IST-Africa Initiative / CAAST-Net Plus Introduction to Horizon 2020

Organised by Ministry of Education Science and Technology

Paul Cunningham, Miriam Cunningham, IIMC, Ireland / IST-Africa Coordinator

Stéphane Hogan, Counsellor for Research & Innovation, Delegation of the European Union to the African Union

Melissa Plath, UniPID, University of Jyväskylä, Finland, George Essegbey, CSIR, Ghana & Constantine Vaitsas, FORTH, Greece - CAAST-Net Plus

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Email: secretariat@IST-Africa.org

IST-Africa Initiative

- **IST-Africa is Supported by the European Commission (EC) and African Union Commission (AUC)**

  Founded in 2002 and Co-funded under European Framework Programme since 2005

  IST-Africa Facilitates Strategic Engagement with Africa in the areas of Information Society, ICT and Innovation Adoption, Policy and Research

  Strategic Partnership between IIMC (Ireland) & 18 Ministries and National Councils responsible for Information Society, ICT and/or Innovation

- **IST-Africa facilitates and supports**

  International Innovation, Policy and Research Cooperation

  Knowledge Sharing and Skills Transfer between IST-Africa Partners

  Collaborative Innovation, Entrepreneurship and Adoption of Living Labs Methodologies

  Information Society, ICT and Innovation aspects of the Africa - EU Strategic Partnership

  Awareness of African Research Capacity, cross-border cooperation & participation in H2020

  Establishment of National Contact Points (NCP) in IST-Africa Partner Countries

IST-Africa Consortium

IST-Africa Partners

- IIMC International Information Management Corporation Limited (“IIMC”, Ireland)
- Ministerio da Ciencia e Tecnologia (“MINCT”, Angola)
- Ministry of Transport and Communications (“MTC”, Botswana)
- Ministere de l’Enseignement Superieur et de la Recherche Scientifique (“MESRS”, Burundi)
- Agence Nationale des Technologies de l’Information et de la Communication (“ANTIC”, Cameroon)
- Ministry of Communications and Information Technology (“MCIT”, Egypt)
- Ministry of Communication and Information Technology (“MCIT”, Ethiopia)
- Ministry of Education, Science and Technology (“MOEST”, Kenya)
- Ministry of Communications, Science and Technology (“MCST-L”, Lesotho)
- National Commission for Science and Technology (“NCST”, Malawi)
- National Computer Board (“NCB”, Mauritius)
- Instituto Nacional de Tecnologias de Informacao e Comunicacao (“INTIC”, Mozambique)
- National Commission on Research, Science and Technology (“NCRST”, Namibia)
- Ministère de l'Enseignement Supérieur et de la Recherche (“MESR”, Senegal)
- Department of Science and Technology (“DST”, South Africa)
- Ministry of Information Communication Technology (“MICT-S”, Swaziland)
- Tanzania Commission for Science and Technology (“COSTECH”, Tanzania)
- Ministere de l'Enseignement Superieur et de la Recherche Scientifique ("MHESR", Tunisia)
- Uganda National Council for Science and Technology (“UNCST”, Uganda)

MoEST Promotes National Research Community

- MoEST leverages the IST-Africa Initiative to actively promote the National Research Community by
  - Presentations at International events
  - Chapter on Kenya as part of the overall IST-Africa Study on ICT Initiatives and Research capacity
  - Chapter on Innovation Spaces and Living Labs in Kenya as part of overall IST-Africa Study on Innovation ecosystem
  - Publishing articles on ongoing and emerging ICT and Innovation activities in Kenya on the IST-Africa portal and in the Newsletter
  - Raising awareness of upcoming Calls for Proposals and international funding opportunities
  - Assists institutions in preparing for new opportunities such as Horizon 2020
  - Raises awareness of activities being undertaken in other African countries
  - Supporting the publishing of Organisational profiles on IST-Africa portal to raise awareness of activities in wider community
  - Has access to IST-Africa Network including Ministries and National Councils in 17 African Countries to share knowledge, experiences and success stories
  - Has first-hand experience of what is involved in being part of International funded activities under the European Framework Programme

Reports to Download

- IST-Africa Guide to 2014 Calls for Proposals in Horizon 2020
- “Supporting the Evolution of Sustainable Living Labs and Living Lab Networks in Africa”
- IST-Africa Guide to National ICT Initiatives and Research Priorities
- IST-Africa Guide to ICT-related Bilateral Cooperation

Visit www.IST-Africa.org

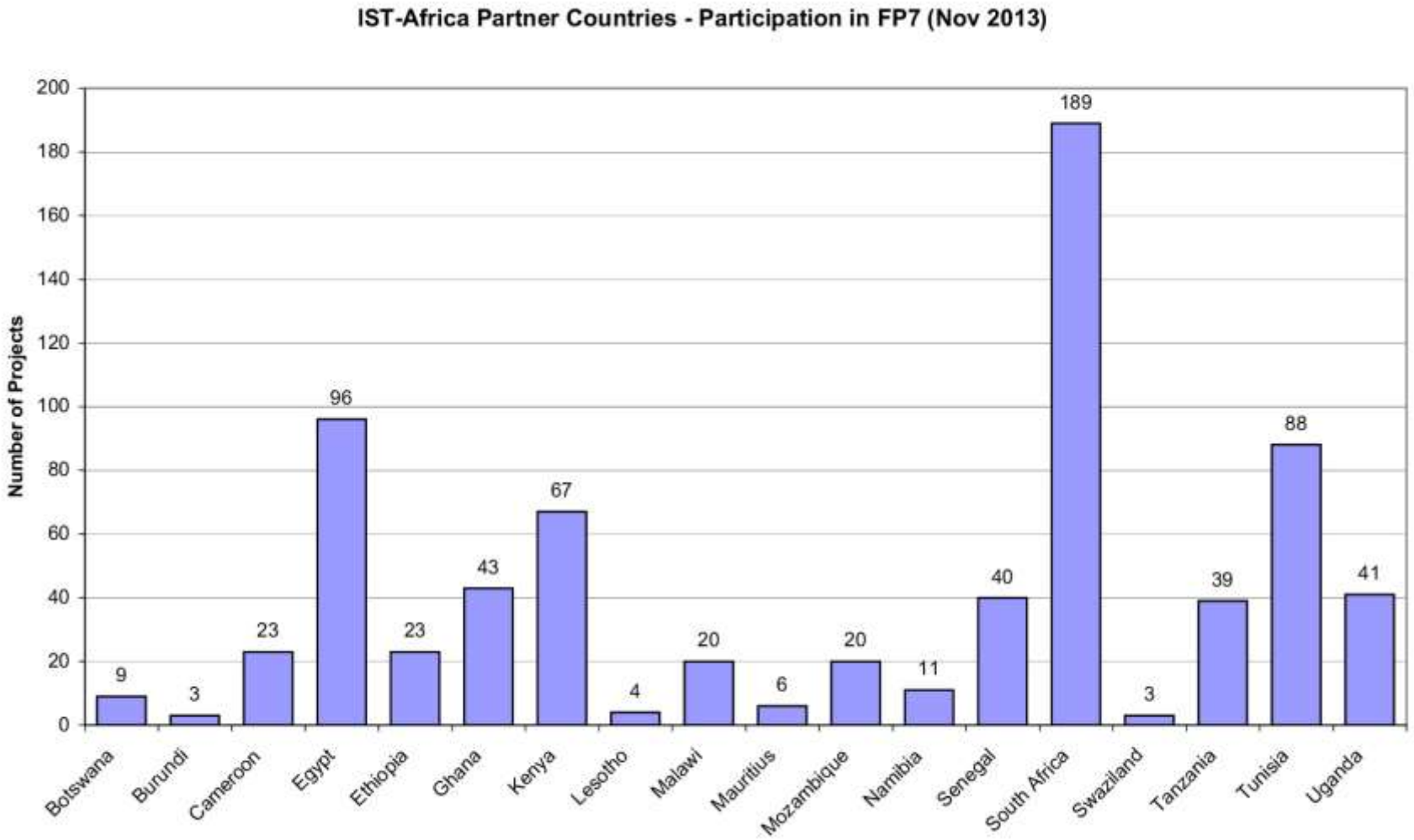
http://www.ist-africa.org/home/files/IST-Africa_Guide_2014Calls_Horizon2020.pdf
http://www.ist-africa.org/home/default.asp?page=reports and
http://www.ist-africa.org/home/default.asp?page=paper-repository

- Next Steps
  - Register Individual Profile in the Community Showcase and Mailing List
  - Send news, events and reports to be published
  - Download recent presentations on Horizon 2020
  - Download published papers from IST-Africa paper repository to learn about activities in other countries
  - Follow up with authors to share your experiences and start virtual engagement towards future collaboration
  - Provide organisational profile to be published and circulated during upcoming events

FP7 Success Stories

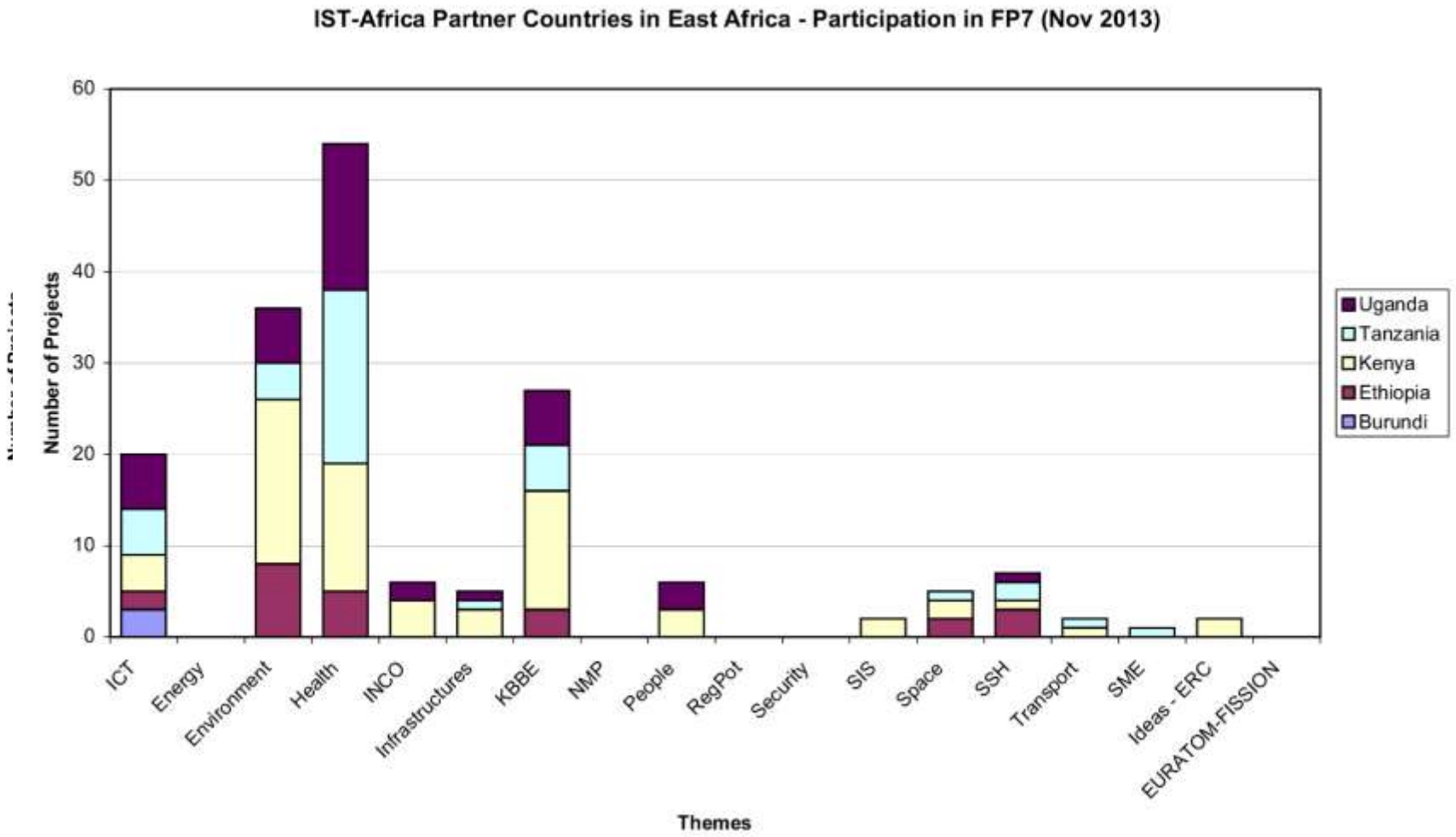
Miriam Cunningham, IIMC / IST-Africa Initiative

FP7 Projects in IST-Africa Partner countries



FP7 Projects in East Africa Countries

- **Overview of Thematic areas in FP7 projects with participants from East Africa as at Nov 2013**



Kenya in FP7 - Experiences

- Kenyan organisations have been successful in 67 FP7 projects in
  - ICT - 4 projects
  - Environment - 18 projects
  - Health - 14 projects
  - International Cooperation (INCO) – 4 projects
  - Infrastructure - 3 projects
  - Food, Agriculture and Biotechnology KBBE - 13 projects
  - People – 3 projects
  - Science in Society - 2 projects
  - Space - 2 projects
  - Social Sciences – 1 project
  - Transport - 1 project
  - Ideas – ERC – 2 projects

  Research funding secured **12.3 million euro**

- Experiences shared by Kenyan organisations involved in FP7
  - How did they get involved?
  - How was the consortium put together?
  - Focus of project work
  - Experiences of FP7
  - Plans for Horizon 2020

Snap shot of research areas under Horizon 2020

Miriam Cunningham, IIMC / IST-Africa Initiative

Societal Challenges

1. Health, demographic change and wellbeing
    - Understanding health, ageing and disease; Improving diagnosis; Innovative treatments and technologies, ICT in Healthcare
2. Food security, sustainable agriculture, marine research & the bio-economy
3. Secure, clean and efficient energy
    - Smart cities; Energy efficient buildings; smart electricity grids; smart metering;
4. Smart, green and integrated transport
    - Smart transport equipment, infrastructures and services; innovative transport management systems; safety aspects
5. Climate action, Environment, resource efficiency and raw materials
    - ICT for increased resource efficiency; earth observation and monitoring
6. Inclusive, innovative and reflective societies
    - Digital inclusion; social innovation platforms; e-government services; e-skills and e-learning; e-culture
7. Secure societies
    - Cyber security; ensuring privacy and protection of human rights on-line

Leadership in Enabling and Industrial Technologies

1. Components and systems
   - Smart embedded components and systems, micro-nano-bio systems, organic electronics, large area integration, technologies for IoT, smart integrated systems, systems of systems and complex system engineering
2. Advanced Computing
   - Processor and system architecture, interconnect and data localization technologies, parallel computing and simulation software
3. Future Internet
   - Networks, software and services, cloud computing, cyber security, privacy and trust, wireless communication and all optical networks, immersive interactive multimedia and connected enterprise
4. Content technologies and information management
   - Technologies for language, learning, interaction, digital preservation, content access and analytics; advanced data mining, machine learning, statistical analysis and visual computing, big data technologies
5. Robotics
   - Service robotics, cognitive systems, advanced interfaces, smart spaces and sentient machines
6. Key Enabling Technologies: Micro-nano-electronics and photonics
   - Design, advanced processes, pilot lines for fabrication, production technologies and demonstration actions to validate technology developments and innovative business models

Introduction from Participants

Each organisation and dept will write up their research areas so we can identify clusters and specific areas of interest under Horizon 2020

Participation Rules & Instruments in Horizon 2020

Miriam Cunningham, IIMC / IST-Africa Initiative

Single Set of Rules under Horizon 2020

- Under FP7 there was a range of funding rules depending on Scheme (FP7, CIP, AAL etc)
- Under Horizon 2020, there will be a single set of rules covering all funding programmes and funding bodies
  - Same rate for all beneficiaries and all activities in the grant
  - Applicable rate will be defined in the Work Programme
    - Up to 100% reimbursement of eligible costs for Research projects
    - Up to 70% reimbursement of eligible costs for “close to market” Projects
    - Flat rate 25% reimbursement of indirect costs
- Grant Agreements and Reimbursement of costs will remain as main funding mechanism
  - Specific provisions for new forms of funding targeting innovation: Pre-Commercial procurement, procurement of innovative solutions, inducement prizes
  - Electronic signature of Grant Agreements

Who can Participate in Horizon 2020?

Legal Entities from

- EU-27 Member States
- Associate Candidate Countries
  - Turkey, Croatia
- Associate States (International Agreement)
  - Iceland, Israel, Liechtenstein, Norway, Switzerland
- EU Scientific Cooperation Agreements
  - Argentina, Australia, Brazil, Canada, China, Chile, Egypt, India, Korea, Japan, Mexico, Morocco, Kazakjstan, Russia, South Africa, Tunisia, Ukraine, USA
- International Cooperation Partner Countries (ICPC-INCO), which includes African countries
- Third countries specifically outlined in the Work Programme description for a Specific Call

Types of Organisations

- Research organisations, Universities
- High-tech Small and Medium Sized Enterprises (SMEs)
- SME Associations (Specific instruments)
- Public Administrations
- Individual researchers wishing to work in another country (Marie Curie)
- Institutions running a research facility of multi-national interest

Eligible for EU Funding

- Eligibility for Funding:
  - Legal entities from Member State and Associated Country or created under EU Community law (and the JRC)
  - International European interest organisations
  - Legal entities established in International Cooperation Partner Countries (ICPC-INCO) including African countries

and

  - Legal entities established in 3rd countries other than ICPC-INCO, if provided for in SP or WP; or if essential for carrying out action; or if provision for funding is provided for in a bilateral agreement between Community and that country

Geographic spread for Consortia

- The minimum consortia structure is dictated by each Call but in general there is a requirement for participation of the following:
  - Three independent legal entities from three different EU Member States (MS) or Associated countries (AC)
  - International (intergovernmental) organisations can participate
  - Participants from Third Countries & International Cooperation Partner Countries (ICPC) if in addition to minima
  - Support actions; no specific restrictions apart from inclusion of European coordinator

Instruments – Horizon 2020

- **Grants for Research and Innovation** – 100% funding of all activities and participants
- **Grants for Innovation (Closer to Market activities)** – 70% funding of all activities and participants –except non-profit (100%)
- **Support and Coordination Actions** – 100% funding of all activities and participants

- **Programme Co-funding Actions**
- **SME-Instrument** – Instrument to support specific SME activities in three phases
- **Pre-Commercial Procurement (PCP)** – Steer development to public sector needs
- **Public Procurement of Innovative Solutions (PPI)** – First buyer for innovative solutions
- **Prizes** – Support for two key categories of prizes (recognition and inducement)

Grants for Research and Innovation

Grants for Research and Innovation

- 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*. May include basic and applied research, technology development and integration, testing and validation on a small-scale prototype in a laboratory or simulated environment. Projects may contain closely connected but limited demonstration or pilot activities aiming to show technical feasibility in a near to operational environment
- 100% funding of all activities and participants
- Mininum of three independent legal entities from three different EU Member States (MS) or Associated countries (AC)
  - Additional information may be defined in the Work Programme
- Main activity type: Research and Development
  - All activities can be covered (Research, Development, Demonstration, Dissemination, Exploitation preparation, Project Management)

Grants for Innovation

- 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*.
- A ‘demonstration or pilot’ aims to validate the technical and economic viability of a new or improved technology, product, process, service or solution in an operational (or near to operational) environment, whether industrial or otherwise, involving where appropriate a larger scale prototype or demonstrator.
- A ‘market replication’ aims to support the first application/deployment in the market of an innovation that has already been demonstrated but not yet applied/deployed in the market due to market failures/barriers to uptake. 'Market replication' does not cover multiple applications in the market of an innovation that has already been applied successfully once in the market.
- ‘First’ means new at least to Europe or new at least to the application sector in question. Often such projects involve a validation of technical and economic performance at system level in real life operating conditions provided by the market.
- Projects may include limited research and development activities.
- Funding rate: 70% (except for non-profit legal entities, where a rate of 100% applies)
- Mininum of three independent legal entities from three different EU Member States (MS) or Associated countries (AC)
  - Additional information may be defined in the Work Programme

Coordination Actions (CAs)

- Focused on coordination of research or creation of a network between other research actions for a specific purpose
- Cannot undertake research and technological development activities
- CAs include two types of activies
  - Coordination Activities
    - Organisation of events (conferences, meetings)
    - Performance of studies, analysis
    - Exchanges of personnel
    - Exchange and dissemination of good practice
    - Setting up of common information systems
    - Setting up of expert groups
    - Definition, organisation, management of joint or common initiatives
  - Consortium Management activities
- CAs have fixed overall work plan, partnership and deliverables

Coordination Actions (CAs) - 2

- Minimum 3 independent legal entities from 3 different EU Member or Associated Countries
- Size of consortium appropriate to coordination activities
  - Experience under FP7 – 13 – 26 partners
- Research organisations, Industry players, SMEs
- 1 - 2 years duration
  - Experience under FP7 EU contribution €0.5 - €2 (average €1 m)
- EU contribution guidelines
  - 100% funding of eligible direct costs for Coordination activities
  - 100% funding of eligible direct costs for consortium management
  - Flat rate of indirect costs: 25%

Support Actions (SAs)

- Designed to
  - underpin the implementation of the Programme & complement the other FP7 funding schemes
  - help in preparations for future Community research and technological development policy activities and
  - stimulate, encourage and facilitate the participation of SMEs, civil society organisations, small research teams, newly developed and remote research centres, as well as setting up research clusters across Europe
  - Cover one off events or single purpose activities
- Cannot undertake research and technological development activities
- SAs include two types of activies
  - Support Activities
    - Conferences, seminars, working groups and expert groups
    - Studies, analysis, fact findings and monitoring
    - Preparatory technical work, including feasibility studies
    - Development of research or innovation strategies
    - High level scientific awards and competitions
  - Consortium Management activities

Support Actions (SAs) - 2

- No miniumum number
- Size of consortium appropriate to support activities
  - Experience under FP7 – 1 – 15 partners
- Research organisations, Industry players, SMEs
- 1 - 3 years duration
  - Experience under FP7 EU contribution €0.3 - €3 (average €0.5 m)
- EU contribution guidelines
  - 100% funding of eligible costs for Support activities
  - 100% funding of eligible costs for consortium management
  - Flat rate of indirect costs: 25%

Spread of Instruments in Horizon 2020

- **Scientific Excellence**
  - Research and Innovation Grants; Prizes; Marie Curie Grants, European Research Council (ERC) Grants. More emphasis on research activities
- **Leadership in Enabling and Industrial Technologies**
  - Research and Innovation Grants, Innovation Grants, Support Actions; PCP, Prizes
- **Societal Challenges**
  - Research and innovation Grants; Innovation Grants; Support Actions, Programme co-funding; PPI; PCP; Prizes; More emphasis on Innovation/close to market activities

ICT Components in Horizon 2020

Excellent Science

Paul Cunningham, IIMC / IST-Africa Initiative

Download individual thematic Work Programmes from

www.ist-africa.org/home/default.asp?page=horizon2020

Overview of ICT components in Horizon 2020

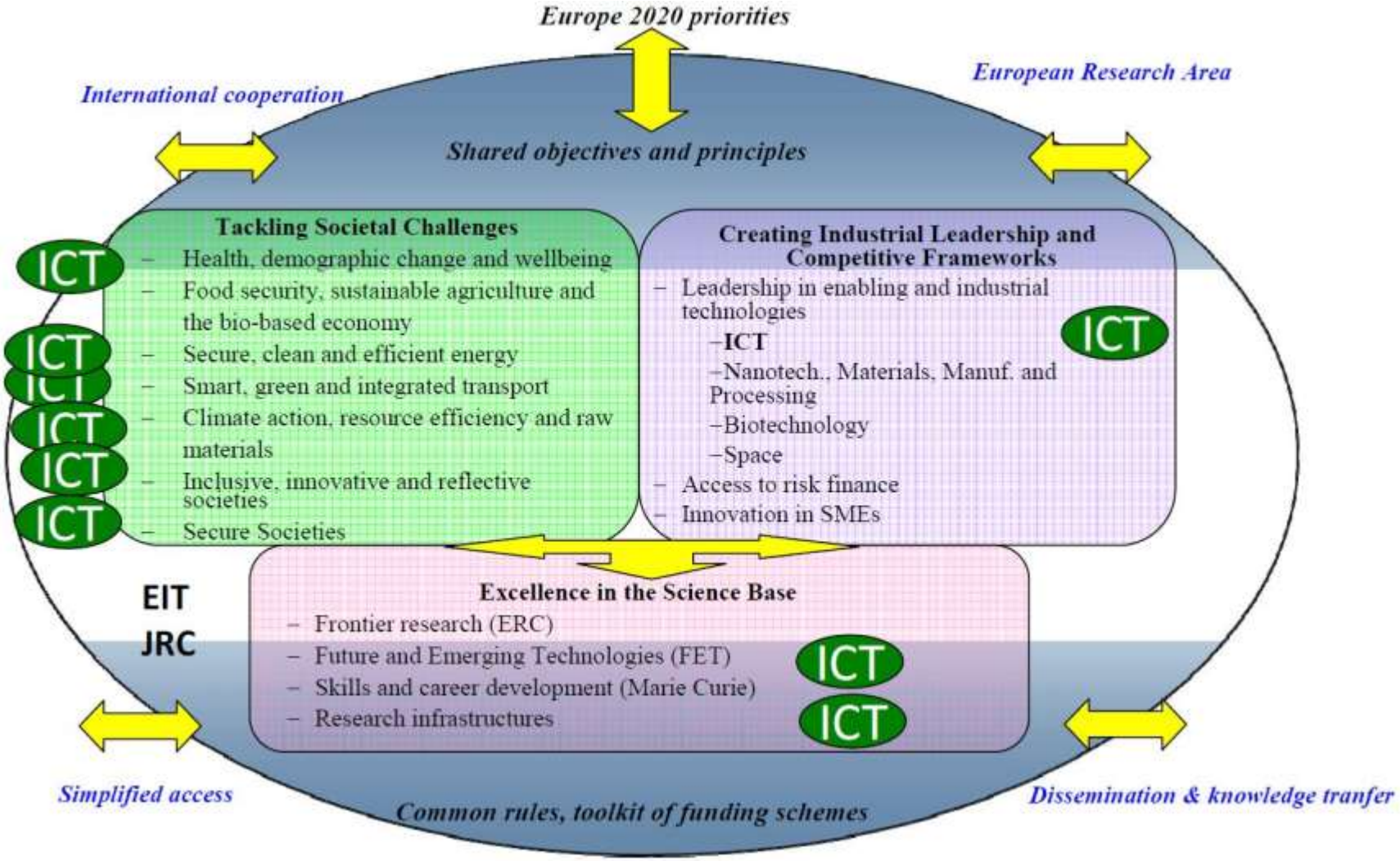


Image provided by DG CONNECT, European Commission

Excellent Science

Download Marie Curie Work Programme and Research Infrastructures Work Programme from www.ist-africa.org/home/default.asp?page=horizon2020

Overview of elements within Excellent Science

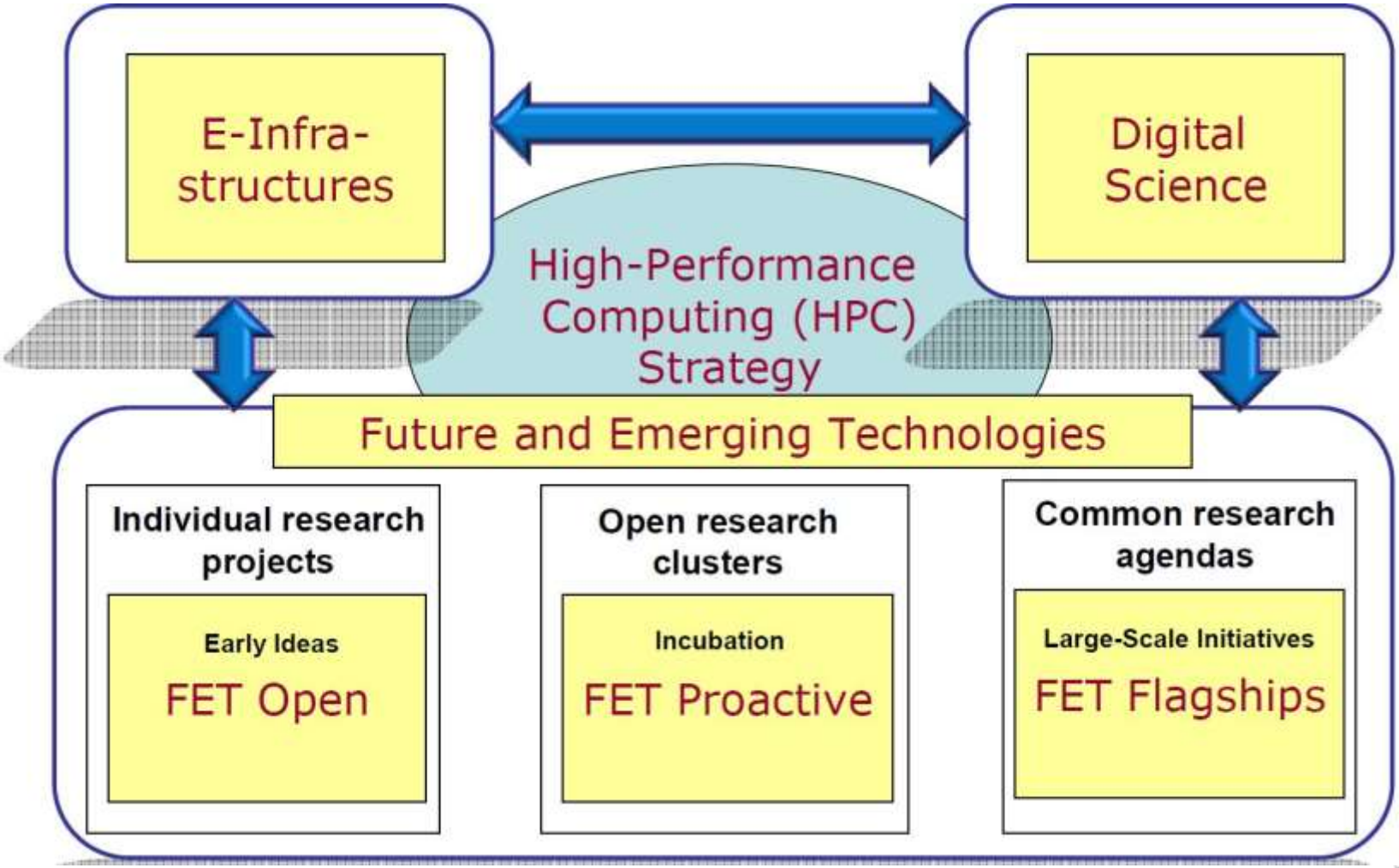


Image provided by DG CONNECT, European Commission

eInfrastructures

- eInfrastructure Vision to support digital researchers

- Priorities include
  - Data-centric Science and Engineering – Ability to support open access, management of large research datasets, community-driven data infrastructures
  - Computational Infrastructure – Support High Computing Centres of Excellence, support open computing platforms and services
  - eInfrastructures for Virtual Research Environments/Communities
  - Development and operation of the GEANT Infrastructure
- Calls:
  - H2020-EINFRA -2014-1 - Deadline 15 April 2014
  - H2020-INFRASUPP-2014-1 - Deadline 14 May 2014
  - H2020- EINFRA -2014-2 (open access) + H2020-INFRASUPP-2014-2 - Deadline 02 Sept 2014
  - H2020-INFRADEV-1 – 2014 – Deadline 02 Sept 2014

Marie Curie Mobility Grants

- The Marie Curie Programme faciliates individuals to access mobility grants to faciliate career development and upskilling for research staff
  - Individual Fellowships incorporates
    - International Outgoing Fellowship – supports researcher to come from Europe to work with your institution
    - International Inward Fellowship – supports PostDoc from Africa to work with European institution on pre-defined project for a pre-defined period of time
      - Necessary to return to original institution when the Fellowship concludes
    - Opportunity for Post Docs to develop career
    - Fellowship must be applied for by the host European Institution through a proposal submitted under Open Call – career development is very important incl career restart
    - Fellowships provide costs of time and monthly allowance for living expenses for between 1 – 3 years depending on the project accepted
  - RISE – Research and Innnovation Staff Exchange (**Deadline 24 April 2014**)
    - New type of exchange of research staff to stimulate transfer of knowledge
    - Can support African researcher to work with European host organisation for period of time or European researcher to come to work with an African organisation to support setting up or extending research skills
    - All levels of research staff can undertake short term secondments
    - Monthly stipend of 2,500 euro to cover living expenses while abroad
    - Person remains part of staff of own institution, proposal submitted through netw by European research institution based on common research project

ICT in Societal Challenges

Health (Societal Challenges)

Health, demographic change and wellbeing 2014 – 2015

ICT areas include

- **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**
- Calls:
  - PHC 19 – 2014) Advancing active and healthy ageing with ICT: Service robotics within assisted living environments; and ICT solutions for independent living with cognitive impairment
  - PHC 20 – 2014) Advancing active and healthy ageing with ICT: ICT solutions for independent living with cognitive impairment
  - PHC 23 - 2014) Developing and comparing new models for safe and efficient, prevention oriented, health and care systems
  - PHC 26 - 2014 Self-management of health and disease: citizen engagement and mHealth

Energy (Societal Challenges)

Secure, clean and efficient energy 2014 – 2015

ICT components include:

- **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)
  - SCC 1 – 2014/2015: Smart Cities and Communities solutions integrating energy, transport, ICT sectors through lighthouse projects
  - SCC 2 – 2014: Developing a framework for common, transparent data collection and performance measurement to allow comparability and replication between solutions and
  - best-practice identification
  - SCC 3 – 2015: Development of system standards for smart cities and communities solutions

Transport (Societal Challenges)

Smart, green and integrated transport 2014 – 2015

ICT components include:

- **Road**
  - **Cooperative Intelligent Transport Systems**
    - Connecting people, vehicles, infrastructures and businesses
  - Safe and connected **automation in road transport**
  - Road transport:
    - MG.3.5-2014 Cooperative ITS for safe, congestion-free and sustainable mobility
    - MG.3.6-2015 Safe and connected automation in road transport
  - Urban mobility - MG.5.3-2014 Tackling urban road congestion
  - Logistics - MG.6.3-2015 Common communication and navigation platforms for pan-European logistics applications
  - Intelligent Transport Systems - MG.7.1-2014 Connectivity and information sharing for intelligent mobility
- **Green vehicles**
  - **Electric vehicles'** enhanced performance and in**tegration into the transport system and the electricity grid**

Climate Action, Environment (Societal Challenges)

Climate action, environment, resource efficiency and raw materials 2014 – 15

ICT components include:

- **Waste management**
  - ICT solutions for waste traceability, waste material flow management

  Calls
  - WASTE-1-2014: Moving towards a circular economy through industrial symbiosis
  - WASTE-2-2014: A systems approach for the reduction, recycling and reuse of food waste
  - WASTE-3-2014: Recycling of raw materials from products and buildings
  - WASTE-4-2014/2015: Towards near-zero waste at European and global level

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

  Calls
  - WATER-1-2014/2015: Bridging the gap: from innovative water solutions to market replication

Inclusive, innovative and reflective societies 2014 – 2015

ICT components include:

- **Reflective societies**
  - REFLECTIVE 6 – 2015: Innovation ecosystems of digital cultural assets
  - REFLECTIVE 7 – 2014: 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

    Calls:
    - EURO-6-2015: Meeting new societal needs by using emerging technologies in the public sector
    - YOUNG-5–2014: Societal and political engagement of young people and their perspectives on Europe
    - INSO-1–2014, 2015: ICT-enabled open government
    - INSO-9–2014: Innovative mobile e-government applications by SMEs
  - ICT for **learning and inclusion -** INSO-6-2014: Platform for ICT for Learning and Inclusion

Secure societies 2014 – 2015

ICT components include:

- **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
  - Calls:
    - DS 1 – 2014: Privacy
    - DS 2 – 2014: Access Control
    - DS 3 – 2015: The role of ICT in Critical Infrastructure Protection
    - DS 4 – 2015: Secure Information Sharing
    - DS 5 – 2015: Trust eServices
    - DS 6 – 2014: Risk management and assurance models

Leadership in Enabling and Industrial Technologies (LEIT)

Leadership in Enabling and Industrial Technologies

1. Components and systems
   - Smart embedded components and systems, micro-nano-bio systems, organic electronics, large area integration, technologies for IoT (Internet of Things), smart integrated systems, systems of systems and complex system engineering
2. Advanced Computing
   - Processor and system architecture, interconnect and data localization technologies, parallel computing and simulation software
3. Future Internet
   - Networks, software and services, cloud computing, cyber security, privacy and trust, wireless communication and all optical networks, immersive interactive multimedia and connected enterprise
4. Content technologies and information management
   - Technologies for language, learning, interaction, digital preservation, content access and analytics; advanced data mining, machine learning, statistical analysis and visual computing, big data technologies
5. Robotics
   - Service robotics, cognitive systems, advanced interfaces, smart spaces and sentient machines
6. Key Enabling Technologies: Micro-nano-electronics and photonics
   - Design, advanced processes, pilot lines for fabrication, production technologies and demonstration actions to validate technology developments and innovative business models

LEIT Calls in 2014

LEIT Call 2014 – Opened 11 December 2013, Closes 23 April 2014

- **Components and Systems**
  - ICT1 – 2014 Smart Cyber Physical Systems (Research & Innovation Actions; Innovation Actions)
  - ICT2 – 2014 Smart System Integration (Research & Innovation Actions; Innovation Actions, CSA)
  - ICT3 – 2014 Advanced Thin, Organic and Large Area Electronics Technologies
- **Future Internet**
  - ICT5 – 2014 Smart Networks and Novel Internet Architectures (Research & Innovation Actions)
  - ICT6 – 2014 Smart Optical and Wireless Network Technologies (Research & Innovation Actions, SA)
  - ICT7 – 2014 Advanced Cloud Infrastructures and Services (Research & Innovation Actions; Innovation Actions, CSA)
  - ICT9 – 2014 Tools and Methods for Software Development (Research & Innovation Actions)
  - ICT13 – 2014 Web Entrepreneurship (Innovation Actions, CSA)
  - ICT14 – 2014 Advanced 5G Network Infrastructures for the Future Internet (Research & Innovation Actions; Innovation Actions CSA)
- **Content Technologies and Information Management**
  - ICT15 – 2014 Big data and Open Data Innovation and Take-up (Innovation Actions, CSA)
  - ICT17 – 2014 Cracking the Language Barrier (Research & Innovation Actions; Innovation Actions, CSA)
  - ICT18 – 2014 Support the Growth of ICT Innovative Creative Industries SMEs (Innovation Actions, CSA)
  - ICT21 – 2014 Advanced Digital Gaming (Research & Innovation Actions; Innovation Actions)
  - ICT22 – 2014 Multimodal and Natural Computer Interaction (Research & Innovation Actions; Innovation Actions)
- **Robotics**
  - ICT23 – 2014 Robotics (Research & Innovation Actions; Innovation Actions)
- **Cross cutting areas**
  - ICT31 – 2014 Human-centric Digital Age (Research & Innovation Actions, CSA)
  - ICT32 – 2014 Cybersecurity, Trustworthy ICT

Components and systems 2014 – 2015

- Covers **systemic integration from smart integrated components to cyber-physical systems**
- **Complementary to the JTI Electronic Components and Systems (ECSEL)**
- **Organised in three related topics:**
  - Smart cyber-physical systems
    - Next generation embedded and connected systems
  - Smart system integration
    - Integration of heterogeneous micro- and nanotechnologies into smart systems
  - Advanced Thin, Organic and Large Area Electronics
- R&I in this area will also contribute to the implementation of the **SRA on Energy Efficient Buildings**
- **Calls**
  - ICT1 – 2014 Smart Cyber Physical Systems (Research & Innovation Actions; Innovation Actions) – ICT1.a €37 million, ICT1.b €17 million, ICT1.c 2 million
  - ICT2 – 2014 Smart System Integration (Research & Innovation Actions; Innovation Actions, CSA) - ICT2.a €35 million, ICT2.b €9 million, ICT2.c €3 million
  - ICT3 – 2014 Advanced Thin, Organic and Large Area Electronics Technologies - ICT3.a €17 million, ICT3.b €15.5 million, ICT3.c €3 million, ICT3.d €2.5 million

Advanced Computing 2014 - 2015

- Reinforce and expand 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
- Calls
  - ICT 4 – 2015: Customised and low power computing

Future Internet 2014 - 2015

- 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:**

ICT 5 – 2014 Smart Networks and Novel Internet Architectures (Research & Innovation Actions) €24 million

ICT 6 – 2014 Smart Optical and Wireless Network Technologies (Research & Innovation Actions, SA) – ICT6.a €29 million, ICT6.b €1 million

ICT 7 – 2014 Advanced Cloud Infrastructures and Services (Research & Innovation Actions; Innovation Actions, CSA) – ICT7.a €66 million, ICT7.b €5 million, ICT7.c €2 million

ICT 9 – 2014 Tools and Methods for Software Development (Research & Innovation Actions) – €25 million

ICT 11 – 2014: FIRE+ (Future Internet Research & Experimentation) – ICT11.a €25 million, ICT11.b €5 million, ICT11.c €1.5 million

ICT 13 – 2014 Web Entrepreneurship (Innovation Actions, CSA) – ICT13.a €6 million, ICT13.b €4 million

ICT 14 – 2014 Advanced 5G Network Infrastructures for the Future Internet (Research & Innovation Actions; Innovation Actions CSA)

ICT 8 – 2015: Boosting public sector productivity and innovation through cloud computing

ICT 10 – 2015: Collective Awareness Platforms for Sustainability and Social Innovation

ICT 12 – 2015: More experimentation for the Future Internet

ICT5 – 2014 Smart Networks and Novel Internet Architectures

- **Challenge** – Lack of functionality planning in original Internet architecture design (security, trust, mobility). Need new approach to bring computer architectures and network architecture closer for greater efficiency. Next wave of research should solve remaining problems and bring promising options closer to deployment
- **Scope** – Innovative Internet architectures and networking concepts that meet challenges and opportunities of 21st century taking into consideration social, economic, and legal issues that arise from interplay between the Internet and society.
  Research to address novel approaches to information access and delivery, built-in security and privacy, generalised mobility and seamless integration with computing environments. Approaches to go beyond known limitations. Need to be able to prove that the architecture can scale and provides a low cost migration strategy from existing IP networks
- **Expected Impact**
  - Contributions to standards (IETF, IRTF), peer-reviewed publications, patents
  - Creation of FI architecture network of researchers and users of sustainable network (will continue beyond funded phase)
  - Links with related International developments (NSF FI Architecture programme, Korea, Japan)
  - Migration/deployment strategies and roadmaps validated by key industrial players (operators/service providers) and other stakeholders such as regulators and policy taking an active part in development of the Internet
  - Contribution towards at least one large scale validation trial makers
- Type of Action – Research & Innovation – Total budget €24 million – Proposals requesting small contribution expected (EU contribution €2 – 4 million)

ICT6 – 2014 Smart optical and wireless network technologies

- **Challenge** – Given the rapid network growth, existing technological approaches for optical and wireless technologies reaching their limits. Cost of current solutions for access networks is barrier to universal coverage with ultra-high speed. Challenges associated with usage of communication networks including increase in mobile and ubiquitous broadband access and impact on backhaul networks and carbon footprint needs to be considered.
- **Scope** – a) ***Research & Innovation Actions*** *(Total budget: €29 million)* – Proposals can focus on optical networks, wireless networks or both.
  Optical Network activities should address i) the lack of dynamic control and management of optical network resources within and across operator's domains for lower cost and more flexible use of resources; ii) the ubiquitous delivery of very high speed access at 10 Gbps per user within 10 years and 100 Gbps later (including visible light communication); iii) the architectural limitations of inter and intra datacenter connectivity; iv) the limitations of current optical transmission technologies. Attention must be given to ensuring compatibility with legacy infrastructures and access unbundling regulation as well as to cost- and energy-efficiency.
  Wireless networks activities should address the lack of dynamic control of wireless network resources through disruptive new "femtocell" like paradigms where end-users play the role of “prosumers” of wireless connectivity. Optimised spectrum use; energy efficiency and new usages are targeted. More flexible use of spectrum may be addressed from an architectural perspective including cognitive radio and spectrum aggregation, usage of higher bands up to 90 GHz, advanced modulation and coding, adaptive beam forming techniques. Hybrid combination of terrestrial and satellite infrastructures to address complete coverage, optimised spectrum use and network resilience are also in scope.
  b) ***Support actions*** *(Total budget: €1 million)* - Production of technological roadmaps, support dissemination (including the yearly domain conference) and standardisation in the wireless/optical domains, support the integration of results coming from the various projects to provide an overall programme view, support liaison with related international activities, support the elaboration of research, operational and economic metrics in the target domains, and explore demonstrations and validation strategies for the objective.

ICT6 – 2014 Smart optical and wireless network technologies (II)

Expected Impact - *Research & Innovation Actions*

- Maintain a state of the art industrial capability on optical network technology in Europe with at least 20% of the global market share.
- Diversify the strong European capabilities in wireless systems through emergence of novel technologies and spectrum usage patterns.
- Support the cost efficient emergence of novel classes of network services and applications by avoiding the "capacity crunch".
- Reduce energy consumption of basic infrastructures by a factor of about 10.
- Decrease spectral radiation exposure through low EMF technologies.
- Move beyond 10 Gbps per user within 10 years and 100 Gbps per user in a farther future over fixed accesses.
- Support metro and core networks with Pb/s throughput and Tb/s interface speeds.
- Enable managed and automated cross domain optical resources and foster emergence of industry open standards.
- Reach higher spectrum efficiency, target 10 fold increase.
- Enable new applications through spectrum efficient use of higher frequency bands little used today.
- Achieve ubiquitous access to critical/societal applications.
- Ensure availability of new interoperability open standards for wireless and optical communications and associated SEP (standard essential patents). US, Japan and Korea may be considered as priority countries where international cooperation may be achieved on a win-win basis.

Support Actions

- Wide dissemination of results, constituency building and maintaining a programme view of the area including complementarity with relevant actions supported at Member States and Associated Countries level

- Type of Actions – a) Research & Innovation (Total budget €29 million) – Proposals requesting small contribution expected (EU contribution €2 – 4 million); b) Coordination & Support Actions (Total budget €1 million)

ICT7 – 2014 Advanced Cloud Infrastructures and Services

- **Challenge** – New requirements for cloud computing (e.g. heterogeneity of resources and devices, software-defined data centres and cloud networking, security, and the rising demands for better quality of user experience). Research oriented towards new computational and data management models (at both infrastructure and services levels) that respond to the advent of faster and more efficient machines, rising heterogeneity of access modes and devices, demand for low energy solutions, widespread use of big data, federated clouds and secure multi-actor environments including public administrations.
  Aim to develop infrastructures, methods and tools for high performance, adaptive cloud applications and services that go beyond the current capabilities, strengthening the competitive position of the industry, including SMEs on a time horizon beyond 2018 and building upon existing strengths in telecoms and mobile infrastructures as well as software applications and services.
- **Scope** – a) ***Research & Innovation Actions*** **(Total budget €66 million)** – Proposals can focus on one or more of the themes identified below, but not necessarily all of them.
  - ***High performance heterogeneous cloud infrastructures***. The focus is on development, deployment and management of cloud-based infrastructures and services (IaaS, PaaS, SaaS) over large-scale, distributed, heterogeneous, dynamic computing and storage environments.
  - ***Federated cloud networking***: Techniques for the deployment and management of federated and decentralised cloud infrastructures, in particular cloud networking techniques (within software-defined data centres and across wide-area networks) and mechanisms to enable incorporation of resources and services independent of their location across distributed computing and storage infrastructures. Approaches, including standards, to increase interoperability between cloud services and infrastructure providers to enable efficient interworking and migration of services, applications and data.
  - ***Dynamic configuration, automated provisioning and orchestration of cloud resources***: Tools for automatic and dynamic deployment, configuration and management of services to enhance availability, flexibility, elasticity and to meet targeted performance constraints; techniques for managing big data taking into account integrity, consistency and maintenance aspects. Tools to facilitate the coherent deployment of distributed applications over heterogeneous infrastructures and platforms from multiple providers. Mechanisms to off-load computation and storage tasks from mobile devices onto the cloud at both design and execution time.

ICT7 – 2014 Advanced Cloud Infrastructures and Services (II)

- ***Automated discovery and composition of services***: Innovative ways to facilitate collaboration between public administrations, users and other stakeholders as to produce, discover, mix and re-use different service components and create new public services through pooling and sharing of resources, data, content and tools, even across national borders. The research will build on the "cloud of public services" concept9 that requires interoperable, reusable modules for public service functionalities. These are likely to be cross-institutional, cross-sector, easily used, re-used and combined dynamically10 to address specific needs.
- ***Cloud security***: Mechanisms, tools and techniques to increase trust, security and transparency of cloud infrastructures and services, including data integrity, localisation and confidentiality, also when using third party cloud resources

b) Innovation Actions (Total budget €5 million): platforms for trusted cloud systems. Collaborative development, adaptation and testing of open source software for innovative and trusted cloud-based services. Allow on-line collaboration across different platforms and different technical environments for geographically dispersed teams. Encourage the rapid prototyping and testing of open applications, including early and active involvement of users.

c) Coordination and support actions (Total budget €2 million): Support to the definition of common reference models for SLAs in the cloud. Support for the adoption of cloud computing infrastructures and services by addressing legal, economic, and societal factors. Support to collaboration among research projects in the areas of software, services and cloud computing, including support to common dissemination / exploitation activities and roadmapping.

- ICT7.a €66 million, ICT7.b €5 million, ICT7.c €2 million

ICT7 – 2014 Advanced Cloud Infrastructures and Services (III)

Expected Impact

- Significantly higher quality of user experience and trust in clouds through stronger security and data protection, including open and auditable solutions for data security.
- Demonstration - of cloud-based services in federated, heterogeneous and multi-layered (IaaS, PaaS, SaaS) cloud environments; of the dynamic provisioning of interoperable applications and services over heterogeneous resources and devices; of high level of performance and quality of service even in highly secure solutions.
- Increased innovation opportunities for service providers, including SMEs and public administrations, evidenced through implementations of advanced cloud infrastructures and services. Promotion of the reuse of open source software solutions in cloud environments, in particular, involving SMEs and public administrations.
- Demonstration through appropriate use cases of the potential to improve the competitive position of the European cloud sector.

Types of action

a. Research & Innovation Actions (Total budget €66 million) – A mix of proposals requesting Small and Large contributions is expected

b. Innovation Actions (Total budget €5 million) – Proposals requesting a Small contribution are expected

c. Coordination and Support Actions (Total budget €2 million)

ICT 9 – 2014 Tools and Methods for Software Development

- **Challenge** – Quality levels required for complex and critical systems in terms of reliability, resilience and automatic adaptation represent a major challenge given current software development methods and tools. Breakthroughs could improve the growth and competitiveness of industry and encourage faster innovation cycles.
- **Scope** – Research and Innovation Action Proposals are expected to cover one or both of the themes identified below
  - ***Software tools and methods for large, complex and data-intensive systems***: Tools and methods for incorporating integrity, robustness, reliability and resilience into evolving software systems across the complete software lifecycle, especially for complex and secure business-critical systems. Innovative means to manage the complexity of large software and data-intensive systems, including simulation, testing and verification.
  - ***Software architectures and tools for highly distributed applications***: Novel approaches to development, deployment, management and dynamic reconfiguration of distributed applications. Architectures and tools to maximise quality of experience in elastically scalable applications. Particular account should be taken of data location, latency and data throughput in heterogeneous cloud environments including specialised hardware resources and sensors..
- ***Expected Impact***
  - A significant and substantiated productivity increase in the development, testing, verification, deployment and maintenance of data-intensive systems and highly distributed applications.
  - Availability and market take-up of innovative tools for handling complex software systems. A credible demonstration that larger and more complex problems can be effectively and securely tackled.
  - At macro level, evidence of potential for productivity gains through appropriate use cases in EU industry.
- Types of action: Research & Innovation Actions (Total budget €25 million) – Proposals requesting small contribution expected (EU contribution €2 – 4 million)

Content Technologies and Information Management 2014 - 2015

- **Addresses:**
  - Big Data with focus on both innovative data products and services 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 this field
  - Multimodal and natural computer interaction

- **Organised in eight topics:**
  - ICT 15 – 2014: Big data Innovation and take-up (ICT15.a €39 million, ICT15.b €11 million)
  - ICT 17 – 2014: Cracking the language barrier (ICT17.a €4 million, ICT17.b €10 million, ICT17.c €1 million)
  - ICT 18 – 2014: Support the growth of ICT innovative Creative Industries SMEs (ICT18.a €14 million, ICT18.b €1 million)
  - ICT 21 – 2014: Advanced digital gaming/gamification technologies (ICT21.a €9 million, ICT21.b €8 million)
  - ICT 22 – 2014: Multimodal and Natural computer interaction (ICT22.a €7.5 million, ICT22.b €16 million, ICT22.c €7.5 million)
  - 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

ICT 15 – 2014 Big data and Open Data Innovation and take-up

- **Challenge** – Activities focus on the general technological and systemic data challenges that concern entire value chains and/or bridge across borders, languages, industries and sectors. Aim is to improve the ability to build innovative multilingual data products and services, in order to turn large data volumes into semantically interoperable data assets and knowledge.
- **Scope** – **a) *Innovation Actions* (Total budget: €39 million):** proposals are expected to cover one of the themes identified below, but not both

  1. One collaborative project establishing a European open data integration and reuse incubator for SMEs to foster the development of open data supply chains and to educate and assist new users. Proposals are expected to:
     - Identify significant opportunities to establish supply chains for products and services, based on open data resources;
     - Attract the participation of European companies willing to contribute some of their own data assets as open data for experimentation or to integrate open data with their own private data as the basis for innovative applications.
     - Attract and manage SMEs interested in business or technology innovation in particular on open data.
     - Link to and reuse data from the European Union Open Data Portal or other local, regional or national Open Data portals, as well as to the CEF programme.
     - Where appropriate, link to and expand the activities of existing national/regional open data incubators.
     - The action may involve financial support to third parties in line with the conditions set out in Part K of the General Annexes. The consortium will define the process of SME selection for which financial support will be granted. Minimum 70% of the EU funding requested by the proposal should be allocated to this purpose.

  2. Collaborative projects focused on innovation and technology transfer in multilingual data harvesting and analytics solutions and services. The projects should have a cross-sectorial, cross-border and/or cross-lingual scope, and take into account the users' and societal perspectives. Consortia should have a core of companies dedicated to focused activities with a clear business perspective with verifiable milestones and market validation.

ICT 15 – 2014 Big data and Open Data Innovation and take-up II

- **Scope – b) *Coordination and Support Actions* (Total budget: €11 million):**
  - To lay the foundation for effective exchange and reuse of data assets (including those controlled by the data subject) across: industry sectors, national boundaries and language barriers, public and private sectors. Proposals are expected to:
    - Define the legal/contractual framework that would foster the exchange of data assets and set up pilots of a self-sustaining data market;
    - Attract and involve players from all parts of the data value chain and representing different sectors and markets;
    - Implement a close clustering mechanism with projects arising from the last bullet point of activity a), involving them in experiments, data reuse pilots, business case workshops etc. and taking input from them in designing the legal framework and infrastructure.
  - To contribute to capacity-building by designing and coordinating a network of European skills centres for big data analytics technologies and business development. The network is expected to identify knowledge/skills gaps in the European industrial landscape and produce effective learning curricula and documentation to train large numbers of European data analysts and business developers, capable of (co)operating across national borders on the basis of a common vision and methodology.
  - To create a Big Data integrator platform with the objective to coordinate and consolidate relevant technology and user communities in any actions supported in Horizon 2020 addressing or making use of Big Data

ICT15 – 2014 Big data and Open Data Innovation and take-up III

- **Expected Impact**
  - Enhanced access to and value generation on (public and private sector) open data resulting in hundreds of multilingual applications reusing tens of billions of open data records used by millions of European citizens.
  - Viable cross-border, cross-lingual and cross-sector data supply chains involving hundreds of European actors in a robust and growing ecosystem capable of generating sizable revenues for all the actors involved and SMEs in particular.
  - Tens of business-ready innovative data analytics solutions deployed by European companies in global markets.
  - Availability of deployable educational material for data scientists and data workers and thousands of European data professionals trained in state-of-the-art data analytics technologies and capable of (co)operating in cross-border, cross-lingual and cross-sector European data supply chains.
  - Effective networking and consolidation of Big Data user and contributor communities, technology providers and other relevant stakeholders across all challenges and across the three pillars of Horizon 2020.
- Types of Action – a) Innovation Actions (Total budget: €39 million): – mix of Small and Large contributions expected (Small contribution €2 – 4 million, Large contribution €5 – 8 million)
  - b) Coordination & Support Actions (Total budget: €11 million)

ICT 17 – 2014 Cracking the language barrier

- **Challenge** – Aims to facilitate multilingual online communication to support the digital single market. Current machine translation solutions typically perform well only for a limited number of target languages, and for a given text type.

  The aim of this challenge is to launch interdisciplinary work leading to a new paradigm in overcoming the language barrier and progressively, to reach high quality for all language combinations and translation directions, and cater for the most demanded text types and use contexts. Systems and solutions that are intended to overcome the language barriers, are expected to deal with huge volumes, high variety of languages and text styles, and deliver results in reasonable time (in most cases, instantly). Where the methods require automatic learning from language resources, the availability and suitability of the latter need to be addressed. Special focus is on the 21 EU languages (both as source and target languages) that have "fragmentary" or "weak/no" machine translation support according to the META-net language white papers.

- **Scope** – **a) *Research & Innovation Actions* (Total budget: €4 million):** Kick off a multidisciplinary research path to develop a new paradigm leading to radically improved quality and coverage (in terms of languages and text types) of machine translation. Special focus is on issues where current methods fall short in quality or fail to adapt to different languages and different needs of translation, or where further improvement with current methods becomes very expensive or requires such amounts of training data that are not available. The projects should use existing and emerging structures (in particular, those developed under action c) below) for testing, validating and evaluating the novel methods against agreed benchmarks.

  b) *Innovation Actions* (Total budget: €10 million): in view of optimizing translation quality and language/topical coverage in demanding, realistic use situations arising from well documented market needs, for example in pan-European online services. The pilots should focus on areas where multilingualism contributes to competitiveness and user-friendliness and optimize, evaluate and test performance improvements with languages that are poorly served by current machine translation systems. The pilots should make use of and contribute to existing and emerging platforms and infrastructures pooling, building, and adding value to language resources and tools

ICT 17 – 2014 Cracking the language barrier II

- **Scope** – c) *Coordination Actions* (Total budget: €1 million): To promote *benchmarking* and competitive *evaluation of machine translation*, as well as the optimal use of language resources from various sources, in view of federating the sources and repositories towards a single access mechanism, respecting appropriate standards of interoperability and metadata.
- **Expected Impact**
  - Initiating a programme of ground-breaking actions that will deliver, by 2025, an online EU internal market free of language barriers, delivering automated translation quality, equal to currently best performing language pair/direction, in most relevant use situations and for at least 90% of the EU official languages.
  - Significantly improving the quality, coverage and technical maturity of automatic translation for at least half of the 21 EU languages that currently have "weak or no support" or "fragmentary support" of machine translation solutions, according to the META-NET Language White Papers referenced before.
  - Attracting a community of hundreds of contributors of language resources and language technology tools (from all EU Member States and Associated Countries) to adopt and support a single platform for sharing, maintaining and making use of language resources and tools; establishing widely agreed benchmarks for machine translation quality and stimulating competition between methods and systems
- Types of Action – a) Research & Innovation Action (Total budget: €4 million): Proposals requesting small contribution expected

  b) Innovation Actions (Total budget: €10 million): Proposals requesting small contribution expected (EU contribution €2 – 4 million)

  c) Coordination Actions (Total budget: €1 million)

ICT 18 – 2014 Support the growth of ICT Innovative Creative Industries SMEs

- **Challenge** – ICT tools and technological innovation are fundamental for the creative industries and their competitiveness. SMEs represent 85% of the actors in the creative industry sector. They co-exist with global players but face difficulties adopting state of the art ICT Technologies and accessing finance. Goal is to increase competitiveness by stimulating ICT Innovation in SME, build up vibrant technological ecosystem for the creative industries needs and foster exchanges between creative industries SMEs and providers fo ICT innovative solutions
- **Scope** – Stimulate adoption and deploymnet of innovative ICT solutions by the creative industries SMEs through collaboration with ICT providers

  a) *Innovation Actions* (Total budget: €14 million) to support the creative industries SMEs in leveraging emerging ICT technologies (e.g. 3D, augmented reality, advanced user interfaces, visual computing) for the development of innovative products, tools, applications and services with high commercial potential. Beyond the driving participation of creative industry SMEs and the participation of ICT technology providers, the involvement of research and innovation centres is encouraged. Proposals should be clearly driven by user-needs and demonstrate the market demand for the solution and the innovation potential. Solutions should be cost-effective, market-ready and target international markets.

  b) *Coordination and Support Actions* (Total budget: €1 million): to stimulate the growth of European creative industries exploiting advanced ICT for the development of new products and services and ICT SMEs innovating in the field of creative industries.

  Activities should: include, where beneficial, investor readiness support (e.g. explaining investors' requirements, assisting in the development of business plans …), connect creative industries SMEs with appropriate sources of funding (e.g. loans, venture capital, business angels investment, crowd-funding …) and with international business networks, increase the market access of creative industries SMEs across borders. The proposals should encompass a broad geographical coverage, stimulating innovation not only in the leading regions of Europe

ICT18 – 2014 Support the growth of ICT Innovative Creative Industries SMEs II

- **Expected Impact**
  - Innovation Actions
    - Tens of innovative solutions with high market potential ready to be deployed by European creative industries SMEs.
    - Stronger collaboration between ICT innovative technologies providers and creative industries SMEs to improve the competitive position of the European creative industries.
  - Coordination and Support Actions
    - An established sustainable network of ICT-driven innovation multipliers active in the creative industries sectors with proven record of stimulating innovation.
    - Tens of examples of fruitful business relations enabled by the network.
- Types of Action

  a) Innovation Actions (Total budget: €14 million): The Commission considers that proposals requesting a contribution from the EU between EUR 0.5 million and EUR 1 million for a period between 6 and 18 months would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts or duration.

  c) Coordination and Support Actions (Total budget: €1 million)

ICT 21 – 2014 Advanced digital gaming / gamification technologies

- **Challenge** – Digital games and gamification mechanics applied in non-leisure contexts is an important but scattered industry that can bring high pay-offs and lead to the emergence of a prospering market. Digital games can also make a real change in the life of a large number of targeted excluded groups, enhancing their better integration in society. This requires however the development of new methodologies and tools to produce, apply and use digital games and gamification techniques in non-leisure contexts, as well as building scientific evidence on their benefits - for governments, enterprises and individuals
- **Scope** – Stimulate adoption and deployment of innovative ICT solutions by the creative industries SMEs through collaboration with ICT providers

  a) *Research & Innovation actions* (Total budget: €9 million) Multidisciplinary research experimentations and collaboration on advanced digital gaming technologies and components (including game engines, emergent narrative, virtual characters, interaction systems and alternative human-machine interfaces, 3D, textures, models for simulations, game design, learner profiles, emotional models, etc.) produced by and for the traditional digital game industry but applied into wider scenario of use in non-leisure contexts. Activities must lead to the creation of a repository of core reusable, open components to enable publishers and game producers as well as user organisations and individual programmers to build specific games applications in non-leisure contexts. Application scenarios will focus on learning and skills acquisition in formal and informal education, in workplace learning and in policy making and collective social and public processes.

  b) *Innovation Actions* (Total budget: €8 million): Stimulate technology transfer and new non-leisure applications by SMEs traditionally working on digital games through coordinating and incubating small scale experiments, thus underpinning new market developments on digital games for learning and skills acquisition, and for empowerment and social inclusion. The activities should also allow the accumulation of scientific evidence of the effectiveness of such approaches for specific target groups or problems.

ICT21 – 2014 Advanced digital gaming / gamification technologies

- **Expected Impact**
  - Increase the number of collaborations between traditional digital game industry players and a broader research community (neurosciences, educational physiology, pedagogy, etc.), intermediaries (teachers, trainers) and users from a wide area of application contexts.
  - Increase the effectiveness of digital games for professionals and researchers, intermediaries and social actors dealing with people with disabilities or at risk of exclusion (socially, physically or technologically disadvantaged groups) and of those who consider themselves unsuited for education.
- Types of Action

  a) Research & Innovation Actions (Total budget: €9 million) Proposals requesting a Large contribution are expected

  b) Innovation Actions (Total budget: €8 million) Proposals requesting a Small contribution are expected (EU contribution €2 – 4 million)

ICT 22 – 2014 Multimodal and Natural Computer Interaction

- **Challenge** – As devices and systems are becoming increasingly powerful, the interface between human and computer is often lagging behind and constitutes a bottleneck for seamless and efficient use. Leveraging on multidisciplinary expertise combining knowledge from both the technological and human sciences, new technologies need to offer interactions which are closer to the communication patterns of human beings and allow a simple, intuitive and hence more "natural" communication with the system
- **Scope**

  a) *Research & Innovation actions* (Total budget: €7.5 million) Provide interactive information retrieval systems with more efficient and natural ways of delivering answers to users' queries especially in unexpected and/or difficult circumstances. This should be supported by research on knowledge-based autonomous human-like social agents that can handle and learn from conversational spoken and multimodal interaction as well as react proactively to new communicative situations. Systems should cope with spontaneous spoken dialogue and gestural interaction, in multiple languages, and exhibit adequate communicative, conversational, affective and social capabilities in relation to the domain/task under consideration and the needs and abilities of the user. Technologies should be designed to match multiple delivery platforms and be demonstrated in real environments, while research is expected to be based on and/or produce freely available and re-usable resources.

  b) *Research & Innovation Actions* (Total budget: €16 million): Develop novel multi-modal, adaptive interfaces, including Brain Computer Interfaces, assisting people with disabilities. Research should explore: how users interact and cooperate with (intelligent) systems, including user modelling aspects for the identification of necessary abilities for different functions and environments; how to detect behaviours, emotions and intentions of the user; how to sense and understand the environment and other context factors; how multimodal (including nonverbal) interaction is used in ambient environments. Activities may cover also interoperability standards (for software and devices) as well as interaction and cooperation between machine intelligence in environments and human intelligence.

ICT 22 – 2014 Multimodal and Natural Computer Interaction II

c) *Innovation Actions* (Total budget: €7.5 million): Develop and validate innovative multimodal interfaces to provide more efficient and natural ways of interacting with computers and improve users' experience. Leveraging on one or multiple smart devices and sensors with capabilities such as scene analysis, voice recognition, human position, gestures and body language detection capabilities, such systems must provide non-intrusive interaction with human where real and virtual content are blended. Built with a user centric approach, solutions should be cost effective; address clear market needs and be validated in domains such as those of the creative industries fields.

- **Expected Impact**
  - a) Research & Innovation Actions - Improve multilingual speech processing and bridging the gap between recognition and synthesis, exploiting metadata and other contextual data; Increase the automatic inferences capacities from rich context thanks to improved language understanding, sensed environments/objects, use of social media and agent's experience
  - b) Research & Innovation Actions - Advance the capacity of human-machine interaction technologies to enable disabled and elderly people to fully participate in society.
  - c) Innovation Actions - Enable better uses of ICT technologies within the creative industries by providing directly usable solutions addressing their specific needs; Provide a large spill over of the knowledge acquired to a maximum of European industries and Improve the competitive position of the European industries through the provision of cost effective, innovative and high-value products and services.
- Types of Action

  a) Research & Innovation Actions (Total budget: €7.5 million) Proposals requesting a Small contribution are expected

  b) Research & Innovation Actions (Total budget: €16 million) Proposals requesting a Small contribution are expected

  c) Innovation Actions (Total budget €7.5 million) Proposals requesting a Small contribution are expected

Robotics 2014 - 2015

- **Roadmap-based research driven by application needs**
- 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
- **Two annual calls**
  - ICT23 – 2014: Robotics – ICT23.a €57 million, ICT23.b €12 million, ICT23.c €5 million
  - ICT24 – 2015: Robotics

ICT 23 – 2014 Robotics

- **Challenge** – Research implementing the Strategic Research Agenda established by the euRobotics AISBL (the private partner in the future Public-Private partnership in Robotics) will be essential to attain a world-leading position in the robotics market. Driven by the applications needs identified in this Strategic Research Agenda (SRA), challenging R&D problems will have to be addressed, to make substantial progress in robots capabilities and improve the Technology Readiness Levels (TRL) of robotics R&D. In addition, a dedicated effort is necessary to close the innovation gap, allow large scale deployment of robots and foster market take-up. Robotics is very broad, both in terms of technologies and disciplines it involves, but also in terms of markets and stakeholders. It is therefore essential to address the inherent fragmentation

- **Scope -** The aim is to develop a new generation of industrial and service robots and underpinning technologies, in particular enabling robotic systems to operate in dynamic real-world environments, reaching measurable improvements of abilities such as autonomy and adaptability and interacting in safe ways with humans. Collaborative projects will cover multi-disciplinary R&D and innovation activities like technology transfer via use-cases and industry-academia cross fertilisation mechanisms. Pre-Commercial Procurement (PCP) will further enable prototype development and stimulate deployment of industrial and service robotics. Projects are strongly encouraged to optimise synergies (e.g: use of shared resources for PCP of R&D&I projects or use cases, collaboration with on-going initiatives). Priority is given to projects driven by industrial or market needs and that are expected to produce step changes in abilities.

  a) *Research & Innovation actions* (Total budget: €57 million)

  RTD to advance abilities and key technologies relevant for industrial and service robotics in the following priority market domains: manufacturing, commercial, civil, agriculture

  - The primary goal is to significantly improve the level of industrial and service robotics abilities in the context of the above mentioned market domains by addressing: adaptability, cognitive ability, configurability, decisional autonomy, dependability, flexibility, interaction capability, manipulation ability, motion capability, perception ability.
  - To reach this ambitious goal, key robotics technologies need to be advanced in the particular fields of cognition, human-robot interaction, mechatronics, navigation, perception. This includes technology combinations such as grasping and dexterous manipulation, physical HRI, mobile manipulation, reactive planning and other combinations, in particular those that connect the key technologies above.
  - To prove the exploitation potential of the results the project outcome is to be shown in market domain-relevant demonstrations proving an increased TRL.

  It will be essential for the deployment of robots to establish systems development processes (from requirement analysis to testing and validation) and to develop techniques and technologies for system design, engineering, architecture, integration, system of systems, modelling and knowledge engineering which are applicable across market domains.

ICT 23 – 2014 Robotics

Shared resources and assessment

- One goal will be to define common hardware and software platforms (e.g.: real world test-beds, software libraries and simulators) taking advantage of existing initiatives and facilities. This will require: (a) mechanisms for sharing; (b) harmonisation of system design practice; (c) the definition of standards; and (d) high quality validation, maintenance and documentation.
- Furthermore, activities will be supported by a benchmarking initiative to provide means for technology assessment and transfer, performance evaluation as well as of paving the way to certification of new robotics systems.

b) *Innovation Actions: Technology Transfer – Robotics use cases* (Total budget: €12 million): Using leading edge science and technology, including results from EU-funded projects, a targeted effort will aim at introducing, testing and validating promising and innovative robotics solutions in real-world conditions. The focus will be on the robust operational deployment of these robotic solutions, based on performance objectives, metrics, and user needs. The strong involvement of stakeholders such as robotics industry, system integrators and end-users is essential.

- **Expected Impact**
  - Increase Europe's market share in industrial robotics to one third of the market and maintain and strengthen Europe's market share of 50% in professional service robotics by 2020.
  - Increase Europe’s market share in domestic service robots to at least 20% by 2020 including with new companies and start-ups in the field.
  - Improve the competitiveness of Europe's manufacturing sector, in particular SMEs, and address pressing technological challenges and the effect of an aging workforce.
  - Increase Industry-Academia cross-fertilisation and tighter connection between industrial needs and academic research via technology transfer, common projects, scientific progress on industry-driven challenges.
  - Deploy robotics technologies in new application domains.
  - Improve Technology Readiness Levels of robotics technologies.
  - Improve performance evaluation and certification of new robotic systems.
  - Create and maintain world class research in Europe and achieve excellent standards of publications and research outputs.
  - Ensure sufficient numbers of well-trained professionals required by the growth of the industry.
  - Ensure wide use of shared resources.

Micro and Nano-Electronics and Photonics – Key Enabling Technologies 2014 - 2015

- Covers **generic technology developments on micro- and nano-electronics** focused on **advanced research** and lower Technology Readiness Levels (TRLs)
  - 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.)
  - Includes calls for ERANETs as well as public procurement actions (roll-out and deployment of optical networking technologies)
- Calls
  - ICT29 – 2014 Development of novel materials and systems for OLED lighting – Total budget €18 million
  - ICT25 – 2015: Generic micro- and nano-electronic technologies
  - ICT26 – 2014: Photonics KET – Budget ICT26.a €28 million, ICT26.b €8 million, ICT26.c €5 million, ICT26.d €6 million
  - ICT27 – 2015: Photonics KET
  - ICT28 – 2015: Cross-cutting ICT KETs

ICT Cross-Cutting Activities

- Internet of Things and Platforms for Connected Smart Objects
  - 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
  - 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
  - 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
  - Mechanisms for effective cross border partnership searches, identifying, understanding and sharing good practices among ICT NCPs
- Calls
  - 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

ICT Innovation Actions

- Innovation and Entrepreneurship Support
  - 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
  - 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

Identifying Relevant Research Areas

- Must be appropriate based on your organisation's strategic direction and research objectives
  - Necessary to be aligned with overall strategic focus and human resources in place
- Read the Work Programme carefully and identify areas of interest in Calls open in 2014 and 2015
  - Prepare roadmap
  - Identify relevant partners to cooperate with
  - Identify research areas of interest to your organistion and be open to how this fits within global research project
- Expensive and time consuming to write proposal
  - Need to undertake research and identify previous projects funded in area
  - Need to clearly identify current state-of-the-art (SoA) and how the proposed project focus and methodology goes beyond the SoA
- Proposals submitted must be relevant to the action lines open within specific calls
- Irrelevant proposals will not be evaluated

International Consortium

- Need to identify European partners that you wish to work with in the long term to justify investment building a relationship
  - Start with organisations that you have already meet (through participation at workshops and conferences) or have cooperative agreement in place with
  - Ask International Cooperation Dept for list of organisations with whom the University has MoU's in place
  - As part of general research, look at projects previously funded in thematic areas of interest. Identify interesting projects and organisations that participated.
  - Make contact outlining opportunity to cooperate under 2014 & 2015 Calls
    - Provide organisational profile, outlining current research and expertise
    - Outline thematic area of interest and activities of interest
- The role of each partner must be clearly articulated and illustrate how their experience is relevant and complementary
  - Clearly identify the role most appropriate based on human resources, expertise and project focus
    - Technical partner – Development role – clearly identify focus and level of cooperation with other technical partners, continguencies
    - Demonstration partner – participation in pilots and user requirement
    - Dissemination partner

Preparing a Proposal

When calls open the Guide for Participants for each instrument can be downloaded to create the proposal template

- **Part A –** Administrative Details related to partners (beneficiaries and proposed budget)
- **Part B - Technical Annex – Research & Innovation Actions**
  - Section 1. Excellence
    - Objectives, Relation to the Work Programme, Concept and Approach, Ambition
  - Section 2. Impact
    - Expected Impacts, Measures to maximise impact (a. Dissemination & Exploitation of Results, b. Communication activities)
  - Section 3. Implementation
    - Work Plan (Work Packages, deliverables & milestones), Management structure and procedures, Consortium as a whole, Resources to be committed
  - Section 4. Members of the Consortium (to judge operation capacity)
    - Participants, Third parties involved in project
  - Section 5. Ethics and Security

Preparing a Proposal

- **Preparation of the grant proposal is split up across all partners**
  - Agree Work Plan structure first
  - Each WP leader outlines proposed tasks, agreed by partners and detailed description provided – identify the tasks that are most relevant for you
  - Objectives based on relevance to the Work Programme and proposed work plan
  - Impact section
  - All partners prepare organisational profile for inclusion

Preparing the Budget

Grant – Reimbursement of actual costs based on budget submitted and actual eligible costs incurred – no profile element

- **Eligible Cost Categories**
  - **Personnel costs (based on salary from payroll – actual cost to the institution – salary plus social security charges)**
    - Need to calculate person time required for each task in WP
    - Need to keep timesheets for actual work undertaken
  - **Subcontracting**
    - It is not allowed to subcontract project management or core project work
    - Eligible activities include printing of dissemination materials, room hire and catering for meetings and workshops, design of website if partners cannot do this themselves
  - **Other direct costs**
    - Travel costs and subsistence allowance (based on normal practises for the institution)
      - Need to calculate the no. of meetings / dissemination at conferences and work out budget based on cost of flights and normal per diem rate for accomodation and subsistence
    - Depreciation costs of essential equipment (depreciation over 3 years – reimbursement based on time used for project requirements)

Intellectual Property Rights – Snap shot

Prior to signing the grant, partners must sign a consortium agreement that provides details of pre-existing knowledge, access rights during the project and rights for knowledge created during the project

- **Important to discuss IPR when preparing proposal**
  - Need to include initial strategy for IPR, Access rights to pre-existing knowledge, Exploitation and Dissemination in the proposal
- **Basic guidelines provided by European Commission**
  - **Ownership of Results**
    - Beneficiary who generated the results
    - Joint-ownership in specific circumstances where a number of partners were involved in the specific activity
  - **Results should be protected**
    - If results are capable of commerical / industrial exploitation
  - **Explotiation**
    - Results should be exploited by the partners on a best efforts basis – need to explain exploitation strategy in proposal
  - **Dissemination**
    - It is required to widely disseminate the results
    - Open access to scientific publications

Evaluation of proposals

- **European Commission have database of thematic experts**
  - Put together a panel of independent thematic experts to evaluate the proposals submitted
- **Award Criteria**
  - Excellence of the approach
    - concept, objectives, alignment with call text, research approach, details and coherence of the work plan
  - Impact
    - aligned with expected impact outlined in the Work Programme
    - Quality of the IPR strategy, Exploitation and Disseminatoin
  - Quality and Efficiency of the Implmentation
    - project management structure – communication flows, assignment of responsibilities, quality controls, conflict resolution strategy etc
    - Partners – profiles must clearly show expertise and relevance of activities to be undertaken based on skill base
    - Complimentary of the consortium
    - Justification of the budget requested (Is person effort reasonable for work envisaged, is travel explained, any equipment costs justified)
- All proposals receive an Evaluation Summary Report

Next Steps

Current Status

- Work Programmes for 2014 – 2015 published on 11 December
- Each 2 year Work Programme outlines specific areas open under each Call and provide more information in relation to the types of collaborative projects
- Grants for Research and Development – up to 100% reimbursement of actual costs
- Grants for Innovation (close to market) – up to 70% reimbursement of actual costs
- Partners under Grant Agreement must be legal entities (e.g. University, research centre, government institution, industry, SME)

Next Steps

- Download IST-Africa Guide to 2014 Calls in Horizon 2020
- Identify relevant core areas for research collaboration under Horizon 2020 & deadlines
- Prepare organisational profile for publication
- Identify potential European cooperation partners, initially based on existing Memorandum of Understandings (MoUs) as project consortia must include at least three independent legal entities from three different EU Member States
- Ensure national IST-Africa partner is aware of your ongoing research and innovation activities so they can also assist in identifying potential partners for cooperation