



Europe 2020 goals and ICT industry challenges

Conference

Internet of Things Enabling Technologies

From Virtual Networks and Cloud Computing to Smart Integrated Communication Systems



02 April, 2014, 09:0-17:00

Telenor Expo, Auditorium Voice

Snarøyveien 30, 1331 Fornebu, Oslo, Norway.

What is Horizon 2020?



**The EU's 2014-20 programme
for research & innovation**

**A core part of Europe 2020,
Innovation Union and European
Research Area**

- Responding to the economic crisis to invest in future jobs and growth
- Addressing people's concerns about their livelihoods, safety and environment
- Strengthening the EU's global position in research, innovation and technology

<http://ec.europa.eu/research/horizon2020>

Horizon 2020 - what's new?

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



Strategic Programming in H2020

- To increase impact of funding, and a more integrated approach by:
 - Bringing together activities from different challenges
 - Providing support across the innovation cycle
 - Use of funding schemes available
- Work programmes expected to have a 2 year-duration
 - First Work Programme 2014-15

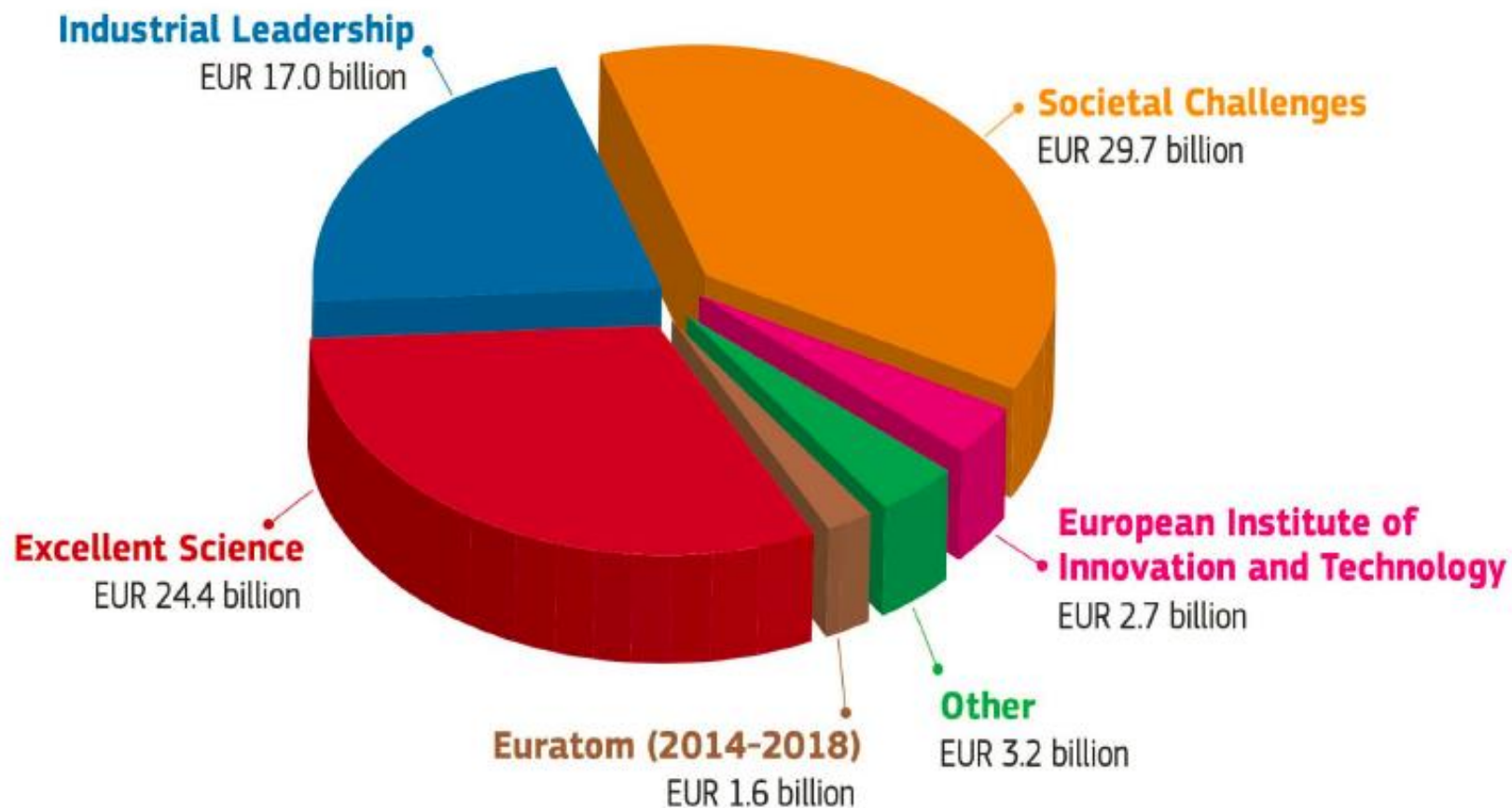


Horizon 2020: Environment-related Novelties

- **Integrated, systemic and challenge-driven approach**
- **Transformation towards a green economy and society**
- **More eco-innovation, including social innovation**
- **More socio-economic and forward-looking activities**
- **Inclusion of raw materials**
- **Environment and health now under "Health" Challenge**



Horizon 2020 Budget



Priority 1.

Excellent science

Why:

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

Excellent science

Funding
(million EUR, 2014-2020)

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

Priority 2. Industrial leadership

Why:

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

Industrial leadership

Funding
(million EUR, 2014-2020)

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

Priority 3. Societal challenges

Why:

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

Societal challenges

Funding

(million EUR, 2014-2020)

Health, demographic change and wellbeing	7 472
Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the Bioeconomy	3 851
Secure, clean and efficient energy *	5 931
Smart, green and integrated transport	6 339
Climate action, environment, resource efficiency and raw materials	3 081
Inclusive, innovative and reflective societies	1 310
Secure societies	1 695
<i>Science with and for society</i>	<i>462</i>
<i>Spreading excellence and widening participation</i>	<i>816</i>

Societal Challenges

- **Why?**

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



Horizon 2020 - Societal Challenge

- Translating science to benefit citizens
- Improve health outcomes
- Support a competitive health & care sector
- Test and demonstrate new health & care models, approaches and tools
- Promote healthy and active ageing



EU support of health related research & innovation is not limited to Societal Challenge 1

New Approach



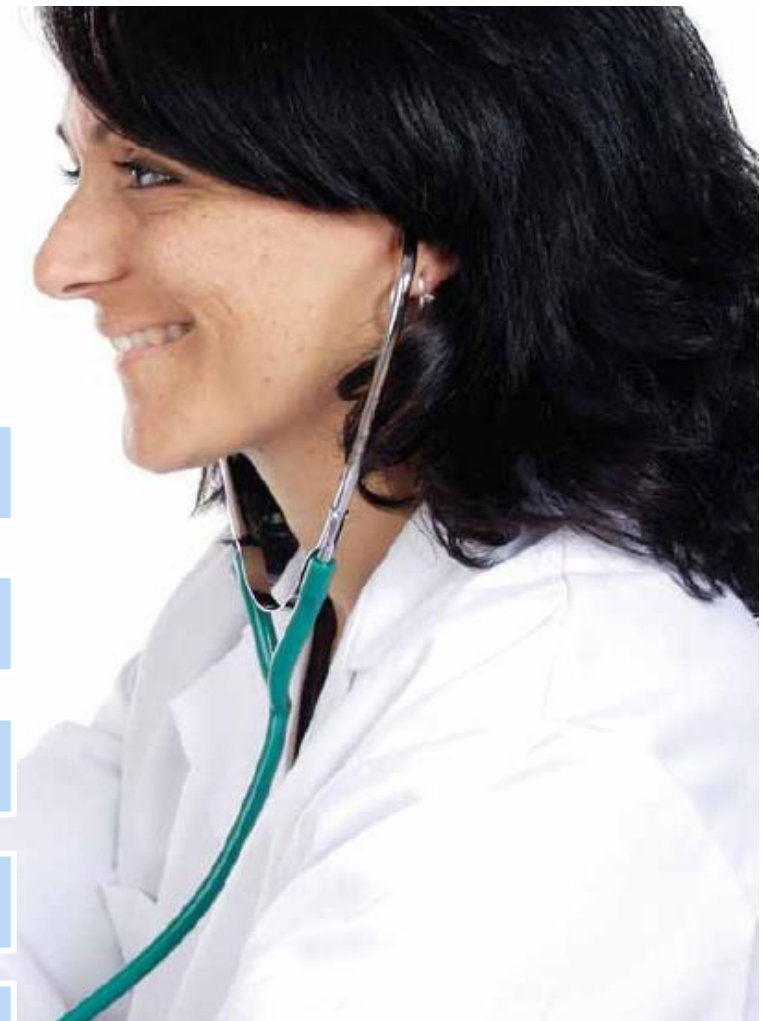
Challenge-driven

Broad topics

Less prescriptive topic texts

Two-year work programme

Stronger focus on end users



More Opportunities for SMEs



- **20% of the total budget** for societal challenges/LEITs to go to SMEs
- **Simplification** – a great benefit to SMEs
- **A new SME instrument**
- **'Innovation in SMEs'** - a dedicated activity for research-intensive SMEs
- **'Access to risk finance'** with strong SME focus (debt and equity facility)



Image courtesy of Vlado/ FreeDigitalPhotos.net

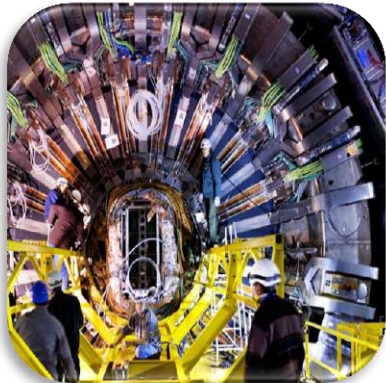


Wanted: international cooperation

- **A priority**
- **Key goal: more and better international cooperation**
- **Horizon 2020 is open to participation from across the world**
- **Targeted actions across the entire programme**
- **Horizon 2020 Regulation and Rules for Participation apply**



Research Infrastructures



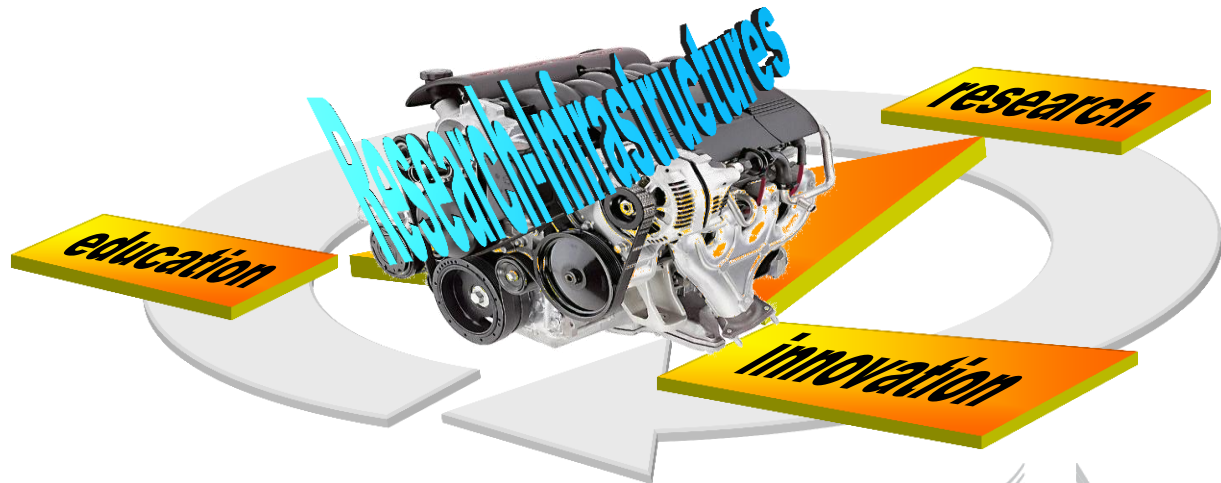
Facilities, resources, organisational systems and services that are used by the research communities to conduct research and innovation in their fields



The Knowledge Triangle at Work

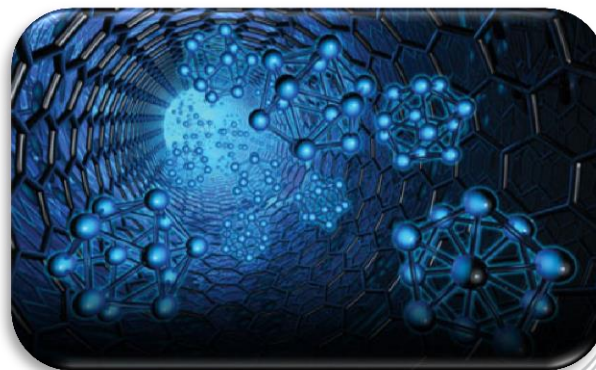
To be a genuinely competitive in the knowledge economy, one must be better in:

- Producing knowledge through research
- Diffusing it through education
- Applying it through innovation



Staying Competitive in Science

- Collaboration between European and worldwide research teams; access to rare/remote resources
- Global Virtual Research Communities
- Data-intensive science and innovation
- Use and manage exponentially growing sets of data
- Experimentation in silicon, simulation
- Use of high-performance computing

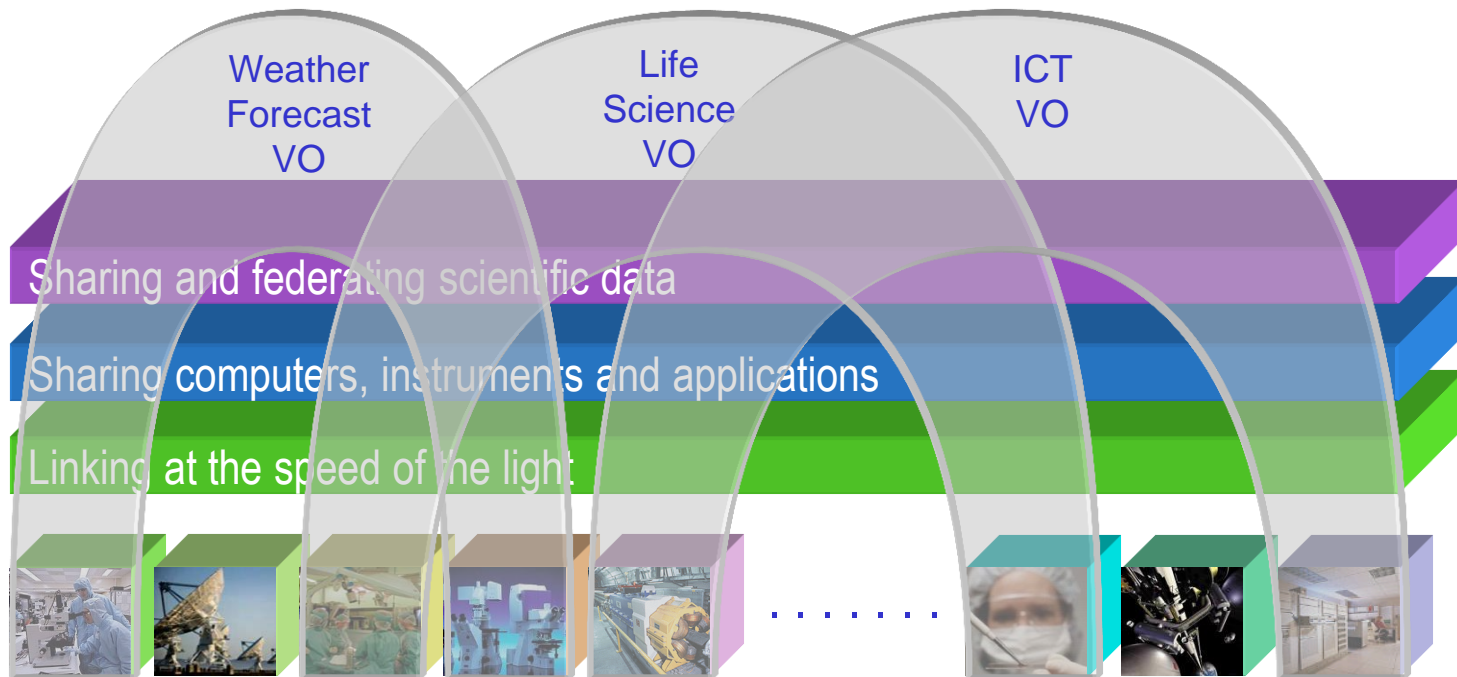


Global Virtual Research Community



Virtual Organizations Formed

Connecting the finest minds
Sharing the best scientific resources
Building global virtual communities



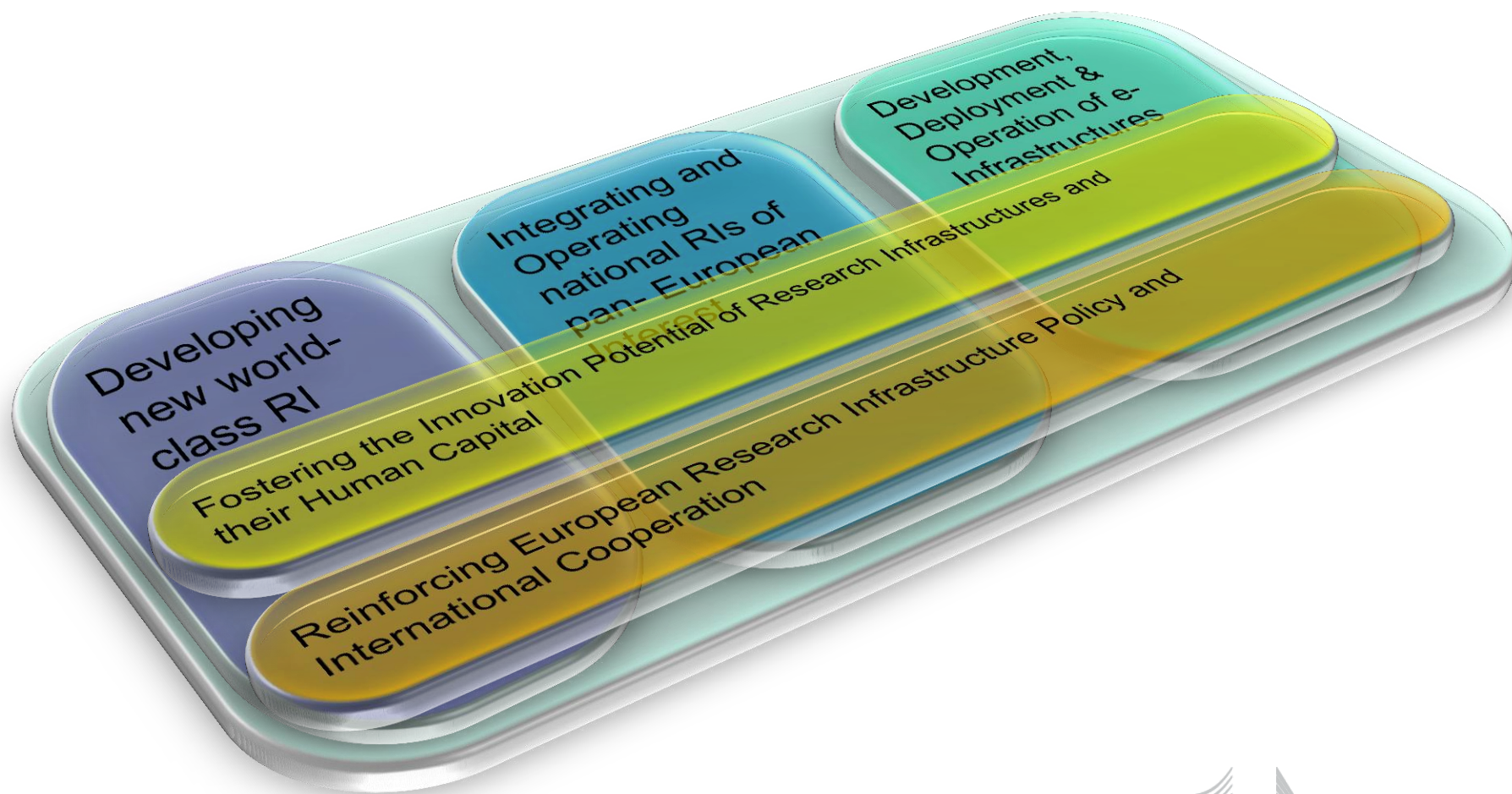
RI Objectives in Horizon2020

Endow Europe with world-class research infrastructures which are accessible to all researchers in Europe and beyond and fully exploit their potential for scientific advance and innovation:

- Addresses core commitments of the Innovation Union flagship initiative, to develop world-class research infrastructures for ground-breaking research and innovation
- Addresses key actions of the Digital Agenda for Europe flagship initiative, to reinforce Europe's e-Infrastructures



Specific Implementation Aspects



Getting you started faster

- **A single set of** simpler and more coherent participation **rules**
- New **trust/control balance**
- Just **2 funding rates** for different beneficiaries and activities (70 and 100%)
- **Single flat rate** for overhead or 'indirect costs' (25%)
- **Simpler financial regulation** to come
- **8 months' time-to-grant** (exceptions for the ERC and in duly justified cases)

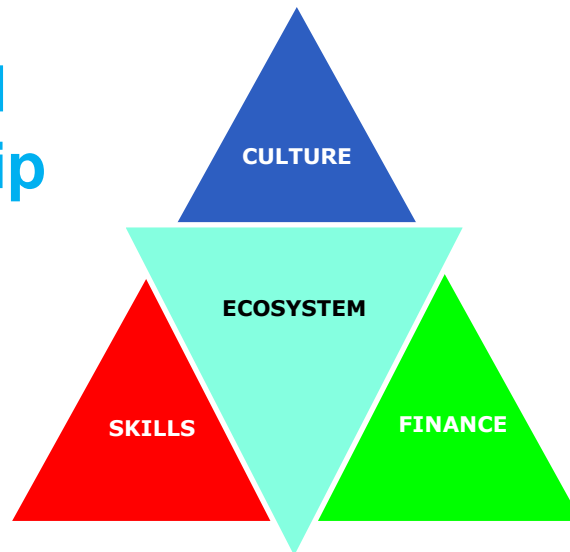


Entrepreneurship

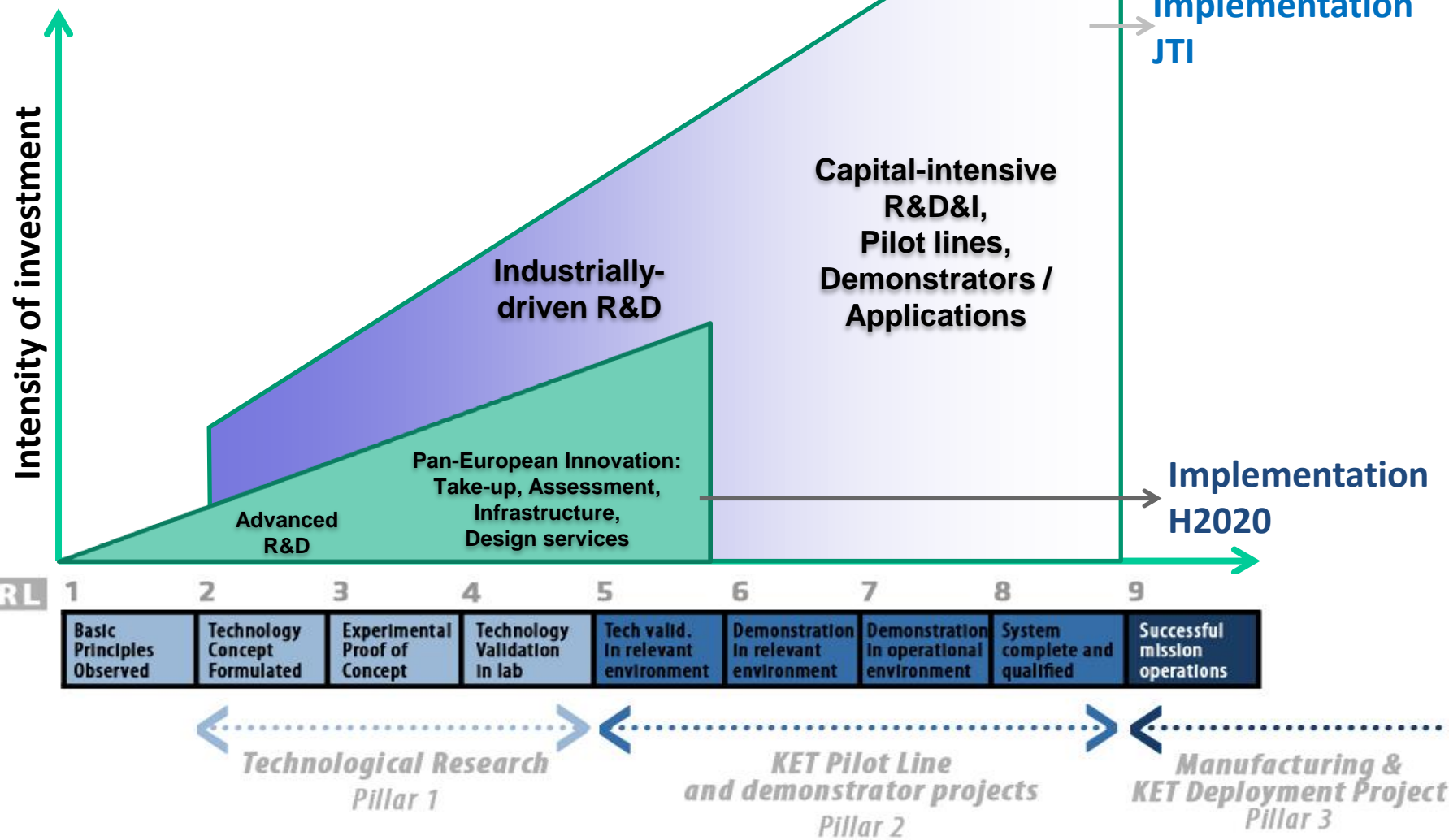
Support start-ups
to commercialize
research products,
grow and scale up

Innovation and
Entrepreneurship
Support

HORIZON 2020



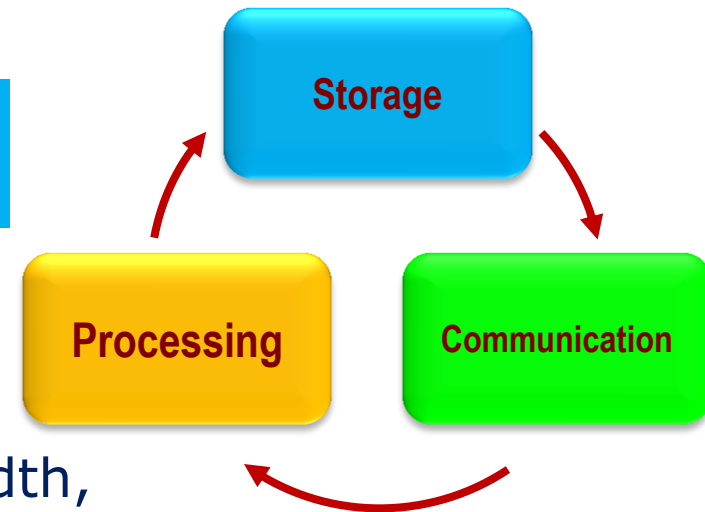
Technology Readiness Level



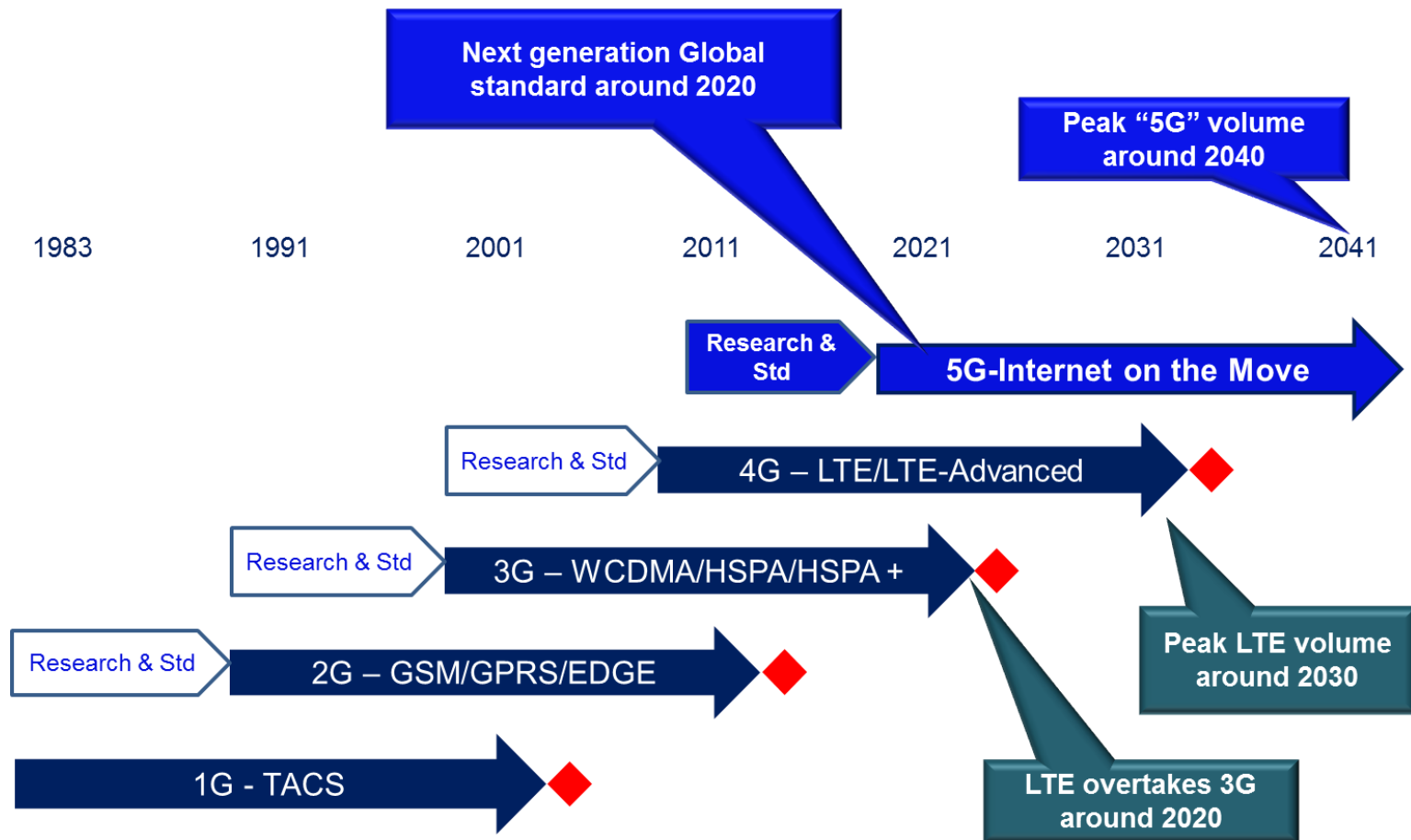
Advanced 5G Network Infrastructure for the Future Internet

Addressing a very wide range of requirements (5G-PPP)

- From IoT to U-HDTV, ubiquity
- Restless Pressure on bandwidth, spectrum crunch
- Complex traffic – usage patterns
- Complex management
- Cloud computing reshaping the networks
- Energy consumption



5G Why now?



Average of 10 years research and standardisation, 20 years from introduction to peak volume

5G-PPP Advanced 5G Network Infrastructure for the Future Internet

Key Performance Indicators 5G-PPP will be formally monitored (Main technical indicators below)

- Providing 1000 times higher wireless area capacity and more varied service capabilities compared to 2010
- Saving up to 90% of energy per service provided
- Reducing the average service creation time cycle from 90 hours to 90 minutes
- Creating a secure, reliable and dependable Internet with a “zero perceived” downtime for services provision
- Facilitating very dense deployments of wireless communication links
- Enabling advanced user controlled privacy

Advanced 5G Network Infrastructure for the Future Internet

a. Radio, convergence and network management

a.1. Radio network architecture & technologies

- Increased frequency re-use, versatile low-cost radio access infrastructure (IoT to > 1Gbps) + low energy
- Flexible backhaul solutions
- Architecture for 5G "transceivers" and micro-servers
- Key hardware building blocks to support various spectrum usage scenarios
- Preparing for large scale demonstrators and test-beds (possibly leveraging existing experimental facilities)

Advanced 5G Network Infrastructure for the Future Internet

a.2. Convergence beyond last mile

- Ubiquitous access continuum
- Cooperative, cognitive fixed and heterogeneous resources, with fixed optical access reaching at least 10 Gb/s
- Address access sharing issues related to competition and business models

a.3. Network management

- Novel approaches (e.g. SON, QoS-enabled)
- Combination SDN/autonomic management
- Security across virtualised SDN domains

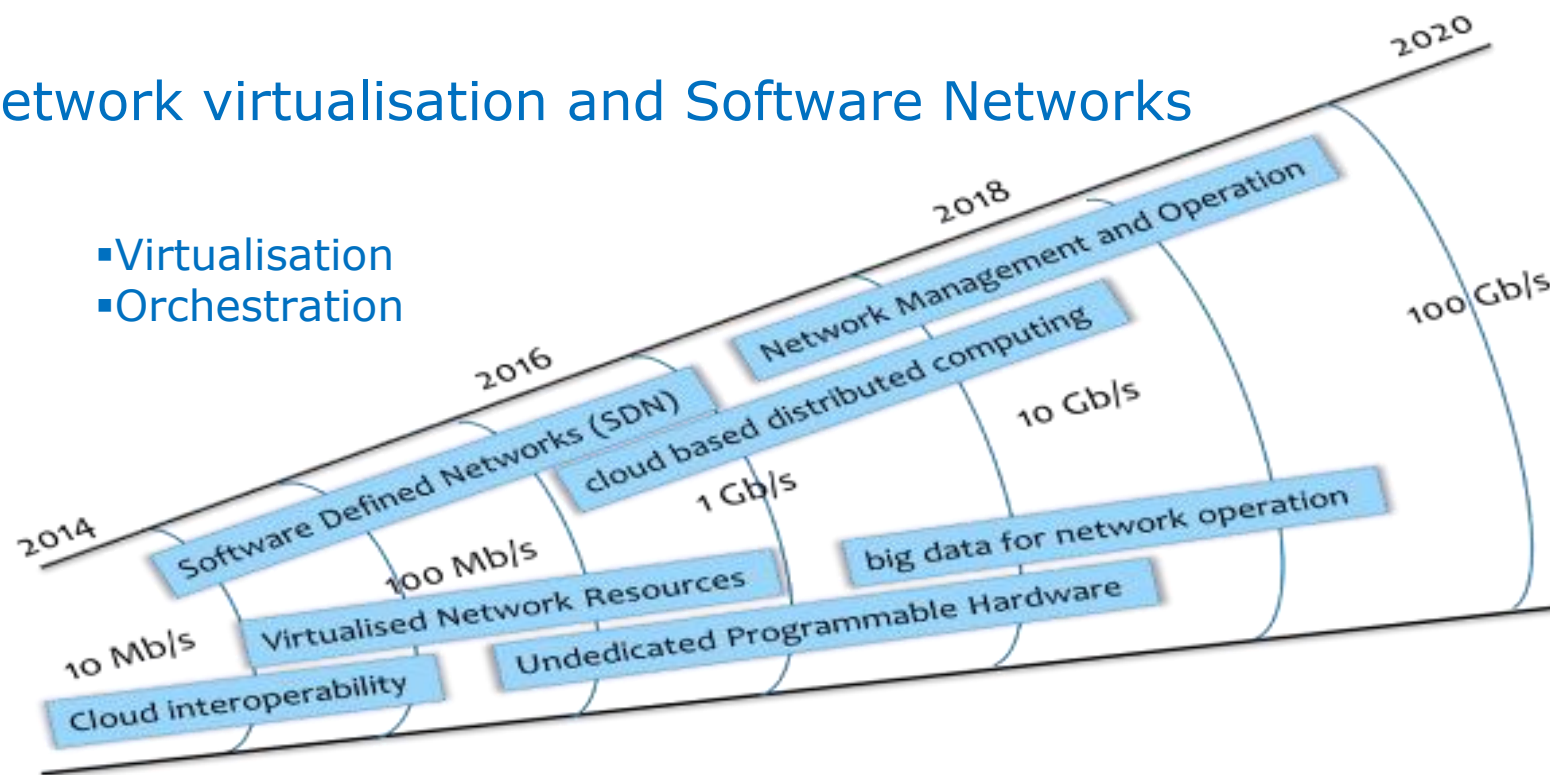
Type of Action:

Research and Innovation – Large projects

Advanced 5G Network Infrastructure for the Future Internet

b. Network virtualisation and Software Networks

- Virtualisation
- Orchestration



Type of Action:

Research and Innovation – Large projects

Advanced 5G Network Infrastructure for the Future Internet

c. Support to initiative (Target budget: € 2 million)

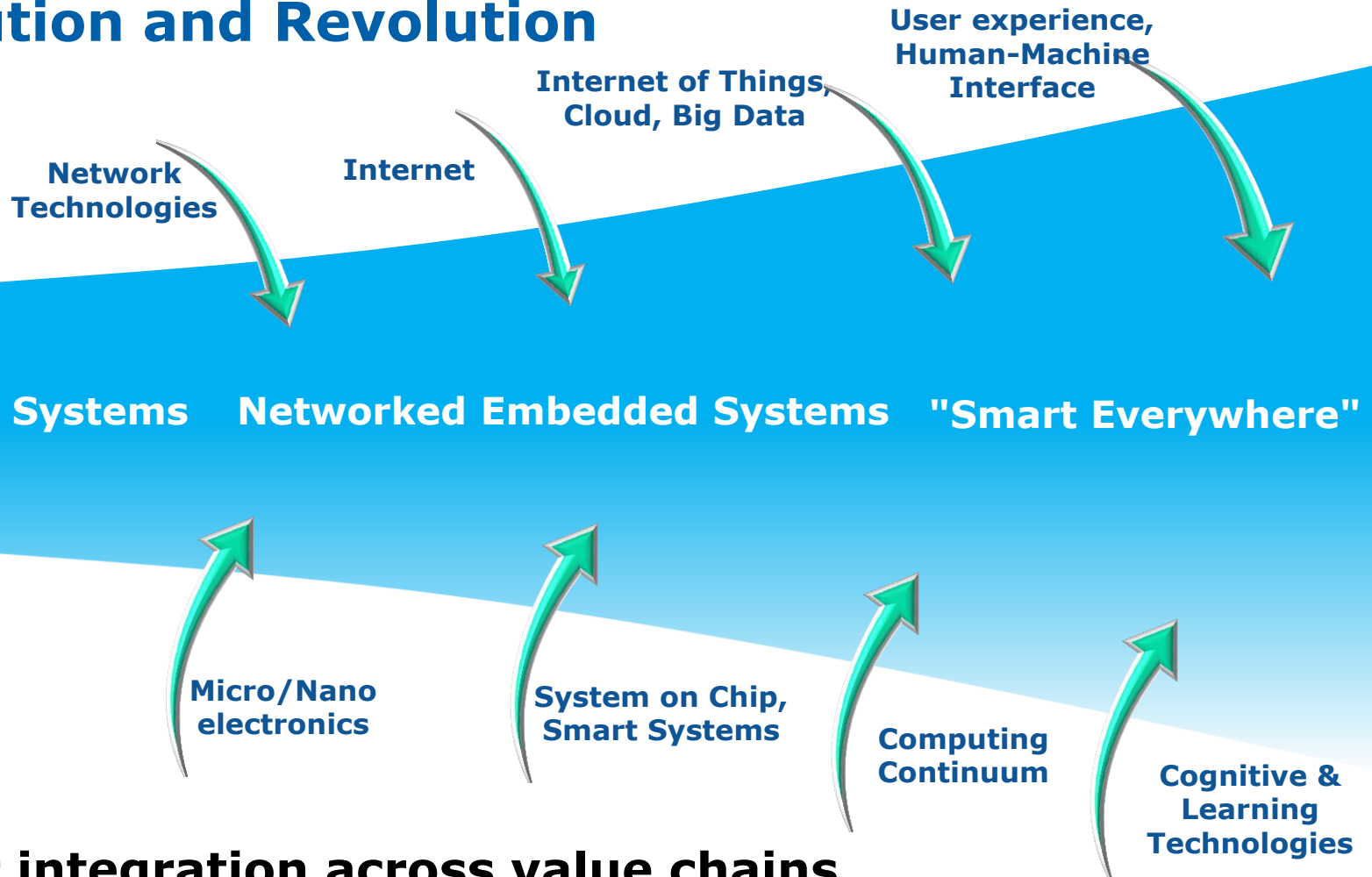
Targeted themes:

- Support to programme integration
- Societal challenges
- Monitoring PPP process
- Analysis international activities
- Standardisation support and spectrum policy support
- 5G web site
- Roadmaps key PPP technologies and for experimental requirements/facilities

Type of action:

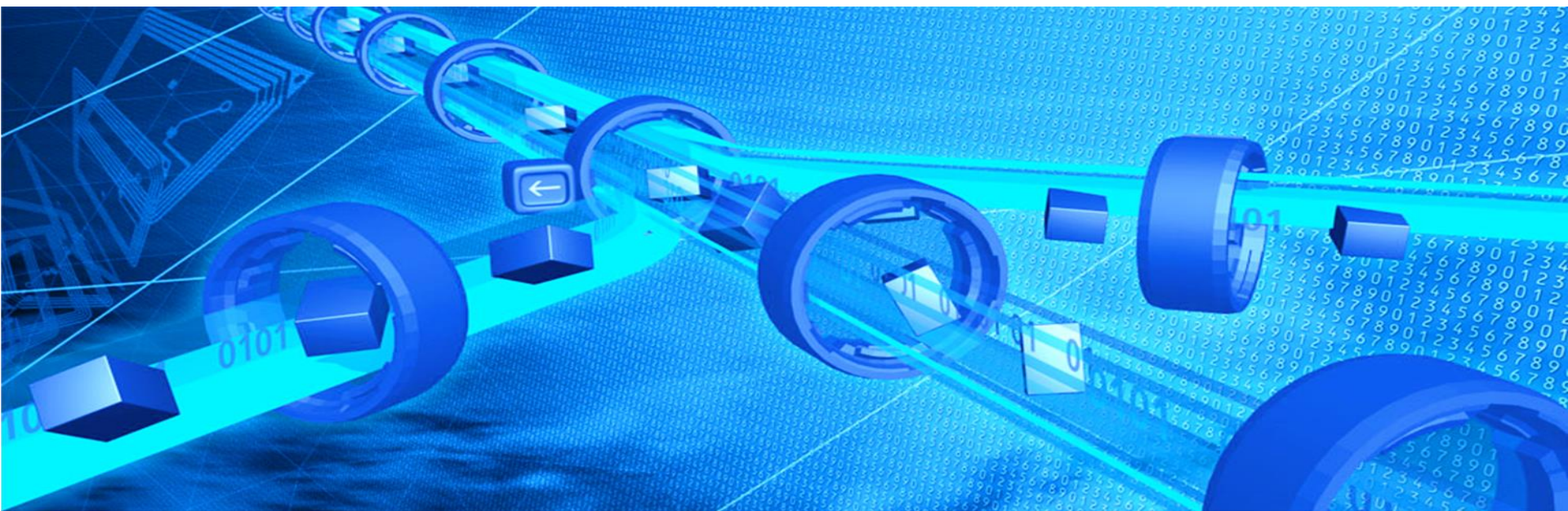
Support actions – Small projects

Evolution and Revolution



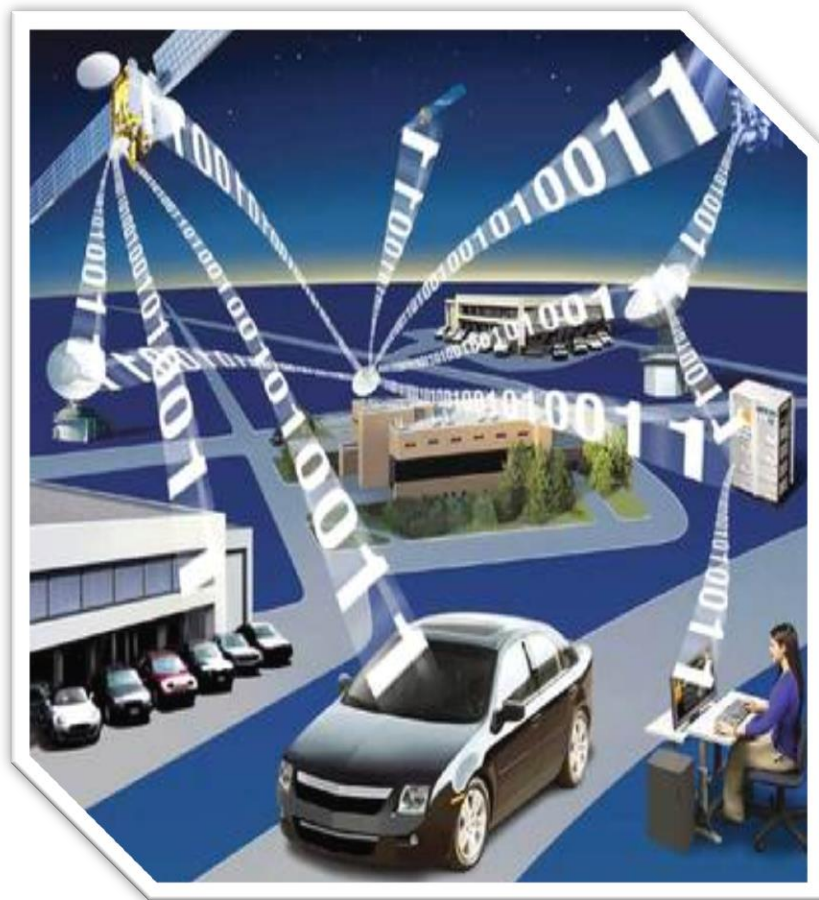
- **Foster integration across value chains**
- Target **industrial – professional – consumer markets**

Internet of Things and Platforms for Connected Smart Objects



The Internet of Things is on its way forward

- Nine billion 'things' connected to the Internet today – by 2020 this will have increased to 24 billion
- Large players and SMEs (infrastructure equipment suppliers, component/system manufacturers, telcos, application designers,...) take up the Internet of Things from their business perspectives
- Stakeholders on all levels to exploit the great potential of connectivity and embedded intelligence mix
- Powerful combination of IoT with Cloud, Future Internet, Big Data, Cyber-Physical Systems, Robotics...



IoT a key enabler in industrial/business environments and Smart Cities

- Connection of all sensors, actuators and smart objects
- Providing identification, search and security & privacy functionalities
- Virtualisation of sensors and services for rich service delivery and energy saving
- Enabling semantic interoperability for cross application sector information and knowledge exchange
- Support of principles of self-organising systems



Internet of Things: An important research and policy element of the European Commission

- Support, as a follow-up of FP7, of specific IoT research and innovation in the context of H2020 for developing federating platforms towards a world of **Connected Smart Objects**
- Stronger combination of the IoT with Cloud Computing, Future Internet and network technologies like 5G
- Support of the policy and social dialogue as the Internet of Things lays the foundation for a “digital society”



Internet of Things and Platforms for Connected Smart Objects

Create Platforms that integrate future generation of devices, embedded systems and network technologies for a multiplicity of applications

- Architectures supporting:
 - Dynamic configuration
 - Integrated smartness and connectivity
 - Self-organised, autonomous systems
 - Interoperable use cases and applications

Thank you very much!

