

Horizonte 2020

Programa Marco de Investigación e Innovación (2014-2020)

Propuesta de la Comisión Europea

Estructura y contenidos

Elaboración: Dpto. Programa Marco de I+D de la UE, CDTI (Enero 2012)

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Más información: http://ec.europa.eu/research/horizon2020/index_en.cfm

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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 secure societies

Creating Industrial Leadership and Competitive Frameworks

Information & Communication technologies

Nanotechnologies

Advanced materials

Advanced manufacturing and processing

Biotechnology

Space

Cross-cutting actions combining several key enabling technologies

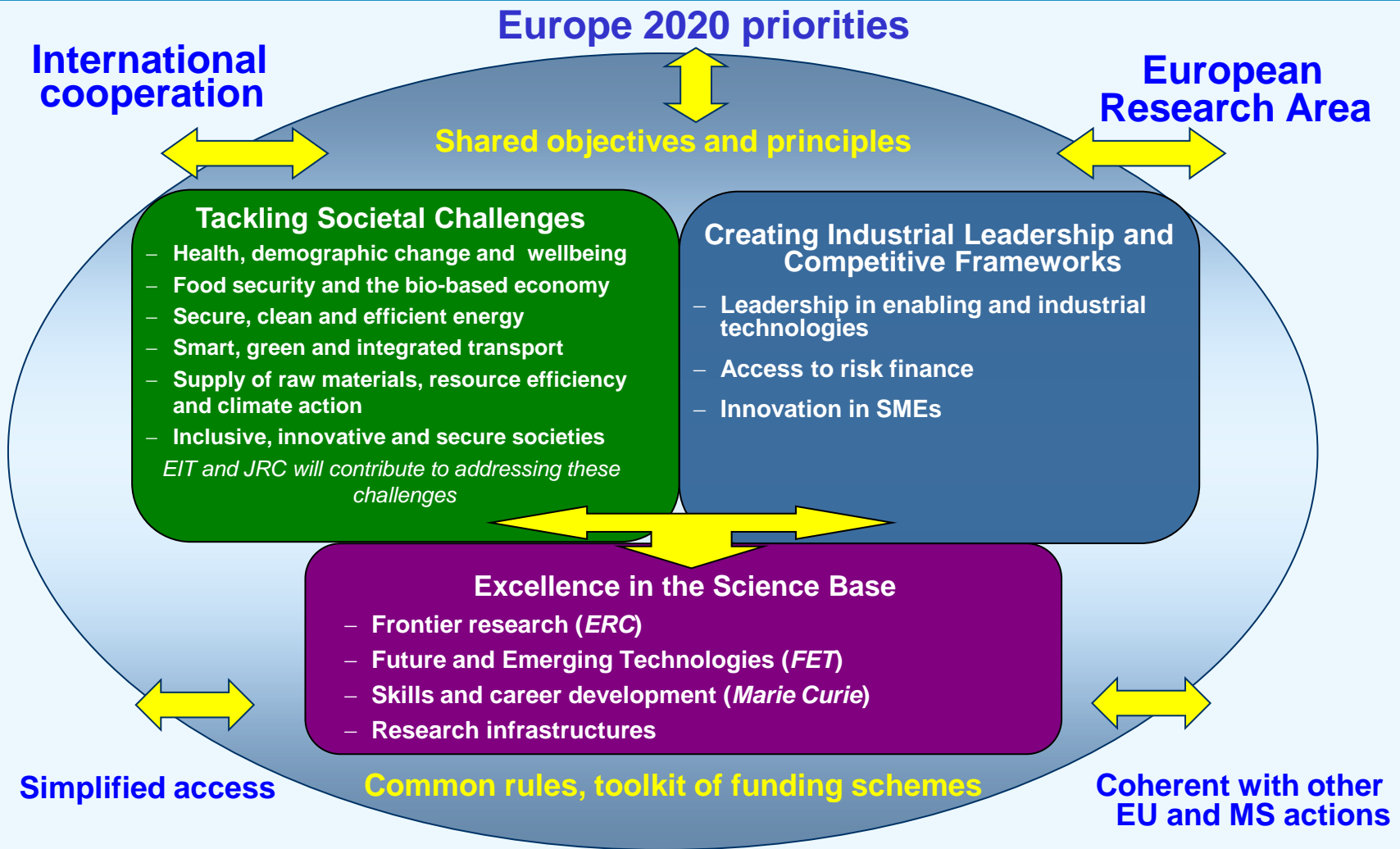
Access to risk finance

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



Tackling Societal Challenges

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Health, Demographic Change and Wellbeing (I)

Activity Lines/ Areas	Content
1.1. Understanding the determinants of health, improving health promotion and disease prevention	<ul style="list-style-type: none"> • 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
1.2. Developing effective screening programmes and improving the assessment of disease susceptibility	<ul style="list-style-type: none"> • Personalized, stratified and collective strategies for disease prevention
1.3. Improving surveillance and preparedness	<ul style="list-style-type: none"> • New and emerging infections • Antimicrobial drug resistance • Consequences of climate change
1.4. Understanding disease	<ul style="list-style-type: none"> • Patho-physiology of disease • Generation of biomedical data and include “-omics”, high throughput and systems medicine approaches • Maximising data utility
1.5. Developing better preventive vaccines	<ul style="list-style-type: none"> • More effective preventive vaccines (or alternative interventions) • Evidence-based vaccination schemes
1.6. Improving diagnosis	<ul style="list-style-type: none"> • New and more effective diagnostics
1.7. Using <i>in-silico</i> medicine for improving disease management and prediction	<ul style="list-style-type: none"> • Model based simulation
1.8. Treating disease	<ul style="list-style-type: none"> • Drugs, vaccines and other therapeutic approaches (incl. gene and cell therapy) • Regenerative medicine approaches (incl. stem cells) • Treatments for diseases and management of disability

Health, Demographic Change and Wellbeing (II)

Activity Lines/ Areas	Content
1.9. Transferring knowledge to clinical practice and scalable innovation actions	<ul style="list-style-type: none"> • Clinical trials • Independent living into real world environments
1.10. Better use of health data	<ul style="list-style-type: none"> • Infrastructures and information structures and sources • Data processing, knowledge management, modelling and visualisation
1.11. Improving scientific tools and methods to support policy making and regulatory needs	<ul style="list-style-type: none"> • 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
1.12. Active ageing, independent and assisted living	<ul style="list-style-type: none"> • Ageing population and people with disabilities • Research and innovation pilots
1.13. Individual empowerment for self-management of health	<ul style="list-style-type: none"> • Behavioural and social models, social attitudes and aspirations in relation to: personalised health techs, mobile and/or portable tools, new diagnostics and personalised services which promote healthy lifestyle, wellbeing, etc. • Support for knowledge infrastructures
1.14. Promoting integrated care	<ul style="list-style-type: none"> • 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)
1.15. Optimising the efficiency and effectiveness of healthcare systems and reducing inequalities through evidence based decision making and dissemination of best practice, and innovative technologies and approaches.	<ul style="list-style-type: none"> • 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
<p>Increasing production efficiency, climate change, sustainability and resilience</p>	<ul style="list-style-type: none"> • 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.
<p>Providing ecosystem services and public goods</p>	<ul style="list-style-type: none"> • Delivering commercial products and societal public goods (including cultural and recreational value) and important ecological services (biodiversity, pollination, water regulation, landscape, erosion reduction and carbon sequestration / GHG mitigation). • Management solutions, decision-support tools. Management of agricultural systems
<p>Empowerment of rural areas, support to policies and rural innovation</p>	<ul style="list-style-type: none"> • 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

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

Unlocking the potential of aquatic living resources

Activity Lines/ Areas	Content
<p>Developing sustainable and environmentally-friendly fisheries</p>	<ul style="list-style-type: none"> • 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.
<p>Developing competitive European aquaculture</p>	<ul style="list-style-type: none"> • 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.
<p>Boosting marine innovation through biotechnology</p>	<ul style="list-style-type: none"> • 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
<p>Informed consumer choices</p>	<ul style="list-style-type: none"> • 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.
<p>Healthy and safe foods and diets for all</p>	<ul style="list-style-type: none"> • 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.
<p>A sustainable and competitive agri- food industry</p>	<ul style="list-style-type: none"> • 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

Activity Lines/ Areas	Content
<p>Fostering the bio-economy for bio-based industries</p>	<ul style="list-style-type: none"> • 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.
<p>Developing integrated biorefineries</p>	<ul style="list-style-type: none"> • 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.
<p>Supporting market development for bio-based products and processes</p>	<ul style="list-style-type: none"> • 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.

FP7 -> Horizon 2020

FP7	Horizon 2020
BIO-KBBE -Food, Agriculture and Fisheries, and Biotechnology	<ul style="list-style-type: none">• Food security, sustainable agriculture, marine and maritime research, and the bioeconomy (Societal Challenge)• Biotechnology (Industrial Technology)

Tackling Societal Challenges

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Secure, Clean and Efficient Energy (I)

Activity Lines / Areas	Content
<p>Reducing energy consumption and carbon footprint through smart and sustainable usage</p>	<ul style="list-style-type: none"> • 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
<p>Low-cost, low-carbon electricity supply</p>	<ul style="list-style-type: none"> • 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
<p>Alternative fuels and mobile energy sources</p>	<ul style="list-style-type: none"> • 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
<p>A single, smart European electricity grid</p>	<p>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</p> <p>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.</p>
<p>New knowledge and technologies</p>	<p>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.</p>

Secure, Clean and Efficient Energy (III)

Activity Lines / Areas	Content
<p>Robust decision making and public engagement</p>	<p>Extensive knowledge of energy technologies and services, infrastructure, markets (including regulatory frameworks) and consumer behaviour is required to provide policy makers with robust analyses.</p> <p>Support of the European Commission's Information System of the SET-Plan</p> <p>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</p>
<p>Market uptake of energy innovation, empowering markets and consumers</p>	<p>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.</p>

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 <u>existing European Industrial Initiatives of the SET Plan are turned into formalised public-private partnerships</u> , 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
<p>Resource efficient transport that respects the environment</p>	<ul style="list-style-type: none"> • Making aircraft, vehicles and vessels cleaner and quieter • Developing smart equipment, infrastructures and services • Improving transport and mobility in urban areas
<p>Better mobility, less congestion, more safety and security</p>	<ul style="list-style-type: none"> • 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
<p>Global leadership for the European transport industry</p>	<ul style="list-style-type: none"> • 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 Smart, green and integrated transport

Transport large scale initiatives (FP7 -> Horizon 2020)

FP7	Horizon 2020
JTI Clean Sky	JTI Clean Sky II Merging with JU SESAR?
JU SESAR	Extension of activities beyond 2013? Merging with JU JTI Clean Sky?
PPP Green Cars	Possibly maintained Possible progressing towards innovation / market and up-scaling activities / actions
-	SHIFT2RAIL proposal in the rail sector
-	Urban Mobility KIC in 2018 (EIT's proposal) Marine KIC proposal (www.marinekic-initiative.eu)

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Climate action, resource efficiency and raw materials (I)

Activity Lines/ Areas	Content
5.1. Fighting and adapting to climate change	<ul style="list-style-type: none"> • <i>Improve the understanding of climate change and the provision of reliable climate projections</i> • <i>Assess impacts, vulnerabilities and develop innovative cost-effective adaptation and risk prevention measures</i> • <i>Support mitigation policies</i>
5.2. Sustainably managing natural resources and ecosystems	<ul style="list-style-type: none"> • <i>Further our understanding of the functioning of ecosystems, their interactions with social systems and their role in sustaining the economy and human well-being</i> • <i>Provide knowledge and tools for effective decision making and public engagement</i>
5.3. Ensuring the sustainable supply of non-energy and non-agricultural raw materials	<ul style="list-style-type: none"> • <i>Improve the knowledge base on the availability of raw materials</i> • <i>Promote the sustainable supply and use of raw materials, covering exploration, extraction, processing, recycling and recovery</i> • <i>Find alternatives for critical raw materials</i> • <i>Improve societal awareness and skills on raw materials</i>
5.4. Enabling the transition towards a green economy through eco-innovation	<ul style="list-style-type: none"> • <i>Strengthen eco-innovative technologies, processes, services and products and boost their market uptake.</i> • <i>Support innovative policies and societal changes</i> • <i>Measure and assess progress towards a green economy</i> • <i>Foster resource efficiency through digital systems</i>
5.5. Developing comprehensive and sustained global environmental observation and information systems	<p><i>Global Monitoring for Environment and Security (GMES) operational services by providing a developmental knowledge base for GMES</i></p>

FP7 -> Horizon 2020

FP7	HORIZON 2020
Coping with climate change	Climate action, 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, resource efficiency and raw materials Other : Food security, sustainable agriculture, marine and maritime research & the bioeconomy
Improving resource efficiency	Climate action, resource efficiency and raw materials Other : Leadership in enabling and industrial technologies
Protecting citizens from environmental hazards	Climate action, resource efficiency and raw materials Health, demographic change and wellbeing,
Mobilizing environmental knowledge for policy, industry and society	Climate action, resource efficiency and raw materials

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Inclusive, innovative and secure societies (I)

Activity Lines/ Areas	Content
<p>Inclusive societies</p>	<p>Promoting smart, sustainable and inclusive growth: sustainable lifestyles; socio-economic behaviours and values; economies and governance; global economies, markets and financial systems.</p>
	<p>Building resilient and inclusive societies in Europe: social transformations; European integration; inclusive innovation; welfare systems and public services; social policies and evolutions; identities, cultures and values; vulnerable populations participation; acquisition of skills; protection of human rights; migration and demography; ICT solutions and digital skills.</p>
	<p>Strengthening 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.</p>
	<p>Closing the research and innovation divide in Europe: teaming of excellent research institutions and less developed regions; twinning of staff exchanges; strategies for the establishment of centres of excellence; 'ERA Chairs' to attract outstanding academics; access to international networks for excellent researchers and innovators; smart specialisation strategies (regional policies).</p>

Inclusive, innovative and secure societies (II)

Activity Lines/ Areas	Content
Innovative societies	<p>Strengthening the 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.</p>
	<p>Exploring 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.</p>
	<p>Ensuring societal engagement in research and innovation: societal actors interaction in all the innovation cycle; development of specific skills, knowledge and capacities; science education methods; accessibility and use of results; gender equality; ethics framework for research and innovation.</p>
	<p>Promoting coherent and effective 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.</p>

Inclusive, innovative and secure societies (III)

Activity Lines/ Areas	Content
Secure societies	<ul style="list-style-type: none">• 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• Providing cyber security: security for systems, networks, access devices, software and services, including cloud computing and interoperability.• Increasing Europe's resilience to crises and disasters: support to different types of emergency management operations(including dual-use technologies).• Ensuring privacy and freedom in the internet and enhancing the societal dimension of security: development of privacy-by-design frameworks, detection of privacy breaches and protection of human rights, including the societal dimension of security.

FP7 -> Horizon 2020

FP7	Horizon 2020
Socio-economic Sciences and Humanities (SSH)	<u>Inclusive, innovative</u> and secure societies SSH shall be an integral part of the activities to address all the challenges.
Security	Inclusive, innovative and <u>secure societies</u>
ICT – Technology pillars: • 1.4 Trust and Security	Inclusive, innovative and <u>secure societies</u>
International Cooperation Activities	Inclusive, <u>innovative</u> and secure societies
Science in Society (partly)	Inclusive, <u>innovative</u> and secure societies
Support to the coherent development of research policies (partly)	Inclusive, <u>innovative</u> and secure societies
Regions of knowledge (partly)	<u>Inclusive</u> , innovative and secure societies

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ICT-Information & Communication Technologies(I)

Activity Lines/ Areas	Content
<p>Electronic Components & Systems</p>	<ul style="list-style-type: none"> • Embedded components and systems • Micro-Nano-Bio systems • Organic electronics • Large area integration • Base technologies for the Internet of Things • Smart integrated systems, systems of systems, complex systems engineering • ARTEMIS JTI
<p>Computing Systems</p>	<ul style="list-style-type: none"> • Advanced computing systems and technologies • Processor and system architecture • Data localization technologies • Cloud computing and parallel computing • Simulation software • Part of ARTEMIS JTI
<p>Future Internet</p>	<ul style="list-style-type: none"> • Infrastructures, technologies and services for Future Internet • Networks, software and services • Cyber security, privacy and trust • Wireless communication and optical networks • Immersive interactive multimedia • Development of Internet of Things • Connected enterprises • Future Internet PPP

ICT-Information & Communication Technologies(II)

Activity Lines/ Areas	Content
Content Technologies	<ul style="list-style-type: none"> • Content and information management • Tools to create, exploit and preserve digital content • Tools to model, analyse and visualise big amountsof data • Technologies for language, learning, interaction and creativity • Advanced data mining, machine learning, statistical analysis and visual computing technologies
Interfaces and Robotics	<ul style="list-style-type: none"> • Industrial and service robotics • Cognitive systems • Advanced interfaces and smart spaces • Sentient machines • Increase computing and networking of systems that can learn, adapt and react
Micro & Nanoelectronics and Photonics	<ul style="list-style-type: none"> • Design, advanced processes, pilot lines for fabrication, production technologies, demonstration and technology validation • Innovative business models • ENIAC JTI

FP7 -> Horizon 2020 (I)

FP7	Horizon 2020
<p>ICT – Technology Pillars:</p> <ol style="list-style-type: none">1) Network and Service Infrastructures2) Cognitive Systems and Robotics3) Electronic Components and Systems4) Digital Content and Languages <p>Future Internet PPP ARTEMIS JTI ENIAC JTI</p>	<p>Enabling and Industrial Technologies – ICT</p>
<p>ICT – Future & Emerging Technologies</p>	<p>Science Base – Future and Emerging Technologies</p>

FP7 -> Horizon 2020 (II)

FP7	Horizon 2020
<p>ICT – Application Pillars:</p> <ol style="list-style-type: none"> 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 5) Part of ICT for inclusion (digital inclusion), ICT for governance, cyber security, ICT systems for response to crises and disasters, privacy in internet, empowerment of digital skills for citizens, ICT for learning, access to cultural resources and social innovation... 6) Energy Efficient Buildings PPP and Factories of the Future PPP 	<p>Move to the following Societal Challenges:</p> <ol style="list-style-type: none"> 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 secure societies <p>Or move to the following Enabling and Industrial Technologies:</p> <ol style="list-style-type: none"> 6) Advanced manufacturing and processing

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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: <ul style="list-style-type: none"> • 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 equipment capacity-enhancing techniques, measuring methods and

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
<p>NMP – Activity 1:</p> <p>Nanosciences and Nanotechnologies</p> <ol style="list-style-type: none"> 1) Contribution to sustainable development 2) Applications to environment, energy and health 3) Safety of Nanotechnology 4) Cross-cutting and enabling R&D 	<p>Enabling and Industrial Technologies – Nanotechnology</p>
<p>NMP – Activity 2:</p> <p>Materials</p> <ol style="list-style-type: none"> 1) Enabling R&D 2) Innovative Materials for advanced applications 3) Structuring actions <p>Support to Green Cars PPP</p>	<p>Enabling and Industrial Technologies – Advanced Materials</p> <p>Possibly maintained</p>

FP7 → Horizon 2020 (II)

FP7	Horizon 2020
<p>NMP – Activity 3:</p> <p>New Production Technologies</p> <p>Factories of the Future PPP Energy Efficient Buildings PPP</p>	<p>Enabling and Industrial Technologies – Advanced Manufacturing and Processing</p>
<p>NMP – Activity 4:</p> <p>Integration</p> <p>Raw Materials</p>	<p>Desapears as such</p> <p>Mainly moves to the following Societal Challenge: Climate action, resource efficiency and raw materials</p>

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 secure societies

Creating Industrial Leadership and Competitive Frameworks

Information & Communication technologies

Nanotechnologies

Advanced materials

Advanced manufacturing and processing

Biotechnology

Space

Cross-cutting actions combining several key enabling technologies

Access to risk finance

Innovation in SMEs

Biotechnology

Activity Lines/ Areas	Content
<p>Boosting cutting-edge biotechnologies as future innovation drivers</p>	<ul style="list-style-type: none"> • 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).
<p>Biotechnology-based industrial processes</p>	<ul style="list-style-type: none"> • 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.
<p>Innovative and competitive platform technologies</p>	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none">• Food security, sustainable agriculture, marine and maritime research, and the bioeconomy (Societal Challenge)• Biotechnology (Industrial Technology)

Tackling Societal Challenges

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Space

Activity Lines/ Areas		Content
<p>Enable European competitiveness, non-dependence and innovation in space activities</p>	<p>Safeguard a competitive space industry and research community</p>	<ul style="list-style-type: none"> • Development of a research-base by providing continuity in space research programmes, for example by a sequence of smaller and more frequent in-space demonstration projects. • Develop the industrial base and space RTD community, contributing to its non-dependence from imports of critical technologies
	<p>Boost innovation between space and non-space sectors</p>	<ul style="list-style-type: none"> • Early co-development, in particular by SMEs, of technologies across space and non-space communities. • Exploitation of existing European space infrastructure, by promoting development of innovative products and services based on remote sensing and geo-positioning.

Space

Activity Lines/ Areas	Content
Enabling advances in space technologies	<ul style="list-style-type: none">a) Fundamental technological research, often relying heavily on key enabling technologies, with the potential of generating breakthrough technologies with terrestrial applicationsb) Improvement of existing technologies, e.g. through miniaturisation, higher energy efficiency, and higher sensor sensitivityc) Demonstration and validation of new technologies and concepts in space and terrestrial analogue environmentsd) Mission context, e.g. analysis of the space environment, ground stations, protecting space systems from collision with debris and effects of solar flares (Space Situational Awareness, SSA), fostering innovative data and sample archiving infrastructuree) Advanced navigation and remote sensing technologies, covering the research essential for future generations of Union space systems (e.g. Galileo)

Space

Activity Lines/ Areas	Content
Enabling exploitation of space data	<ul style="list-style-type: none">• To ensure more extensive utilisation of space data from existing and future European missions in the scientific, public and commercial domain• To coordinate and organise the processing, validation and standardisation of space data from European missions.• Innovations in data acquisition and procesing, data fusion, and data dissemination
Enabling European research in support of international space partnerships	<p>Contribution to space endeavours of global character:</p> <ul style="list-style-type: none">• Cosmic threat: space weather, space debris• International Space Station (ISS)• Robotic space science and exploration activities

Space FP7 -> Space Horizon 2020

Space FP7	Space Horizon 2020
GMES applications and services	<ul style="list-style-type: none"> • 1.6.1.2 Boost innovation between space and non-space sectors • 1.6.3 Enabling exploitation of space data • 1.6.2 e) Advanced navigation and remote sensing technologies <p>Other: "Climate Action, resource efficiency and raw materials"</p>
GMES space component (satellites and ground segment)	Not in Horizon 2020
Space Science – exploitation of space science and exploration data	1.6.3 Enabling exploitation of space data
Space Transportation	Not explicitly mentioned, perhaps as part of 1.6.2 Enabling advances in space technologies ("investments in a multitude of space technologies, e.g. launchers)

Space FP7 -> Space Horizon 2020

Space FP7	Space Horizon 2020
Space Exploration	Only mentioned in: <ul style="list-style-type: none"> 1.6.4 Enabling European research in support of international space partnerships Other possibilities: <ul style="list-style-type: none"> 1.6.2 Enabling advances in space technologies
Space Technologies	1.6.2 Enabling advances in space technologies
Vulnerability of space assets (SSA)	Mentioned in: <ul style="list-style-type: none"> 1.6.2 d) mission context, e.g. protecting space systems from collision with debris and effects of solar flares (Space Situational Awareness, SSA) Other possibilities in 1.6.4 Enabling European research in support of international space partnerships: <ul style="list-style-type: none"> Cosmic threat to Earth and space systems: space weather and space debris

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Access to Risk Finance

Activity Lines/ Areas	Content
Debt facility	<p>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.</p> <p>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)</p>
Equity facility	<p>The Equity facility will focus on early-stage venture capital funds providing venture capital and/or mezzanine capital to individual portfolio enterprises.</p> <p>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.</p>
Accompanying measures	<p>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.</p> <p>Schemes to foster corporate venturing and encourage the activities of family offices and business angels.</p>

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
Entrepreneurs and Innovation / EIP financial instruments/ SMEG	Access to Risk Finance / Debt facility
Entrepreneurs 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 SMEs

Innovation in SME

Activity Lines/ Areas	Content
Mainstreaming SME support	<p>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.</p>
Support for research intensive SMEs	<p>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.</p>
Enhancing the innovation capacity of SMEs	<p>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.</p>
Supporting market-driven innovation	<p>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.</p>

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.