EU OPPORTUNITIES FOR ICT RESEARCH AND INNOVATION IN HORIZON 2020 FOR 2016-2017

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ABSTRACT

Information and communication technologies (ICT) play an important role by contributing to rapid technological progress and productivity growth. The ICT sector represents 4.8% of the European economy. It generates 25% of total business expenditure in Research and Development (R&D), and investments in ICT account for 50% of all European productivity growth. It is therefore obvious that ICT lies at the heart of research and innovation globally. The European Union considers that ICT have a catalytic impact in three key areas: productivity and innovation , by facilitating creativity and management; modernisation of public services , such as health, education and transport; and advances in science and technology , by supporting cooperation and access to information.

Horizon 2020 is the European Union framework programme for research and innovation for 2014-2020. EU investments in ICT increased by about 25% under Horizon 2020 compared to the previous EU framework programme for research, FP7. This EU investment supports the whole chain from basic research to innovation that can deliver new business breakthroughs, often on the basis of emerging technologies. In Horizon 2020, ICT-related topics can be found in all priorities and programmes.

The overall structure of the Work Programme for Information and Communication Technologies 2016-2017 is very similar to the one of 2014-2015, however, a few changes were made, namely: Activities aiming at supporting innovative SMEs of the ICT sector through the dedicated SME instrument are grouped together with similar activities addressing other scientific and technical fields in a single call of the 'Innovation in SMEs' part of Horizon 2020; 'Cross-cutting activities' combining contributions from the 'Leadership in enabling and industrial technologies' priority and 'Societal Challenges' are also grouped together in a specific part of Horizon 2020.

KEYWORDS: Information and Communication Technologies; ICT; Horizon 2020

INTRODUCTION

Information and communication technologies (ICT) are essential for our society and play an important role, notably by contributing to rapid technological progress and productivity growth. For example, firms use ICTs to organize transnational networks in response to international competition and the increasing need for strategic interaction[2]. ICT help enterprises to reduce costs, improve processes, boost innovation, and increase productivity. ICT also make the public sector leaner, faster and more citizen-friendly. ICT

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[2] http://eco.ieu.edu.tr/wp-content/proceedings/2008/0804.pdf

improves the provision of medical care, increases safety and provides greater quality of life.

Software, IT services and telecommunications are the growth drivers of the economy. For example, a study performed by the Fraunhofer Institute (LIFE 2[1]) shows that IT service industry in Germany has grown steadily to become an independent economic factor whose gross value creation and impact on employment is set to rise even further over the next two decades. The IT industry also plays a central role in intelligent networks and technologies which society will be able to use to tackle the challenges of the future, e.g. climate change and demographic change.

The ICT sector represents 4.8% of the European economy. It generates 25% of total business expenditure in Research and Development (R&D), and investments in ICT account for 50% of all European productivity growth. It is therefore obvious that ICT lies at the heart of research and innovation globally. The European Union considers that ICT have a catalytic impact in three key areas[2]:

- **productivity and innovation** , by facilitating creativity and management;
- **modernisation of public services** , such as health, education and transport;
- **advances in science and technology** , by supporting cooperation and access to information.

ICT Research and Innovation in Horizon 2020

Horizon 2020 is the European Union framework programme for research and innovation for 2014-2020[3], with the largest so far budget (80 billion Euro) for actions from basic research to market uptake.

EU investments in ICT increased by about 25% under Horizon 2020 compared to the previous EU framework programme for research, FP7. This EU investment supports the whole chain from basic research to innovation that can deliver new business breakthroughs, often on the basis of emerging technologies.

In H2020, ICT-related topics can be found in all priorities, from 'Excellence Science' to 'Industrial Leadership', to 'Societal Challenges'[4]. **'Excellent Science'** research will cover the radically new technological possibilities through the 'Future and Emerging Technologies', including FET Flagships, and the 'European research infrastructures' ('eInfrastructures'). Within the new research programme, integrating more than ever research and innovation, Future and Emerging Technologies (FET) will go beyond its historical role of path-finding information technologies: it will open to all technologies thus strengthening its multidisciplinary aspects to turn Europe's excellent science base into a competitive advantage.

Research and innovation activities on generic ICT technologies either driven by industrial roadmaps or through a bottom up approach are addressed in the **'Industrial Leadership'** pillar, more specifically in the 'Leadership in Enabling and Industrial Technologies' (LEIT) part of the work programme, under the section 'Information and communication

[1] http://www.studie-life.de/en/life-studies/working-connected/the-significance-of-ict-for-business-and-society/the-significance-of-ict-%E2%80%93-the-macroeconomic-perspective/
[2] http://cordis.europa.eu/fp7/ict/home_en.html
[3] http://ec.europa.eu/programmes/horizon2020/
[4] http://ec.europa.eu/programmes/horizon2020/en/area/ict-research-innovation

technologies'. In particular, the topics addressed in the first two years of the programme cover the ICT technology value chain in a comprehensive way, from key enabling technologies up to content and information management technologies, robotics and networking technologies. Several cross-cutting topics addressing cyber-security, Internet of Things and research on Human-centric Digital Age are included. All activities are complemented with support to innovation and take-up and international cooperation. In addition, three ICT-related topics are integrated in the Factory of the Future (FoF) PPP.
A number of essential EU policy objectives on health, ageing, climate, environment, energy, transport, public sector modernisation, security cannot be achieved without ICT innovation. ICT also invades and transforms bit by bit all aspects of our societies and economies and change the way people live and behave. Multi-disciplinary, application-driven research and innovation actions leveraging ICT to tackle societal challenges are included in the different **'Societal Challenges'** parts of the Horizon 2020 programme.

ICT research and innovation projects in Horizon 2020 in 2014-2015

In 2014-2015, there were over 100 topics relevant to ICT that have been open to calls for proposals, in all areas of Horizon 2020: Excellent Science; Leadership in Enabling and Industrial Technologies; Societal Challenges[1]. In the area "Leadersjip in Enabling and Industrial Technologies", the Work Programme dedicated to Information and Communication Technologies 2014-2015 had 39 topics over 2014-2015, i.e. 23 topics opened in 2014 and 17 topics opened in 2015, as follows[2] (Table 1).

Table 1. ICT in 'Leadership in Enabling and Industrial Technologies' 2014 - 2015
(Source: Work Programme Information Communication Technologies 2014-2015)

Area	Topics 2014	Topics 2015
A new generation of components and systems	- ICT 1 – 2014: Smart Cyber-Physical Systems - ICT 2 – 2014: Smart System Integration - ICT 3 – 2014: Advanced Thin, Organic and Large Area Electronics (TOLAE) technologies	
Advanced Computing		- ICT 4 – 2015: Customised and low power computing
Future Internet	- ICT 5 – 2014: Smart Networks and novel Internet Architectures - ICT 6 – 2014: Smart optical	- ICT 8 – 2015: Boosting public sector productivity and innovation through cloud

[1] https://ec.europa.eu/research/participants/portal/doc/call/h2020/h2020-fetopen-2014-2015-ria/1587705-guide-to-ict-related-activities-in-wp2014-15_en.pdf
[2] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-leit-ict_en.pdf

Area	Topics 2014	Topics 2015
	and wireless network technologies - ICT 7 – 2014: Advanced Cloud Infrastructures and Services - ICT 9 – 2014: Tools and Methods for Software Development - ICT 11 – 2014: FIRE+ (Future Internet Research & Experimentation) - ICT 13 – 2014: Web Entrepreneurship - ICT 14 – 2014: Advanced 5G Network Infrastructure for the Future Internet	computing services - ICT 10 – 2015: Collective Awareness Platforms for Sustainability and Social Innovation - ICT 12 – 2015: More experimentation for the Future Internet
Content technologies and information management	- ICT 15 – 2014: Big data Innovation and take-up - ICT 17 – 2014: Cracking the language barrier - ICT 18 – 2014: Support the growth of ICT innovative Creative Industries SMEs - ICT 21 – 2014: Advanced digital gaming/gamification technologies - ICT 22 – 2014: Multimodal and Natural computer interaction	- ICT 16 – 2015: Big data - research - ICT 19 – 2015: Technologies for creative industries, social media and convergence - ICT 20 – 2015: Technologies for better human learning and teaching
Robotics	- ICT 23 – 2014: Robotics	- ICT 24 – 2015: Robotics
Micro- and nano-electronic technologies, Photonics	- ICT 26 – 2014: Photonics KET - ICT 29 – 2014: Development of novel materials and systems for OLED lighting	- ICT 25 – 2015: Generic micro- and nano-electronic technologies - ICT 27 – 2015: Photonics KET - ICT 28 – 2015: Cross-cutting ICT KETs
ICT Cross-Cutting Activities	- ICT 31 – 2014: Human-centric Digital Age - ICT 32 – 2014: Cybersecurity, Trustworthy ICT - ICT 33 – 2014: Trans-national co-operation among National Contact Points	- ICT 30 – 2015: Internet of Things and Platforms for Connected Smart Objects

Area	Topics 2014	Topics 2015
Horizontal ICT Innovation actions	- ICT 35 – 2014: Innovation and Entrepreneurship Support - ICT 37 - 2014-15: Open Disruptive Innovation Scheme (implemented through the SME instrument)	- ICT 34 – 2015: Support for access to finance - ICT 36 – 2015: Pre-commercial procurement open to all areas of public interest requiring new ICT solutions - ICT 37 – 2014-15: Open Disruptive Innovation Scheme (implemented through the SME instrument)
International Cooperation actions		- ICT 38 – 2015: International partnership building and support to dialogues with high income countries - ICT 39 – 2015: International partnership building in low and middle income countries

For the ICT topics in 2014 there were 375 projects funded in Horizon 2020, with a total EU contribution of over 800 million Euro (Source: European Commission public database Cordis[1]). The ICT topic that attracted the highest number of projects (151) was ICT-37-2014 Open Disruptive Innovation Scheme (implemented through the SME instrument) (Figure 1).

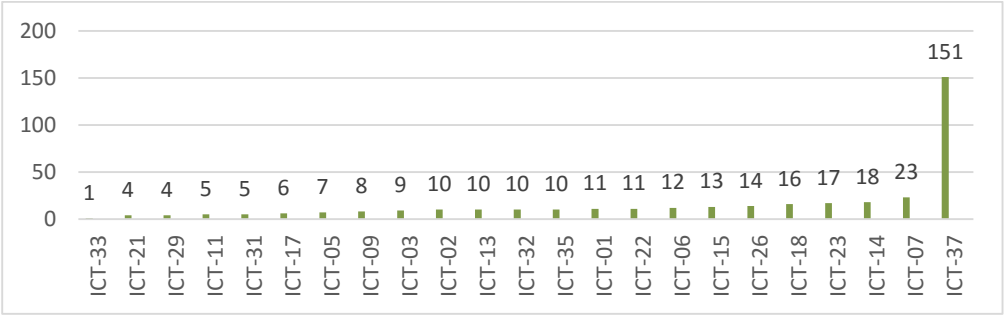

Figure 1. Number of projects funded in 2014 in Horizon 2020 in ICT
(Source: CORDIS)

From the total projects funded in 2014 in Horizon 2020, 151 of them were SME Instrument). Other types of instruments used by ICT projects in 2014 were Research and

[1] http://cordis.europa.eu/home_en.html

Innovation Action (RIA) – 131 projects; Innovation Action (IA) – 57 projects and Coordination and Support Action Action (CSA) – 36 projects (Source: CORDIS) (Box 1).

"**Research and Innovation Action (RIA)**: Action primarily consisting of activities aiming to establish new knowledge and/or to explore the feasibility of a new or improved technology, product, process, service or solution. For this purpose they may include basic and applied research, technology development and integration, testing and validation on a small-scale prototype in a laboratory or simulated environment."

"**Innovation Action (IA)**: Action primarily consisting of activities directly aiming at producing plans and arrangements or designs for new, altered or improved products, processes or services. For this purpose they may include prototyping, testing, demonstrating, piloting, large-scale product validation and market replication."

"**Coordination and Support Action (CSA)**: Actions consisting primarily of accompanying measures such as standardisation, dissemination, awareness-raising and communication, networking, coordination or support services, policy dialogues and mutual learning exercises and studies, including design studies for new infrastructure and may also include complementary activities of strategic planning, networking and coordination between programmes in different countries."

"**SME Instrument (SME)**: The SME instrument is targeted at all types of innovative SMEs showing a strong ambition to develop, grow and internationalise. It provides staged support covering the whole innovation cycle in three phases."

"**Pre-Commercial Procurement (PCP)**: PCP actions aim to encourage public procurement of research, development and validation of new solutions that can bring significant quality and efficiency improvements in areas of public interest, whilst opening market opportunities for industry and researchers active in Europe. It provides EU funding for a group of procurers ('buyers group') to undertake together one joint PCP procurement, so that there is one joint call for tender, one joint evaluation of offers, and a lead procurer24 awarding the R&D service contracts in the name and on behalf of the buyers group. Each procurer in the buyers group contributes its individual financial contribution to the total budget necessary to jointly finance the PCP, enabling the procurers to share the costs of procuring R&D services from a number of providers and comparing together the merits of alternative solutions paths from a number of competing providers to address the common challenge."

Box 1. Types of actions (funding instruments) in Horizon 2020
(Source: Horizon 2020 Work Programme General Annexes 2014-2015)

Examples of ICT research and innovation projects funded in Horizon 2020 in 2014 are given, per type of funding instrument, in Boxes 2 - 5.

Strategic action for future CPS through roadmaps, impact multiplication and constituency building - Road2CPS

Type of action: CSA

Topic: ICT-01-2014

Objectives of the project: The miniaturisation of sensing, actuating, and computing components together with the increasing number of interacting systems in strongly connected environments, and the growing complexity of such systems have triggered a paradigm shift. CPS concepts address challenges for system implementation such as increasing complexity and flexibility. These challenges and the need to optimise performance and comply with essential requirements like safety and security raise many questions that are partially addressed by current research in areas such as transport, health, production, smart grids and smart cities already. Nevertheless, there is still a huge gap between theoretical concepts, technical developments, and successful application, as well as considerable differences with regard to propagation and maturity of CPS between application domains and along the value chain. Strategic action is needed to bring the relevant stakeholders together and to facilitate mutually beneficial collaborations between them.

Road2CPS has been conceived to respond to this situation by
• Analysing impact from past and ongoing projects, identifying gaps and bridging efforts towards impact multiplication

• Developing technology, application and innovation strategy roadmaps for CPS to serve as a catalyst for early adoption of CPS technologies

• Enhancing CPS implementation and exposing exploitation opportunities via case studies
• Developing recommendations for future research priorities and implementation strategies
• Building a CPS constituency – bringing together key players into targeted task forces to contribute to the Road2CPS action plan

This will provide European organisations with the direction required to establish their future visions of CPS environments, supporting their efforts to stay at the forefront of new

Box 2. Example of an ICT project funded in 2014 – type of action Coordination and Support Action (CSA)
(Source: Cordis)

European Network of competencies and platforms for Enabling SME from any sector building Innovative CPS products to sustain demand for European manufacturing - EuroCPS

Type of action: IA
Topic: ICT-01-2014

Objectives of the project: SMEs play a key role in European economies; they constitute the largest business block and provide the bulk of employment. They generate most of the innovative ideas for ICT and CPS-enabled IoT products, two areas which represent an inflection point for innovators and industry in Europe.
EuroCPS is an ambitious project that aims to arm Europe with a network of design centres that will boost and initiate synergies between SMEs, major CPS-platforms, and CPS-competency providers, to capture the emerging markets for IoT products.

EuroCPS will:
1. Leverage the existing regional ecosystem across the full value chain (from micro-electronics, smart systems, and CPS, to high value added products and services) and range of expertise and competencies to provide innovators from any sector with an easy path to build innovative CPS-enabled systems.
2. Act as a one-stop-shop that provides a critical mass of technologies and competencies by facilitating user-supplier partnerships across value-chains and regions. Hence the typical development time of innovative for CPS applications will be significantly decreased through the ease of access to the platforms, and coaching by the competence partners within EuroCPS.
3. Link software, system and nano-electronic industries along the full CPS value chain to demonstrate a new cooperation model evidenced by experiments initiated and led by innovators that translate the rich pool of ideas from end users into implementation of CPS applications made in Europe.

EuroCPS gathers major European system suppliers and world class research centres and technology providers, all rooted in the top European regional ecosystems. Based on strong foundations in European and national initiatives, EuroCPS will, through pan European collaboration and knowledge exchange and access to the strong value chain in this strategic

Box 3. Example of an ICT project funded in 2014 – type of action Innovation Action (IA)
(Source: Cordis)

Business and IT-Cloud Alignment using a Smart Socket - CloudSocket

Type of action: RIA
Topic: ICT-07-2014

Objectives of the project: Business and IT Alignment is important challenge, as we are facing a dramatic change in the way we rely, depend and interact with ICT that influences our everyday life. Although "digital natives" will soon enter the workforce, there is still a huge gap between the business domain and ICT domain in terms of awareness, common understanding or expertise. This hampers the take-off of technology such as Cloud Computing. Hence, we are facing a competition, between global-market players who quicker succeed in changing business into the Cloud to raise ICT efficiency and reduce costs. This is particularly true for SMEs that have started to embrace virtualisation or at best IaaS offers but the exploding and dynamic market of components available on the PaaS or SaaS level demands for expertise and time typically not available at SMEs.

Business processes are commodity when defining business activities in human understandable way in form of "sequences of manual, semi-automatic or automated tasks with the aim to achieve the company's goal".

Previous work in plugIT mapped business processes on static ICT configurations available at a company's site, assuming ICT is still mainly configured on platform or component level.

CloudSocket envisions the idea of "Business Process as a Service", where domain-specific business processes like employee registration at social insurance, tax report, or legal verification are supported by workflows that optimally match the ICT support for the selected process. The ICT support is expected to be realized by available platforms or software components from PaaS or SaaS platforms.

CloudSocket introduces the concept BPaaS that fulfills the business process needs thanks to smart alignment techniques, packages this BPaaS as "extended Cloudlets" that are autonomously deployable and include adaptive rules to appropriately react in a multi-cloud

Box 4. Example of an ICT project funded in 2014 – type of action Research and Innovation Action (RIA)
(Source: Cordis)

Let us build the first European Business-to-Business Social Network - EB2BSN

Type of action: SME1
Topic: ICT-37-2014

Objectives of the project: ALG is an innovative SME founded in 2010, builder of the Attestation Légale platform (http://www.attestationlegale.fr), currently in use by thousands of French businesses. The Attestation Légale platform is a Software as a Service (SaaS) Web application through which businesses can share their administrative documents and can benefit from alerts and always up-to-date documents.

Because of the future implementation of a European directive that reinforces the obligation of diligence in Europe (http://www.lemoniteur.fr/165-commande-publique/article/actualite/23657764-bruxelles-adoption-definitive-des-directives-marches-publics-et-concessions), our objective and our main motivation for this project proposal are to investigate the possibility of deploying our solution on a European scale.

The deployment of such a solution will lead to the following outcomes:
- Improvement of the competitiveness of European businesses by the administrative simplification accelerated by the European directive;
- Better regulation in the context of worker secondment and contribute to the effort on countering unfair competition between multiple European Union businesses.

These outcomes will also lead to the following impacts:
- Usage disruption by eliminating the redundant processes and costs related to the diffusion and the collect of administrative documents;
- Technological disruption by modeling and exploiting these Business-to-Business social networks while respecting the requirement of privacy and data property specific to businesses actors;
- Data governance disruption by letting the members of our platform to remain the owner of the produced data.

The objectives of this phase 1 are to identify the European countries in which our solution can be deployed. If such countries are found in phase 1, the phase 2 would enable us to either

Box 5. Example of an ICT project funded in 2014 – type of action SME Instrument (SME)
(Source: Cordis)

ICT research and innovation projects in Horizon 2020 in 2016-2017

In Horizon 2020 for 2016-2017 ICT will be found in all main programmes: Excellent Science; Leadership and Enabling Industrial Technologies; and Societal Challenges (Figure 2).

Figure 1. ICT in Horizon 2020 for 2016-2017
(Source: A guide to ICT-related activities in WP 2016-2017[1])

The Work Programme dedicated to Information and Communication Technologies 2016-2017 continues most of the areas and topics started in 2014 (Table 2).

Table 2. ICT areas in 2016-2017 compred to 2014-2015
(Source: Work Programmes Information and Communication Technologies 2014-2015[2] and 2016-2017[3])

ICT Areas 2014-2015	ICT Areas 2016-2017
A new generation of components and systems	A new generation of components and systems
Advanced Computing	Advanced Computing And Cloud Computing
Future Internet	Future Internet
Content technologies and information management	Content

[1] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-ga_en.pdf
[2] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-leit-ict_en.pdf
[3] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-leit-ict_en.pdf

ICT Areas 2014-2015	ICT Areas 2016-2017
Robotics	Robotics and Autonomous Systems
Micro- and nano-electronic technologies, Photonics	ICT Key Enabling Technologies
ICT Cross-Cutting Activities	Innovation and Entrepreneurship Support
Horizontal ICT Innovation actions	Responsibility and Creativity
International Cooperation actions	International Cooperation activities

A special attention is dedicated to ICT as Focus Area in the Cross-cutting activities for 2016-2017. The topics with ICT relevance within the Work Programme Cross-cutting activities for 2016-2017 are (Work Programme Cross-cutting activities (focus areas) 2016-2017[1]) (Box 6).

Industry 2020 in the Circular Economy
ICT for the Factories of the Future
FOF-11-2016: Digital automation
FOF-12-2017: ICT Innovation for Manufacturing SMEs (I4MS)
FOF-13-2016: Photonics Laser-based production
Internet of Things
IoT-01-2016: Large Scale Pilots
IoT-02-2016: IoT Horizontal activities
IoT-03-2017: R&I on IoT integration and platforms

Box. ICT topics in Cross-cutting activities 2016-2017
(Source: Work Programme Cross-cutting activities (focus areas) 2016-2017)

Calendar of ICT calls 2016

The Horizon 2020 work programmes for 2016-2017 were published on the Research Participant Portal on 13 October 2015[2]. According to the Work Programme for Information and Communication Technologies for 2016-2017[3], some of the topics for 2016 are already opened for calls for proposals, with about three months to the deadline; other topics will be opened at the begining of 2016 (Source: Work Programme Information and Communication Technologies 2016-2017) (Table 4).

Table 4. Calendar 2016 for ICT areas and topics
(Source: Work Programme Information and Communication Technologies 2016-2017)

[1] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-focus_en.pdf
[2] http://ec.europa.eu/research/participants/portal/desktop/en/funding/reference_docs.html#h2020-work-programmes-2016-17
[3] http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-leit-ict_en.pdf

Areas and Topics	Type of action*	OPEN	DEADLINE
Call - Information and Communication Technologies			
A new generation of components and systems			
ICT-01-2016: Smart Cyber-Physical Systems	RIA / CSA	20 Oct 2015	12 Apr 2016
ICT-02-2016: Thin, Organic and Large Area Electronics	RIA / IA	20 Oct 2015	12 Apr 2016
ICT-03-2016: SSI - Smart System Integration	CSA	20 Oct 2015	12 Apr 2016
Advanced Computing and Cloud Computing			
ICT-06-2016: Cloud Computing	RIA / IA	20 Oct 2015	12 Apr 2016
Future Internet			
ICT-10-2016: Software Technologies	RIA	20 Oct 2015	12 Apr 2016
ICT-12-2016: Net Innovation Initiative	IA / RIA / CSA	20 Oct 2015	12 Apr 2016
ICT-13-2016: Future Internet Experimentation - Building a European experimental Infrastructure	CSA / RIA	20 Oct 2015	12 Apr 2016
Content			
ICT-14-2016: Big Data PPP: cross-sectorial and cross-lingual data integration and experimentation	IA	20 Oct 2015	12 Apr 2016
ICT-15-2016: Big Data PPP: Large Scale Pilot actions in sectors best benefitting from data-driven innovation	IA	20 Oct 2015	12 Apr 2016
ICT-17-2016: Big data PPP: Support, industrial skills, benchmarking and evaluation	CSA	20 Oct 2015	12 Apr 2016
ICT-18-2016: Big data PPP: privacy-preserving big data technologies	RIA / CSA	20 Oct 2015	12 Apr 2016
ICT-21-2016: Support technology transfer to the creative industries	IA	20 Oct 2015	12 Apr 2016
ICT-22-2016: Technologies for Learning and Skills	IA / RIA	20 Oct 2015	12 Apr 2016
ICT-24-2016: Gaming and	IA	20 Oct 2015	12 Apr 2016

Areas and Topics	Type of action*	OPEN	DEADLINE
gamification			
Robotics and Autonomous Systems			
ICT-25-2016: Advanced robot capabilities research and take-up	RIA / IA	20 Oct 2015	12 Apr 2016
ICT-26-2016: System abilities, development and pilot installations	RIA / IA	20 Oct 2015	12 Apr 2016
ICT Key Enabling Technologies			
ICT-29-2016: Photonics KET 2016	RIA / IA / CSA	20 Oct 2015	12 Apr 2016
Innovation and Entrepreneurship support			
ICT-34-2016: Pre-Commercial Procurement open	PCP	20 Oct 2015	12 Apr 2016
Responsibility and Creativity			
ICT-35-2016: Enabling responsible ICT-related research and innovation	RIA	20 Oct 2015	12 Apr 2016
ICT-36-2016: Boost synergies between artists, creative people and technologists	IA / CSA	20 Oct 2015	12 Apr 2016
International Cooperation Activities			
ICT-37-2016: CHINA: Collaboration on Future Internet	CSA	20 Oct 2015	19 Jan 2016
ICT-38-2016: MEXICO: Collaboration on ICT	CSA / RIA	20 Oct 2015	19 Jan 2016
ICT-39-2016: International partnership building in low and middle income countries	CSA	20 Oct 2015	19 Jan 2016
Call - EU-Japan Joint Call			
EUJ-01-2016: 5G – Next Generation Communication Networks	RIA	20 Oct2015	19 Jan 2016
EUJ-02-2016: IoT/Cloud/Big Data platforms in social application contexts	RIA	20 Oct2015	19 Jan 2016
EUJ-03-2016: Experimental testbeds on Information-	RIA	20 Oct2015	19 Jan 2016

Areas and Topics	Type of action*	OPEN	DEADLINE
Centric Networking			
Call - EU-South Korea Joint Call			
EUK-01-2016: 5G – Next Generation Communication Networks	RIA	20 Oct2015	19 Jan 2016
EUK-02-2016: IoT joint research	RIA	20 Oct2015	19 Jan 2016
EUK-03-2016: Federated Cloud resource brokerage for mobile cloud services	RIA	20 Oct2015	19 Jan 2016

* See Box 1

Conclusions

In 2016-2017 ICT actions will cover the full innovation chain, offering opportunities for:

- Advanced research to uncover radically new technological possibilities and ICT contributions to upstream research and innovation are addressed in the 'Excellent science' part of the Horizon 2020, respectively under 'Future and Emerging Technologies' and 'European research infrastructures' ('eInfrastructures').
- Research and innovation activities on generic ICT 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 Horizon 2020.
- Multi-disciplinary application-driven research and innovation leveraging ICT to tackle societal challenges are addressed in the different 'Societal challenges' part of Horizon 2020.

The overall structure of the Work Programme for Information and Communication Technologies 2016-2017 is very similar to the one of 2014-2015, however, a few changes were made, namely (Source: A guide to ICT-related activities in WP 2016-2017):

- Activities aiming at supporting innovative SMEs of the ICT sector through the dedicated SME instrument are grouped together with similar activities addressing other scientific and technical fields in a single call of the 'Innovation in SMEs' part of Horizon 2020.
- 'Cross-cutting activities' combining contributions from the 'Leadership in enabling and industrial technologies' priority and 'Societal Challenges' are also grouped together in a specific part of Horizon 2020.

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Work Programme Information and Communication Technologies 2016-2017, http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-leit-ict_en.pdf

Work Programme Information and Communication Technologies 2014-2015, http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-leit-ict_en.pdf

Work Programme General Annexes 2014-2015, http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-ga_en.pdf