HORIZON 2020
Information and Communication Technologies

Budapest
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European Commission

HORIZON 2020

What is Horizon 2020

- **Initial Commission proposal for a €80 billion research and innovation funding programme (2014-2020); now just over €70 billion**
- **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

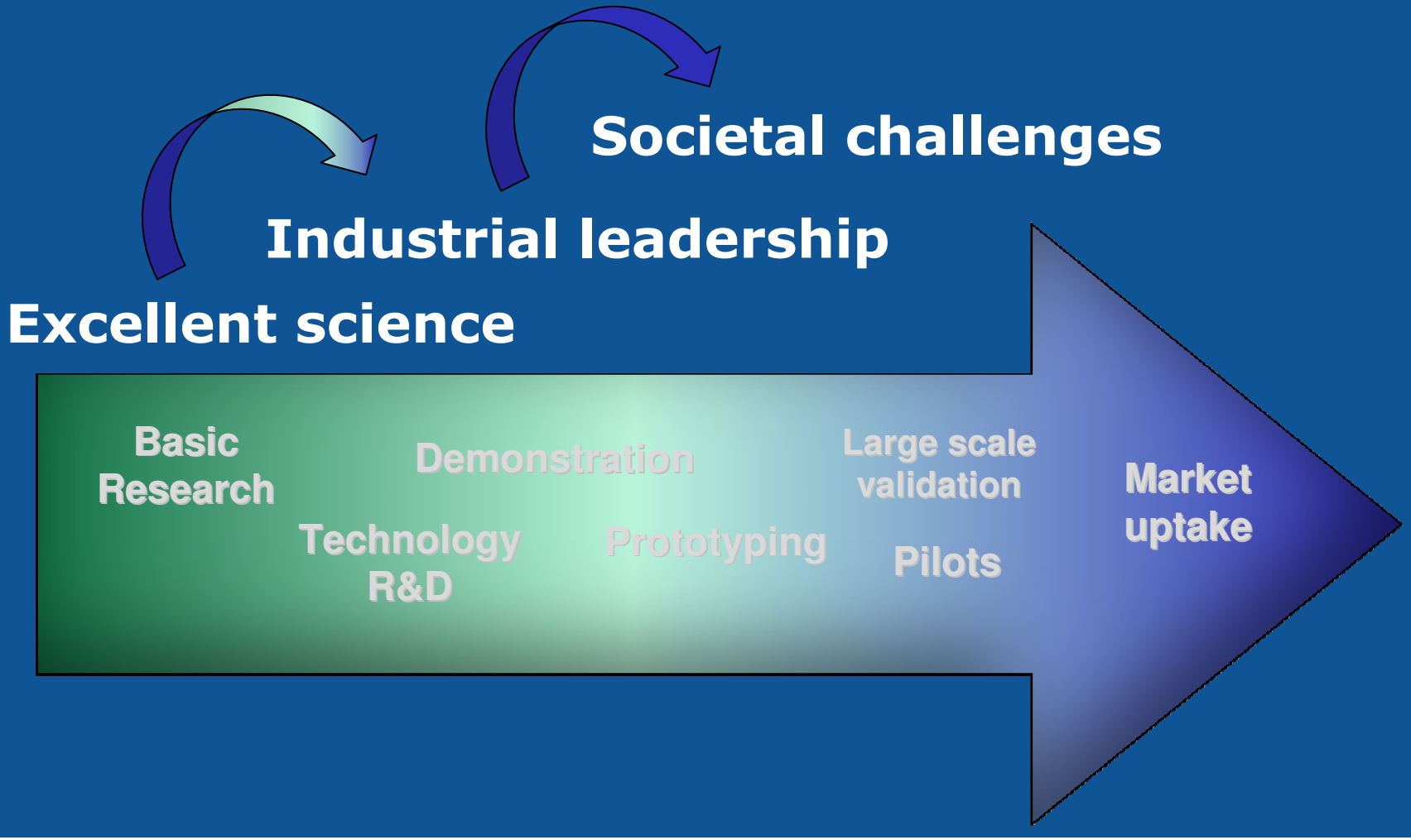
What's new

- **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
- **Simplified access,** for all companies, universities, institutes in all EU countries and beyond

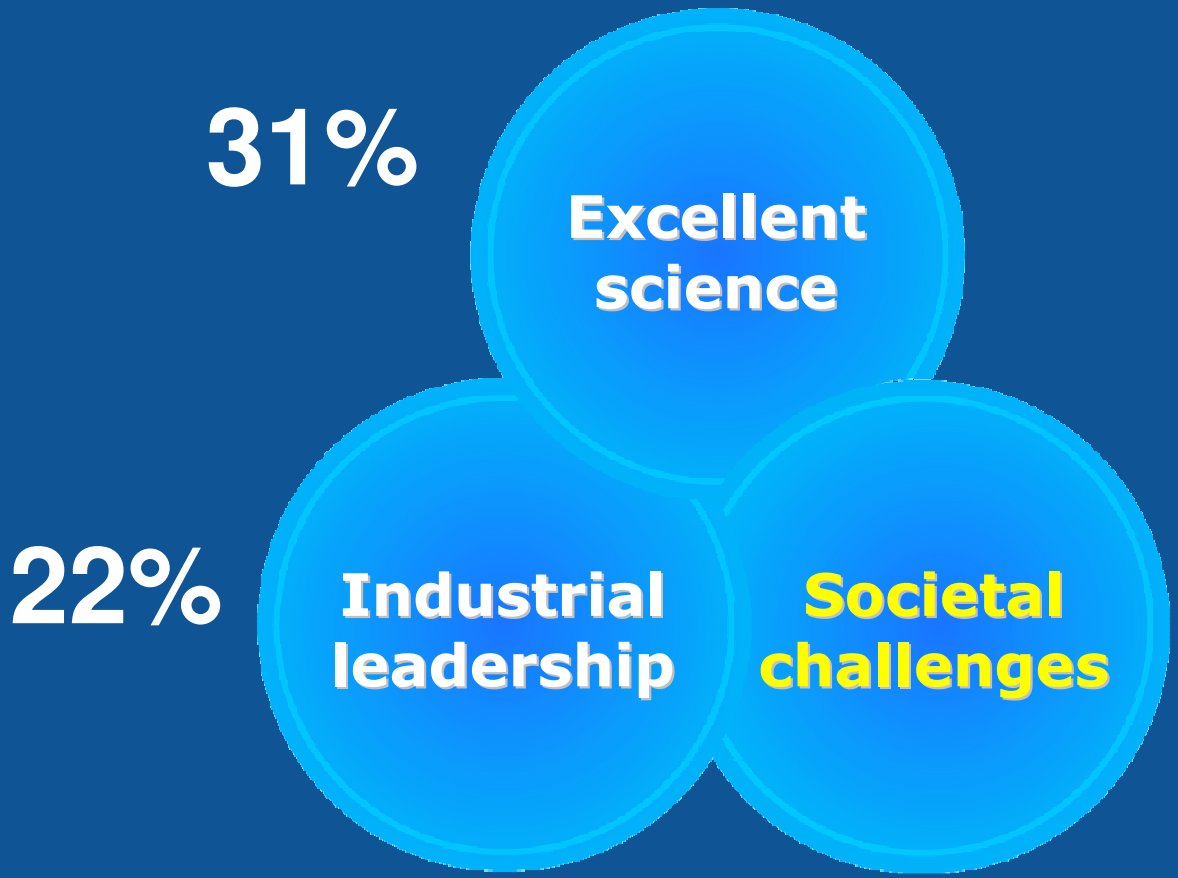
☐The 7th Research Framework Programme (FP7), innovation aspects of Competitiveness and Innovation Framework Programme (CIP), EU contribution to the European Institute of Innovation and Technology (EIT)

Three priorities

Coverage of the full innovation chain



Three priorities



Priority 1.
Excellent science

- **Why:**
- World class science is the foundation of tomorrow's technologies, jobs and wellbeing
- Europe needs to develop, attract and retain research talent
- Researchers need access to the best infrastructures

Proposed funding (€ million, 2014-2020)*

European Research Council (ERC) Frontier research by the best individual teams	**13 095**
Future and Emerging Technologies Collaborative research to open new fields of innovation	**2 696**
Marie Skłodowska-Curie actions (MSCA) Opportunities for training and career development	**6 162**
Research infrastructures *(including e-infrastructure)* Ensuring access to world-class facilities	**2 488 (ICT: 863)**

☐All funding figures in this presentation are subject to the pending Multiannual Financial Framework Regulation by the EP and the Council

Priority 2.
Industrial leadership

- **Why:**

- Strategic investments in key technologies (e.g. advanced manufacturing, micro-electronics) underpin innovation across existing and emerging sectors
- Europe needs to attract more private investment in research and innovation
- Europe needs more innovative small and medium-sized enterprises (SMEs) to create growth and jobs

Proposed funding (€ million, 2014-2020)

Leadership in enabling and industrial technologies (LEITs) (ICT, nanotechnologies, materials, biotechnology, manufacturing, space)	**13 557** **(ICT: 7 360)**
Access to risk finance Leveraging private finance and venture capital for research and innovation	**2 842**
Innovation in SMEs Fostering all forms of innovation in all types of SMEs	**616** + complemented by expected 20% of budget of societal challenges + LEITs and ***'Access to risk finance'*** with strong SME focus

Priority 3.
Societal challenges

- **Why:**

- Concerns of citizens and society/EU policy objectives (climate, environment, energy, transport, etc) cannot be achieved without innovation
- Breakthrough solutions come from multi-disciplinary collaborations, including social sciences & humanities
- Promising solutions need to be tested, demonstrated and scaled up

Proposed funding (€ million, 2014-2020)

		ICT
Health, demographic change and wellbeing	**7 472**	**15%**
Food security, sustainable agriculture, marine and maritime research & the Bioeconomy	**3 851**	**0**
Secure, clean and efficient energy	**5 931**	5%
Smart, green and integrated transport	**6 339**	6%
Climate action, resource efficiency and raw materials	**3 081**	3.5%
Innovative, inclusive and reflective societies	**1 309**	**25%**
Secure societies	**1 695**	**25%**
Science with and for society	*462*	*0*
Spreading excellence and widening participation	*816*	*0*

Strong participation by SMEs

- **Integrated approach** - around 20% of the total budget for societal challenges and LEITs to go to SMEs
- **Simplification** of particular benefit to SMEs (e.g. single entry point)
- A **new SME instrument** will be used across all societal challenges as well as for the LEITs
- A dedicated activity for research-intensive SMEs in **'Innovation in SMEs'**
- **'Access to risk finance'** will have a strong SME focus (debt and equity facility)

Next steps

- **Formal political decisions on Horizon 2020** — ***Autumn 2013***
- **Formal political decision on Multi-annual financial framework (2014-2020)** — ***Autumn 2013***
- **Adoption of work programme and publication of first calls for proposals** — ***11 December 2013***
- **Horizon 2020 national launch events** — ***October to January 2014***

ICT in Horizon 2020

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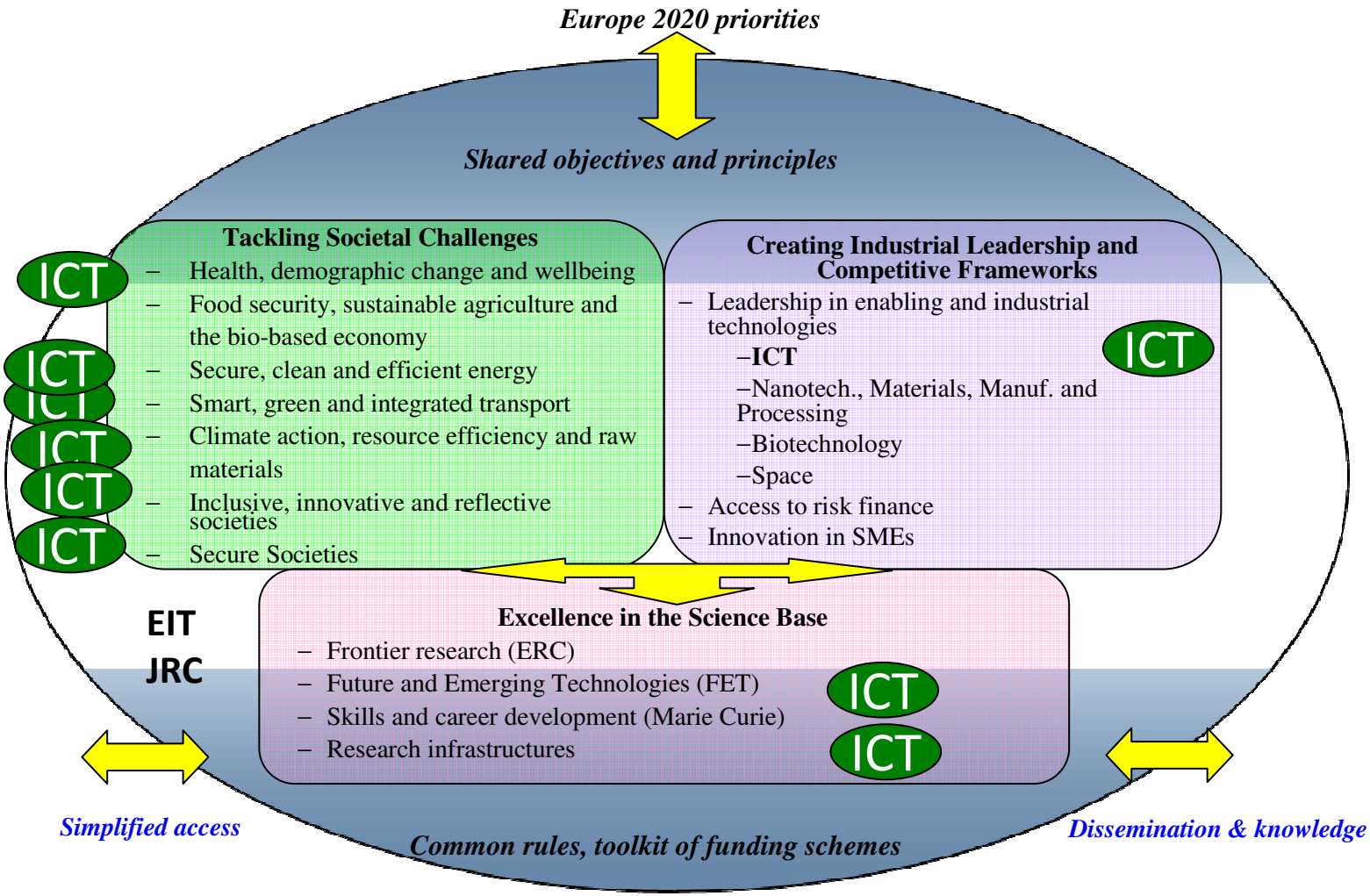
Europe 2020 priorities
Shared objectives and principles
Tackling Societal Challenges
– Health, demographic change and wellbeing
– Food security, sustainable agriculture and the bio-based economy
– Secure, clean and efficient energy
– Smart, green and integrated transport
– Climate action, resource efficiency and raw materials
– Inclusive, innovative and reflective societies
– Secure Societies
Creating Industrial Leadership and Competitive Frameworks
– Leadership in enabling and industrial technologies
–ICT
–Nanotech., Materials, Manuf. and Processing
–Biotechnology
–Space
– Access to risk finance
– Innovation in SMEs
ICT
ICT
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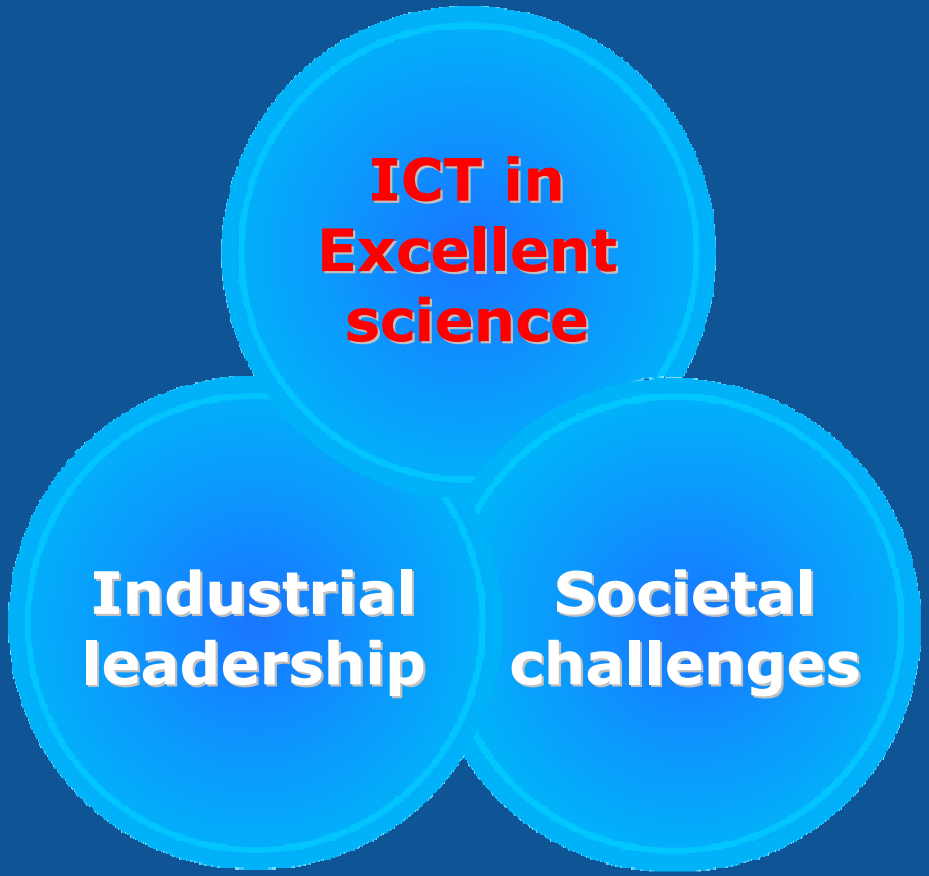
ICT
EIT
JRC
Excellence in the Science Base
– Frontier research (ERC)
– Future and Emerging Technologies (FET)
– Skills and career development (Marie Curie)
– Research infrastructures
ICT
ICT
Simplified access
Common rules, toolkit of funding schemes
Dissemination & knowledge tranfer

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**

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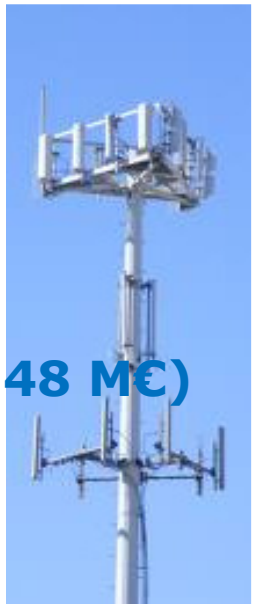
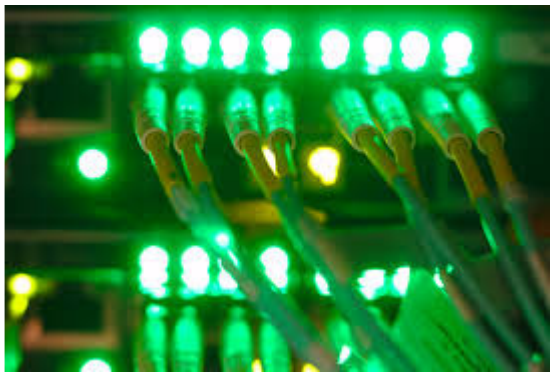
eInfrastructures / 2014-2015
(overall budget 177 M€)



- **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

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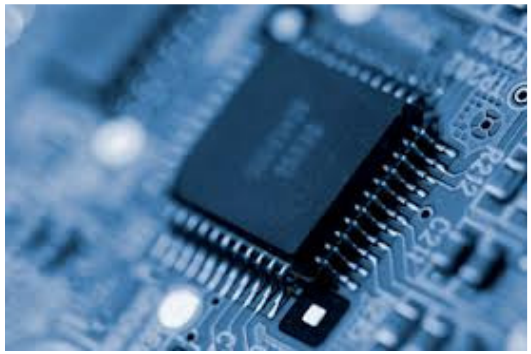
ICT in Industrial Leadership (LEIT)

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

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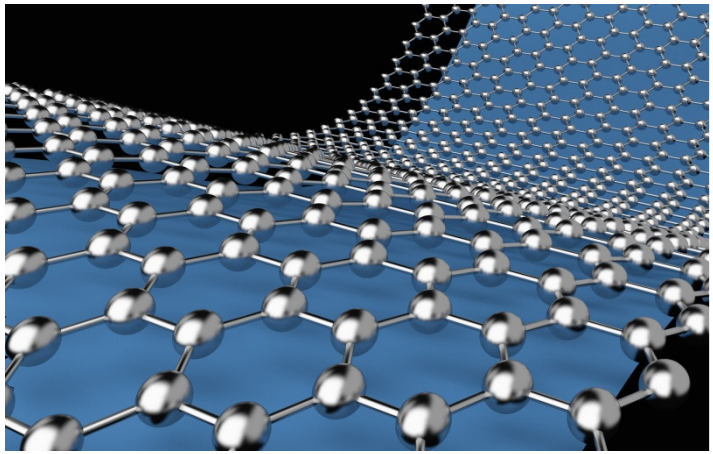
Components and systems / 2014-2015 (overall budget 142 M€)



- Covers **systemic integration from smart components to cyber-physical systems**
- **Complementary to the JTI Electronic Components and Systems (ECSEL)**
- **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€)
- R&I in this area will also contribute to the implementation of the **SRA on Energy Efficient Buildings**

Advanced Computing /
2014-2015 (overall budget 57 M€)

- Reinforce and expand Europe's industrial and technology strengths in **low-power ICT**
- 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)
- **Organised in one topic:**
    - Customised and low power computing

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

- Focused on **network and computing infrastructures** to accelerate innovation and address 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** Network Infrastructure for the Future Internet (125 M€)
    → 5G PPP
  - Advanced **cloud** infrastructures and services (73 M€)
  - Boosting public sector productivity and innovation through 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** for sustainability and social innovation (37 M€)
  - **Web Entrepreneurship** (10 M€)

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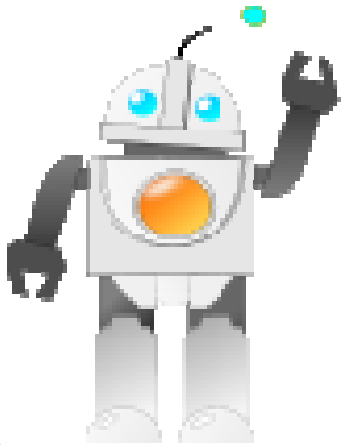
Content technologies and information management / 2014-2015 (overall budget 260 M€)

- **Addresses:**
  - **Big Data** with focus on both innovative data products and services and solving research problems
  - **Machine translation** in order to overcome barriers to multilingual online communication
  - **Tools for creative, media and learning industries** in order to mobilise the innovation potential of SMEs active in the area
  - **Multimodal and natural computer interaction**

- **Organised in eight topics:**
  - Big data and Open Data innovation and take-up (50 M€)
  - Big data research (39 M€)
  - Cracking the language barrier (15 M€)
  - Support to the growth of ICT innovative creative industries SMEs (15 M€)
  - Technologies for creative industries, social media and convergence (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
  - Includes two pre-commercial procurement actions (health-care sector, public safety and environmental monitoring)
- Additional activities: shared resources, performance evaluation & benchmarking, community building and robotic competitions
- **Organised in two annual calls**
  (of 74 M€ and 83M€ respectively)



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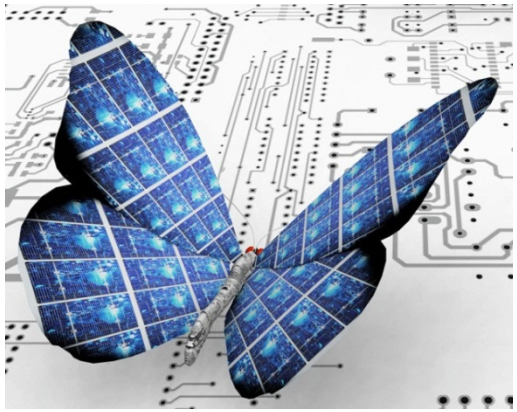

Micro- and nano-electronics and photonics
Key Enabling Technologies / 2014-2015 (overall budget 206 M€)

- Covers **generic technology developments on micro- and nano-electronics** focused on **advanced research** and lower Technology Readiness Levels (TRLs) (50 M€)
  - Complementary to the JTI Electronic Components and Systems

- Addresses the **full innovation and value chain** in markets sectors where the European **photonics** industry is particularly strong (optical communications, lighting, medical photonics, laser technologies, etc.) (156 M€)
  →Photonics PPP
  - Includes calls for ERANETs as well as public procurement actions (roll-out and deployment of optical networking technologies)

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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)
- Organised in **three topics:**
  - Process optimisation of manufacturing assets (34 M€)
  - ICT-enabled modelling, simulation, analytics and forecasting technologies (32 M€)

- ICT Innovation for Manufacturing SMEs (36 M€)
- Part of **FoF PPP**

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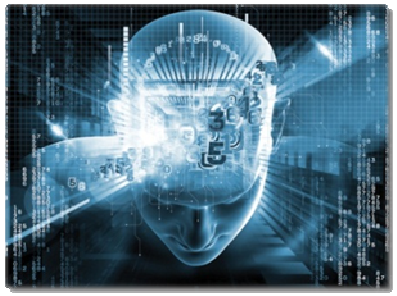
ICT Cross-Cutting Activities / 2014-2015

- **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

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ICT horizontal innovation actions / 2014-2015

- **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

- **Open Disruptive Innovation Scheme (90 M€)**
- Support to a large set of **early stage high risk innovative SMEs in ICT**
- Implementation through the **SME instrument**
  - -> Continuously open calls with several (3) cut-off dates/year
  - -> 5% of LEIT budget

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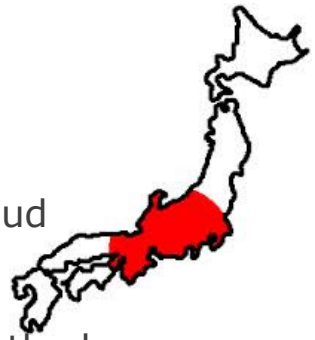
International cooperation actions / 2014-2015
(overall budget 27 M€)

- **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
  - Acces 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€)**

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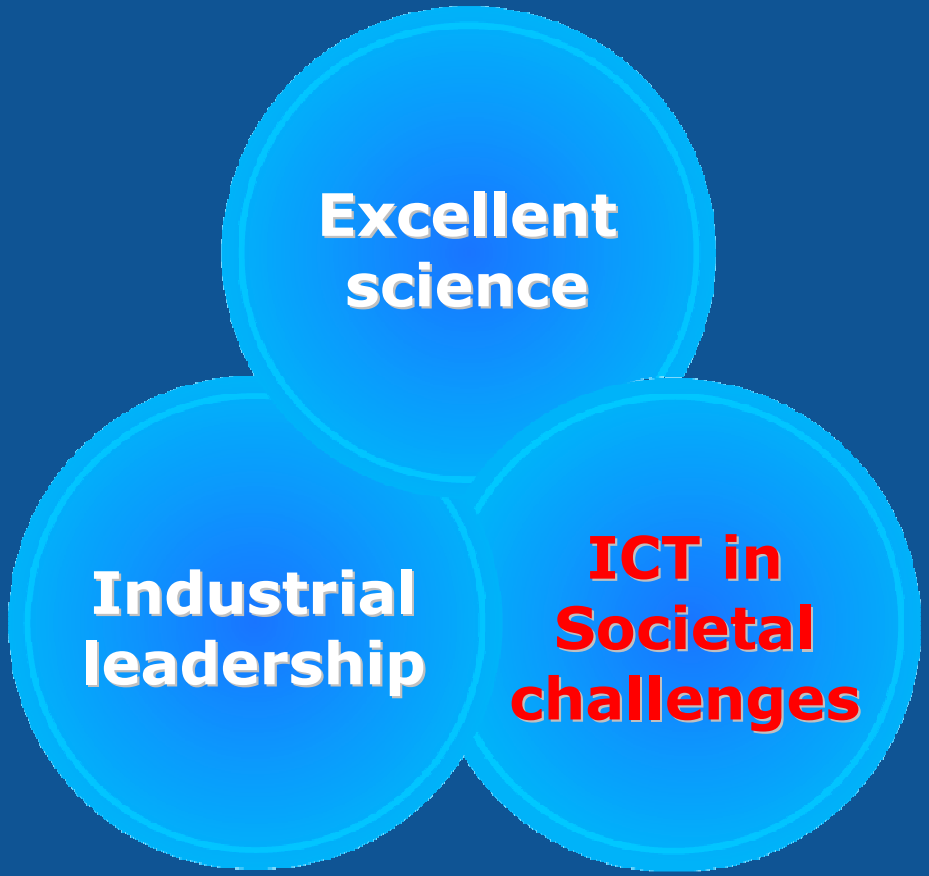
ICT in Societal Challenges



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**

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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)

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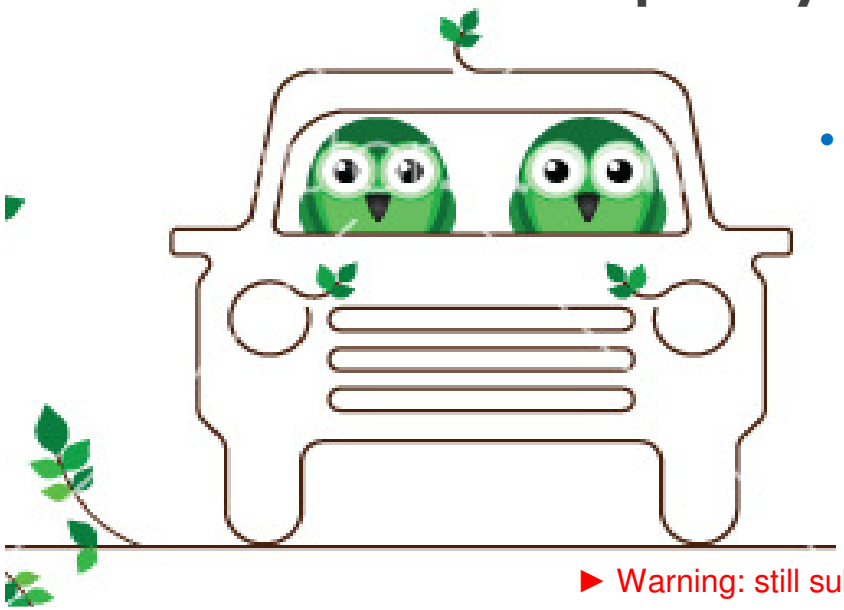
Smart, green and integrated transport / 2014-2015
(overall budget 92 M€)

- **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)

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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**

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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

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Description of the topics

- 3 key features
  - ***Specific Challenge*** – sets the context, the problem to be addressed, why intervention is necessary
  - ***Scope*** – delineates the problem, specifies the focus and the boundaries of the potential action BUT without overly describing specific approached
  - ***Expected Impact*** – describes the key elements of what is expected to be achieved
- Simplified types of action (instruments): Research & Innovation 100%; Innovation 70%; Coordination and Support Action etc.
- Size of projects is indicated

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**

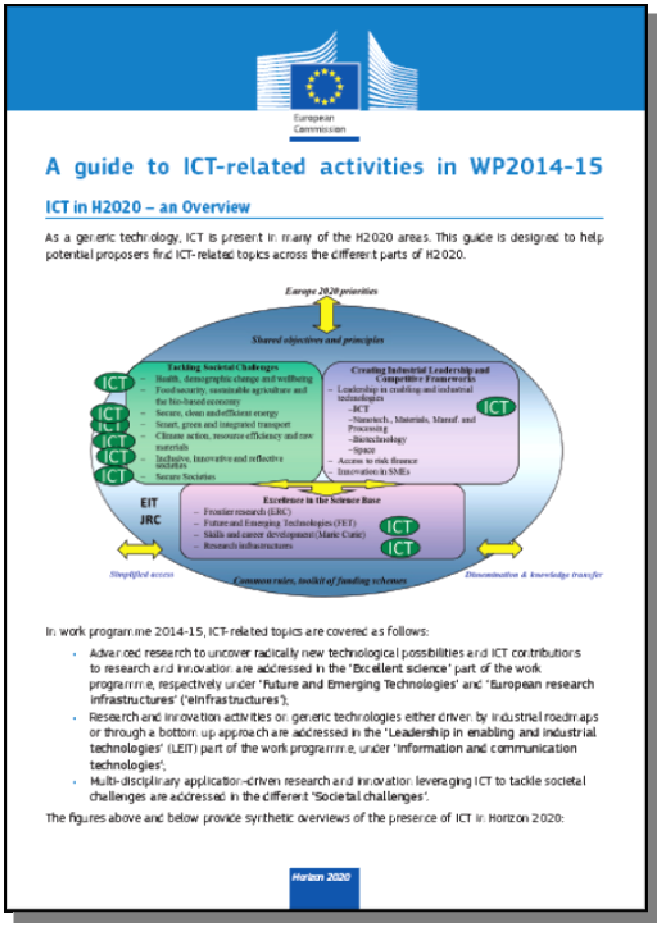
  Equity or quasi-equity investments; loans; guarantees; other risk-sharing instruments

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

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**



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A guide to ICT-related activities in WP2014-15

ICT in H2020 – an Overview

As a generic technology, ICT is present in many of the H2020 areas. This guide is designed to help potential proposers find ICT-related topics across the different parts of H2020.

In work programme 2014-15, ICT-related topics are covered as follows:

- Advanced research to uncover radically new technological possibilities and ICT contributions to research and innovation are addressed in the 'Excellent science' part of the work programme, respectively under 'Future and Emerging Technologies' and 'European research infrastructures' ('einfrastructures');
- Research and innovation activities on generic technologies either driven by industrial roadmaps or through a bottom-up approach are addressed in the 'Leadership in enabling and industrial technologies' (LEIT) part of the work programme, under 'Information and communication technologies';
- Multi-disciplinary application-driven research and innovation leveraging ICT to tackle societal challenges are addressed in the different 'Societal challenges'.

The figures above and below provide synthetic overviews of the presence of ICT in Horizon 2020:

Horizon 2020

Call planning overview (indicative)

- **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: **13 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**

Thanks for your attention!

Further information:
www.ec.europa/research/horizon2020

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