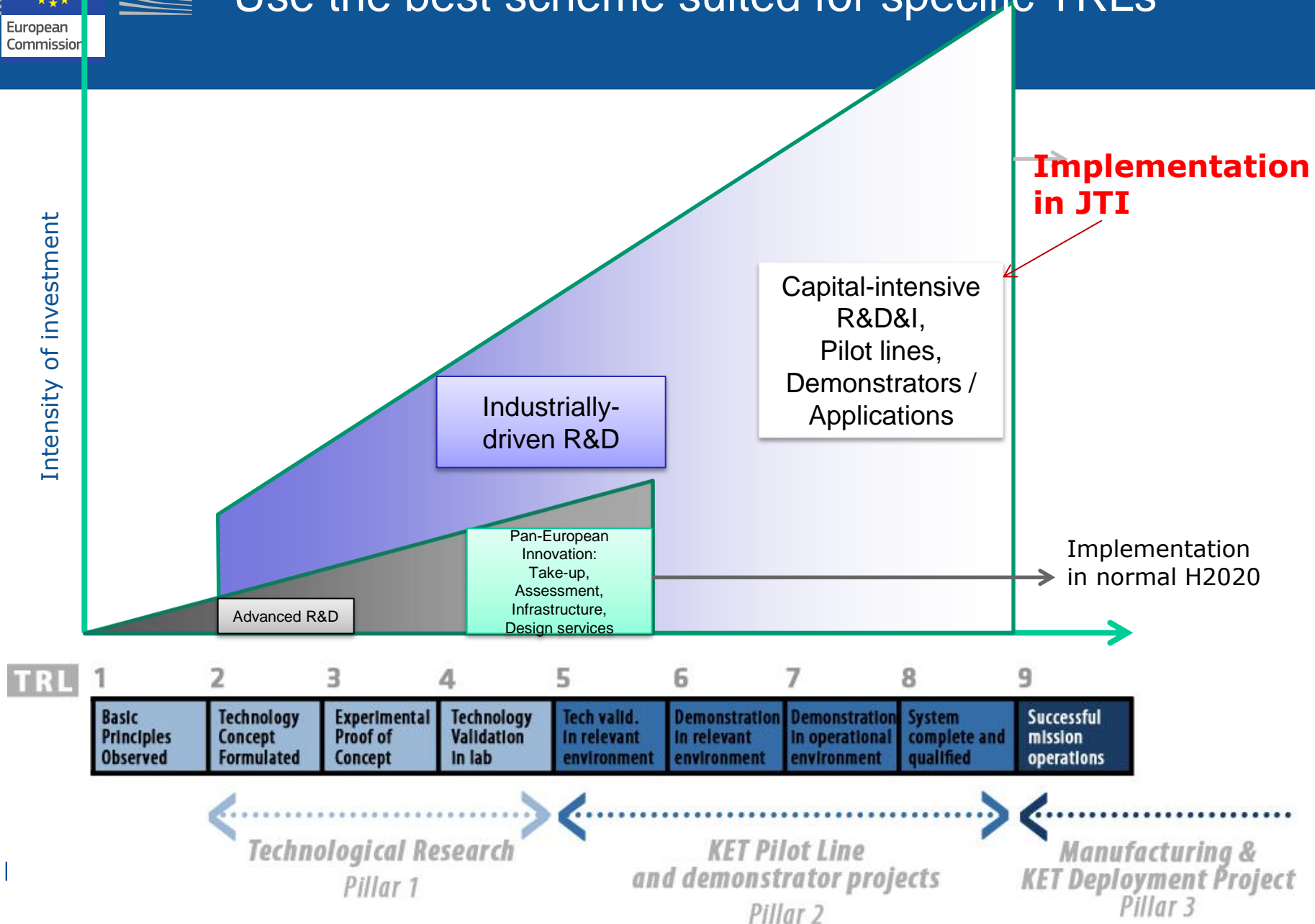


H2020 – LEIT – ICT, Components and systems



Focus along TRLs

Use the best scheme suited for specific TRLs



ICT in Societal Challenges



Societal Challenges - ICT



- **Health, demographic change and wellbeing**
- Food security, sustainable agriculture, and forestry, marine, maritime and inland water research, and the bioeconomy
- **Secure, clean and efficient energy**
- **Smart, green and integrated transport**
- **Climate action, environment, resource efficiency and raw materials**
- **Europe in a changing world – inclusive, innovative and reflective societies**
- **Secure societies – protecting freedom and security of Europe and its citizens**

Key principles for ICT R&I in the Societal Challenges

- **Interoperability**
 - **Re-use and economies of scale**
 - **Breakthroughs leveraging the transformative power of ICT**
 - **Preparation for market deployment**
- +
- **Information for future digital policy**



Proposed funding (€ million, 2014-2015)

Challenge	Total	ICT	%
Health, demographic change and wellbeing	1 804	269	15%
Food security, sustainable agriculture, marine and maritime research & the Bioeconomy	687		
Secure, clean and efficient energy	1 447	72	5%
Smart, green and integrated transport	1 542	92	6%
Climate action, resource efficiency and raw materials	745	26	3,5%
Innovative, inclusive and reflective societies	310	82	26%
Secure societies	393	100	25%

Health, demographic change and wellbeing / 2014-2015 (overall budget 269)



- **Advancing active and healthy ageing with ICT**
 - **Service robotics** within assisted living environments
 - ICT solutions for **independent living with cognitive impairments**
 - ICT solutions enabling **early risk detection and intervention**
- **Integrated, sustainable, citizen-centred care**
 - ICT-based approaches for **integrated care** (beyond current state-of-art in tele-health and tele-care)
 - **Self-management of health and disease**
 - Public-procurement of innovative eHealth services
- **Improving health information and data exploitation**
 - Digital representation of **health data** to improve diagnosis and treatment
 - **eHealth interoperability**



Secure, clean and efficient energy / 2014-2015 (overall budget 72 M€)

- **Energy efficiency / buildings and consumers**
 - Public procurement of **green data centres**
 - New ICT-based solutions for **energy efficiency through citizens' behavioural change**
- **Competitive low-carbon energy / modernising the single European electricity grid**
 - Distribution grid and retail market
 - Next generation ICT infrastructure for **smart metering and smart grids**
- **Smart cities and communities**
 - Integration of **energy, transport and ICT** through **lighthouse projects** (large scale demonstration)



Smart, green and integrated transport / 2014-2015

(overall budget 92 M€)

- **Road**

- **Cooperative Intelligent Transport Systems**

- Connecting people, vehicles, infrastructures and businesses
 - Safe and connected **automation in road transport**

- **Green vehicles**

- **Electric vehicles'** enhanced performance and **integration into the transport system and the electricity grid**



- **Smart cities and communities**

- Integration of **energy, transport and ICT** through **lighthouse projects** (large scale demonstration)

Climate action, environment, resource efficiency and raw materials / 2014-2015 (overall budget 26 M€)

- **Waste management**

- ICT solutions for waste traceability, waste material flow management

- **Water management**

- Development and deployment of advanced ICT solutions for water resources management in agriculture and urban areas



Europe in a changing world – inclusive, innovative and reflective societies / 2014-2015

(overall budget 82 M€)

- **Reflective societies – Cultural Heritage**

- Innovative ecosystems of digital cultural assets
- Advanced 3D modelling for accessing and understanding European cultural assets

- **New forms of innovation**

- **Innovation in the public sector** by using emerging ICT technologies
- ICT-enabled **open government**
- Personalised public services
- M-government
- Open participation
- Transparency
- ICT for **learning and inclusion**



Secure societies – protecting freedom and security of Europe and its citizens / 2014-2015

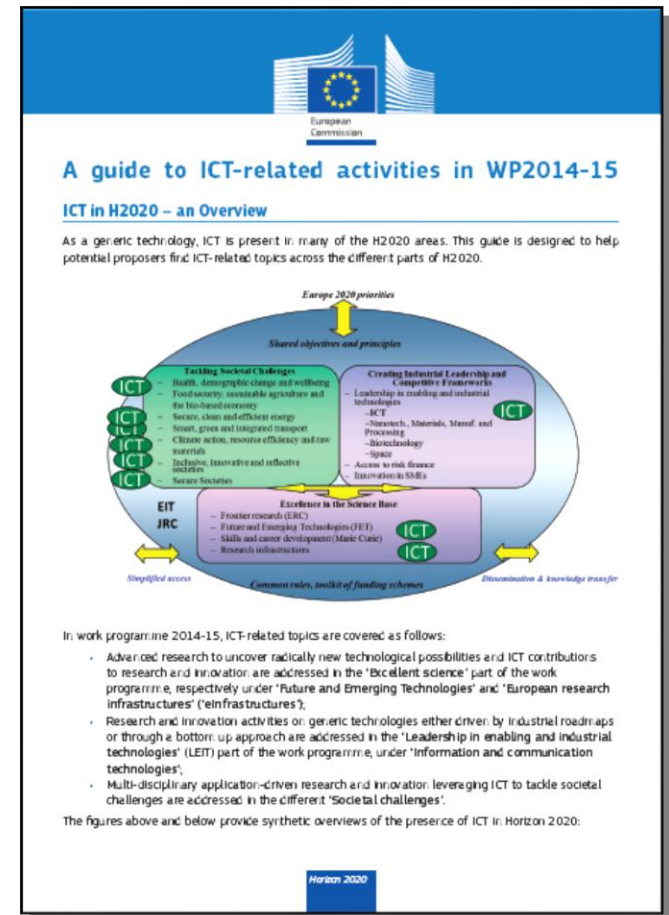
(overall budget 100 M€)

- **Digital security: cybersecurity, privacy and trust**

- Protecting our society by providing sustained **trust in the usage of ICT** and in securing the ICT underlying our digital society
- **Preventing cyber-attacks** on any component of the digital society
- **Ensuring freedom and privacy in the digital society**, protecting the fundamental values of our society and democratic rights of our citizens in cyberspace
- Protect the weak in our society from abuses over the internet and **giving the user control over his private data**
- Demonstrating the viability and maturity of state-of-the-art security solutions in **large scale demonstrators**, involving end users

Guide to the presence of ICT in H2020

- Comprehensive coverage of all three H2020 pillars
- Detailed list of calls and topics
- Detailed budget allocation and call deadlines not provided yet



Forms of funding

- **Grants**

Direct financial contribution by way of donation in order to finance an action

- **Prizes**

Financial contribution given as reward following a contest
(recognition or inducement prizes)

- **Procurement**

Supply of assets, execution of works or provision of services against payment

- **Financial instruments**

Equity or quasi-equity investments; loans; guarantees; other risk-sharing instruments

Types of actions supported by grants

- Research and innovation actions
- Innovation actions
- Coordination and support actions
- SME instrument
- ERANET Co-fund
- Pre-commercial procurement Co-fund
- Public procurement of innovative solutions Co-fund



HORIZON 2020

Thank you!

More Information

www.ec.europa.eu/research/horizon2020