División
Programas de la UE

MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD
CDTI Centro para el Desarrollo Tecnológico Industrial

HORIZONTE 2020

PROGRAMA MARCO DE INVESTIGACIÓN E INNOVACIÓN (2014-2020)

ESTRUCTURA Y CONTENIDOS

PROPUESTA DE LA COMISIÓN EUROPEA Y ACUERDOS CONSEJO-PARLAMENTO

Elaboración: División de Programas de la Unión Europea, CDTI
(Enero 2012; revisión 09/13)

Más información:
http://Eshorizonte2020.es
http://ec.europa.eu/research/horizon2020

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Tackling Societal Challenges

- Health, demographic change and wellbeing
- Food security, sustainable agricultures, marine and maritime research and the bioeconomy
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, resource efficiency, raw materials
- Inclusive, innovative and reflective societies
- Secure societies

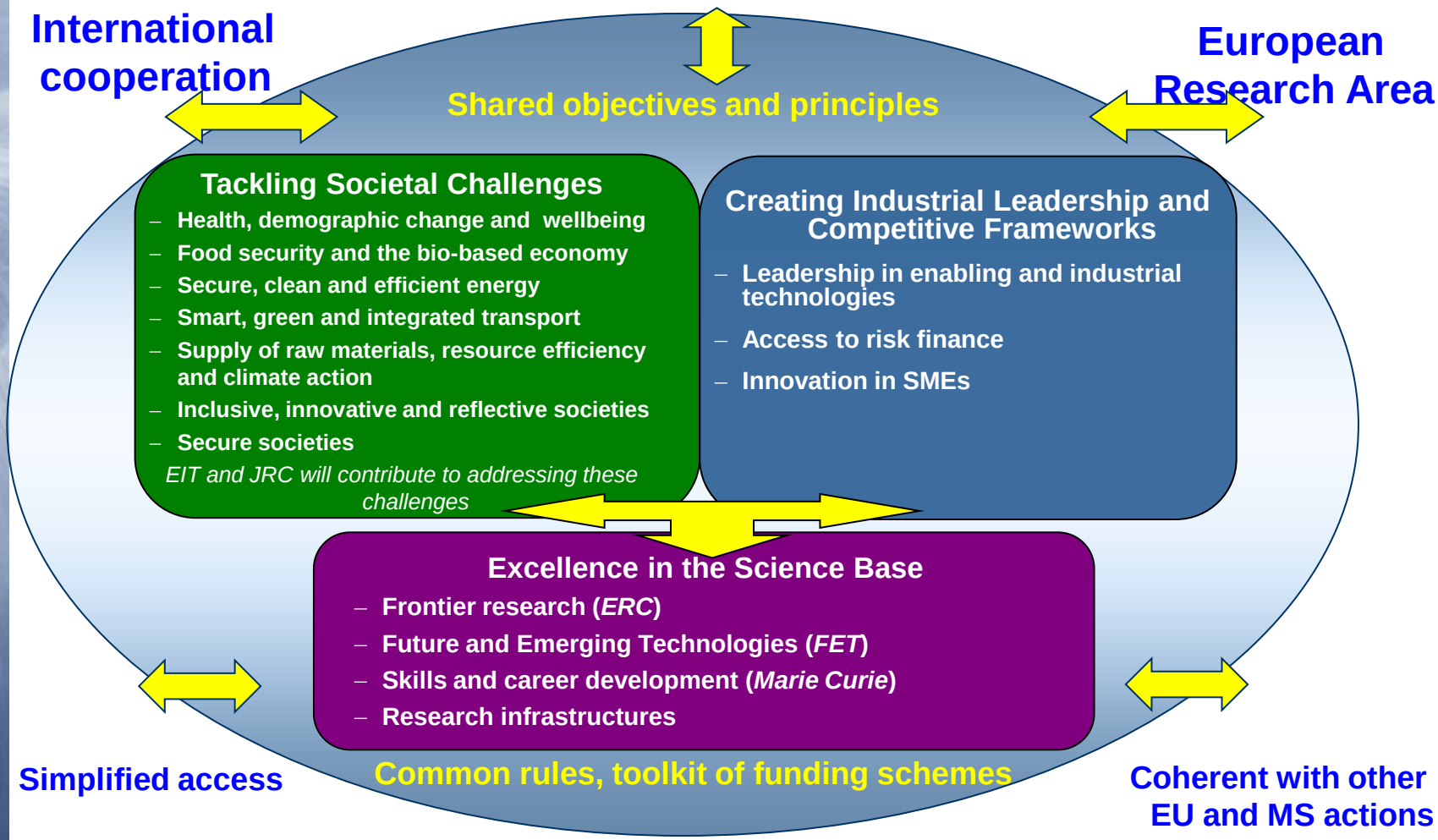
Creating Industrial Leadership and Competitive Frameworks

- Information & Communication technologies
- Nanotechnologies
- Advanced materials
- Advanced manufacturing and processing
- Biotechnology
- Space
- Access to risk finance
- Innovation in SMEs

Prólogo

El objetivo de este documento es tratar de identificar con palabras clave el alcance temático de los contenidos de los pilares de II- Retos de la Sociedad y III-Liderazgo Industrial que propone la Comisión Europea para Horizonte 2020, así como analizar la posible correspondencia con las actuales temáticas del VII Programa Marco.

Horizon 2020 – Objectives and structure



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Health, Demographic Change and Wellbeing (I)

Activity Lines/ Areas	Content
1.1. Understanding health, wellbeing and disease	•Environmental, behavioral and genetic factors •Long term study cohorts & data from "-omics" research •Environment as a determinant of health •Behavioral interventions, prevention and education programmes
	•Patho-physiology of disease •Generation of biomedical data and include "-omics", high throughput and systems medicine approaches •Maximising data utility
	•New and emerging infections •Antimicrobial drug resistance •Consequences of climate change
1.2. Preventing disease	•Personalized, stratified and collective strategies for disease prevention
	•New and more effective diagnostics
	•More effective preventive vaccines (or alternative interventions) •Evidence-based vaccination schemes
1.3. Treating and managing disease	•Drugs, vaccines and other therapeutic approaches (incl. gene and cell therapy) •Regenerative medicine approaches (incl. stem cells) •Treatments for diseases and management of disability
	•Clinical trials •Independent living into real world environments

Health, Demographic Change and Wellbeing (II)

Activity Lines/ Areas	Content
1.4. Active ageing and self-management of health	•Ageing population and people with disabilities •Research and innovation pilots
	•Behavioral and social models, social attitudes and aspirations in relation to: personalized health techs, mobile and/or portable tools, new diagnostics and personalized services which promote healthy lifestyle, wellbeing, etc. •Support for knowledge infrastructures
1.5. Methods and data	•Infraestructures and information structures and sources •Data processing, knowledge management, modeling and visualization
	•Accurate and predictive assessment of the safety, efficacy and quality of health technologies •Ethical aspects •Risk assessment methodologies, testing approaches and strategies relating to environment and health
	•Model based simulation
1.6. Health care provision and integrated care	•Management of chronic diseases outside institutions •Improved cooperation between the providers of health and social or informal care •Evidence for large scale deployments and market exploitation of novel solutions (incl. Tele-health and telecare services)
	•HTA (Health Technology Assessment) and health economics •Best practices and innovative techs & approaches in the healthcare sector •Health inequalities & their interplay with other economic and social inequalities

FP7 -> Horizon 2020

FP7	Horizon 2020
Health	**Health, Demographic Change and Wellbeing**

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Food Security, Agriculture, Marine Research & Bioeconomy (I)

Sustainable agriculture and forestry	
Activity Lines/ Areas	**Content**
Increasing production efficiency, climate change, sustainability and resilience	• Adaptive capacity of plants, animals and production systems. • Use of biomass and by-products from agriculture and forestry for non-food applications. • Efficient resource use (water, nutrients, energy) and the ecological integrity of rural areas. • Genetic improvement of plants and animals for adaptation and productivity traits. • On-farm soil management for increasing soil fertility as a basis for crop productivity. • Animal and plant health, integrated disease/pest control measures. • Eradication of animal diseases including zoonosis, research on antimicrobial resistance. • Studying the effects of practices on animal welfare.
Providing ecosystem services and public goods	• Delivering commercial products and societal public goods (including cultural and recreational value) and important ecological services (biodiversity, pollination, water storage and regulation, landscape, soil function, erosion reduction, resilience to flooding and droughts and carbon sequestration / GHG mitigation). • Management solutions, decision-support tools. Management of agricultural systems.
Empowerment of rural areas, support to policies and rural innovation	• Development opportunities for rural communities (primary production and delivery of eco-systems services, new and diversified products (food, feed, materials, energy)) • Cohesion of rural areas and prevent economic and social marginalization, foster diversification of economic activities (including service sector); appropriate relations between rural and urban areas. • Support policy makers and other actors in the implementation of relevant strategies, policies and legislation, not only for rural areas but for the whole bio-economy. • Socio-economic and comparative assessment of farming/forestry systems
Sustainable forestry	• Sustainable produce bio-based products and sufficient biomass. • Consideration of economic, ecological and social aspects. • Resource efficient forestry systems. Forest resilience and biodiversity protection.

Food Security, Agriculture, Marine Research & Bioeconomy (II)

Unlocking the potential of aquatic living resources	
Activity Lines/ Areas	**Content**
Developing sustainable and environmentally-friendly fisheries	• In depth understanding of marine ecosystems (new insights, tools and models to improve understanding of what makes marine ecosystems healthy and productive). • Evaluate and mitigate the impact of fisheries on marine ecosystems (including deep sea). • The socio-economic effects of management options will be measured. • Effects and adaptation to environmental changes, including climate change. • Biology, genetic and dynamics of fish populations; role of key species in the ecosystems; fishing activities. • Shared use of maritime space with other activities, in particular in the coastal zone, and its socio-economic impact will also be addressed.
Developing competitive European aquaculture	• Development of healthy, safe and competitive products. • Domestication of established species and diversification for new species. • Interactions between aquaculture and the aquatic ecosystems, effects of climate change. • Sustainable production systems in inland, on the coastal zone and offshore. • Understanding the social and economic dimensions of the sector to underpin cost and energy efficient production.
Boosting marine innovation through biotechnology	• Discovery of new species and applications in the field of marine biotechnologies. • Explore and exploit marine biodiversity and aquatic biomass to bring new innovative processes, products and services on the markets with potential applications in sectors including chemical and material industries, pharmaceutical, fisheries and aquaculture, energy supply and cosmetic.

Food Security, Agriculture, Marine Research & Bioeconomy (III)

Sustainable and competitive agri-food sector for a safe and healthy diet	
Activity Lines/ Areas	**Content**
Informed consumer choices	• Consumer preferences, attitudes, needs, behavior, lifestyle and education. • Communication between consumers and the food chain research community. • Improve informed choice, sustainable consumption and their impacts on production, inclusive growth and quality of life, especially of vulnerable groups.
Healthy and safe foods and diets for all	• Nutritional needs and the impact of food on physiological functions, physical and mental performance. • Links between diet, ageing, chronic diseases and disorders and dietary patterns. • Dietary solutions and innovations leading to improvements in health and well-being. • Chemical and microbial food and feed contamination, risks and exposures. • Food safety innovations, improved risk communication tools.
A sustainable and competitive agri- food industry	• Needs for the food and feed industry to cope with social, environmental, climate and economic change from local to global. • Food design, processing, packaging, process control, waste reduction, by-product valorization and the safe disposal of animal by-products. • Innovative and sustainable resource-efficient processes. • Diversified, safe, affordable and high quality products. • Traceability, logistics and services, socio-economic factors, the resilience of the food chain against environmental and climate risks. • Limitation of negative impacts of food chain activities and of changing diets and production systems on the environment.

Food Security, Agriculture, Marine Research & Bioeconomy (IV)

Sustainable and competitive bio-based industries and supporting the development of a European bio-economy

Activity Lines/ Areas	Content
Fostering the bio-economy for bio-based industries	• Major progress towards low carbon, resource efficient and sustainable industries. • Discovery and exploitation of terrestrial and aquatic biological resources, minimizing adverse environmental impacts. • Potential trade-offs between the various uses of biomass. • Development of bio-based products and biologically active compounds for industries and consumers with novel qualities, functionalities and improved sustainability. • Economic value of renewable resources, bio-waste and by-products will be maximized through new and resource efficient processes.
Developing integrated biorefineries	• Bioproducts, intermediates and bioenergy/biofuels (cascade approach). • Technologies and strategies will be developed to assure the raw material supply. • Types of biomass for use in second and third generation biorefineries, including forestry, biowaste and industrial by-products.
Supporting market development for bio-based products and processes	• Demand-side measures will open new markets for biotechnology innovation. Standardisation (determination of bio-based content, functionalities and biodegradability). • Methodologies and approaches to life-cycle analysis need to be further developed and continuously adapted to scientific and industrial advances. • Research activities supporting product and process standardisation and regulatory activities in the field of biotechnology are considered essential for supporting the creation of new markets and for realising trade opportunities.

Food Security, Agriculture, Marine Research & Bioeconomy (V)

Cross-cutting marine and maritime research	
Activity Lines/ Areas	**Content**
Climate change impact on marine ecosystems and maritime economy	• Understand the functioning of marine ecosystems, the interactions between oceans and the atmosphere. • Increase the ability to assess the role of the oceans on climate and the impact of climate change and ocean acidification on marine ecosystems and coastal areas.
Develop the potential of marine resources through an integrated approach	• Boosting long-term, sustainable maritime growth and create synergies across all the maritime sectors requires an integrated approach. • Research activities will focus on preserving the marine environment as well as the impact of maritime activities and products on non-maritime sectors. • Advances in the field of eco-innovation (new products, processes and the application of management concepts, tools and measures) to assess and mitigate the impact of human pressures on the marine environment. • Towards a sustainable management of maritime activities.
Cross-cutting concepts and technologies enabling maritime growth	• Develop platform technologies (e.g. genomics, meta-genomics, proteomics, molecular tools) • Cross-cutting enabling technologies (e.g. ICT, electronics, nanomaterials, alloys, biotechnologies, etc.) and new developments and concepts in engineering. • Marine and maritime research and ocean observation (deep-sea research, observing systems, sensors, automated systems for monitoring of activities and surveillance, screening marine biodiversity, marine geohazards, Remotely Operated Vehicles…) • Reduce the impact on the marine environment (underwater noise, invasive species and pollutants) and minimise the carbon foot-print of human activities. • Cross-cutting enabling technologies will underpin the implementation of marine and maritime Union policies.

FP7 -> Horizon 2020

FP7	Horizon 2020
BIO-KBBE -Food, Agriculture and Fisheries, and Biotechnology	• **Food security, sustainable agriculture, marine and maritime research, and the bioeconomy (Societal Challenge)** • **Biotechnology (Industrial Technology)**

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Secure, Clean and Efficient Energy (I)

Activity Lines / Areas	Content
Reducing energy consumption and carbon footprint through smart and sustainable usage	• Bring to mass market technologies and services for a **smart and efficient energy use** • Unlock the potential of efficient and renewable **heating-cooling** systems • Foster European **Smart cities and Communities**
Low-cost, low-carbon electricity supply	• Develop the full potential of **wind energy** • Develop efficient, reliable and cost-competitive **solar energy** systems • Develop competitive and environmentally safe technologies for **CO2 capture, transport and storage** • Develop **geothermal, hydro, marine and other renewable energy** options
Alternative fuels and mobile energy sources	• Make **bio-energy** competitive and sustainable • Reducing time to market for **hydrogen and fuel cells** technologies • New **alternative fuels**

Secure, Clean and Efficient Energy (II)

Activity Lines / Areas	Content
A single, smart European electricity grid	• **Pan-European market, integrate** massive increase of **renewable** energy sources; **manage interactions** between millions of **suppliers and customers**, including owners of **electrical vehicles**, novel **energy storage**, synergies between smart grids, **ICT** and **telecommunication networks** • **Large-scale demonstration projects are needed** to test and validate solutions and assess the benefits for the system and for individual stakeholders, before deploying them across Europe.
New knowledge and technologies	• Novel, more efficient and cost-competitive technologies will be required for the long term. Progress should be accelerated through **multi-disciplinarily research** to achieve scientific breakthroughs in energy related concepts and enabling technologies (e.g. **nano-science, material science, solid state physics, ICT, bio-science, computation, space**); as well as the development of innovations in **future and emerging technologies**.

Secure, Clean and Efficient Energy (III)

Activity Lines / Areas	Content
Robust decision making and public engagement	• Extensive **knowledge of** energy **technologies** and services, **infrastructure, markets (including regulatory frameworks) and consumer behaviour** is required to provide policy makers with robust analyses. • Support of the European Commission's **Information System of the SET-Plan** • **Take advantage of the possibilities offered by web and social technologies,** consumer behaviour including that of vulnerable consumers like persons with disabilities and behavioural changes will be studied in open innovation platforms such as the **Living Labs and large scale** demonstrators for service innovation
Market uptake of energy innovation, empowering markets and consumers	• Innovations **to create favourable market conditions** at the **regulatory, administrative and financing level** for low-carbon, renewable and energy efficiencies technologies and solutions. **Facilitate the energy policy implementation**, preparing the ground for rollout of the investments, supporting the capacity building and acting on **public acceptance.**

FP7 -> Horizon 2020

FP7	Horizon 2020
Energy	• Challenge: Secure, Clean and Efficient Energy
Hidrogen and Fuel Cells – JU FCH	• Challenge: Secure, Clean and Efficient Energy. • Alternative fuels and mobile energy sources (Reducing time to market for **hydrogen and fuel cells** technologies)

CIP Competitiveness and Innovation Framework Programme (CIP)	Horizon 2020
Intelligent Energy Europe Programme (IEE)	• Robust decision making and public engagement • Market uptake of energy innovation, empowering markets and consumers.

SET Plan Initiatives	Horizon 2020
European Industrial Initiatives - EII Solar, Wind, CCS, Bioenergy, Smart Grids. ¿Smart Cities & Nuclear?	• It may be envisaged, on a case by case basis, that **existing European Industrial Initiatives of the SET Plan are turned into formalised public-private partnerships,** if considered appropriate, to increase the level and coherence of national funding and to stimulate joint research and innovation actions among Member States.
European Energy Research Alliance (EERA)	• **Partnering Initiatives under Article 185 of the Treaty** - • Further support may also be provided to the EERA established under the Strategic Energy Technology Plan (SET Plan).

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Smart, green and integrated transport (I)

Activity Lines / Areas	Content
Resource efficient transport that respects the environment	• Making aircraft, vehicles and vessels cleaner and quieter • Developing smart equipment, infrastructures and services • Improving transport and mobility in urban areas
Better mobility, less congestion, more safety and security	• Reduction of traffic congestion • Improvements in the mobility of people and freight • Developing and applying new concepts of freight transport and logistics • Reducing accident rates and fatal casualties and improving security
Global leadership for the European transport industry	• Developing the next generation of transport means as the way to secure market share in the future • On board, smart control systems • Advanced production processes • Exploring entirely new transport concepts

Smart, green and integrated transport (II)

Activity Lines / Areas	Content
Socio-economic research and forward looking activities for policy making	• Policy analysis and impact of policy measures; Socio-economic aspects; European research and innovation policies for transport; Prospective studies and technology foresight; Strengthening of the European Research Area; User behaviour, social acceptance, mobility patterns and business models; Scenario development; Models for policy making; Prevention of social inequalities in access to mobility and in vulnerable road users; Externalities, taxation and pricing models; Skills and jobs.

FP7 -> Horizon 2020

FP7	Horizon 2020
Transport (including Aeronautics) / Aeronautics	Smart, green and integrated transport
Transport (including Aeronautics) / Surface Transport	Smart, green and integrated transport
Transport (including Aeronautics) / Galileo	Enabling and industrial technologies - Space

Transport large scale initiatives (FP7 -> Horizon 2020)

FP7	Horizon 2020
JTI Clean Sky	JTI Clean Sky 2
JU SESAR	Extension of activities until 2024
PPP Green Cars	PPP Green Vehicles
-	"Vessels for the Future" PPP proposal in the waterborne sector
-	"Shift2Rail" JTI proposal in the rail sector
-	Urban Mobility KIC in 2018 (EIT's proposal) Marine KIC proposal (www.marinekic-initiative.eu) "reFINE": a potential PPP in transport infrastructures

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Climate action, environment, resource efficiency and raw materials (I)

Activity Lines/ Areas	Content
5.1. Fighting and adapting to climate change	• *Improve the understanding of climate change and the provision of reliable climate projections* • *Assess impacts, vulnerabilities and develop innovative cost-effective adaptation and risk prevention measures* • *Support mitigation policies*
5.2. Sustainably managing natural resources and ecosystems	• Further our understanding of the functioning of ecosystems, their interactions with social systems and their role in sustaining the economy and human well-being • Provide knowledge and tools for effective decision making and public engagement
5.3. Ensuring the sustainable supply of non-energy and non-agricultural raw materials	• *Improve the knowledge base on the availability of raw materials* • *Promote the sustainable supply and use of raw materials, covering exploration, extraction, processing, recycling and recovery* • *Find alternatives for critical raw materials* • *Improve societal awareness and skills on raw materials*
5.4. Enabling the transition towards a green economy through eco-innovation	• *Strengthen eco-innovative technologies, processes, services and products and boost their market uptake.* • *Support innovative policies and societal changes* • *Measure and assess progress towards a green economy* • *Foster resource efficiency through digital systems*
5.5. Developing comprehensive and sustained global environmental observation and information systems	• *Global Monitoring for Environment and Security (GMES) operational services by providing a developmental knowledge base for GMES*

FP7 -> Horizon 2020

FP7	HORIZON 2020
Coping with climate change	• **Climate action, environment, resource efficiency and raw materials** • **Other :** Secure, clean and efficient energy and Inclusive, innovative and secure societies
Sustainable use and management of land and seas	• **Climate action, environment, resource efficiency and raw materials** • **Other :** Food security, sustainable agriculture, marine and maritime research & the bioeconomy
Improving resource efficiency	• **Climate action, environment, resource efficiency and raw materials** • **Other :**Leadership in enabling and industrial technologies, European Innovation Partnerships: on Water, on Raw Materials; CIP-ECO-INNOVATION
Protecting citizens from environmental hazards	• **Climate action, environment, resource efficiency and raw materials** • **Health, demographic change and wellbeing,**
Mobilizing environmental knowledge for policy, industry and society	• **Climate action, environment, resource efficiency and raw materials**

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Inclusive, innovative and reflective societies (I)

Activity Lines/ Areas	Content
Inclusive societies	**Mechanisms to promote smart, sustainable and inclusive growth:** citizen participation, sustainable lifestyles; cultural understanding; socio-economic behaviours and values; economies and governance; global economies, markets and financial systems.
	Resilient and inclusive societies in Europe: social transformations; European integration; inclusive innovation; welfare systems and public services; social policies and evolutions; gender equality; identities, cultures and values; vulnerable populations participation; acquisition of skills; protection of human rights; migration and demographic change; ICT solutions and digital skills.
	Europe's role as a global actor: Europe and global changes; EU as global actor; conflicts prevention and resolution; impacts of globalisation; the role and influence of transnational actors; Europe contribution to global governance.
	Innovative spatial and urban planning: cities; urban and peri-urban planning and design; urban societies; energy, environment, transport and land-use; design and use of public space within cities; new model of cities as hubs of innovation

Inclusive, innovative and reflective societies (II)

Activity Lines/ Areas	Content
Innovative societies	**Evidence base and support for the Innovation Union and ERA:** research and innovation policies, systems and actors; indicators, data and information infrastructures; forward-looking activities; pilot initiatives; research training; mobility and career development of researchers; coordination of policies; framework conditions for innovation; innovation support mechanisms and services.
	New forms of innovation, including social innovation and creativity: social innovation; distributed platforms to support Europe 2020 objectives; ICT for learning processes, networks of social innovators and social entrepreneurs; eGovernment.
	Potential of all generations: new products, technologies, improved services, new business and social models adapted to the changing structure of the society; smart policies for active ageing; integration of generations of young Europeans
	Cooperation with third countries: policy dialogues in research and innovation; networking and twinning activities; coordination of policies and programmes; research and innovation 'presence' in third countries.

Inclusive, innovative and reflective societies (III)

Activity Lines/ Areas	Content
Reflective societies	**European heritage:** memory; identity; tangible and non-tangible heritage; integration and cultural interaction; traslation; archives and museums
	European countries and regions history: cultural diversity; intercultural developments; role of arts, media, literature, landscapes, philosophy and religions in relation to diversity
	Europe's role in the world: Europe and global changes; EU as global actor; conflicts prevention and resolution; impacts of globalisation; the role and influence of transnational actors; Europe contribution to global governance.

FP7 -> Horizon 2020

FP7	Horizon 2020
Socio-economic Sciences and Humanities (SSH)	Challenge 6: Europe in a changing world: Inclusive, innovative and reflective societies SSH shall be an integral part of the activities to address all the challenges.
International Cooperation Activities	Inclusive, innovative and reflective societies

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Secure societies

Activity Lines/ Areas	Content
Secure societies	• **Increasing Europe's resilience to crises and disasters:** support to different types of emergency management operations(including dual-use technologies). • **Fighting crime and terrorism:** including the protection of critical infrastructures, systems and services. • **Strengthening security through border management:** including control and surveillance, integration with EUROSUR initiative and integration with the European border management system • **Digital Security:** including **Cyber-security** (security for systems, networks, access devices, software and services, including cloud computing and interoperability) **& Ensuring privacy and the societal dimension of security**.

FP7 -> Horizon 2020

FP7	Horizon 2020
Security	Secure societies
ICT – Technology pillars: • 1.4 Trust and Security	Secure societies

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ICT-Information & Communication Technologies(I)

Activity Lines/ Areas	Content
Components & Systems	• Smart Cyber-Physical Systems (embedded systems) • Micro-Nano-Bio systems • Organic and large area electronics • Smart system integration, systems of systems, complex systems engineering • Part of new ECSEL JTI (formerly ARTEMIS JTI)
Advanced Computing	• Computing systems and technologies • Low power computing • Processor and system architecture • Data localization technologies • Parallel computing • Simulation software • Part of new ECSEL JTI (formerly ARTEMIS JTI)
Future Internet	• Infrastructures, technologies, services and experimentation for Future Internet • Novel internet architectures • Wireless communication and optical networks • Cloud infrastructures and services • Software technologies • Collective awareness platforms • Web entrepreneurship • Advanced 5G network infrastructure (New 5G PPP)

ICT-Information & Communication Technologies(II)

Activity Lines/ Areas	Content
Content Technologies and Information Management	• Tools to create, exploit and preserve digital content • Big Data: tools to model, analyse and visualise big amounts of data • Technologies for language, learning, teaching, multimodal and natural interaction • Technologies for creative industries, social media and convergence • Advanced data mining, statistical analysis, visual computing technologies, gamification technologies
Robotics	• Industrial and service robotics • Cognitive systems, sentient machines • Use cases and smart spaces • Increase computing and networking of systems that can learn, adapt and react • New PPP Robotics
Micro & Nanoelectronics and Photonics	• Design, advanced processes, pilot lines for fabrication, production technologies, demonstration and technology validation; Innovative business models • New PPP Photonics • Part of new ECSEL JTI (formerly ENIAC JTI)

ICT-Information & Communication Technologies(III)

Activity Lines/ Areas	Content
Cross cutting activities	• Internet of Things (IoT), connected smart objects • Human–centric digital age, changes in human behaviour due to ICT • Cybersecurity, trustworthy ICT, security-by-design, criptography
Horizontal ICT Innovation Actions	• Support for access to finances, venture capital (VC), co-investments with private sector • Support for entrepreneurship • Open Disruptive Innovation scheme (ODI), innovative bottom-up ideas, SME Instrument • Fast track for innovation
International Cooperation	• High income countries and low & middle income countries. • Brazil: cloud computing, high performance computing, experimental platforms • Japan: network technologies (optical communications, big data, IoT, cloud, access networks)

ICT-Information & Communication Technologies(III)

Activity Lines/ Areas	Content
Factories of the Future	• Process optimization of manufacturing assets • ICT-enabled modelling, simulation, analytics and forecasting technologies • I4MS: ICT innovation for manufacturing SMEs • New PPP FoF2 (follow up of PPP FoF)

FP7 -> Horizon 2020 (I)

FP7	Horizon 2020
ICT – Technology Pillars: 1) Network and Service Infrastructures 2) Cognitive Systems and Robotics 3) Electronic Components and Systems 4) Digital Content and Languages Future Internet PPP ARTEMIS JTI ENIAC JTI Factories of the Future PPP (FoF)	LEIT – ICT Photonics PPP Robotics PPP 5G PPP (different but complementary to Future Internet PPP) ECSEL JTI FoF2 PPP
ICT – Future & Emerging Technologies	Excellent Science – Future &Emerging Technologies

FP7 -> Horizon 2020 (II)

FP7	Horizon 2020
ICT – Application Pillars: 1) ICT for Health, Personal Health Systems, VPH, Patient Guidance Services, ICT for Ageing and Wellbeing, part of ICT for Inclusion (dissabilities), Art. 185 AAL… 2) ICT for smart energy grids, ICT for energy efficiency, Smart Cities 3) ICT for efficient resources management, ICT for environmental services, ICT for waste and water management… 4) ICT for multimodal mobility, cooperative systems for mobility and transport, V2V and V2I interaction, Green Car PPP (EGCI) 5) Part of ICT for inclusion (digital inclusion), ICT for governance,, empowerment of digital skills for citizens, ICT for learning, access to cultural resources and social innovation… 6) Part of Cyber security, trustworthy digital society, ICT systems for response to crisis and disasters, 7) Energy Efficient Buildings PPP (EeB)	**Move to the following Societal Challenges:** 1) Health, demographic change and wellbeing 2) Secure, clean and efficient energy 3) Climate action, resource efficiency and raw materials 4) Smart, green and integrated transport 5) Inclusive, innovative and reflective societies 6) Secure societies **Or move to a combination of Societal Challenges and Enabling and Industrial Technologies:** 7) Advanced manufacturing and processing; Secure, clean and efficient energy

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Nanotechnologies

Activity Lines/ Areas	Content
Nano- materials, devices and systems	Developing next generation **nanomaterials, nanodevices and nanosystems**, aiming at fundamentally new products enabling **sustainable solutions in a wide range of sectors**.
Safety of Nanotechnology	Ensuring the safe development and application of nanotechnologies: • potential **impact on health or on the environment** • scientific tools and platforms for **hazard exposure and risk assessment** • management along the entire **life cycle** of nanomaterials and nanosystems.
Societal Dimension	Developing the **societal dimension** of nanotechnology Addressing the human and physical **infrastructure needs**
Synthesis and manufacturing	Efficient **synthesis and manufacturing of nanomaterials, components and systems** Focusing on new flexible, scalable and repeatable **unit operations**, **smart integration** of new and existing processes, as well as **up-scaling** to achieve mass production
Underpinning technologies	Developing **capacity-enhancing techniques, measuring methods and equipment**

Advanced Materials

Activity Lines/ Areas	Content
Cross-cutting and enabling materials technologies	Research on **functional materials, multifunctional materials** such as self-repairing or biocompatible materials and **structural materials**, for innovation in all industrial sectors particularly for high value markets.
Materials development and transformation	Research and development to ensure efficient and sustainable **up-scaling** to enable industrial manufacturing of future products e.g. in the metal or chemical industries.
Management of materials components	Research and development for new and innovative techniques and systems, **joining, adhesion, separation, assembly, self-assembly and disassembling, decomposition and deconstruction**.
Materials for a sustainable industry	Developments to **reduce energy demand** and facilitate **low-carbon production**, as well as **process intensification, recycling, depolution and high added-value materials from waste and remanufacture**.
Materials for creative industries	Applying design and the development of **converging technologies** to create **new business opportunities**, including the preservation of Europe's materials with historical or cultural value.
Metrology , characterisation, standardisation and quality control	Promoting technologies such as **characterisation, non-destructive evaluation and predictive modelling of performance** for progress in materials science and engineering.
Optimisation of the use of materials	Research and development to investigate **alternatives to the use of materials** and **innovative business model approaches**.

Advanced Manufacturing and Processing

Activity Lines/ Areas	Content
Technologies for Factories of the Future	Development and integration of the **adaptive production systems** of the future, with particular emphasis on the needs of European **SMEs**
Technologies enabling Energy-efficient buildings	**Sustainable construction** technologies Implementation and replication of measures for an **increased uptake of energy-efficient systems and materials**
Sustainable and low-carbon technologies in energy-intensive process industries	Increasing the **competitiveness of process industries**, such as chemical, pulp and paper, glass, or non-ferrous metals and steel
New, sustainable business models	Cross-sectoral cooperation in concepts and methodologies for **"knowledge-based", specialised production**

FP7 → Horizon 2020 (I)

FP7	Horizon 2020
NMP – Activity 1: **Nanosciences and Nanotechnologies** **1) Contribution to sustainable development** **2) Applications to environment, energy and health** **3) Safety of Nanotechnology** **4) Cross-cutting and enabling R&D**	**Nanosciences under the Science Pillar** **Enabling and Industrial Technologies – Nanotechnology:** •Bridging the gap between nanotechnology research and markets •Nanotechnology and Advanced Materials for more effective Healthcare •Nanotechnology and Advanced Materials for low-carbon energy technologies and Energy Efficiency •Exploiting the cross-sector potential of Nanotechnologies and Advanced materials to drive competitiveness and sustainability •Safety of nanotechnology-based applications and support for the development of regulation •Addressing generic needs in support of governance, standards, models and structuring in nanotechnology
NMP – Activity 2: **Materials** **1)Enabling R&D** **2)Innovative Materials for advanced applications** **3)Structuring actions** **Support to Green Cars PPP**	**Enabling and Industrial Technologies – Advanced Materials:** •Nanotechnology and Advanced Materials for more effective Healthcare •Nanotechnology and Advanced Materials for low-carbon energy technologies and Energy Efficiency •Exploiting the cross-sector potential of Nanotechnologies and Advanced materials to drive competitiveness and sustainability •Addressing generic needs in support of governance, standards, models and structuring in advanced materials **Maintained through coordinated calls**

FP7 → Horizon 2020 (II)

FP7	Horizon 2020
NMP – Activity 3: New Production Technologies Factories of the Future PPP Energy Efficient Buildings PPP	Enabling and Industrial Technologies – Advanced Manufacturing and Processing • Addressing generic needs in support of governance, standards, models and structuring in advanced manufacturing and processing Appart coordinated calls for PPPs: • Factories of the Future • Energy-Efficient Buildings • Sustainable Process Industries
NMP – Activity 4: Integration Raw Materials	Disappears as such Mainly moves to Societal Challenge 5: Climate action, resource efficiency and raw materials (with the exception of substitution of critical materials and some developments towards resource efficiency in the extraction and processing of minerals and metals)

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Tackling Societal Challenges

- Health, demographic change and wellbeing
- Food security, sustainable agricultures, marine and maritime research and the bioeconomy
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, resource efficiency, raw materials
- Inclusive, innovative and reflective societies
- Secure societies

Creating Industrial Leadership and Competitive Frameworks

- Information & Communication technologies
- Nanotechnologies
- Advanced materials
- Advanced manufacturing and processing
- **Biotechnology**
- Space
- Access to risk finance
- Innovation in SMEs

Biotechnology

Activity Lines/ Areas	Content
Boosting cutting-edge biotechnologies as future innovation drivers	• Development of emerging tools such as synthetic biology, bioinformatics, systems biology. • Exploiting the convergence with other enabling technologies such as nanotechnology (e.g. bionanotechnology) and ICT (e.g. bioelectronics). • Transfer and implementation into new applications (drug delivery systems, biosensors, biochips, etc).
Biotechnology-based industrial processes	• Enabling the European industry (e.g. chemical, health, mining, energy, pulp and paper, textile, starch, food processing) to develop new products and processes meeting industrial and societal demands; • Biotechnology-based alternatives to replace established ones; • Potential of biotechnology for detecting, monitoring, preventing and removing pollution (enzymatic and metabolic pathways, bio-processes design, advanced fermentation, up- and down-stream processing, dynamics of microbial communities) • Development of prototypes for assessing the techno-economic feasibility of the developed products and processes.
Innovative and competitive platform technologies	• Develop platform technologies (e.g. genomics, meta-genomics, proteomics, molecular tools) • Development of bio-resources with optimised properties and applications beyond conventional alternatives; • Exploration, understanding and exploitation in a sustainable manner of terrestrial and marine biodiversity for novel applications; • Biotechnology-based healthcare solutions (e.g. diagnostics, biologicals, bio-medical devices).

FP7 -> Horizon 2020

FP7	Horizon 2020
BIO-KBBE	• Food security, sustainable agriculture, marine and maritime research, and the bioeconomy (Societal Challenge) • Biotechnology (Industrial Technology)

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Space

Activity Lines/ Areas	Content
Satellite Navigation	• Development of new innovative EGNSS applications , using EGNOS and Galileo Early Services • EGNSS applications with real commercial potential led by SMEs • Developing applications through international cooperation
	• EGNSS awareness raising, capacity building and/or promotion activities, inside or outside of the European Union

	• Development of the security module for Galileo PRS (Public Regulated Service)
	  • Coating-PUF technology : (Physical unclonable functions)
	  • Three-dimensional integrated circuits (3D-IC) and scalable Security Module architecture
	Procurement, not subject to call for proposals

	• Development of enabling technologies for future generations of European GNSS missions • Support activities for the full exploitation of the European GNSS infrastructure in public, scientific and commercial fields *Procurement, not subject to call for proposals*
	• Infrastructure-related R&D activities for the EGNSS, comprising the early phases of Galileo and EGNOS evolution *Procurement, not subject to call for proposals*

Space (II)

Activity Lines/ Areas	Content

Earth Observation (EO)	• EO Space applications
	  • New ideas for Earth-relevant space applications
	  • EO applications with a demonstrated commercial value with targeted client communities

	• Development of new access methods for the research use of Copernicus Sentinel Data
	• Reprocessing and calibration of Land Use/Land Use Change Data from past EO missions
	• Research on Land Surface changes at Global Scale

	• Climate Change:
	  • Mapping of existing sensor technologies and measurements, identification of gaps in available systems and drawing up the needs for climate change monitoring campaigns
	  • Reprocessing and calibration of remote sensing missions data to produce Climate Data Records

	• Technology developments for commercial imaging in fractionated satellites

Space (III)

Activity Lines/ Areas	Content
Competitiveness of the European Space Technology	Technologies for European non-dependence and competitiveness • ASICs for mixed signal processing • Advanced thermal control systems • Space qualification low shock non-explosive actuators • Alternative to Hydrazine in Europe • Spacecraft charging analysis tool • Advanced materials and material technology for combustion chamber • Fiber Optic gyro (FOG) based inertial measurement unit • Power amplification: Travelling Wave Tube (TWT) materials • Passive components • Active discrete components • High density (up to 1000 pints and beyond) assemblies on PCB
	Improvement of conventional launch systems and breakthrough technologies for new launching systems
	Programmatic Support Activity (PSA) for the future implementation of a Strategic Research Cluster (SRC) on in-Space electrical propulsion
	Programmatic Support Activity (PSA) for the future implementation of a Strategic Research Cluster (SRC) on Space Robotics Technologies
	Studies to define the requirements for the implementation of affordable In-Orbit demonstration missions (IOD) and In-Orbit Validation missions (IOV)
	Bottom-up space technologies at low TRL

Space (IV)

Activity Lines/ Areas	Content
Protection of European Assets in and from space	• Exploratory work of new ideas for data analysis and modelling of space weather and further improvement of existing models • Access technologies and characterisation for Near Earth Objects (NEOs) • Passive means to reduce the impact of Space Debris (prevention of new debris, mitigation through de-orbiting solutions and protection from impact)
Space Surveillance and Tracking (SST) *Activities not subject to call for proposals, pre-defined beneficiary*	• Participation of the EU Satellite Centre in the SST Service Function
	• Contribution of H2020 to the SST programme
	• Identification and prioritization of which assets need to be updated or renewed to improve the future SST service

Space (V)

Activity Lines/ Areas	Content

Space exploration and science	• Space exploration:
	  • On-ground preparatory activities for future human missions: life support and habitat management
	• Space Science:
	  • Study the aspects required to develop a facility to keep and analyze samples brought back from space in future missions (Sample curation facility)
	  • Scientific exploitation of data from Mars missions
	  • Scientific exploitation of astrophysics and comets data

International Cooperation in Space matters	• Studies on how to build technology "demonstrator projects" for exploration: Robotics, Energy, Propulsion, Life support • International Cooperation in planetary science
Outreach and comunication	• Outreach through education

Space FP7 -> Space Horizon 2020

Space FP7	Space Horizon 2020
GMES applications and services	• EO 1 - 2014: New ideas for Earth-relevant space applications • EO 2 - 2014: Stimulating wider research use of Copernicus Sentinel Data • EO 3 - 2014: Land Use/Land Use Change Space-based Data reprocessing and calibration • EO 4 – 2014: Land Surface changes at Global Scale • EO 5 – 2014: Observation capacity mapping and needs for Climate change monitoring • EO 1 – 2015: Bringing EO applications to the market • EO 2 – 2015: Stimulating science use of Copernicus Sentinel Data • EO 3 – 2015: Climate Change relevant space-based Data reprocessing and calibration
GMES space component (satellites and ground segment)	Not in Horizon 2020 for the time being
Space Science – exploitation of space science and exploration data	• COMPET 8 - 2014: Science in context: sample curation facility and scientific exploitation of data from Mars missions • COMPET 5 – 2015: Scientific exploitation of astrophysics and comets data
Space Transportation	• COMPET 2 – 2014 y 2015: Independent access to space

Space FP7 -> Space Horizon 2020

Space FP7	Space Horizon 2020
Space Exploration	• COMPET 7 - 2014: Space exploration – Life support • COMPET 4 – 2015: Space exploration – Habitat management
Space Technologies	• COMPET 1 – 2014 y 2015: Technologies for European non-dependence and competitiveness • COMPET 3 – 2014: In-Space electrical propulsion and station keeping • COMPET 4 – 2014: Space Robotics Technologies • COMPET 5 – 2014: In-Orbit demonstration/Validation (IOD/IOV) • COMPET 6 – 2014 y COMPET 3 – 2015 : Bottom-up space technologies at low TRL
Vulnerability of space assets (SSA)	• PROTEC 1 - 2014: Space Weather • PROTEC 2 - 2014: Access technologies and characterisation for Near Earth Objects (NEOs) • PROTEC 1 -2015: Passive means to reduce the impact of Space Debris • PART B: Other actions (not subject to calls for proposals) – Activity 2 – 2014 : Space Surveillance and Tracking: participation of the EU Satellite Centre in the SST Service Function – Activity 3 – 2015: Space surveillance and tracking (SST) – Activity 4 – 2015: Improving the Performances of the SST at European Level

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Access to Risk Finance

Activity Lines/ Areas	Content
Debt facility	• The Debt facility will provide loans to single beneficiaries for investment in R&I; guarantees to financial intermediaries making loans to beneficiaries; combinations of loans and guarantees; and guarantees and/or counter-guarantees for national or regional debt-financing schemes. • An SME window under the Debt facility will be maintained targeting R&I-driven SMEs and small mid-caps with loan amounts exceeding EUR 150,000. thus complementing finance to SMEs by the Loan Guarantee Facility under the Programme for the Competitiveness of Enterprises and SMEs. (COSME)
Equity facility	• The Equity facility will focus on early-stage venture capital funds providing venture capital and/or mezzanine capital to individual portfolio enterprises. • The facility will also have the possibility to make expansion and growth-stage investments in conjunction with the Equity Facility for Growth (EFG) under the Programme for the Competitiveness of Enterprises and SMEs.
Accompanying measures	• Investment readiness schemes covering incubating, coaching and mentoring SMEs and fostering their interaction with potential investors. Measures to raise the awareness and attract private investors and philanthropic foundations about the growth potential of innovative SMEs involved in Union funding programmes. • Schemes to foster corporate venturing and encourage the activities of family offices and business angels.

FP7 -> Horizon 2020

FP7	Horizon 2020
Risk Sharing Financial Facility	Access to Risk finance / Debt facility
RSI Facility - Risk Sharing Instrument for Innovative and Research oriented SMEs and small Mid-Caps	Access to Risk finance / Debt facility

CIP	Horizon 2020
Entrepreunership and Innovation / EIP financial instruments/ SMEG	Access to Risk Finance / Debt facility
Entrepreunership and Innovation / EIP financial instruments / GIF 1	Access to Risk Finance / Equity facility

Horizon 2020 and COSME complementarities

COSME and Horizon 2020 will jointly support two financial instruments for R&I and growth: (both managed by EIF)

- **Equity instrument for R&I and growth**
  - Equity Facility for R&I (H2020)
  - Equity Facility for Growth (COSME)
- **Debt instrument for R&I and growth**
  - for SMEs

  Loan Guarantee Facility (COSME)

  SMEs & Small Midcaps Guarantee Facility for R&I (H2020)
  - for larger firms, research bodies, project finance, etc

  Loans & Guarantees Service for R&I (H2020)

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Innovation in SME

Activity Lines/ Areas	Content
Mainstreaming SME support	• A dedicated SME instrument (SBIR-like) targeting all types of innovative SMEs showing a strong ambition to develop, grow and internationalise. • Only SMEs will be allowed to apply for funding and support forming consortia according to their needs, including the subcontract of research and development work. • Sampled bottom-up approach.
Support for research intensive SMEs	• Continuation of Eurostars, covering the entire field of science and technology with a bottom-up approach to fit the needs of R&D performing SMEs.
Enhancing the innovation capacity of SMEs	• Set of support measures including among others training and mobility activities, networking and exchange of best practices, spinning in technology to develop SME innovation capacity, development of innovative services for SMEs (including mentoring, coaching and partner search activities for SMEs), cluster cross-sectoral and cross-regional innovation activities.
Supporting market-driven innovation	• Improving the framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative firms, in particular SMEs and enterprises of intermediate size with potential for fast growth. Specialised innovation support and reviews of public policies in relation to innovation will be supported.

FP7 -> Horizon 2020

FP7	Horizon 2020
Research for the benefit of SMEs / Research for SMEs	Innovation in SME / Integrated SME instrument*
Research for the benefit of SMEs / Research for SME Associations	No dedicated activity
Research for the benefit of SMEs / Eurostars	Innovation in SME / Eurostars 2.0

CIP	Horizon 2020
Entrepreneurship and Innovation / Creation of an environment favourable to SME co-operation	Innovation in SME / Enhancing the innovation capacity of SMEs
Entrepreneurship and Innovation / Innovation in enterprises	Innovation in SME / Supporting market-driven innovation

* Since the SME instrument allows “free” consortia composition and subcontracting, R4SME programme is integrated in the SME instrument concept.