HORIZON 2020

The EU framework programme for
research and innovation

What is Horizon 2020?

Horizon 2020 is the European Commission´s proposal for an 80 billion euro research and innovation funding programme for 2014-2020.

Horizon 2020 will:

» Respond to the economic crisis by investing in future jobs and growth

» Address peoples' concerns about their livelihoods, safety and environment

» Strengthen the EU's global position in research, innovation and technology

providing smart, sustainable and inclusive growth to create a knowledge society, and to complete the European Research Area as a single market for knowledge.

What is new?

There are four new crucial points in Horizon 2020:

» It is a single programme that brings together three separate programmes/initiatives*.

» It demands more innovation, from research to retail, and includes all forms of innovation. This allows innovative projects to be supported from the laboratory to commercial exploitation. It also includes innovation in services and social innovation.

» It focuses on tackling seven grand societal challenges.

» It simplifies access for all companies, universities and institutes in EU and beyond. The simplification will provide a single set of rules, less paperwork and faster funding.

Horizon 2020 is a break from the past!

* The 7th research Framework Programme (FP7), innovation aspects of Competitiveness and Innovation Framework Programme (CIP), EU contribution to the European Institute of Innovation and Technology (EIT)

Three pillars

The research and innovation programme Horizon 2020 builds on three pillars. Each pillar includes specific objectives and programmes.

Excellent Science

The purpose of the Excellent Science pillar is to strengthen frontier research through the activities of the European Research Council (ERC); to strengthen research in future and emerging technologies; to strengthen skills, training and career development; and to strengthen European research infrastructures and e-infrastructures. It is all about creating world class science of tomorrow's technologies, developing and retaining research talent, and giving researches access to the best research infrastructures.

Industrial Leadership

Innovative companies are at the heart of job creation and growth. The purpose of the Industrial Leadership pillar is to strengthen industrial leadership through Key Enabling Technologies to drive competitiveness and boosting Europe's position in research, technological development, demonstration and innovation. The prioritised Key Enabling Technologies to drive the industrial leadership are; 1) information and communication technologies, 2) nanotechnologies, 3) advanced materials, 4) biotechnology, 5) advanced manufacturing and processing, and 6) space. The Industrial Leadership pillar will furthermore enhance access to risk finance for investment in research and innovation, and increase innovation in SMEs.

Societal Challenges

The purpose of the grand Societal Challenges is to pursue research, technological development, demonstration and innovation actions to meet the objectives of Europe 2020 and other EU policies.
The Societal Challenges are divided in seven specific areas that includes Health, demographic change and wellbeing; Food security, sustainable agriculture and the bio economy; Secure, clean and efficient energy; Smart, green and integrated transport; Climate action, resource efficiency and raw materials; Inclusive, innovative and secure societies; and Secure societies to protect freedom and security of Europe and its citizens.

3

Explaining the pillars of HORIZON 2020

Excellent Science
European Research Council (ERC)

The European Research Council consists of a Scientific Council and an Executive Agency. The Scientific Council is the independent decision making body of the ERC and defines the scientific funding strategy and methodologies and acts on behalf of the scientific community in Europe to promote creativity and innovative research. The Executive Agency implements the strategy set by the Scientific Council, which outlines a bottom-up approach for research funding within the overall strategy.

The ERC support researches within the following categories:

» Starting grants: aim to support up-and-coming research leaders who are about to establish a proper research team and to start conducting independent research in Europe. The scheme targets promising researchers who have the proven potential of becoming independent research leaders. For researchers with 2-7 years of experience since completion of PhD.

» Consolidator grants: are designed to support researchers at the stage at which they are consolidating their own independent research team or programme. The scheme will strengthen independent and excellent new individual research teams that have been recently created. For researchers with 7-12 years of experience since completion of PhD.

» Advanced grants: allow exceptional established research leaders of any nationality and any age to pursue ground-breaking, high-risk projects that open new directions in their respective research fields or other domains. Advanced grant funding targets researchers who have already established themselves as independent research leaders in their own right.

» Synergy grants: are intended to enable a small group of Principal Investigators and their teams to bring together complementary skills, knowledge, and resources in new ways, in order to jointly address research problems.

» Proof of concept: open to researchers who have already been awarded an ERC Grant. ERC grant holders can apply for this additional funding to establish the innovation potential of ideas arising from their ERC-funded frontier research projects.

5

Future and Emerging Technologies (FET)

The Future and Emerging Technologies will in Horizon 2020 cover all research topics and build on different logics of intervention.

» FET Open: fostering novel ideas. This pillar supports a large set of high risk visionary science and technology collaborative bottom-up research projects as necessary for the successful exploration of new foundations for radically new future technologies. The aim is to attract new high-potential actors in research and innovation, such as young researchers and high-tech SMEs.

» FET Proactive: nurturing emerging themes and communities. This pillar regularly opens calls on several high-risk, high-potential innovative themes. This makes the step from collaborations between a small number of researchers, to a cluster of projects that each address aspects of a research theme and exchange results.

» FET Flagships: tackling grand interdisciplinary science and technology challenges. This pillar includes research initiatives that are science-driven, large-scale, multidisciplinary, and build around a visionary unifying goal. This requires cooperation and partnerships among a range of disciplines, communities and programmes.

Marie Curie Actions

Marie Curie Actions are all about fostering new skills by means of excellent initial training of researchers. Therefore, Marie Curie Actions will continue to equip early stage researchers with a diversity of skills that will allow them to face current and future callenges.

This requires support to a Union-wide competitively selected research training programmes implemented by partnerships of universities, research institutions, businesses, SMEs and other socio-economic actors. Increased focus on the creative mind, an entrepreneurial outlook and innovation skills that will match the furture needs of the labour market.

The Marie Curie Actions will also provide training in team-work, risk-taking, project management, standardisation, entrepreneurship, ethics, IPR, communication and societal outreach.

Europe has to be attractive to the best researchers and therefore funding will be giving to the best or most promising experienced researchers, who want to develop their skills through a transnational or international mobility experience. Marie Curie Actions in Horizon 2020 will support researchers mobility with a range of possibilities to achieve European-wide mobility possibilities for researchers training, career development and staff exchange.

Research Infrastructures

To foster the innovation potential and human capital the aim is to develop European research infrastructures for 2020 and beyond. To reach these objectives and help Europe to respond to grand challenges in science, industry and society, the aim is to ensure the implementation, long-term sustainability and efficient operation of research infrastructures identified by the European Strategy Forum on Research Infrastructures.

Funding of European research infrastructures will contribute to:

» Developing new world class infrastructures

» Integrating and opening existing national research infrastructures of pan-European interest.

» Development, deployment, and operation of ICT-based e-infrastructures

» Exploiting the innovation potential of research infrastructures

» Strengthening the human capital of research infrastructures

» Facilitate international cooperation

Industrial Leadership

Leadership in Key Enabling Technologies

Innovation activities will be combined with R&D as an integral part of the funding of the Industrial Leadership pillar of Horizon 2020. It will focus on mastering and deploying Key Enabling Technologies. The accumulated benefit from combining a number of enabling technologies can lead to technological leaps which can enhance product competitiveness and impact. Therefore, at strong private sector involvement will be a prerequisite. Implementation of projects will to a large extent be based on Public Private Partnerships.

Key Enabling Technologies targeted in Horizon 2020:

» Information and Communication Technologies (ICT): This includes research and innovation of a new generation of components and systems such as micro-nano-bio systems, cloud computing, software, information management and robots.

Focus areas

» A new generation of components and systems: engineering of advanced and smart embedded components and systems

» Next generation computing: advanced computing systems and technologies

» Future Internet: infrastructures, technologies and services

» Content technologies and information management: ICT for digital content and creativity

» Advanced interfaces and robots: robotics and smart spaces

» Micro- and nanoelectronics and photonics

» Nanotechnologies: Develop and application of next generation of nanomaterials, nanodevices and nanosystems to address the human and physical infrastructure for societal benefit.

» Advanced Materials: Research and innovation within materials to ensure efficient and sustainable industrial manufacturing; and research and development for new and innovative techniques and systems to create new business opportunities.

Focus areas

» Developing next generation nanomaterials, nanodevices and nanosystems

» Ensuring the safe development and application of nanotechnologies

» Developing the societal dimension of nanotechnology

» Efficient synthesis and manufacturing of nanomaterials, components and systems

» Developing capacity-enhancing techniques, measuring methods and equipment

Focus areas

» Cross-cutting and enabling materials technologies

» Materials development and transformation

» Management of materials components

» Materials for a sustainable industry

» Materials for creative industries

» Metrology, characterization, standardization and quality control

» Optimization of the use of materials

» Biotechnology: The objective is to enable the European industry within biotechnologies to develop new innovative products and processes to meet industrial and societal demands

» Advanced Manufacturing and Processing: The aim is to promote sustainable industrial growth and to develop and integrate adaptive production systems of the future. This includes focusing on energy-efficient systems and materials as well as cross-sectoral co-operation.

Focus areas
» Boosting cutting-edge biotechnologies as future innovation drivers
» Biotechnology-based industrial processes
» Innovative and competitive platform technologies

Focus areas
» Technologies for Factories for the Future
» Technologies enabling Energy-efficient buildings
» Sustainable and low-carbon technologies in energy-intensive process industries
» New, sustainable business models

» Space: The objective is to maintain a globally lea-
ding role in space by safeguarding and developing
a competitive space industry and research commu-
nity that also boosts innovation between space and
non-space sectors.

Focus areas
» Enable European competitiveness, non-dependen-
ce and innovation in space activities

» Enabling advances in space technologies

» Enabling exploitation of space data

» Enabling European research in support of interna-
tional space partnerships

» Specific implementation aspects

Access to Risk Finance

Horizon 2020 will set up two facilities: the Debt Facility and the Equity Facility. The implementation of the two facilities will be delegated to the European Investment Bank Group and/or to other financial institutions that may be entrusted with the implementation of financial instruments in compliance with the Financial Regulation.

The Debt Facility will provide loans to:
» Single beneficiaries for investment in research and innovation

» Guarantees to financial intermediaries making loans to beneficiaries

» Combinations of loans and guarantees

» Guarantees and/or counter-guarantees for national or regional debt-financing schemes.

The Equity Facility will focus on:
» Early-stage venture capital funds providing venture capital

» And/or mezzanine capital to individual portfolio enterprises.

Innovation in SMEs

Horizon 2020 will provide a dedicated SME instrument, targeted at all types of innovative SMEs showing a strong ambition to develop, grow and internationalize. It will be provided for all types of innovation, including non-technological and service innovations. The objective is to help filling the gap in funding for early stage high risk research and innovation, stimulate break-through innovations and increase private-sector commercialization of research results.

The SME instrument will be applicable in both the Societal Challenges and the Industrial Leadership pillars with allocated amounts for the activities.

Societal Challenges

Horizon 2020 will focus on seven Societal Challenges. Each of them is shortly described below.

Health, demographic change and wellbeing
» In meeting the societal challenges within the European health sector, Horizon 2020 will focus the following topics in order to provide support throughout research and innovation to strengthen the competitiveness of European based industries and to develop new market opportunities.

Focus area

» Understanding the determinants of health, improving health promotion and disease prevention

» Developing effective screening programmes and improving the assessment of disease susceptibility

» Improving surveillance and preparedness

» Understanding disease

» Developing better preventive vaccines

» Improving diagnosis

» Using in-silico medicine for improving disease management and prediction

» Treating disease

» Transferring knowledge to clinical practice and scalable innovation actions

» Better use of health data

» Improving scientific tools and methods to support policy making and regulatory needs

» Active ageing, independent and assisted living

» Individual empowerment for self-management of health

» Promoting integrated care

» Optimizing the efficiency and effectiveness off healthcare systems and reducing inequalities through evidence based decision making and dissemination of best practice, and innovative technologies and approaches

» Specific implementation aspects
(full spectrum of activities – Large scale demonstration actions)

Food Security, sustainable agriculture, marine and maritime research and the bio-economy

» The aim of this Challenge is to cover the whole food chain and related services, from primary production to consumption. This also includes sustainable contribution of fisheries and aquaculture and to boost marine biotechnologies to fuel "blue growth". Additionally, the aim is to accelerate the conversion of fossil-based European industries to low carbon, resource efficient and sustainable ones.

Focus area
» Sustainable agriculture and forestry
» Sustainable and competitive agri-food sector for a safe and healthy diet
» Unlocking the potential of aquatic living resources
» Sustainable and competitive bio-based industries

Secure, clean and efficient energy

» The focus is to ensure secure, clean and efficient energy and to develop near-zero-emission buildings, highly efficient industries and energy-efficient approaches by companies, individuals and communities. To reach these objectives a range of topics will be focused to meet the challenges within the energy sector.

Focus area
» Reducing energy consumption and carbon footprint through smart and sustainable usage
» Low-cost, low-carbon electricity supply
» Alternative fuels and mobile energy sources
» A single, smart European electricity grid
» New knowledge and technologies
» Robust decision making and public engagement
» Market uptake of energy innovation, empowering markets and consumers

Smart, green and integrated transport

» Research and innovation in the transport sector will substantially contribute to the development and take up of the necessary solutions for all transport modes, which will drastically reduce transport's emissions that are harmful to the environment, lower its dependence on fossil fuels, and hence reduce transport impact on biodiversity and preserve natural resources. A range of specific activities will be targeted in this Challenge to reach the expected results of a greener and integrated transport sector.

Focus areas

» Sustainable agriculture and forestry

» Sustainable and competitive agri-food sector for a safe and healthy diet

» Unlocking the potential of aquatic living resources

» Sustainable and competitive bio-based industries

Climate action, resource efficiency and raw materials

» The aim within this Challenge is to develop and assess innovative, cost-effective and sustainable adaptation and mitigation measures, targeting both CO_2 and non-CO_2 greenhouse gases. Societies face a major challenge to establish a sustainable balance between human needs and the environment. Research and development will focus and contribute to reversing the trends that damage the environment and to ensure that ecosystems are preserved and at the same time ensure the supply of raw materials.

Focus areas

» Fighting and adapting to climate change

» Sustainably managing natural resources and ecosystems

» Ensuring the sustainable supply of non-energy and non-agricultural raw materials

» Enabling the transition towards a green economy through eco-innovation

» Developing comprehensive and sustained global environmental observation and information systems

Inclusive, innovative and reflective societies

» To ensure inclusive societies the objective is to enhance social, economic and political inclusion. Humanities research shall therefore support the implementation of the Europe 2020 strategy and has an important role to play in this context. To create innovative societies it is necessary to maximize the socio-economic impacts and efficiency of research and innovation policies and increase substantially transnational policy synergies and coherence. To ensure reflective societies the aim is to contribute to an understanding of Europe's heritage, traditions, different cultures and identities.

Inclusive societies
» Promoting smart, sustainable and inclusive growth

» Building resilient and inclusive societies in Europe

» Strengthening Europe's role as a global actor

» Closing the research and innovation divide in Europe

Innovative societies
» Strengthening the evidence base and support for the Innovation Union and European Research Area

» Exploring new forms of innovation, including social innovation and creativity

» Ensuring societal engagement in research and innovation

» Promoting coherent and effective cooperation with third countries

Reflective societies
» Study European heritage, memory, identity, integration and cultural interaction and translation, including its representations in cultural and scientific collections, archives and museums, to better inform and understand the present by richer interpretations of the past

» Research into European countries' and regions' history, literature, art, philosophy and religions and how these have informed contemporary European diversity

» Research on Europe's role in the world, on the mutual influence and ties between the world regions, and a view from outside European cultures

Secure societies to protect freedom and security of Europe and its citizens

» To ensure secure societies it is necessary to develop and apply innovative technologies, solutions, foresight tools and knowledge, stimulate cooperation between providers and users, find civil security solutions, improve the competitiveness of the European security industry and services, including ICT, and prevent and combat the abuse of privacy and breaches of human rights in the Internet, and elsewhere. Therefore, coordination and improvement for the security research area is an essential element to protect freedom and security of Europe and its citizens.

Focus areas
» Fighting crime and terrorism
» Strengthening security through border management
» Providing cyber security
» Increasing Europe's resilience to crises and disasters
» Ensuring privacy and freedom in the internet and enhancing the societal dimension of security

Rules of participation

» A single set of rules: This includes the whole research and innovation cycle and covers all research programmes and funding bodies.

» One project – one funding rate: There is a maximum of 100% direct costs (except for actions close to market, where a 70 % maximum will apply). When it comes to indirect eligible costs: a flat rate of 25% of direct eligible costs*.

» Simple evaluation criteria: Excellence – Impact – Implementation (Excellence only for the ERC).

» New forms of funding: Is aimed at innovation: pre-commercial procurement, inducement prizes, and dedicated loan and equity instruments.

» International participation: Is facilitated, but with better protection of EU interests.

» Simpler rules for grants: There will be a broader acceptance of participants accounting practices for direct cost, flat rater for indirect costs, no time-sheets for personnel working full time on a project, possibility of output based grants.

» Fewer, better targeted controls and audits: The lowest possible level of requirements for submission of audit certificates without undermining sound financial management and audit strategy focused in risk and fraud prevention.

» Improved rules on intellectual property: There has to be balance between legal security and flexibility; tailor-made IPR provisions for new forms of funding, and a new emphasis on open access to research publications.

*This is the Council's decision of October 10th 2012. The final decision is expected by the end of 2012.

European Institute of Innovation and Technology (EIT)

The EIT is a body of the European Union established in March 2008. The mission is to increase European sustainable growth and competitiveness by reinforcing the innovation capacity of the EU. The EIT is the first EU initiative to fully integrate all three sides of the Knowledge Triangle (higher education, research and business) by way of so-called Knowledge and Innovation Communities (KICs). KICs regroups excellent researchers, businesses, students and entrepreneurs to catalyse more efficient delivery of results needed by the market and consumers. The first three KICs were established in December 2009 within the fields of climate change mitigation and adaptation (Climate-KIC), sustainable energy (KIC InnoEnergy) and the future information and communication society (EIT ICT Labs).

New KICs

EIT's operations for the period   2014-2020.
The plan is to set up new KICs in two phases:

» The first phase, to be set up in 2014, will have the following themes: innovation for healthy living and active ageing (improving the quality of life and well-being of citizens of all ages); food4future (sustainable food supply chain, from farm to fork); raw materials (sustainable exploration, extraction, processing, recycling and substitution of raw materials).

» The next wave of KICs, to be established in 2018, will most likely focus on: added value manufacturing (developing more competitive, sustainable and environmentally-friendly manufacturing processes); smart secure societies (addressing Europe's security gaps through the development and deployment of innovative ICT solutions); and urban mobility (delivering a greener, more inclusive, safer and smarter urban mobility system).

Next Steps

By summer 2013: First drafts of Horizon 2020 Work Programmes
1/1/2014: Horizon 2020 starts; launch of first calls

Links:

To read further about Horizon 2020 please visit the official website at

http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=home&video=none

To read further about European Institute of Innovation and Technology (EIT) and KICs, please follow this link:

http://eit.europa.eu/

Contact

http://funding.aau.dk