2017
Science, Technology and Innovation in Europe
and Joint Activities with South Korea

European Commission

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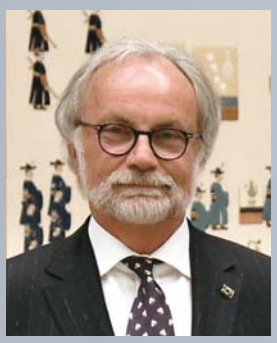
and Joint Activities with South Korea

European Commission

EU, The world's True Mecca of Science, Technology and Innovation

Foreword



Science, Technology and Innovation play a pivotal role in shaping industry and the economy in the twenty-first century. They provide instruments to tackle many of the economic and social challenges such as climate change, diseases, poverty and security, to name just a few. In recognition of the importance of science and technology and its strong influence on all walks of life, the European Union (EU) has long emphasised the need for innovation as a vehicle for promoting stable and sustainable economic development and enabling a quantum leap in development to allow everybody a better life.

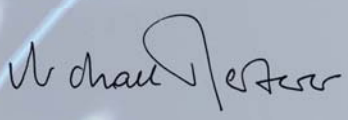
With just 7% of the world's population, the EU takes up 20% and 27% of the global R&D expenditure and patent applications respectively. The result proves the EU's persistent and intensive support for science and technology over the long-term. Following the path, the EU has accumulated abundant knowhow and excellent human resources.

We would like not only to share but also develop jointly science, technology and innovation. Therefore I am pleased to present you in this booklet the wide range of relevant programmes of the EU and its Member States. We have intensified cooperation with the Republic of Korea in these areas which should encourage us to do more to meet the mentioned common challenges. The 4th Industrial Revolution will be one of the formidable challenges.

The ambitious research and innovation support programme, "Horizon 2020" running 2014-2020, brings together numerous researchers and companies within and outside of Europe, enabling them to acquire knowledge and expertise in the field of science and technology and to be deeply inter-connected through extensive networks and research grants. Since its inception in 2014 Korean researchers and research institutions are already part of this common endeavour.

In addition to this Europe wide strategy each individual EU Member State has its own national strategy and programmes tailored to its respective national capacity in science, technology and innovation. Member States support their researchers and companies to reach excellence on a world wide scale.

I am sure that this book will help raising awareness in describing European programmes and showing how to engage in cooperation – science is no longer national, it is international.



Michael REITERER
Ambassador of the European Union to the Republic of Korea

Science, Technology and Innovation in Europe

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1 Why Cooperate with Europe?

NORWEGIAN
SEA
ICELAND
Faeroes Is. Denmark
Shetland Is. U.K.
Orkney Is.
Lewis I.
SCOTLAND
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KINGDOM
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PORTUGAL
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Ceuta Spain
Melilla Spain
Algiers
Oran
Tunis
MALTA
Valletta
TUNISIA
Tripoli
Bengasi
Alexandria
Cairo
El Giza
Sinai Pen.
Rabat
Casablanca
Madeira Is. Portugal
MOROCCO
ALGERIA
LIBYA
EGYPT
SAUDI ARABIA
WESTERN SAHARA
MAURITANIA
Nouakchott
MALI
NIGER
CHAD
SUDAN
Khartoum
Asmara
ERITREA
Dakar
SENEGAL
Banjul
GAMBIA
Bissau
GUINEA-BISSAU
GUINEA
Conakry
Freetown
Bamako
BURKINAFASO
Ouagadougou
Niamey
NIGERIA
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N'djamena
COTE D'IVOIRE
GHANA
AFRICA
Addis Ababa
ETHIOPIA
CENTRAL

Why Cooperate with Europe?

The European Union is a **world leader in research and innovation**, responsible for 20% of world expenditure on research, 32% of high impact publications and 27% of patent applications.

With the largest internal market in the world the European Union is home to **many of the world's leading innovative companies**, and has a leading position in many fields of knowledge such as health, food, renewable energies, environmental technologies, transport, and key enabling technologies. It has untold wealth stemming from its highly educated workforce and its leading talent in creative industries.

Research and innovation are increasingly **interlinked internationally**. The number of internationally co-authored scientific publications and the mobility of researchers are increasing. Research organisations are establishing offices abroad and companies are investing outside their home countries.

Global challenges are important drivers for research and innovation. Our planet has finite resources which need to be cared for sustainably; climate change and infectious diseases do not stop at national borders, food security needs to be ensured across the globe. The European Union are strengthening its dialogues with international partners to build critical mass for tackling these challenges.

New growth opportunities come from providing new products and services derived from technological breakthroughs, new processes and business models, non-technological innovation and innovation in the services sector, combined with and driven by creativity, flair and talent, or, in other words, from innovation in its broadest sense.

2 EU Science, Technology and Innovation

PART 1

EU POLICIES AND PROGRAMMES

EU Policies and Programmes

1. Policies and Strategies

International cooperation in research and innovation contributes to the broader policies of the European Union in supporting the following objectives:

(a) **Strengthening the Union's excellence and attractiveness in research and innovation as well as its economic and industrial competitiveness** – by creating win-win situations and cooperating on the basis of mutual benefit; by accessing external sources of knowledge; by attracting talent and investment to the Union; by facilitating access to new and emerging markets; and by agreeing on common practices for conducting research and exploiting the results;

(b) **Tackling global societal challenges** – by developing and deploying effective solutions more rapidly and by optimising the use of research infrastructures; and,

(c) **Supporting the Union's external policies** – by coordinating closely with enlargement, neighbourhood, trade, Common Foreign and Security Policy, humanitarian aid and development policies and making research and innovation an integral part of a comprehensive package of external action.

'Science diplomacy' is using international cooperation in research and innovation as an instrument of soft power and a mechanism for improving relations with key countries and regions. Good international relations may, in turn, facilitate effective cooperation in research and innovation.

The strategy underlines that enhancing and focusing EU international cooperation requires an **approach which fully captures the global dimension** of research and innovation in all its aspects. This is embedded in Horizon 2020 with its stronger focus on international cooperation.

Furthermore, the strategy also focuses on strengthening the innovation dimension of international cooperation, developing adequate principles and framework conditions for it, strengthening the engagement with multilateral initiatives and enhancing the synergies with the EU's external policies and the activities of the Member States.

2. Programmes and Initiatives

The **Horizon 2020 Programme** strongly supports Open Innovation, Open Science, and being Open to the World.

Open Innovation is about combining diverse sources of knowledge to innovate, underpinned by networked, multi-collaborative innovation systems and involving researchers, entrepreneurs, investors, users, governments and civil society. Favouring Open Innovation means encouraging the capitalisation of results from European research and innovation.

Open Science includes moving forward on the need for more open access to research results and the underlying data. It also means the need for new initiatives to strengthen research integrity for policy makers, research funders, research institutions and researchers.

Open to the World means to engage more in global scientific and technological collaboration and in science diplomacy to remain relevant and competitive, and to lead the way in developing global research and innovation partnerships to address global challenges.

Horizon 2020 spans seven years, **2014 to 2020**, and is the biggest EU research and innovation funding programme ever. The programme is implemented through two-year work programmes setting out funding opportunities under its different parts through calls for proposals and public procurements.

Horizon 2020 underlines the importance of **international cooperation** as a cross-cutting priority and adopts a dual approach focusing on general opening and targeted international cooperation.

Through the **general opening** legal entities from across the world can participate in Horizon 2020. This is an important tool for enhancing international cooperation and is essential for those parts of Horizon 2020 which work primarily on a bottom-up basis. Grants provided by the European Research Council are increasingly recognised as awards for scientific excellence. Participation in the Knowledge and Innovation Communities of the European Institute for Innovation and Technology is open to legal entities from across the world. The Marie Skłodowska-Curie actions (MSCA) enable researchers from outside Europe to start or pursue their careers in Europe.

Complementing the general opening, **targeted international cooperation activities** are included across Horizon 2020. For these activities, themes and partners for cooperation are identified upfront and they concern areas where cooperating with international partners creates win-win situations. Collaborative projects are launched under programme priorities for innovative solutions to societal challenges in the areas of health, bioeconomy, energy, transport, climate action, and security, as well as for enabling and industrial technologies, future and emerging technologies, and research infrastructures. A full list of targeted international cooperation topics included in the work programmes is available on the Horizon 2020 **Participant Portal**: http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/index.html.

The Euratom work programme also includes a very strong component of international cooperation, including that connected to the European Fusion Roadmap and embodied by the flagship project ITER.

3. Horizon 2020 – Strategic Orientations for Work Programme 2018-2020

Building on the achievements of the previous Horizon 2020 Work Programmes and the experience with implementation so far as well as taking account the Union's policy priorities, the following strategic orientations will be integrated with greater emphasis into the work programmes for 2018-20.

I. **Increased Investment in Sustainable Development and Climate related Research and Innovation**: In the light of the Paris Agreement, marking a new era in the fight against climate change, the Horizon 2020 target of investing at least 35% of its total budget for climate action becomes more important as does the 60% target to contribute to Sustainable Development, including in areas like health, food, energy, transport and resource efficiency which call for integrated responses. The focus areas (section 3.3) proposed for this work programme and in particular the one addressing the 'Building a low Carbon, Climate-resilient Future' will provide a very effective means to align R&I investments towards the climate and sustainable development targets. R&I actions should support Europe's priorities to implement the Energy Union, be number one in renewables reduce energy use, and decarbonise the energy system by 2050. This should also cover work related to the circular economy and the proposed focus area on 'Connecting economic and environmental gains – the Circular Economy'. Both, the follow-up to the Paris Agreement and circular economy, should become mutually reinforcing focus areas.

II. **Integrating Digitisation in all Industrial Technologies and Societal Challenges**: As emphasised under the Digital Single Market strategy 3, the combination of digital technologies (big data, internet of things, 5G, high performance computing etc.) with other advanced technologies and service innovation offers huge opportunities for increasing industrial competitiveness, growth and jobs and addressing societal challenges. Digitisation also alters the conduct of research (open science, open data, skills needs, user involvement etc.). Consequently the integration of 'digital' in all its forms, notably digital technologies, the use and management of big data and digital-physical integration should be substantially increased across Horizon 2020, including in all societal challenges. A dedicated focus area on 'Digitising and transforming European industry and services' should foster a better integration and coordination of the efforts conducted across the various parts of the programme and maximise their impact stressing the 'physical meets digital' dimension and showcasing major initiatives. In addition, a particular emphasis needs to be put on cybersecurity (see also point IV.) and on addressing the societal impact of the digital transformation. 'Open Science' will be promoted throughout the Work Programme, in particular the 'Open Research Data' approach, and the creation of a European Open Science Cloud fostering the stewardship and re-use of research data and tools across disciplinary and geographical borders. The Commission is already working both bilaterally (South Africa, Australia) and in multi-lateral settings (G7, OECD, G20) to ensure that the EOSC is aligned to similar initiatives on a global scale, on the grounds of common standards, openness and reciprocity. The Strategic Forum for International Science and Technology Cooperation (SFIC) will be kept regularly informed on the progress of these discussions.

III. **Strengthening International Research & Innovation Cooperation**: International cooperation is necessary to ensure the EU's scientific leadership and industrial competitiveness. It is indispensable to access research excellence and all types of know-how wherever it is located, and to tap into global innovation networks and value chains. However, the participation of 3rd countries in Horizon 2020 has dropped compared to the previous Framework Programme, and the opportunity to use Horizon 2020 to establish international leadership is underexploited. Measures will be taken in the next work programme across all areas to reverse this trend and to maximise international cooperation for mutual benefit. This should notably include reinforcing and setting up new international cooperation flagship initiatives in areas of mutual interest. SFIC will be kept regularly informed on the implementation of the flagship initiatives. It is also envisaged to increase efforts to attract and retain researchers in Europe as well as to open mobility paths for European researchers elsewhere in the world, including the Marie Skłodowska-Curie actions (MSCA) and the European Research Council.

IV. **Societal Resilience**: Europe is facing multiple and seemingly sudden changes on multiple fronts, such as large migration pressures, cyber-crime, security threats as well as hybrid threats. Such events require, more than ever, capacities for coordinated EU responses. Research on **security** threats, notably from terrorism (e.g. on the links between terrorism and other forms of serious and organised crime and on the forces leading to radical alienation) can underpin an effective and coordinated EU response. Ensuring cybersecurity requires looking at vulnerabilities of critical infrastructures and digital services and calls for new technological as well as non-technological solutions, e.g. to ensure data protection, so that the full economic and social potential of digital technologies can be safely exploited. A dedicated focus area, 'Boosting the effectiveness of the Security Union', will address these issues. **Migration** and more broadly the mobility of highly qualified people (including researchers) offer great opportunities to meet challenges faced by the EU (skills shortage, demographic change, etc.). At the same time, migration flows need to be managed, as highlighted by the European Agenda on migration. Research should help improve our capacity to foresee and address the challenges of (legal and irregular) migration and to develop effective policies for integrating migrants in our society and economy. Synergies will be sought between activities related to the 'Sustainable Development Goals' and 'Migration' to address root causes of migration, including, for example, activities related to poverty alleviation, food safety and security, sustainable agriculture and improved nutrition.

V. **Market Creating Innovation**: Europe does not use its full potential in capturing new markets from market-creating innovation, and Europe's current industrial strengths are likely to be disrupted in the coming years by digital technologies and business model innovations at the interface of different sectors, technologies and disciplines. Innovation-friendly framework conditions are a prerequisite for such new markets to develop in Europe. A major new component in Horizon 2020 will be first elements of a potential European Innovation Council (EIC) which will focus on support for innovative firms and entrepreneurs with the potential to scale up rapidly at the European and global levels. Moreover Horizon 2020 will make better use of prizes and support large-scale demonstrators that not only test technological and non-technological innovations, but also address legal and standardisation requirements as well as citizen/user/consumer involvement. Stronger links will be created between the industrial technologies parts and the societal challenges, in particular, through the focus areas and with view to supporting the modernisation of Europe's industrial and economic base. Coordination and synergies between the European Institute of Innovation and Technology (EIT), other relevant parts of Horizon 2020, and the potential EIC will be ensured as well as with other EU programmes notably ESIF.

The strategic orientations and priorities will be translated into calls for proposals. Each programmed call will have a clearly defined mission, within a broad challenge, which will be reflected in an expected impact statement at the level of the call.

4. Joint Activities with South Korea

EU-South Korean relations are governed by **three key agreements** as well as more specific agreements in several fields. South Korea is the only country with whom the EU has signed a Framework Agreement (in 2010), a Free Trade Agreement (in 2011) and a Crisis Management Agreement (in 2014).

Cooperation between South Korea and the EU on research and innovation is governed by the **Agreement for Scientific and Technological Cooperation**, which came into force in 2007. In fusion research, Euratom and South Korea are parties to the ITER International Agreement and have a bilateral cooperation agreement on fusion energy research. In fission research, Euratom and South Korea are signatories to the Generation IV International Forum.

In **FP7** collaborative projects, there were 66 participations of entities from South Korea. They took part in 53 projects. Most of the projects were in the areas of ICT, Health, Nanotechnologies, Materials and Production technologies, Environment, and Euratom.

So far, under **Horizon 2020**, there are 39 participations of entities from South Korea: 26 in collaborative projects, 12 in MSCA actions, and 1 ERC grant the success rate for South Korean applicants has been 27.2% (as compared to 14.4% overall). South Korean participants have received €0.7 million from the European Commission and have contributed with €8.4 million. Horizon 2020 participation so far is mainly in the areas of ICT, health, energy, climate action, and satellite navigation.

Both the EU and South Korea emphasise the need to **deepen, scale up and open opportunities for cooperation** in selected thematic areas.

- In the ICT area, a joint call was launched under the 2016-17 Work Programme of Horizon 2020 addressing the topics of 5G communication networks, Internet of Things and brokerage of mobile cloud services. The bilateral ICT cooperation also includes other ICT and 5G policy areas such as standardisation and spectrum management.
- In the non-nuclear energy area, both sides are engaging in twinning activities in the area of technologies and processes for post- and/or pre-combustion CO_2 capture. Initiatives for collaboration between EU projects, selected under the 2016-17 WP of Horizon 2020,

and endorsed South Korean projects are launched from 2016 onwards.

- In the area of nanotechnology, during 2015 and 2016 both sides cooperate through Nanoreg, the initiative for regulatory testing of nanomaterials.
- In the area of health and bio-medical challenges, cooperation continues in the context of the Global Research Collaboration for Infectious Disease Preparedness. The EU and South Korea is also participating in the International Rare Diseases Research Consortium and the International Human Epigenome Consortium.

In the area of satellite navigation, the EC-Korea Satellite Navigation Cooperation Agreement, which entered into force on 1 July 2016, foresees the promotion of joint research activities.

Potential further areas of future EU-South Korea S&T cooperation include:

- ICT topics of 5G communication networks, Internet of Things and brokerage of mobile cloud services, where a second joint call is foreseen under Horizon 2020 WP 2018-20 addressing these areas with ongoing discussion with Korean counterparts at MSIP/IITP.
- Micro/nanoelectronics, where the two sides have agreed to exchange roadmaps and pursue with twinning/joint activities in view of exploiting synergies and developing a more intense cooperation.
- Materials modelling, where both sides have agreed to promote cooperation and South Korea's active cooperation with the European Materials Modelling Council, a network of materials modelling stakeholders.
- Satellite navigation, where both sides have agreed to continue promoting joint research activities and partnering.
- Innovative medicine and medical equipment, where cooperation could be strengthened e.g. on Anti-Microbial Resistance, via the existing Joint Programming Initiative, and the International Initiative for Traumatic Brain Injury Research.
- Smart Grids and other emerging areas in the energy industry sector, with working level discussions seeking new cooperation opportunities, e.g. through the 'Mission Innovation' initiative on clean energy innovation.

To support the participation of entities established in South Korea in Horizon 2020 projects, the South Korean government (Ministry of Science, ICT and Future Planning, MSIP and Ministry of Trade, Industry and Energy, MOTIE) regularly co-funds such participation. The mechanism covers all thematic areas of Horizon 2020.

The two sides have agreed on early exchange of programme information to enable provision of such co-funding and to allow for monitoring of the cooperation intensity, as well as to continue to support efforts of multiplayers, notably National Contact Points, for

facilitating access to information and partnering of R&I stakeholders. Moreover, both sides have agreed to jointly promote the organisation of R&I Days and other matchmaking events to facilitate partnering with both academia and industry.

Schemes for researchers' mobility are important cooperation arrangements. The Implementing Arrangement for South Korean researchers to join the teams of European Research Council Principal Investigators, signed during the EU-South Korea summit in 2013, is progressing well with several calls and successful visits already undertaken.

Mobility of researchers is also promoted through the EU's Marie Skłodowska-Curie Research Fellowship Programme with hundreds of exchanges already taking place. The two sides have agreed to make further joint efforts to promote the participation of South Korean researchers and research institutes in this programme.

PART 2

HORIZON 2020 IN BRIEF

European Commission

Horizon 2020

in brief

The EU Framework Programme for Research & Innovation

Research and Innovation

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EUROPEAN COMMISSION

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EUROPEAN COMMISSION

HORIZON 2020

in brief

The EU Framework Programme for Research & Innovation

2014 Directorate-General for Research and Innovation

HORIZON 2020 in brief

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Introduction

Horizon 2020 – delivering excellent science for Europe

Horizon 2020 is the biggest EU research and innovation programme ever. It will lead to more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market. Almost €80 billion1 of funding is available over 7 years (2014 to 2020) – in addition to the private and national public investment that this money will attract.

Horizon 2020 has the political backing of Europe's leaders and the Members of the European Parliament. They agreed that investment in research and innovation is essential for Europe's future and so put it at the heart of the Europe 2020 strategy for smart, sustainable and inclusive growth. Horizon 2020 is helping to achieve this by coupling research to innovation and focusing on three key areas: excellent science, industrial leadership and societal challenges. The goal is to ensure Europe produces world-class science and technology that drives economic growth.

EU research funding under previous framework programmes has already brought together scientists and industry both within Europe and from around the world to find solutions to a vast array of challenges. Their innovations have improved lives, helped protect the environment and made European industry more sustainable and competitive. Horizon 2020 is open to participation by researchers from all over the world.

Their experience has been essential for the development of this pioneering programme – the Commission collected their feedback and took into account recommendations from the Member States and the European Parliament, as well as lessons learned during earlier programmes. The message was clear – make Horizon 2020 simpler for users – and it is!

1) All figures are quoted in current prices

Getting to know Horizon 2020

Excellent science, competitive industry and tackling societal challenges are at the heart of Horizon 2020. Targeted funding will help to ensure that the best ideas are brought to the market faster – and are used in our cities, hospitals, factories, shops and homes as quickly as possible.

▶ Excellent science

Horizon 2020 will bolster the EU's position as a world leader in science, attracting the best brains and helping our scientists collaborate and share ideas across Europe. It will help talented people and innovative firms boost Europe's competitiveness, creating jobs along the way, and contributing to a higher standard of living – benefiting everyone.

Frontier research funded by the European Research Council (ERC)

Horizon 2020 will bolster the EU's position as a world leader in science, attracting the best brains and helping our scientists collaborate and share ideas across Europe. It will help talented people and innovative firms boost Europe's competitiveness, creating jobs along the way, and contributing to a higher standard of living – benefiting everyone.

Funding: €13.095 billion

Marie Skłodowska-Curie Actions

Training and career development helps produce leading researchers. Support is offered to young and experienced researchers to reinforce their career and skills through training, or periods of placement in another country or in the private sector. This gives them new knowledge and experience to allow them to reach their full potential.

Funding: €6.162 billion

Future and emerging technologies

Staying at the cutting edge of new technologies will keep Europe competitive and create new, high-skilled jobs – and this means being proactive and thinking one step ahead of the crowd. EU funding is helping to make Europe the best possible environment for responsible and dynamic multi-disciplinary cooperation on new and future technologies.

Funding: €2.696 billion

World-class infrastructure

Research equipment can be so complex and costly that no single research team – or even country – can afford to buy or construct or operate it alone. Examples include: the high powered lasers that serve a diverse research community spanning medicine, materials sciences and biochemistry; specialised high-tech airplanes; or a monitoring station at the bottom of the sea, used for observing climate change.

These can cost millions of euro, and need the skills of the world's top experts. EU funding helps to pool resources for such large-scale projects, and provides Europe's researchers with access to the very latest, state of-the-art infrastructure – making new and exciting research possible.

Funding: €2.488 billion

▶ Industrial leadership

To be the best at what it does, Europe needs to invest in promising and strategic technologies, such as those used in advanced manufacturing and micro-electronics. But public funding alone is not enough: the EU needs to encourage businesses to invest more in research, and target areas where they can work with the public sector to boost innovation.

Businesses gain by becoming more innovative, efficient and competitive. This in turn creates new jobs and market opportunities. Every €1 invested by the EU generates around €13 in added value for business. And increasing investment further to 3% of GDP by 2020 would create a further 3.7 million jobs!

Leadership in enabling and industrial technologies

Horizon 2020 supports the ground-breaking technologies needed to underpin innovation across all sectors, including information and communication technology (ICT) and space. Key enabling technologies such as advanced manufacturing and materials, biotechnology and nanotechnologies, are at the heart of game-changing products: smart phones, high performance batteries, light vehicles, nanomedicines, smart textiles and many more besides. European manufacturing industry is a key employer providing jobs for 31 million people across Europe.

Funding: €13.557 billion

Small and medium enterprises (SMEs) – a key source of jobs and innovation – receive special attention in Horizon 2020. They can collaborate in projects as part of a consortium and can receive support through a dedicated instrument designed specifically for highly innovative smaller companies. The integrated and streamlined character of Horizon 2020 will boost SME participation to at least 20% (€8.65 billion) of the total combined budgets of the 'Leadership in enabling and industrial technologies' and the 'Societal Challenges' themes. The SME instrument will be pivotal in achieving this target by providing support to help single SMEs, or consortia of SMEs, assess the market viability of their ideas at the high-risk stage, and then to help them develop these ideas further. Funding is also available for business coaching and guidance on how to identify and attract private investors.

Funding: At least €3 billion allocated to the SME instrument

Access to risk finance

Innovative companies and other organisations often find it difficult to access financing for high-risk new ideas or their development. Horizon 2020 helps to fill this "innovation gap" through loans and guarantees, as well as by investing in innovative SMEs and small midcaps. This support acts as a catalyst to attract private finance and venture capital for research and innovation. It is estimated that every €1 the EU invests generates €5 in additional finance.

Funding: €2.842 billion

▶ Societal challenges

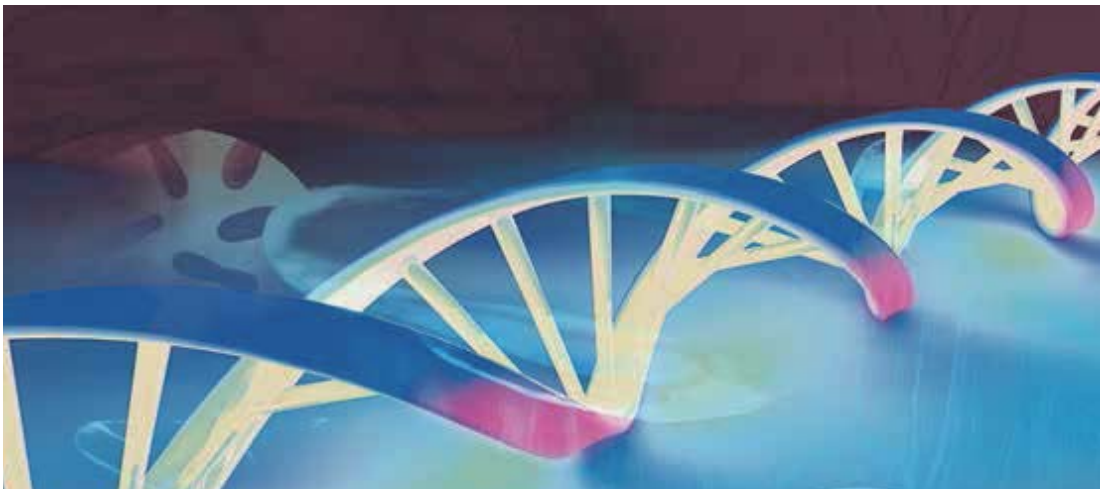
The EU has identified seven priority challenges where targeted investment in research and innovation can have a real impact benefitting the citizen:

- Health, demographic change and wellbeing
- Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, environment, resource efficiency and raw materials
- Europe in a changing world - inclusive, innovative and reflective societies
- Secure societies - protecting freedom and security of Europe and its citizens.

Health and wellbeing

Everyone wants a long, happy and healthy life, and scientists are doing their best to make this possible. They are tackling some of the major current health issues as well as emerging threats such as the increasing impact of Alzheimer's disease, diabetes and antibiotic-resistant 'superbugs'. Investment in health research and innovation will help us stay active, develop new, safer and more effective treatments and help keep our health and care systems viable. It will give doctors the tools they need for more personalised medicine, and it will step up prevention and treatment of chronic and infectious diseases.

Funding: €7.472 billion



Food security and sustainable use of biological resources

With the world population set to reach nine billion by 2050 we need to find ways to radically change our approach to production, consumption, processing, storage, recycling and waste disposal while minimising the environmental impact. This will include balancing the use of renewable and non-renewable resources from land, seas and oceans, transforming waste into valuable resources, and the sustainable production of food, feedstuffs, bio-based products and bioenergy. In the EU, agriculture and forestry and the food and bio-based industry sectors altogether employ 22 million people and play a key role in rural development and the management of Europe's natural heritage.

Funding: €3.851 billion

Sustainable energy

Energy drives the modern economy but even just maintaining our standard of living requires a huge amount of energy. As the world's second-largest economy, Europe is over-dependent on the rest of the globe for its energy – energy derived from fossil fuels that accelerate climate change. The EU has, therefore, set itself ambitious climate and energy targets. EU funding through Horizon 2020 will play a key role in achieving these goals.

Funding: €5.931 billion

Green, integrated mobility

Mobility drives employment, economic growth, prosperity and global trade. It also provides vital links between people and communities. However, today's transport systems and the way we use them are unsustainable. We rely too heavily on shrinking stocks of oil, which makes us less energy secure. And transport-related problems – congestion, road safety, atmospheric pollution – impact on our daily lives and health. To address these issues Horizon 2020 is contributing to the creation of a sustainable transport system that is fit for a modern, competitive Europe.

Funding: €6.339 billion

Climate action, environment, resource efficiency and raw materials

The era of never-ending cheap resources is coming to an end: access to raw materials and clean water can no longer be taken for granted. Biodiversity and ecosystems are also under pressure. The solution is to invest now in innovation to support a green economy – an economy that is in sync with the natural environment. Dealing with climate change is a cross-cutting priority in Horizon 2020 and accounts for 35% of the overall budget across the programme.

Waste and water are particular priorities. Waste is currently responsible for 2% of the EU's greenhouse gas emissions, while boosting growth in the water industry by just 1% could create up to 20 000 new jobs.

Funding: €3.081 billion

Europe in a changing world - inclusive, innovative and reflective societies

In 2011 around 80 million people were at risk of poverty in Europe. Significant numbers of young people – on whom our future depends – are not in education, work or training. These are just two examples of challenges that threaten the future of Europe and individuals in large sectors of society. Research and innovation can help, which is why Horizon 2020 is funding research on new strategies and governance structures to overcome prevailing economic instability and ensure Europe is resilient to future downturns, demographic change and migration patterns. Funding also supports new forms of innovation such as open innovation, business model innovation, public sector and social innovation to meet social needs. By supporting research and innovation on European heritage, identity, history, culture and Europe's role in the world, the EU is also building 'reflective societies' – in which shared values and their contribution to our joint future are explored.

Funding: €1.309 billion

Secure societies – protecting freedom and security of Europe and its citizens

Today, keeping citizens safe means fighting crime and terrorism, protecting communities from natural and man-made disasters, thwarting cyber-attacks and guarding against illegal trafficking in people, drugs and counterfeit goods. EU research and innovation is developing new technologies to protect our societies, while respecting privacy and upholding fundamental rights – two core values at the heart of EU security research. These technologies have a significant potential to stimulate economic activity through new products and services and create jobs.

Funding: €1.695 billion

▶ Spreading excellence and widening participation

Research and innovation are crucial to economic prosperity and so measures are needed to ensure that the innovation performances of all Member States and their regions converge and improve. Experience shows that when economic crises constrain national budgets, disparities in innovation performance across Europe become more apparent. Exploiting the potential of Europe's talent pool and maximising and spreading the benefits of innovation across the Union is therefore the best way to strengthen Europe's competitiveness and its ability to address societal challenges in the future.

Specific measures under Horizon 2020 include:

- 'Teaming' excellent research institutions with lower performing counterparts to create or upgrade centres of excellence
- 'Twinning' institutions, including staff exchanges, expert visits and training courses
- Establishing 'ERA Chairs' to attract outstanding academics to highpotential institutions
- A Policy Support Facility to help improve national and regional research and innovation policies
- Providing excellent researchers and innovators with better access to international networks
- Strengthening the transnational networks of National Contact Points to provide information to those seeking support.

Funding: €816 million

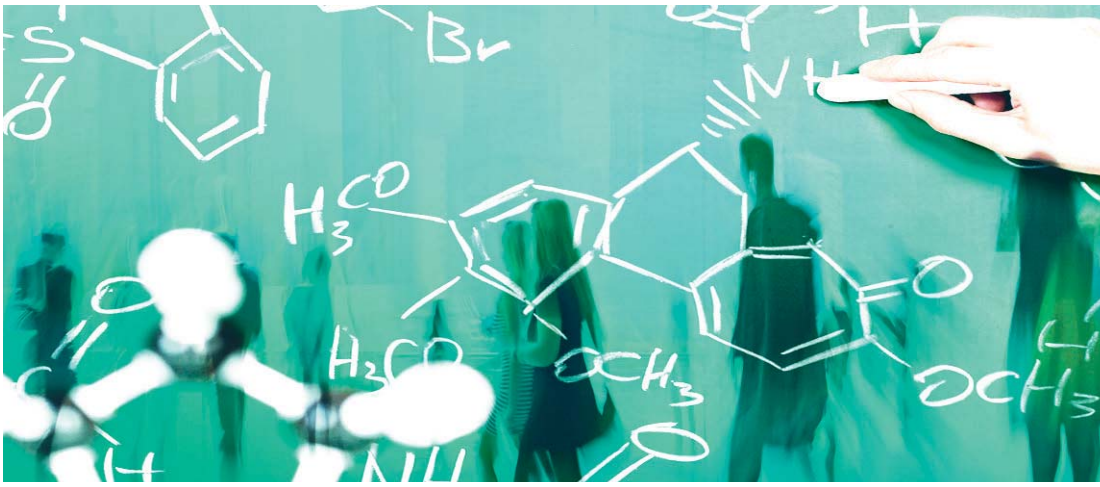
Synergies with other policies

A basic premise of the Europe 2020 strategy for smart, sustainable and inclusive growth is that all EU policies should work together to achieve its objectives. As regards research and innovation, the European Structural and Investment Funds are providing complementary support to Horizon 2020 to finance the upgrade of scientific infrastructure – from laboratory equipment to supercomputers, to high-speed data networks – and to boost research and innovation capacities where needed.

▶ Science with and for society

Effective cooperation between science and society is needed to recruit new talent for science and to marry scientific excellence with social awareness and responsibility. This means understanding the issues from all sides. Horizon 2020 is, therefore, supporting projects that involve the citizen in the processes that define the nature of the research that affects their everyday lives. Broader understanding between the specialist and non-specialist communities on objectives and the means for achieving them will maintain scientific excellence and allow society to share ownership of the results.

Funding: €462 million



Innovation actions in Horizon 2020

Substantial support for innovation is provided throughout Horizon 2020 for prototyping, testing, demonstrating, piloting, large-scale product validation and market replication. Significant support to demand side approaches is another important feature, notably pre-commercial and first-commercial public procurement of innovation, as well as regulation to foster innovation and standard-setting. New forms of public sector innovation and social innovation as well as pilot actions for private sector services and products are also covered.

Social Sciences and Humanities

As a cross-cutting issue of broad relevance, Social Sciences and Humanities (SSH) research is fully integrated into each of the general objectives of Horizon 2020. Embedding SSH research across Horizon 2020 is essential to maximise the returns to society from investment in science and technology. Integrating the socio-economic dimension into the design, development and implementation of research itself and of new technologies can help find solutions to societal problems. Indeed, the idea to focus Horizon 2020 around "Challenges" rather than disciplinary fields of research illustrates this new approach.

Nuclear research for all citizens

EU research on nuclear fission focuses on safety and security, medical research, radiation protection, waste management, industrial uses of radiation, and includes many other areas such as the use of radiation in the agricultural sector.

EU research on nuclear fusion aims at demonstrating that fusion can become a viable energy source for large-scale commercial exploitation within a reasonable timeframe, by gathering the efforts of all stakeholders into a unique European joint programme.

Funding: €1.603 billion

Science for policy – the role of the Joint Research Centre (JRC)

The Joint Research Centre is the Commission's in-house service providing independent, evidence-based scientific and technical support for EU policies. Its activities are funded through Horizon 2020 and many of its actions address the seven societal challenges. Through the research and training programme of the European Atomic Energy Community, the JRC also supports the EU's efforts to strengthen nuclear security, safety and radiation protection.

Further information: https://ec.europa.eu/jrc/.

How it works

Horizon 2020 is open to everyone. Under Horizon 2020 there is only one set of simplified rules and procedures to follow. This means that participants can focus on what is really important: research, innovation and results.

This focused approach makes sure new projects get off the ground quickly – and achieve results faster.

The rules are designed to guarantee fairness, protect participants and ensure public money is spent appropriately.

▶ Who may apply?

- For standard research projects – a consortium of at least three legal entities. Each entity must be established in an EU Member State or an Associated Country.
- For other programmes – European Research Council (ERC) (p.40), SME Instrument (p.41), the co-funding of national or public sector calls or programmes (p.44), coordination and support (p.47), training and mobility (p.41) – the minimum condition for participation is one legal entity established in a Member State or in an Associated Country.

Additional conditions may apply. Check the Work Programme for details.

In general, legal entities established in any country and international organisations, may participate.

In general, legal entities established in any country and international organisations, may participate.

Agreements between the EU and individual governments have created a number of **associated countries**, where legal entities can participate in Horizon 2020 on an equal footing to those of EU Member States.

For a list of associated countries, see http://bit.ly/H2020AC.

Participating legal entities from other countries may also be able to get EU funding in certain circumstances.

See http://bit.ly/H2020IPC.

▶ Action types

Research and innovation actions

Funding for research projects tackling clearly defined challenges, which can lead to the development of new knowledge or a new technology.

Who? Consortia of partners from different countries, industry and academia.

Innovation actions

Funding is more focused on closer-to-the-market activities. For example, prototyping, testing, demonstrating, piloting, scaling-up etc. if they aim at producing new or improved products or services.

Who? Consortia of partners from different countries, industry and academia.

Coordination and support actions

Funding covers the coordination and networking of research and innovation projects, programmes and policies. Funding for research and innovation per se is covered elsewhere.

Who? Single entities or consortia of partners from different countries, industry and academia.

Frontier research grants – European Research Council

Funding for projects evaluated on the sole criterion of scientific excellence in any field of research, carried out by a single national or multinational research team led by a 'principal investigator'.

Who? The ERC funds excellent young, early-career researchers, already independent researchers and senior research leaders. Researchers can be of any nationality and their projects can be in any field of research.

Support for training and career development – Marie Skłodowska-Curie Actions

Funding for international research fellowships in the public or private sector, research training, staff exchanges.

Who? Early stage researchers or experienced researchers (of any nationality), technical staff, national/regional research mobility programmes.

SME Instrument

This instrument is aimed at highly innovative SMEs with the ambition to develop their growth potential. It offers lump sums for feasibility studies, grants for an innovation project's main phase (demonstration, prototyping, testing, application development...); lastly, the commercialisation phase is supported indirectly through facilitated access to debt and equity financial instruments.

Who? Only SMEs can participate. Either a single SME or a consortium of SMEs established in an EU or Associated Country.

Fast track to innovation

Funding is due to start in 2015 as a pilot action. Continuously open, innovator-driven calls will target innovation projects addressing any technology or societal challenge field. The pilot action will undergo an in-depth assessment half-way through Horizon 2020.

Who? Industry, including SMEs, with a minimum of three and maximum of five partners and a maximum EU contribution of €3 million per project.

▶ Funding rates

In Horizon 2020 there is one single funding rate for all beneficiaries and all activities in the research grants. EU funding covers up to 100% of all eligible costs for all research and innovation actions. For innovation actions, funding generally covers 70% of eligible costs, but may increase to 100% for non-profit organisations. Indirect eligible costs (e.g. administration, communication and infrastructure costs, office supplies) are reimbursed with a 25% flat rate of the direct eligible costs (those costs directly linked to the action implementation).

▶ Checks and audits

Only coordinators in projects requesting funding from the Union of €500 000 or more will be subject to a financial viability check, in which they must prove that they have the resources to implement the project.

The European Commission audits project participants up to two years after payment of the balance. The audit strategy is focused on risk and fraud prevention.

Access rights

Access rights are a right to use results or background of another participant in a project.

Access rights are enjoyed by participants to implement the project or exploit their results, by the EU for non-commercial policy purposes, and by Member States in the area of Secure Societies for non-commercial policy purposes.

Sharing results while protecting IPR

Each participant must disseminate the results it produces – and therefore owns – as early as possible. Exceptions only apply to protect intellectual property rights (IPR), security or legitimate interests.

When publishing results in scientific publications, open access to the publication must be ensured. This guarantees that research results funded by EU taxpayers are available for free to everyone.

IPR belongs to the team that generates the results. In very specific circumstances, joint-ownership may apply. Once results have been generated the joint owners may agree on a different ownership system.

▶ Ethics and research

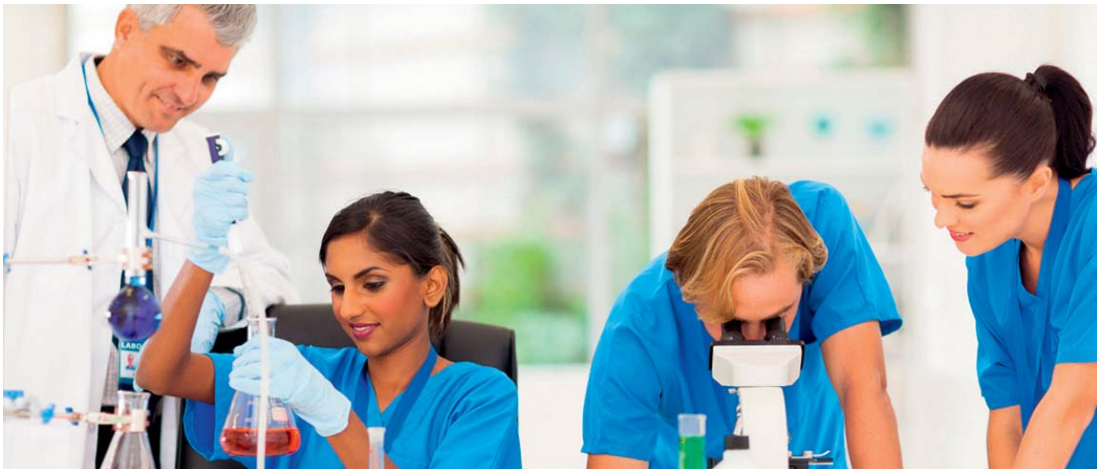
Ethics is an integral part of research and a driver for research excellence. All activities funded under Horizon 2020 shall comply with ethical principles and relevant national legislation. The ethical principles include the need to avoid breaches of research integrity, in particular any form of plagiarism, data fabrication or falsification.

▶ Other sources of funding through Horizon 2020

Through partnerships, Horizon 2020 will develop closer synergies with national and regional programmes, encourage greater private investment in research and innovation, and pool Europe's resources to tackle the biggest challenges.

Over seven years, EU funding of €8 billion will attract €10 billion from the private sector and another €4 billion from EU countries. Most of the funding will go to Joint Technology Initiatives (JTIs). These are run as joint undertakings and organise their own research agenda. JTIs are active in a number of areas of strategic importance for the EU: innovative medicines; fuel cells and hydrogen; cleaner, quieter aircraft; bio-based industries; and electronics manufacturing. An updated list can be found on this webpage http://bit.ly/H2020Partners

Public-Public Partnerships also allow public sector organisations in EU Member States to draw up joint research programmes. Areas covered include: support for high-tech SMEs; new treatments for poverty-related diseases; new measurement technologies; and technologies empowering the elderly and disabled to live safely in their own homes.



Coordination and support actions

- Calls for proposals between national research programmes (ERA-NET co-fund);
- Calls for tenders for Pre-Commercial Public Procurements or Public Procurement of Innovative solutions (PCP-PPI co-fund);
- Mobility programmes (Marie Skłodowska-Curie co-fund).

European Institute of Innovation and Technology (EIT)

The EIT integrates higher education, research and innovation through the 'Knowledge and Innovation Communities' (KICs) to generate new approaches towards innovation, trigger sustainable growth and competitiveness and promote entrepreneurship. These innovative partnerships must have a long-term vision of at least seven years, and be run with business logic following a results-oriented approach with clear objectives and a focus on achieving economic and social impact to become global players.

For further information: http://eit.europa.eu/

Funding: €2.711 billion

Who? Consortia representing research, education and innovation/business.

Thinking European – and globally

▶ Borderless research

If Europe is to find solutions to societal challenges while boosting growth and competitiveness, it needs a fully functioning network of research excellence – a European Research Area (ERA). This single market for knowledge, research and innovation is being developed with the aid of EU funding and is helping researchers, their knowledge and results to circulate freely across Europe.

The ERA guarantees that knowledge and ideas are shared across Europe, reducing the risk of wasting money on duplicating research – scientists in different European labs carrying out the same research simultaneously. This coordinated approach – encouraged by Horizon 2020 – helps to ensure that every euro spent on research is invested strategically.

▶ Open to the world

In line with the Union's strategy for international cooperation in research and innovation, Horizon 2020 is open to the participation of researchers from across the world. As more research and innovation is performed in international partner countries, it is crucial that Europe is able to access the best researchers and research centres worldwide. Not only does this provide sources of new ideas and expertise, it is also important to ensure that European researchers are able to collaborate worldwide with the best in the field.

Targeted international cooperation activities are included in the societal challenges, enabling and industrial technologies and other relevant parts of Horizon 2020. The areas and partners for cooperation are identified in the relevant Work Programme.

For more information on who is eligible, see p.39.

How to apply

Work programmes announce the specific research and innovation areas that will be funded. They are accessible through the Participant Portal (http://bit.ly/H2020PP) and indicate the timing of forthcoming Calls for Proposals. When ready each Call gives more precise information on the research and innovation issues that applicants for funding should address in their proposals.

Although details on all Calls can also be found in the EU's Official Journal, the Participant Portal goes further. It provides easy-to-follow guidance and all the tools needed to apply for funding and manage projects throughout their lifecycle. It covers every type of research and innovation action.

National Contact Points (http://bit.ly/H2020NCP) also provide a wealth of information and individual guidance on Horizon 2020. There is at least one in every EU country and some in other countries.
Specific questions can also be sent to the online Research Enquiry Service http://ec.europa.eu/research/enquiries.

Submitting a proposal

Proposals must be submitted before the deadline of the relevant Call. The Participant Portal provides clear instructions. The system is simpler than ever – no more paper! All proposals must be submitted online only.

Finding partners

Many Calls require a team to have at least three partners. The Participant Portal partner search function helps to identify potential partners with particular competences, facilities or experience.

Evaluation by experts

After the deadline passes, each proposal is evaluated by a panel of independent experts in the areas covered by the Call. The expert panels score each proposal against a list of criteria (see http://bit.ly/H2020Eval). On that basis, the best proposals are selected for funding.

Grant agreement

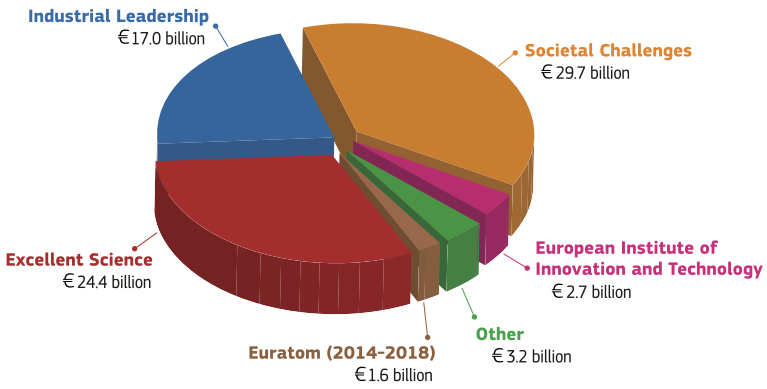
Once a proposal passes the scientific evaluation stage (duration five months), applicants are informed about the outcome. For the proposals which are selected for funding, the European Commission then draws up the grant agreement.

The time limit for signing the grant agreements is generally three months.

The grant agreement confirms the description of the research and innovation activities that will be undertaken, the project duration and budget, rates and costs, rights and obligations, division of roles, rules on suspending and terminating projects, and more.

Then the project can begin!

Horizon 2020 Budget (in current prices 2013)



Useful links:

Participant Portal http://bit.ly/H2020PP

Helpdesk http://ec.europa.eu/research/enquiries

Learn more about Horizon 2020 http://ec.europa.eu/Horizon 2020

National contact Points (NCPs): http://bit.ly/H2020NCP

Enterprise Europe Network: http://een.ec.europa.eu/

Register as an expert: http://bit.ly/H2020Experts

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HOW TO OBTAIN EU PUBLICATIONS

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  by contacting the Europe Direct service (http://europa.eu/europedirect/index_en.htm) or
  calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (*).

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

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- via one of the sales agents of the Publications Office of the European Union (http://publications.europa.eu/others/agents/index_en.htm).

European Commission
Horizon 2020 in brief
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doi: 10.2777/3719

Horizon 2020 is the biggest EU research and innovation programme ever.
Almost €80 billion of funding is available over seven years (2014 to 2020) – in addition to the private and national public investment that this money will attract.
Horizon 2020 will help to achieve smart, sustainable and inclusive economic growth. The goal is to ensure Europe produces world-class science and technology, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering solutions to big challenges facing our society. This guide explains the programme in more detail.

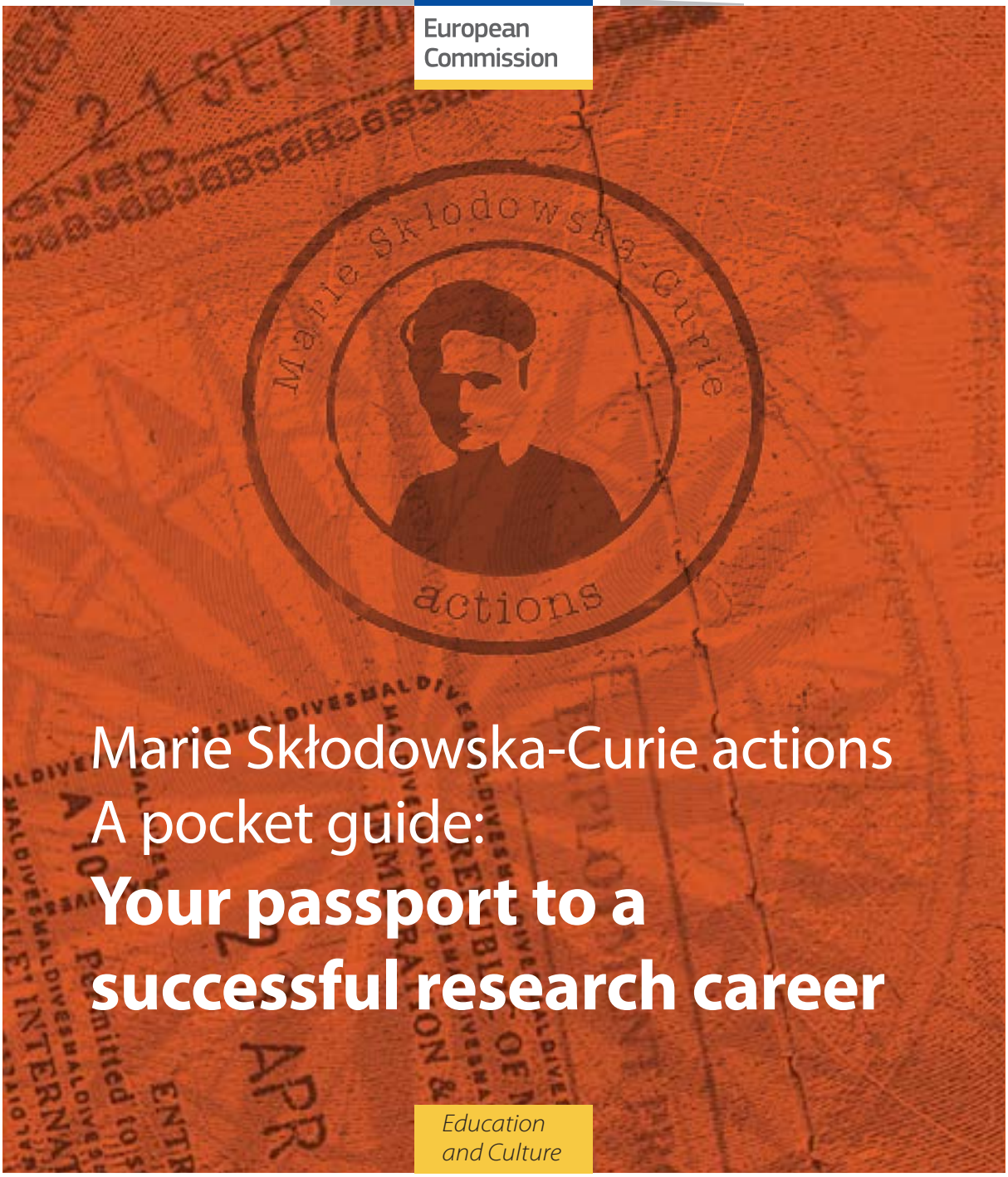
www.ec.europa.eu/Horizon 2020

EU 출판국

PART 3

MARIE SKŁODOWSKA-CURIE ACTIONS

European Commission



Marie Skłodowska-Curie actions
A pocket guide:
Your passport to a successful research career

Education and Culture

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Directorate-General for Education and Culture
Research careers. Marie Skłodowska-Curie actions.
B-1049 Brussels

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EAC-UNITE-C3@ec.europa.eu
Internet: **ec.europa.eu/msca**
ec.europa.eu/programmes/Horizon 2020
www.facebook.com/Marie.Curie.Actions

EUROPE DIRECT is a service to help you find answers to your questions about the European Union.

Freephone number(*):

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More information about the European Union is available on the internet **(http://europa.eu).**
Cataloguing data can be found at the end of this publication.
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EUROPEAN COMMISSION

MARIE SKŁODOWSKA-CURIE ACTIONS

A POCKET GUIDE:
YOUR PASSPORT TO A SUCCESSFUL RESEARCH CAREER

2014 Horizon 2020

MARIE SKŁODOWSKA-CURIE ACTIONS
YOUR PASSPORT TO A SUCCESSFUL RESEARCH CAREER

> **"Nothing in life is to be feared. It is only to be understood."**
>
> Marie Skłodowska-Curie

Investing in innovative research is investing in Europe's future.

The Marie Skłodowska-Curie actions (MSCA) help to fund career development opportunities for researchers at all stages of their careers.

They encourage the development of skills for innovation in all scientific disciplines, through worldwide and cross-sector mobility.

The scheme offers high-quality and innovative research training and knowledge sharing opportunities in the academic and non-academic sectors. A strong emphasis is given to the employability of researchers and the enhancement of transferable skills, entrepreneurship, management and financing of research activities and programmes, management of intellectual property rights, ethical aspects and communication.

The MSCA ensure attractive employment and working conditions for researchers. For instance, funded research projects must promote gender balance and equal opportunities in order to counteract previous barriers in these areas.

Funded beneficiaries are also required to undertake public outreach activities to bridge the gap between science and society, raising awareness of the impact of researchers' work on citizens' daily lives.

This booklet is designed to help you decide which MSCA grant is the right one for you.

WHICH ACTION?

Compare the available research funding opportunities at a glance.

» Page 56

NEED TO KNOW

Some useful basics before you dive in.

» Page 58

TRAINING FUTURE GENERATIONS OF RESEARCHERS

Marie Skłodowska-Curie actions bring together academic and non-academic partners to train early-stage researchers.

INNOVATIVE TRAINING NETWORKS

» Section 1, page 60

GOING FURTHER IN YOUR RESEARCH CAREER

Are you a talented researcher looking to undertake research in or outside Europe? Marie Skłodowska-Curie actions can support the next step in your international career.

INDIVIDUAL FELLOWSHIPS

» Section 2, page 64

KNOWLEDGE SHARING ACROSS SECTORS AND BORDERS

Find out about coordinated short-term postings for research and innovation staff to support the transfer of knowledge and international collaboration.

RESEARCH AND INNOVATION STAFF EXCHANGE

» Section 3, page 68

BROADENING HORIZONS

Does your organisation fund or manage a doctoral or fellowship programme for researchers? Boost its international dimension with additional funding.

CO-FUNDING OF REGIONAL, NATIONAL AND INTERNATIONAL PROGRAMMES

» Section 4, page 72

SCIENCE CLOSE TO PEOPLE

People interact with scientists in engaging ways at public events across Europe.

EUROPEAN RESEARCHERS' NIGHT

» Section 5, page 76

WHICH ACTION?

RESEARCH FUNDING OPPORTUNITIES IN MARIE SKŁODOWSKA-CURIE ACTIONS

	INDIVIDUALS APPLY	HOST APPLIES
	IF Individual Fellowships	**ITN** Innovative Training Networks
Aims	Enable talented researchers to work on projects within or outside Europe.	Promote innovative research and doctoral training in Europe. Develop researchers' skills for innovation within and outside academia.
Profile of the researchers	Experienced researchers of any nationality.	Early-stage researchers of any nationality.
Profile of the hosts	Universities, research centres, companies including SMEs, other non-academic sector organisations.	At least 3 partners: universities, research centres, companies including SMEs, other nonacademic sector organisations.
How does it work?	Proposal submitted by researcher in liaison with host. Successful proposals receive up to 2 years' support (additional 1-year return phase in Global fellowships).	Successful proposals from a network receive funding for up to 4 years to cover researcher allowances, as well as the cost of research, training and networking activities.

HOST APPLIES	FUNDER APPLIES
RISE Research and Innovation Staff Exchange	**COFUND** Co-funding of regional, national and international programmes
Stimulate more interaction between academia and non-academia, in different countries and sectors. Enhance the international dimension of research and innovation.	Support regional, national or international programmes to foster excellence in human resources development in research and innovation.
All research and innovation staff of the participating organisations.	Early stage researchers in doctoral programmes and experienced researchers in fellowship programmes.
At least 3 partners: universities, research centres, companies including SMEs, other non-academic sector organisations.	Universities, research centres, companies including SMEs, other non-academic sector organisations
A joint research and innovation project implemented by the exchange of individual staff for 1-12 months. The staff members return to their organisation after the secondment to ensure transfer of knowledge.	organisations that fund or manage a doctoral or a fellowship programme receive a fixed amount for each supported researcher as a contribution to the total costs.
For further information: **ec.europa.eu/msca**	

MARIE SKŁODOWSKA-CURIE ACTIONS
NEED TO KNOW

Rights of the fellows
The MSCA provide a new set of rights to granted fellows. They must receive at least a minimum level of allowances. To know more about them, you can consult the Work Programme at the Participant Portal:
ec.europa.eu/programmes/Horizon 2020/en/h2020-section/mariesklodowska-curie-actions

The EU's policy to make research an attractive career includes two key documents: the European Charter for Researchers and the Code of Conduct for Recruitment.

Downloadable versions are available at:
ec.europa.eu/euraxess/index.cfm/rights/brochure

Success stories
Outstanding Marie Skłodowska-Curie fellows working within the best research groups around the world contribute to successful projects with a strong impact on science and society:
ec.europa.eu/programmes/Horizon 2020/en/newsroom/551/503

National Contact Points
The National Contact Point of your country or destination provides assistance and information about Marie Skłodowska-Curie actions:
ec.europa.eu/research/participants/portal/desktop/en/support/national_contact_points.html

Research Executive Agency (REA)
The REA is an executive agency of the European Commission in charge of implementing Marie Skłodowska-Curie actions. Over the course of your work under a project, the REA will be your main contact point: ec.europa.eu/rea

Definitions

Academic sector: public or private higher education establishments awarding academic degrees, public or private non-profit research organisations whose primary mission is to pursue research, or international European interest organisations.

Non-academic sector: any socio-economic actor not included in the academic sector and fulfilling the requirements of the Horizon 2020 Rules for Participation. A possible non-academic profile could be a profit-making organisation involved in research activities such as businesses, SMEs, multi-national companies, as well as NGOs, public sector entities, governmental bodies, charities, etc.

Early-stage researchers: researchers with less than 4 years of research experience (full-time equivalent) and who have not been awarded a doctoral degree at the time of their recruitment (ITN, COFUND) or secondment (RISE) by the host organisation.

Experienced researchers: in possession of a doctoral degree or at least 4 years of research experience (full-time equivalent) at the time of their proposal submission (IF), recruitment (COFUND) or secondment (RISE) by the host organisation.

Mobility rules: researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host beneficiary for more than 12 months in the 3 years immediately prior to their proposal submission (IF), or recruitment by the host organisation (ITN, COFUND). Compulsory national service and/or short stays such as holidays are not taken into account. This rule does not apply for hosting by international European interest organisations or international organisations, as long as the researcher has not spent more than 12 months in the 3 years immediately prior to their recruitment at the same host organisation.

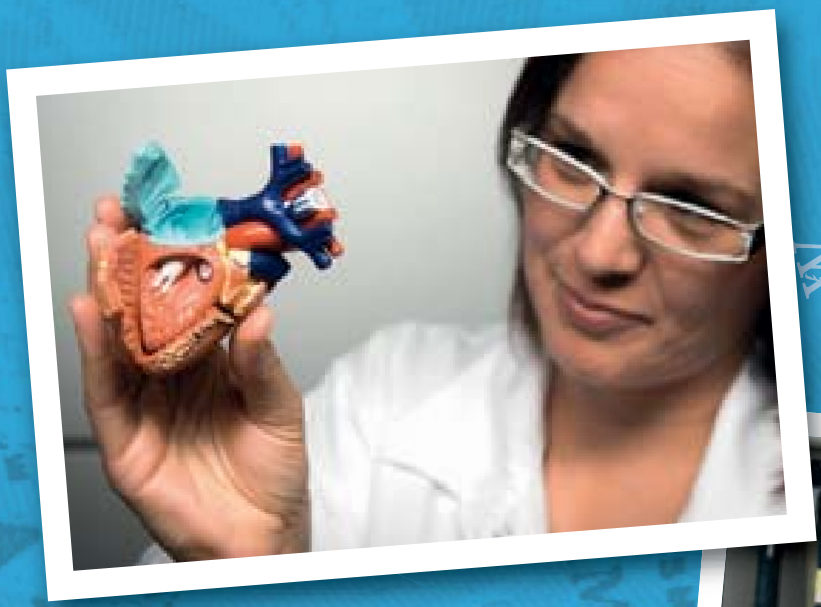
In the Career Restart Panel (IF) and the Reintegration Panel (IF), researchers must not have resided or carried out their main activity in the country of their host organisation for more than 3 years in the 5 years immediately prior to the relevant deadline for submission of proposals.

Staff members (in RISE): are early-stage and experienced researchers or administrative, managerial and technical staff supporting the research and innovation activities of the project.

» SECTION 01

TRAINING FUTURE GENERATIONS OF RESEARCHERS

INNOVATIVE TRAINING NETWORKS (ITN)



INNOVATIVE TRAINING NETWORKS (ITN)

Looking for high quality doctoral training that combines scientific excellence with innovation skills to enhance your career prospects?

Innovative Training Networks (ITN) aim to train a new generation of creative, entrepreneurial and innovative early-stage researchers.

The high quality joint research and doctoral training is delivered by international networks that bring together universities, research centres and non-academic organisations (companies, NGOs, charities, etc.) across Europe and beyond. They benefit from collaborating on innovative projects, with access to the best researchers and cutting-edge technologies.

ITNs can take **one of three forms:**

» **European Training Networks (ETN):** Joint research training, implemented by at least three partners from in and outside academia. The aim is for the researcher to experience different sectors and develop their transferable skills by working on joint research projects. The organisations should be established in at least three different EU Member States or Associated Countries. Additional participants from any organisation anywhere in the world can also join a network.

» **European Industrial Doctorates (EID):** Joint doctoral training delivered by at least one academic partner entitled to award doctoral degrees, and at least one partner from outside academia, primarily enterprise. Each participating researcher is enrolled in a doctoral programme and is jointly supervised by supervisors from the academic and non-academic sector, where they spend at least 50% of their time. The aim is for the doctoral candidates to develop skills inside and outside academia that respond to public and private sector needs. The organisations should be established in at least two different EU Member States or Associated Countries. A wider set of partner organisations from anywhere in the world may also complement the training.

» **European Joint Doctorates (EJD):** A minimum of three academic organisations form a network with the aim of delivering joint, double or multiple degrees. Joint supervision of the research fellow and a joint governance structure are mandatory. The aim is to promote international, intersectoral and multi/interdisciplinary collaboration in doctoral training in Europe. The organisations should be from different EU or Associated Countries. The participation of additional organisations from anywhere in the world, including from the non-academic sector, is encouraged.

The involvement of non-academic organisations is considered relevant for researchers to acquire training beyond the academic world. It will boost excellence in research and innovation by the transfer of knowledge and the creation of interactive collaborations between academic and non-academic organisations.

Another feature of this action is to provide substantial training modules in key transferable skills common to all fields, such as entrepreneurship, management and financing of research activities and programmes, management of intellectual property rights, ethical aspects and communication **to prepare researchers for current and future societal challenges.**

Who can apply?

The lead **host organisation** submits a proposal in reply to a **call for proposals.** All open calls and related information can be found at the **Participant Portal:** ec.europa.eu/research/participants/portal

Individuals then apply for the specific positions created by these networks, using the Euraxess website: ec.europa.eu/euraxess

Which topics can be funded?

Any research field may qualify for **ITN** funding, apart from research areas covered by the EURATOM Treaty[1].

What does the funding cover?

Grants cover:

- **Recruitment and mobility** of each researcher for up to **three years** and 100% of costs. Researchers are hired under an employment contract and enjoy full social security coverage.
- **Research costs, training costs and networking** including for organising joint activities such as conferences.
- **Management and indirect costs.**

Successful proposals are typically funded for **four years.**

Who decides?

All **ITN** projects are selected through **open competition and transparent, independent peer review, using a series of predetermined criteria.**

How do we apply?

The lead **host organisation** submits a proposal in reply to a **call for proposals.** All open calls and related information can be found at the **Participant Portal:** ec.europa.eu/research/participants/portal

1) *These fields of research concerning nuclear energy are referred to in article 4 and Annex I of the Euratom Treaty:* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:084:0001:0112:EN:PDF

» SECTION 02

GOING FURTHER IN YOUR RESEARCH CAREER

INDIVIDUAL FELLOWSHIPS (IF)

Individual Fellowships (IF)

Are you a talented researcher planning your next career move? Undertaking research in another country is an invaluable way to gain new knowledge and skills, expand your network and advance your career.

Individual Fellowships support the mobility of experienced researchers through European Fellowships and Global Fellowships.

There are **two types** of Individual Fellowships:

European Fellowships

- Held in EU Member States or Associated Countries
- Open to researchers either coming to Europe or moving within Europe
- Researcher funding is for one to two years
- Can help you restart your research career after a break such as parental leave
- Can help your reintegration if you are coming back to Europe

Global Fellowships

- Fund secondments outside Europe for researchers based in the EU or Associated Countries
- Researcher funding is for two to three years
- There is a mandatory one-year return period

European and Global Fellowships can also include a **secondment period** of up to three or six months in another organisation in Europe, where this would boost the impact of the fellowship.

Who can apply?

The **best, most promising individual researchers** from anywhere in the world are encouraged to apply.

Fellowships are for **experienced researchers.** See definition page 56.

To apply you must submit a **research proposal,** including your CV, in response to the **call for proposals.** The proposal is **written jointly with your chosen host organisation**(s) (a university, a research centre or a company). All open calls and related information can be found at the **Participant Portal:**
ec.europa.eu/research/participants/portal

Which topics can be funded?

Any research field may qualify for **IF** funding, apart from research areas covered by the EURATOM Treaty[2].

What does the funding cover?

The grant is awarded to your **host organisation in Europe.** The grant provides an **allowance to cover your living, travel and family costs.** The **research costs and indirect costs of the host(s)** are also supported.

Successful proposals are typically funded for one to two years. In the case of a Global Fellowship, an additional twelve-month return phase to Europe is also financed.

Who decides?

All **IF** projects are selected through **open competition and transparent, independent peer review, using a series of predetermined criteria.**

Your proposal will be evaluated on its **research quality, your future career prospects,** and the **career development support offered by your host organisation.**

How do I apply?

You submit a **research proposal, written jointly with your chosen host organisation** in response to the **call for proposals.** All open calls and related information can be found at the **Participant Portal: ec.europa.eu/research/participants/portal**

2) *These fields of research concerning nuclear energy are referred to in article 4 and Annex I of the Euratom Treaty:* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:084:0001:0112:EN:PDF

» SECTION 03

KNOWLEDGE SHARING ACROSS SECTORS AND BORDERS

RESEARCH AND INNOVATION STAFF EXCHANGE (RISE)

Research and Innovation Staff Exchange (RISE)

Collaborative interaction between academic and non-academic sectors can be a powerful catalyst for innovation. The Research and Innovation Staff Exchange (RISE) enables this interaction via staff exchanges among the two sectors. RISE also supports worldwide exchanges, irrespective of the sector.

These exchanges help research staff to develop careers that combine scientific excellence with exposure to international and/or intersectoral settings, contributing to the knowledge economy in Europe.

Who can apply?

Both academic and non-academic organisations are eligible. In particular, the participation of small and medium-sized enterprises (SMEs) is encouraged.

A RISE partnership is composed of at least three independent participants established in three different countries and must respect one of the following two conditions:

- Two organisations are located in two different Member States or Associated Countries and one organisation is located in a Third Country, independently from the sector it belongs to, or
- If all three independent organisations are from Member States or Associated Countries, at least one organisation should be from the academic sector and one from the nonacademic sector.

Above these minimum requirements additional organisations established in Member States or Associated Countries and/or in other Third Countries can participate.

Partners get together and propose a **joint research and innovation project.** Proposals should highlight **networking opportunities, sharing of knowledge** and the **skills development** of staff members.

Staff members of **any nationality** and **any career level** can undertake a secondment. An eligible staff member must be engaged in or linked to research and innovation activities for at least six months prior to the secondment.

Which topics can be funded?

Any research field may qualify for **RISE** funding, apart from research areas covered by the EURATOM Treaty[3].

What does the funding cover?

The grant offers appropriate funding for secondments of staff members **for one month to one year** as well as funding to support research, training and networking activity. Funding for a RISE project can last up to **four years.**

Who decides?

All **RISE** projects are selected through **open competition and transparent, independent peer review, using a series of predetermined criteria.**

How do we apply?

Organisations submit a proposal in reply to a **call for proposals.** All open calls and related information can be found at the **Participant Portal: ec.europa.eu/research/participants/portal**

3) *These fields of research concerning nuclear energy are referred to in article 4 and Annex I of the Euratom Treaty:* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:084:0001:0112:EN:PDF

» SECTION 04

BROADENING HORIZONS

CO-FUNDING OF REGIONAL, NATIONAL AND INTERNATIONAL PROGRAMMES (COFUND)

Co-Funding of regional, national and international programmes (COFUND)

Transnational mobility opens up new horizons for researchers.

COFUND offers additional funding for new or existing regional, national and international programmes for research training and career development. This extra funding enables the greater movement of researchers across borders and research sectors.

Who can apply?

Applicants for COFUND should be **organisations that fund or manage doctoral programmes or fellowship programmes for researchers.** Each COFUND proposal will have a **sole participant,** e.g. a government ministry, regional authority, funding agency, university, research organisation, research academy or enterprise.

Individuals can find open calls and vacancies of co-funded programmes on the **Euraxess website:** ec.europa.eu/euraxess

Which topics can be funded?

Any research field may qualify for **COFUND** funding, apart from research areas covered by the EURATOM Treaty[4].

COFUND programmes can cover several or all research fields or can be restricted to a specific domain. Programmes that prioritise specific research disciplines based on Smart Specialisation Strategies for regional investment will also be supported. For more information about Smart Specialisation Strategies, visit:
ec.europa.eu/research/regions/index_en.cfm?pg=smart_ specialisation

4) *These fields of research concerning nuclear energy are referred to in article 4 and Annex I of the Euratom Treaty:* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:084:0001:0112:EN:PDF

What does the funding cover?

Individuals - **both doctoral candidates and experienced research fellows** - are supported in their research training and career development through the co-funding. Participating organisations receive a fixed amount for each supported researcher as contribution to the researcher's remuneration and to the management of the programme.

Movement across borders is a must. **Cross-sectoral mobility** is also encouraged.

Selected programmes will be co-funded for **three to five years.**

Who decides?

All **COFUND** projects are selected through **open competition and transparent, independent peer review, using a series of predetermined criteria.** Collaboration with a wider set of partners, including from the non-academic sector, which may provide hosting or secondment opportunities or training in research or transferable skills, as well as innovative elements of the proposed programme, will be positively taken into account during the evaluations.

How do we apply?

Organisations submit a proposal in reply to a **call for proposals.** All open calls and related information can be found at the **Participant Portal: ec.europa.eu/research/participants/portal**

» SECTION 05

SCIENCE CLOSE TO PEOPLE

European Researchers' Night (NIGHT)

European Researchers' Night (NIGHT)

European Researchers' Nights are public events dedicated to bringing researchers closer to the general public, showcasing the diversity of science and its impact on our daily lives and stimulating young people to embark on scientific careers.

The events showcase what researchers really do for society, in interactive and engaging ways.

The NIGHT has dramatically grown in size and importance since its launch in 2005 in 20 cities in 15 countries. In 2013, this annual research outreach initiative took place in over 300 cities and 33 countries involving almost 1.3 million participants. The NIGHT is organised on the last Friday of September each year.

Who can apply?

European Researchers' Night grants may be awarded to **any legal entity,** established in an **EU Member State or Associated Country.** This will usually involve coordinating local, regional, national or international partners.

Possible beneficiary profiles could be private and public research organisations, companies, public authorities, schools, science museums, parent-teacher organisations, EU mobility centres for researchers, foundations and the media.

What can be funded?

Any action or event that boosts **public awareness of the positive role of research in society,** especially among **young people, is eligible for funding.**

What does the funding cover?

You may use the funding to cover **any expenses linked to the organisation of a research outreach event.**

Grants can cover **up to two years.** Their value varies in line with the scale of the events proposed.

Activities that can be supported include:

» **Hands-on experiments** conducted by researchers
» **Science shows** with public participation
» **Debates**
» **Competitions** (science quizzes, games, puzzles, photo and art contests, etc.)
» **Workshops** for children
» **"Researchers' dating"** (meet researchers and ask them questions)
» **Science slams**
» **Guided visits** of labs, research institutes, and other relevant places that are usually closed to the public.

This list is by no means exhaustive… **be creative!**

Who decides?

All **NIGHT** projects are selected through **open competition and transparent, independent peer review, using a series of predetermined criteria.**

How do we apply?

Organisations submit a proposal in reply to a **call for proposals.** Calls can be found at the **Participant Portal:**
http://ec.europa.eu/research/participants/portal/

For more useful information, check out the **European Researchers' Night website:**
ec.europa.eu/researchersnight

European Commission

Marie Skłodowska-Curie actions - A pocket guide: Your passport to a successful research career

Luxembourg: Publications Office of the European Union

2014 – 32 pp. – 10.5 x 14.8 cm

ISBN 978-92-79-35061-0

doi:10.2766/65630

NC-02-13-842-EN-C

Marie Skłodowska-Curie actions

Research training and career development; international and intersectoral mobility; partnerships between academic and non-academic organisations; doctoral programmes; staff exchanges; outreach activities. The EU's Marie Skłodowska-Curie actions fund all kinds of opportunities for researchers. So which is the right Marie Skłodowska-Curie action for you? This starter booklet gives you just enough information to make the right choice.

Publications Office

3 EU Member States Science, Technology and Innovation

PART 1

AUSTRIA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

AUSTRIA

Country Outline

- GDP: 349,344 mil. euros (Eurostat 2016)
- GDP per Capita: 36,100 euros (Eurostat 2016)
- Areas of marked S&T specialisations: Energy, Environment, Agriculture

Contact Information

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With research and development accounting for nearly 3% of the country's economic output (GDP), Austria is performing well above the EU and OECD average. Over the last decade, Austria has built a mature and modern innovation system. One of its pillars is its educational system: there are currently 22 state universities in Austria (including six universities of the Arts and three technical universities), 21 universities of applied sciences and 13 private universities – with a total of around 370,000 students (2016), of which more than 102,000 come from abroad. Austrian universities are also strongly advancing internationalization in the field of research: this is impressively demonstrated by above-average participation in the EU funding framework programme, with Austria ranking 5th in the success rate of the prestigious and highly competitive ERC grants. Austrian researchers and scientists are among the world's elite in numerous areas, such as quantum physics, mathematics and medicine, as well as the humanities and social sciences. In addition to higher education institutions, Austria's educational system is also aligned with the needs of companies by having a longstanding tradition of dual vocational training for young adults, which operates in parallel in apprenticeships and vocational schools. Furthermore, for all technical disciplines, Higher Technical Colleges (HTC) offer highly qualified training courses that are often equivalent to international Bachelor levels. The Austrian business landscape is characterized by innovative small and medium sized enterprises, which form the backbone of Austria's innovation economy. In terms of R&D expenditure, which currently stands at EUR 10.74 billion, it is the business enterprise sector that accounts for the biggest share of R&D expenditure in terms of total expenditure at approx. 48% (or EUR 5.14 billion), with a - by international comparison - high share of foreign investment at 16% (or EUR 1.71 billion). Also, innovative companies in Austria can make use of a research financing support system that is recognized as a global model. The funding quota for company research projects ranks at the top end of the international scale. From basic to applied research, the entire innovation process is supported generously in Austria by public financing, with three agencies being mainly responsible for administering those funds: the Science Fund "FWF" makes available almost EUR 200 million per year for basic research projects; the Austrian Research Promotion Agency "FFG" supports industry-oriented research with an extensive programme of grants (incl. with Korea) and services. Over EUR 400 million are invested annually for application-oriented projects. Thirdly, the Austrian Federal Promotional Bank "AWS" supports companies as a financing partner in all stages, from pre-seed to company creation and international growth projects.

1. Policies and Strategies in Science, Technology and Innovation

Austrian RTI Strategy "Becoming an Innovation Leader" (2011)

The Federal Government of Austria formulated its first Research, Technology and Innovation Strategy in March 2011. This strategy (which covers the period until 2020) is intended to "push Austria forward from the group of Innovation Followers to the group of Innovation Leaders, i.e. to be among the most innovative countries in the EU." Before the formulation of the strategy in 2011, the Austrian Government had already taken comprehensive measures to strengthen the competitiveness of the Austrian economy since 2000. Several processes and institutions have come into being since the decision was taken to implement the strategy, including the "RTI Task Force", an inter-ministerial steering committee with constituent working groups. A variety of initiatives have been launched and some have already been implemented. One of the RTI strategy's particular strengths is that it offers a broad, integrative and systemic overview of the constituent parts (education, research and industry), especially regarding the educational system as an integral part of the innovation system.

Open Innovation Strategy (2015)

The Austrian Federal Government was tasked by the National Council in July 2015 with developing an Open Innovation Strategy for Austria. This was delegation to the Federal Ministry for Transport, Innovation and Technology (BMVIT) and to the Federal Ministry of Science, Research and Economy. This makes Austria one of the first countries in the world to develop its own national open innovation strategy. The goal of creating such a strategy is to deploy open innovation as a guiding concept for further development of the national innovation system and thereby also to reinforce Austria's international competitiveness as a location for knowledge and business.

The strategy was adopted in July 2016 by the Austrian Government. In addition to accompanying studies concerning specific aspects of open innovation, particular attention was given to intensive and long-term participation by members of the public and relevant stakeholder groups. The most important tool in this participation process was the online portal openinnovation.gv.at. From the middle until the end of 2015, stakeholders, interested members of the public and experts all had the opportunity to discuss their ideas for the Open Innovation Strategy and to publish existing Best Practice examples. Parallel to the digital options a stakeholder workshop was organised in January 2016 and also provided an opportunity to participate in the process of drawing up the strategy and contributing specific content. The fact that 470 people from science, business and government took part in this process demonstrates the high level of stakeholder interest in open innovation. This was followed in spring 2016 by an online consultation in which the general public was

invited to submit comments on the key elements of the Open Innovation Strategy, Vision 2025 and the proposed measures, and to suggest changes. This formed the basis for the drafting of the final text of the strategy. In July 2016 the Open Innovation Strategy was adopted by the Austrian Government.

2. National Programmes and Initiatives

List of National Programmes open to the world

Programme Title	Contents
Beyond Europe https://www.ffg.at/node/38858	The Austrian Research Promotion Agency (FFG) programme "Beyond Europe" supports Austrian companies, research and university institutes and other organisations in creating and extending collaborations. The programme is open to all thematic fields. Funding is available for projects in all technical disciplines. Project proposals may be submitted for exploratory projects and cooperative R&D projects of the category "Experimental Development". In the 1st call of the Beyond Europe programme, one Austrian-Korean joint project was selected to be funded. A 2nd call (Funding budget: EUR 4.6 Mio.) was opened in early 2017. Furthermore, FFG provides a wide range of funding options and support for participation in international programmes and initiatives. For more information go to www.ffg.at/en/funding
EU Horizon 2020 https://www.ffg.at/en/horizon-2020-international-cooperation	FFG also serves as the main Austrian National Contact Point (NCP) to provide guidance, practical information and assistance on all aspects of participation in Horizon 2020. Under Horizon 2020, 7 projects included project partners from Austria and Korea.

3. Joint Activities with Korea

List of Joint Programmes or Activities with RoK in 2016

Programme Title	Contents
University Cooperation	A total of 27 cooperation agreements exist between 10 Austrian and their Korean counterparts. In addition to that, a total of 43 cooperation agreements exist between 11 Austrian Universities of Applied Sciences and Korean institutions.
Research organizations and research promotion organizations	▪ Bilateral agreement on scientific cooperation between the Austrian Academy of Sciences and the Korean Academy of Science and Technology (KAST) has led since 2011 to: - 5 cooperation agreements - 15 joint research projects - Visits of some 45 people from both organizations ▪ Bilateral agreement between the Austrian Science Fund and the National Research Foundation of Korea (NRF). Several joint research projects have been supported. ▪ Cooperation agreement between Austrian Research Promotion Agency and Korea Institute for the Advancement of Technology (KIAT). KIAT is also participating in the 2017 M-ERA.NET Call.

List of Planned Programmes or Activities with RoK in 2017

Programme Title	Contents
Renewal of Memorandum of Understanding	A renewal of a Memorandum of Understanding, which had been signed in 2007 between the Austrian Federal Ministry of Science, Research and Economy (BMWFW) and RoK is planned for 2017. The MoU shall further intensify the mobility of researchers between the 2 countries and also Austrian-Korean cooperation in international consortia such as the above mentioned Horizon 2020 program.
GoSeoul & GoAustria Programme for Startups	The GIN (Global Incubator Network) initiative, which is supported by the Austrian Business Agency, the Austrian Federal Economic Chambers, ADVANTAGE AUSTRIA as well as the Vienna Business Agency and processed jointly by the agencies FFG and AWS, has been expanded to Korea. In 2017, Korean start-ups are invited to apply to the accelerator programme "GoAustria", and in 2018 a first batch of Austrian start-ups will come to Korea as participants in the GoSeoul programme.
PyeongChang 2018	The Austrian National Weather Service (ZAMG) is supporting the Korea Meteorological Administration with regard to weather forecasts during the Olympic Winter Games 2018 in Korea.

4. Others

Key Austrian Research Organisations and Companies

Organisation Name	Detailed information
Austrian Institute of Technology https://www.ait.ac.at/	The Austrian Institute of Technology (AIT) is Austria's largest Research and Technology Organisation (RTO) and plays a key role in Austria and in Europe as a research and technology institute for key infrastructure issues of the future. With its five departments of Energy, Mobility, Health & Environment, Safety & Security as well as Foresight & Policy at locations such as TechGate Vienna or the Austrian Research Centres Seibersdorf, AIT closely cooperates with the business community on developing new infrastructure solutions. Several Korean researchers and PhD students are doing research at AIT.
AVL List GmbH https://www.avl.com/	AVL is the world's largest independent company for development, simulation and testing technology of powertrains (hybrid, combustion engines, transmission, electric drive, batteries and software) for passenger cars, trucks and large engines. It has its headquarters in Graz, Austria, and has research facilities in Korea.
Austrian Universities and Universities of Applied Sciences	For a complete list of all Austrian Universities and Universities of Applied Sciences, please visit this link of the Austrian Federal Ministry of Science, Research and Economy.

PART 2

BELGIUM

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

BELGIUM

Country Outline

- GDP: 421,611 mil. euros (Eurostat 2016)
- GDP per Capita: 34,400 euros (Eurostat 2016)
- Areas of S&T specialisations: Chemistry, Pharmaceuticals, Space

Contact Information

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Belgium is a federal country with a federal government. The federated entities are communities and regions which bear the primary responsibility for science, technology, education and economic policies. As such they control the main levers for innovation policy. Several responsibilities remain at the federal level: space; polar research; international programmes and institutes; fiscal measures (taxes); scientific research institutes regarding its own competences; access to other federal competences (labour market, social security, scientific visa, regulatory framework, etc.).

There is no hierarchy of powers between the federal government and the other authorities. The governance of the Belgian research system reflects the federal structure of the country. The Federal Science Policy office (BelSPO) coordinates science policy at the federal level and runs the bodies where the different Belgian authorities meet in order to agree on international science policy issues of common interest. The regions and communities coordinate their own specific policies through the regional governments and agencies.

(Source: ANNUAL REPORT ON S&T INDICATORS FOR BELGIUM 2013, BELSPO ERAWATCH Country Reports 2013: Belgium, Michele Cincera, 2014)

1. Policies and Strategies in Science, Technology and Innovation

Research and innovation policy in Belgium is designed and implemented in a multi-level governance framework involving the Federal Government and autonomous regional and (linguistic) community governments.

Belgium, although not among the innovation leaders in the EU, is placed 7th among EU Member States, second in the 'strong innovators' category in the European Innovation Scoreboard 2016 (European Commission, 2016) and over the last five years has achieved moderate growth in innovation performance. The country has a strong, internationally competitive research infrastructure (most importantly its universities and a handful of major research facilities) driven by a globally connected and highly productive workforce. At the same time, the business sector in Belgium is more active than the EU28 average in terms of

both the financing and performance of research and development (R&D). A small number of foreign owned companies play a key role in underpinning this strong performance with the R&D investments of a few large companies in a limited number of sectors and mostly managed overseas making significant impact on the R&D performance. The country is characterised by a relatively large share of SMEs. Belgian SMEs are highly innovative and have the highest absorptive capacity in the EU in terms of employment of highly skilled labour force.

The Belgian authorities are strongly committed to and participate in European initiatives, especially the EU Framework programme for R&D, or in related initiatives such as ESFRI (on research infrastructures). In a number of cases this commitment matches national challenges or priorities, such as the implementation of the European Partnership for Researchers in both Communities, which should contribute to attract and retain qualified human resources. With regard to cross-border cooperation, Belgium is actively engaged in a range of initiatives, which include bilateral agreements, joint R&D projects and shared research infrastructures.

In Belgium, although there is no national strategy, each region/community has its own multi-annual plan that covers research and innovation (either as a sub-element of an overall plan or as a specific strategy). In each region/community a new strategy has been redefined following the new Government Agreements of Autumn 2014.

The multi-annual plans that are running in 2016 are namely: the Flanders in Action initiative (VIA)/ PACT 2020; the Brussels-Capital Regional Innovation Plan (PRI 2016-2020) that was adopted in 2016; the Walloon "Marshall Plan 4.0" completed recently by the Research Strategy 2011-2015 and the Wallonia-Brussels partnership for researchers, both adopted by the Wallonia-Brussels Federation and the Walloon Region in 2011.

The key R&I relevant aspects of Belgium's National Reform Programme 2016 can be summarized as follows.

- Increased fiscal support for R&D

  The fiscal support policy for R&D was intensified in 2013, particularly with regard to the payroll tax exemption for researchers (an increase from 75% to 80% as from 1 July 2013).

- Unitary patent protection

  The European Agreement of 19 February 2013 on the Unified Patent Court (UPC) was ratified by the Federal Parliament. The UPC Agreement constitutes a crucial step in the development of the European patent with unitary effect, as intended in regulation 1257/2012 of 7/2/2012 implementing enhanced cooperation in the area of the creation

of unitary patent protection.

- **Strengthening and diversifying funding schemes**
  Competitive clusters, with additional support for public/private partnerships, specific programmes focusing on SMEs, particularly as regards cooperation with research centres and knowledge transfer and "green support" to young innovative enterprises; to R&D programmes on thematic priorities of the Research Strategy. Smart specialization.
  Paths aimed at speeding up the transition from innovation to market for companies that are not proactive as regards innovation and do not develop new products, processes or services themselves, but implement or use them.

- **Reindustrialisation, KETs and technology deployment**
  To support re-industrialisation, the Belgian authorities also aim at strengthening the eco-system around innovative large companies and SMEs to improve the competitive position of the indigenous industry in global value chains.

Basic indicators for R&D investments

	2011	2012	2013	2014	2015	EU28 (2015)
GDP growth rate	1.8	-0.1	0.2	-	-	2.2
GERD (% of GDP)	2.21	2.24 p	2.43	1.7	1.5	2.03 p
GERD (€ per capita)	742.8	757.6 p	855	2.46 e	2.45 p	587.7 p
GBAORD - Total R&D appropriations (€ million)	2 395.551	2 489.552	2 537.718 p	881.3 e	894.7 p	96 082.00
R&D funded by Business Enterprise Sector (% of GDP)	1.33	1.67	1.71	2 726.97	2 537.33	1.13 (2013e)
R&D performed by HEIs (% of GERD)	22.3	23.2 p	20.8	-	-	23.21 p
R&D performed by Government Sector (% of GERD)	8.1	8.2 p	8.12	20.21 e	19.94 p	11.96 p
R&D performed by Business Enterprise Sector (% of GERD)	68.7	67.8 p	70.6	8.22 e	7.77 p	63.99 p
Venture Capital as % of GDP (Eurostat table code tin00141)	0.031	0.034	0.028	71.22 e	71.95 p	N/A

Employment in knowledge-intensive service sectors as share of total employment (Eurostat table code tin00141)	46.2	47.6	46.7	0.0317	0.0154	39.9

(source: RIO Country report 2014: Belgium, Duchêne, V.; ERAWATCH Country Reports 2013: Belgium, Michele Cincera, 2014)

2. National Programmes and Initiatives

Programme Title	Contents
STEREO III http://eo.belspo.be	▪ Cooperation Type: Belgian R&I programme open to international partner(s) ▪ Funding Organisation: Belgian Science Policy Office (BELSPO) ▪ Call Opening/Closing Date: nearly 1 call/year ▪ Participation Qualification: open to universities, public scientific institutions and non-profit research institutions ▪ Project Duration: small projects (1-3 years), big projects (4-5 years) ▪ Funding Scale and Funding Scheme: a maximum of 20% of the STEREO budget may be earmarked for foreign teams per project ▪ Research Fields: Earth observation ▪ Matching fund from Korean government: the foreign partners co-finance the project by matching the STEREO III under a parallel funding arrangement
Programme BRAIN-be II www.belspo.be	▪ Cooperation Type: joint research ▪ Funding Organisation: Belgian Science Policy Office (BELSPO) ▪ Call Opening/Closing Date: every two year; first call planned for the beginning of 2018 - please check website ▪ Participation Qualification: call is intended for Belgian institutions. Projects with non-Belgian universities or public research institutes are possible under certain circumstances - please see website for more information ▪ Project Duration: please check website ▪ Funding Scale and Funding Scheme: 14 million €/year for interdisciplinary network research projects ▪ Research Fields: network projects in three thematic axis: (1) federal contribution to the challenges of Planet Earth; (2) heritage science; (3) societal challenges.
Federal Research Programme Drugs www.belspo.be	▪ Cooperation Type: joint research ▪ Funding Organisation: Belgian Science Policy Office (BELSPO) ▪ Call Opening/Closing Date: every year (opening date in 2017 still to be confirmed) ▪ Participation Qualification: open to collaboration with researchers in other countries on a co-funding basis ▪ Project Duration: average is 2 years ▪ Funding Scale and Funding Scheme: 250.000€ per project ▪ Research Fields: social sciences and humanities and life sciences. Each year specific topics are selected for the call. ▪ Matching fund from Korean government: No ▪ Others: foreign research fundable up to 20% of total budget of proposal/project

Scholarships for Excellence program – IN.WBI http://www.wbi.be	▪ Cooperation Type: mobility ▪ Funding Organisation: Wallonia-Brussels-International (WBI) ▪ Call Opening/Closing Date: for doctorate or post-doctorate scholarships for a duration of minimum 1 year deadline is 1/03/2016 (academic year 2016-2017); for research scholarships 3 times a year (please check website) ▪ Participation Qualification: foreign nationals with a diploma from a foreign institution of higher education of Master II level or an equivalent education at Master II level or who hold the title of doctor or foreign researchers ▪ Project Duration: 1 to 3 months ▪ Funding Scale and Funding Scheme: please check website ▪ Research Fields: particularly focused on sectors of the Marshall Plan 4.0: transport, logistics, life sciences & aviation-space. Other fields may also be considered.
Grants Programme ASEM DUO – Belgium/Wallonia-Brussels http://www.wbi.be	▪ Cooperation Type: mobility ▪ Funding Organisation: Wallonia-Brussels-International (WBI) ▪ Call Opening/Closing Date: 30/06/2014 at the latest for the academic year '14-'15 ▪ Participation Qualification: lecturers/professors from a higher education institution recognised by the Wallonia-Brussels Federation whose institution already has a cooperation agreement with an education institution in Australia, India, Japan or South Korea or intends to have it within the next 2 years. To find the universities of the countries: www.asemduo.org and search on "FINDING PARTNERS". ▪ Project Duration: 1 to 3 months ▪ Funding Scale and Funding Scheme: 6,000€/month for both lecturers/professors, that is 3,000€ per lecturer / professor ▪ Research Fields: all ▪ Others: cooperation process between the EU and ASEM. Aims to encourage "mobility in pairs (2 persons)" of lecturers/professors from 2 partner higher education institutions and, in particular, from Australia, India, Japan or South Korea.
Several PhD and postdoctoral fellowships and other grants from the FWO www.fwo.be	▪ Cooperation Type: mobility ▪ Funding Organisation: The Research Foundation - Flanders (FWO) ▪ Call Opening/Closing Date: several dates ▪ Participation Qualification: please check website ▪ Project Duration: various durations possible ▪ Funding Scale and Funding Scheme: please check website ▪ Research Fields: all ▪ Others: support to ground-breaking fundamental research at universities of the Flemish Community (including the academic programmes within the corresponding association); federal or Flemish scientific institutes; university hospitals in the Flemish Community and hospitals with an academic character recognised as research center in the Flemish Community. FWO stimulates international cooperation and international mobility by giving researchers the opportunity to gain experience or work as members of international research groups or by attracting researchers from abroad.

Strategic Basic Research Programme (SBO) http://www.fwo.be/en/fellowships-funding/research-projects/sbo-projects/	▪ Funding Organisation: The Research Foundation - Flanders (FWO) ▪ Call Opening/Closing Date: from January 16, 2017, with 2 deadlines: April 25, 2017 at 5 PM to send the proposals to the host institutions and May 19, 2017 at 5 PM for the host institutions to submit the proposals to FWO (please check website for more details) ▪ Participation Qualification: SBO project proposal is submitted by at least one "Flemish R&D actor" (definition available on the website). Proposal may include one or more R&D actors from outside Flanders up until 20% of the proposed budget. ▪ Project Duration: up to 4 years ▪ Funding Scale and Funding Scheme: about 2 million € ▪ Research Fields: all ▪ Others: the SBO project team is expected to both carry out high-quality basic research as well as to have a clear vision of the potential for utilisation and to undertake active efforts to achieve the effective transfer, the exploitation and the utilisation of the research results by economic or social actors.
Innovation mandates (IM) www.iwt.be/english/funding/	▪ Cooperation Type: joint research ▪ Funding Organisation: Agency for Innovation by Science and Technology (IWT) ▪ Call Opening/Closing Date: 16/10/15 - 07/03/16 ▪ Participation Qualification: open to anyone who holds a PhD ▪ Project Duration: around 2 years ▪ Funding Scale and Funding Scheme: there are various types of mandates: spin-off mandates that are 100% funded by IWT for up to 2 years; Innovation mandates involving cooperation with existing companies ▪ Research Fields: all ▪ Others: the ultimate goal of the mandates is to bridge the gap between academia and industry and to help researchers to make the transition into the business world
Applied Biomedical Research with a primary social finality (TBM) http://www.fwo.be/en/fellowships-funding/research-projects/tbm-projects/	▪ Cooperation Type: joint research ▪ Funding Organisation: The Research Foundation – Flanders (FWO) ▪ Call Opening/Closing Date: from January 16, 2017 with two deadlines: April 18, 2017 at 5pm to send the proposals to the host institutions and April 25, 2017 at 5 pm for the host institutions to submit the proposals to FWO ▪ Participation Qualification: non-Flemish non-profit R&D players can be included in the consortium as co-applicants ▪ Project Duration: 2 to 4 years ▪ Funding Scale and Funding Scheme: overall budget for non-Flemish actors may not exceed 20% of overall budget. Project budget between €250,000 and €1,500,000 ▪ Research Fields: applied biomedical research with a primary social finality ▪ Others: focuses on niche in biomedical research: advanced application-driven research with pronounced societal applicability but limited potential for industry

3. Joint Activities with Korea in 2016

Programme Title	Contents
Participation of F.R.S.-FNRS in the joint mobility call between South Korea and Europe - KONNECT www.haneurope.or.kr	▪ Activity (Programme) Outline: multilateral call for scientific mobility projects ▪ Major topic or agenda: resources and sustainability ▪ Target Participants from the Belgian side: researchers with a permanent position in a university of the French speaking Community ▪ Relevant Information: programme focuses on multilateral scientific mobility projects
FWO's agreement with the National Research Foundation of Korea http://www.fwo.be/en/fellowships-funding/international-collaboration/scientific-cooperation/cooperation-with-south-korea/	▪ Activity (Programme) Outline: exchange of young postdoctoral researchers; start of projects: January 2018 ▪ Major topic or agenda: all scientific domains ▪ Target Participants from the Belgian side: researchers with a PhD affiliated to a university in the Flemish Community or belonging to the scientific staff of the Dutch-speaking community of a federal or Flemish scientific institute, or belonging to the scientific staff of an university hospital in the Flemish Community, or belonging to the scientific staff of a hospital with an academic character recognised as research center in the Flemish Community ▪ Relevant Information: programme focuses on the exchange of young postdoctoral researchers

4. Others

Most of the research in Belgium takes places in eleven universities, covering both basic and applied research in all scientific domains. They are listed on http://www.studyinflanders.be/en/institutions/ for Flanders-Brussels and on http://www.studyinbelgium.be/en/institutions for Wallonia-Brussels. The list below provides the contact of several institutes and (strategic) research centres in specific scientific domains.

Organisation Name	Detailed information
Belgian Nuclear Research Centre (SCK-CEN) http://www.sckcen.be	▪ Organisation type: research organisation ▪ Major Research Area/Product: nuclear science and technology and ionising radiation ▪ Contact Information: Services, consultancy and R&D, business@sckcen.be
Von Karman Institute for Fluid Dynamics (VKI) www.vki.ac.be	▪ Organisation type: research and education organisation ▪ Major Research Area/Product: theoretical and experimental fluid dynamics including numerical methods ▪ Contact Information: secretariat@vki.ac.be

Cenaero www.cenaero.be	▪ Organisation type: research organisation ▪ Major Research Area/Product: aeronautics ▪ Contact Information: info@cenaero.be
Flanders Institute for Biotechnology (VIB) www.vib.be	▪ Organisation type: research organisation ▪ Major Research Area/Product: life sciences ▪ Contact Information: info@vib.be
Interuniversity Micro-Electronics Centre (IMEC) www2.imec.be	▪ Organisation type: research organisation ▪ Major Research Area/Product: semiconductor technology, nanoelectronics, nanotechnology, design methods and technologies for ICT systems ▪ Contact Information: info@imec.be ▪ (please note: in 2016 the nano-electronics research center, imec, and the digital research and incubation center, iMInds, merged into a unique high-tech R&D hub under the brand name IMEC)
VITO https://vito.be	▪ Organisation type: research organisation ▪ Major Research Area/Product: energy, materials, chemistry, health and land use (including earth observation) ▪ Contact Information: Tel. (+ 32) 14 33 55 11
Institute of Tropical Medicine (ITM) www.itg.be	▪ Organisation type: research organisation ▪ Major Research Area/Product: tropical medicine and health care ▪ Contact Information: itmedu@itg.be, receptie@itg.be
Competitiveness Clusters in Wallonia http://clusters.wallonie.be/federateur-en/	▪ Organisation type: competitiveness clusters in various fields ▪ Major Research Area/Product: transport and logistics (www.logisticsinwallonia.be), aerospace (www.skywin.be), green chemistry and durable materials (www.greenwin.be), biotechnology and health (www.biowin.org), food industry (www.wagralim.be), mechanical engineering (www.polemecatech.be) ▪ Contact Information: info@logisticsinwallonia.be, contact@greenwin.be, contact@biowin.org, info@wagralim.be, info@polemecatech.be

PART 3

BULGARIA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016

BULGARIA

Country Outline

- GDP: 47,364 mil. euros (Eurostat 2016)
- GDP per Capita: 6,000 euros (Eurostat 2016)

Contact Information

- Name / Position: Mr. Panko Panov / Deputy Head of Mission
- Phone no. / e-mail: (+82) 2 794 8625 / panko.panov@mfa.bg
- Organisation: Embassy of Bulgaria

47 universities operate in Bulgaria, fostering its scientific and technological know-how. The country has a strong tradition in mathematics, astronomy, physics, nuclear technology and science-oriented education, and has significant experience in medical and pharmaceutical research. The Bulgarian Academy of Sciences (BAS), the leading scientific institution in the country, employs most of Bulgarian researchers working in its numerous branches.

1. Policies and Strategies in Science, Technology and Innovation

The Bulgarian government approved a 10-year plan for funding three main areas of scientific development - Innovative potential sciences (biotechnology, healthcare technology, alternative energy sources, nanotechnology and communications); Sustainable development sciences (ecology) and scientific studies for the support of industry. It has planned an increase of scientific spending from 0.4 to 0.6% of GDP.

2. National Programmes and Initiatives

The National Development Programme of Bulgaria 2020 (NDP BG 2020) is the leading strategic and programming document detailing objectives of the development of science and technology policies of the country. Bulgaria is in the first half of the ranking of countries worldwide in following areas: Biology & Biochemistry, Chemistry, Earth Science, Physics, Material Science, Engineering Sciences, Botany & Zoology, Pharmacology & Toxicology.

3. Joint Activities with Korea in 2016

A. New trends in Cyber Security and Perspective for the Korea-Bulgarian Cooperation
B. Sensor system in KIST(Korea Institute of Science & Technology)
C. Digital holography as a 3D-imaging and metrological tool
D. Biomedical Photonics and Perspective for the Korea-Bulgaria

PART 4

CROATIA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

CROATIA

Country Outline

- GDP: 45,819 mil. euros (Eurostat 2016)
- GDP per Capita: 10,900 euros (Eurostat 2016)
- Areas of marked S&T specialisations: Food, Agriculture and Fisheries Transport, Construction and Humanities.

Contact Information

- Organisation: Ministry of Science, Education and Sports
- Name / Position: Mr. Vedran Mornar / Minister of Science, Education and Sports
- Phone no. / E-mail: (+38) 5 1 4569 000

Croatia recognizes science as developmental priorities that can enable its long-term social stability, economic prosperity and secure cultural identity. The quality of science and technology in Croatia is monitored by the Ministry of Science, Education and Sports, the National Science Council and the National Council for higher Education. There are five types of institutions which carry out the scientific and research activities in Croatia:

1. public institutes
2. institutions of higher education
3. other research legal entities
4. independent commercial institutes
5. corporate industrial institutes

(Source: http://ec.europa.eu/invest-in-research/pdf/download_en/psi_countryprofile_croatia.pdf)

1. Policies and Strategies in Science, Technology and Innovation

Since 2000 Croatia has been in the process of reforming the organisation of research, science and innovation in the country. In particular since the accession negotiations on the research and science were opened and then provisionally closed in October 2006 Croatia has been engaging in reforms in line with the EU actions and targets established under the EU policy for R&I (participation in EU research programmes, European Research Area, and the Innovation Union). Despite the efforts taken, R&I capacity is still weak and requires many more actions if it is to become a real driver for economic growth and competitiveness.

Since the new government took office in 2011 several actions and strategies have been announced but only a few have been adopted. Thus it is difficult to assess the reforms undertaken and whether or not the expected impact is being achieved.
The amendments to the Act on the Croatian Science Foundation and the Act on Science and Higher Education marked the beginning of a series of announced reforms. The Acts bring changes in the financing and governance system of public research activities aimed

at increasing the efficiency of the R&D system. The Croatian Qualifications Framework Act, adopted in the beginning of 2013, also constitutes an important step in improving scientists' qualifications.

The first reform relates to the new model of financing scientific activities introducing performance-based funding based on multi-annual research programmes established at the level of research institutes and universities and the level of funding based on performance indicators for the first time. Besides performance funding, the funding of research projects/grants continues but is based on stricter peer-review criteria which should result in the funding of a smaller number of high-quality projects (about 800 compared to 2500 projects per year previously). In terms of governance project funding is shifted from the MSES to the Croatian Science Foundation which will act as an independent body applying a rigid evaluation process.

On the 20th of December 2012 the government adopted an Action Plan on Science and Society aiming at a more systematic approach to science as a social value, promoting and rebalancing gender and ensuring good communication about science with the citizens. The announced Strategies for Education, Science, Technology and for Innovation are to be adopted by the summer of 2014. As both strategies propose actions to valorize the results of research efforts which, as explained above is Croatia's major weakness, those are the improvements that should be made and implemented as a matter of priority. For example, it is well known that the research infrastructure in Croatia is outdated and that state-of-the-art equipment is lacking. In this context, in April 2014, the adoption of a Roadmap on Infrastructures according to the European Strategic Forum on Research Infrastructures (ESFRI) will be welcomed. Finally the biggest change will come from the fact that since the 1st of July 2013 Croatia has become a Member State. This gives full access to the Structural Funds but will also step up monitoring by the EC of the announced reforms, notably through preparation of the National Reform Programme on all policies, including R&I, to strengthen its competitiveness. (Research and Innovation performance in Croatia, Country Profile 2014, DG R&I, European Commission)

(Source: http://ec.europa.eu/research/innovation-union/pdf/state-of-the-union/2014/iuc_progress_report_2014.pdf#view=fit&pagemode=none)

2. National Programmes and Initiatives

Not Applicable

3. Joint Activities with Korea in 2016

Not Applicable

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
Croatian Science Foundation http://www.hrzz.hr/	▪ Organisation type: research foundation ▪ Major Research Area/Product: all areas ▪ Major Activities with Korea: none ▪ Future Plans/Strategy: promotes science for the economic growth and encouraging employment ▪ Contact Information: Hrvoje Mataković, PhD, Executive Director Phone: (+385) 51 228 690 E-mail: hmatakovic@hrzz.hr
Croatian Institute of Technology Ltd. http://europski-fondovi.eu/	▪ Organisation type: research institute ▪ Major Research Area/Product: all areas ▪ Major Activities with Korea: none ▪ Future Plans/Strategy: 1. supporting and guiding Croatian researches aimed at development and technology 2. monitoring, analyzing and anticipating the effect of global technological movements in the Republic of Croatia 3. giving advice and support in the area of intellectual property and technology transfer 4. promoting participation in European research and development projects 5. Promoting Croatian technological production and research and development potential in the EU and other countries. ▪ Contact Information: Phone (+385) 1 5494 721, Fax (+385) 1 5494 720 ▪ Information on HIT can be found in Ministry of Science, Eduation and Sports site: http://public.mzos.hr/Default.aspx?art=9070&sec=3201

PART 5

CYPRUS

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

CYPRUS

Country Outline

- GDP: 17,901 mil. euros (Eurostat 2016)
- GDP per Capita: 21,300 euros (Eurostat 2016)
- Areas of marked S&T specialisations: Energy, Food, Built Environment, Transport, Health, ICT, Environment

Contact Information

- Name / Position: Mr. Savvas Zannetos / Planning Officer
- Phone no. / E-mail: (+357) 22 602874 / szannetos@dgepcd.gov.cy

The RTDI system in Cyprus is relatively new and is evolving with the aim to increase efficiency and modernize the government, research and productive sector cooperation.

Recently a systematic effort was initiated in order (a) to evaluate the current research and innovation system and procedures in Cyprus and to give recommendations for its adjustment and upgrading it to become more effective and efficient and (b) to adopt explicit multiannual RTDI priorities. The National Committee for Research, Innovation and Technological Development (NCRITD), established by the Council of Ministers, in September 2013, was entrusted with the task to evaluate the current research and innovation system and procedures in Cyprus and to give recommendations for its adjustment and upgrading to become more effective and efficient. The study was submitted to the President of the Republic in March 2014.

R&D expenditure GERD/GDP is among the lowest in the EU with 0.47% or €83.3 million in 2012 (latest available data) and is slightly decreasing compared to 2011. In the National Reform Programme 2013 Cyprus set an R&D intensity target of 0.5% for 2020. This target was set taking seriously into consideration the particularities of Cyprus in terms of both the size of the research community as well as the orientation of the economy in low value added products and services (lack of big manufacturing firms) and the very small size and low involvement of Cypriot enterprises and firms in research and innovation activities in terms of participation and expenditure on R&D and innovation.

1. Policies and Strategies in Science, Technology and Innovation

The Smart Specialisation Strategy for Cyprus, an ex-ante conditionality for the absorption of European Structural and Investment Funds for R&I, was initiated in mid-2013 by DG EPCD and was adopted by the Council of Ministers in March 2015. An extensive analysis of the national R&I priorities has been conducted with the aim of maximizing the knowledge based development potential of the Cyprus economy through targeted support to research and innovation in the sectors where Cyprus has a competitive advantage. The sectors identified through this process are Tourism, Energy, Agriculture/Food Industry, Construction, Shipping, Health, and ICT and Environment as horizontal priorities.

2. National Programmes and Initiatives

As mentioned above a new Strategy was adopted by the Council of Ministers in March 2015. The strategy includes a pillar called "Extraversion" that specifically aims at boosting international cooperation that foreign research entities can participate in projects as partners of Cypriot Contractors.

3. Joint Activities with Korea in 2016

Not Applicable

4. Others

Most of the research in Cyprus takes place in the research centres within the universities. Moreover, there are also several specialized research centres and knowledge institutes outside of universities. However none of the Key Research Organisations has active STI cooperation programmes with RoK.

Key Research Organisations and Companies

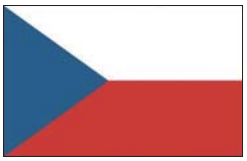
Organisation Name	Detailed information
Research Promotion Foundation http://www.research.org.cy/	▪ Organisation type: research foundation ▪ RPF promotes the development of scientific and technological research in Cyprus, and provides funding ▪ Major Activities with Korea: none ▪ Contact Information: Tel (+357) 22 205000, Fax (+357) 22 205001 Email: ipe@research.org.cy
Cyprus Institution http://www.cyi.ac.cy/	▪ Organisation type: research institute ▪ Major Research Area/Product: Energy, Environment and Water, Archaeology Computation-based Science and Technology ▪ Major Activities with Korea: none ▪ Contact Information: info@cyi.ac.cy
Cyprus International Institute www.hsph.harvard.edu/cyprus	▪ Organisation type: university ▪ Major Research Area/Product: Environment and Public Health ▪ Major Activities with Korea: none ▪ Contact Information: lenia.josephides@cut.ac.cy
Agricultural Research Centre www.ari.gov.cy	▪ Organisation type: research institute ▪ Major Research Area/Product: Agriculture ▪ Major Activities with Korea: none ▪ Contact Information: info@ari.gov.cy
Cyprus Institute of Neurology and Genetics www.cing.ac.cy	▪ Organisation type: research institute ▪ Major Research Area/Product: Health and Genetics ▪ Major Activities with Korea: none ▪ Contact Information: enquiries@cing.ac.cy
University of Cyprus www.ucy.ac.cy	▪ Organisation type: university ▪ Contact Information: (+357) 22 894288
Cyprus University of Technology www.cut.ac.cy	▪ Organisation type: university ▪ Contact Information: (+357) 25 002500

PART 6

CZECH REPUBLIC

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

CZECH REPUBLIC



Country Outline

- GDP: 176,564 mil. euros (Eurostat 2016)
- GDP per Capita: 16,500 euros (Eurostat 2016)
- Areas of marked S&T specialisations: Nanotechnologies and Materials, Molecular Medicine, Biotechnology, Optics and Laser Research, Cybernetics, ICT, Nuclear Energy

Contact Information

- Organisation: Embassy of the Czech Republic to the Republic of Korea
- Name / Position: Mr. Květoslav Sulek / Head of Economic and Commercial Section
- Phone no. / e-mail: (+82) 2 725 6763 / commerce_soul@mzv.cz

The Czech Republic has a rich scientific tradition as well as extremely high-quality human resources and well developed infrastructure. Czech graduates can be found at prestigious foreign universities and respected institutions. Our specialists can confidently knock on the doors of leading global research institutes and multinational companies. The sectors in which we truly excel include informatics and cybernetics, medicine and biotechnology, materials and nanotechnology, nuclear energy and physics-based sciences such as optics, laser technology and optoelectronics. The Czech Republic is a global power in areas such as cybersecurity software.

Czech science has tremendous potential for the future. The number of newly built centres in the full range of sectors is a promise of extraordinary possibilities. Czech industry's links to the world's most advanced economies offer an opportunity to support applied research and to transform industrial production in line with the Industry 4.0 concept. If we promote a systematic approach in combination with an interdisciplinary perspective, the world will undoubtedly hear a lot about Czech research.

1. Policies and Strategies in Science, Technology and Innovation

The responsible state institution for financing and administrating of the R&D is the Ministry of Education, Youth and Sports. However, the Research, Development and Innovation Council (council to the Government) defines strategic visions for the future and estimates the budget (acting under the chairmanship of Deputy Prime Minister of Science, Research and Innovation).

In the field of applied research, the Technology Agency of the Czech Republic (TACR) is the main funding institution while the Czech Science Foundation, finances the basic research. Some ministries – like the Ministry of Industry and Trade responsible for innovations, and the Ministry of Education, Youth and Sports responsible for research – also have various R&D instruments. The Academy of Sciences of the Czech Republic encompasses 54 public research institutions. However, research is also conducted at universities, mainly the technical ones.

2. National Programmes and Initiatives

Czech's support of applied research is conducted through the Technology Agency of the Czech Republic. The Czech Science Foundation supports all disciplines of basic research. CzechInvest – Investment and business development agency of the Czech Republic administrates investment incentives available to investors launching technological centers in the Czech Republic.

List of National Programmes open to the world

Programme Title	Contents
DELTA PROGRAMME www.tacr.cz	▪ Cooperation Type: joint research ▪ Programme for the support of bilateral international collaboration of Czech companies and research organizations in applied research and experimental development with their foreign partners. ▪ Funding Organisation: The Technology Agency of the Czech Republic ▪ Funding Scale and Funding Scheme: TA CR is funding only Czech R&D institutions ▪ Participation Qualification: company from the CR (research organizations from the CR only together with the company) that has a partner in the RoC ▪ Project Duration: The planned duration of the DELTA programme is 6 years (2014-2019), individual projects can be funded up to 3 years. ▪ Research Fields: bottom-up approach ▪ In 2016, a call for Czech-Korean cooperation was launched – Korean funding institutions are Korea Institute for Advancement of Technology (KIAT) and Korea Institute of Energy Technology Evaluation and Planning (KETEP). ▪ In 2017 another Czech-Korean call is being prepared (call expected to be launched on 30th May 2017)
INVESTMENT INCENTIVES FOR TECHNOLOGY CENTERS www.czechinvest.org	▪ Programme for the support of investments into company technology centers. ▪ Funding Organisation: Ministry of Industry and Trade of the Czech Republic via CzechInvest.
THE CZECH SCIENCE FOUNDATIO www.gacr.cz	▪ Bilateral cooperation with National Research Foundation of Korea (NRF).

3. Joint Activities with Korea

List of Joint Programmes or Activities with RoK in 2016

Programme Title	Contents
Joint Call for Proposals For Korea-Czech Bilateral Co-funding R&D Projects	▪ On Czech side the funding agency is TA CR through its DELTA programme (for details see above) ▪ On Korean side funding institutions are KIAT and KETEP. ▪ Evaluation process was concluded by the end of October 2016. ▪ 6 project proposals jointly selected for funding.
Korea-V4 Knowledge Sharing Program 2016/2017	▪ Knowledge sharing project between V4 countries and RoK ▪ On Korean side the responsible institution is Korea Development Institute (KDI) ▪ TA CR had an observer role.

List of Planned Programmes or Activities with RoK in 2017

Programme Title	Contents
Joint Call for Proposals For Korea-Czech Bilateral Co-funding R&D Projects	▪ On Czech side the funding agency is TA CR through its DELTA programme (for details see above) ▪ On Korean side funding institutions are KIAT and KETEP. ▪ Evaluation process will be concluded by the end of October 2017.
Korea-V4 Knowledge Sharing Program 2017/2018	▪ Knowledge sharing project between V4 countries and RoK ▪ On Korean side the responsible institution is Korea Development Institute (KDI) ▪ TA CR discusses its participation along with the Ministry of Industry and Trade

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
CEITEC – Central European Institute of Technology www.ceitec.eu	CEITEC is a multidisciplinary science centre focused on life sciences and advanced materials and technologies whose aim is to establish itself as a recognised centre for basic as well as applied research. Supported by the Region of South Moravia and the City of Brno, it is a consortium whose partners include the most prominent universities and research institutes in Brno. CEITEC offers state-of-the-art infrastructure for research divided into 61 groups and seven programmes: Advanced Nanotechnologies and Microtechnologies, Advanced Materials, Structural Biology, Genomics and Proteomics of Plant Systems, Molecular Medicine, Brain and Mind Research, and Molecular Veterinary Medicine. Modern laboratories with an area of 25,000 square meters grew in Brno. The advanced technologies in use at CEITEC facilitate synergistic study in life and material sciences at all levels of complexity, from individual atoms, through molecules, molecule groups and cells to whole organisms. Ten core facilities enable specialised research, attainment of higher levels of expertise, higher-quality facilities for advanced education and mainly close, multidisciplinary cooperation.
Institute of Physics AS CR, projects ELI Beamlines & HiLASE www.eli-beams.eu	Extreme Light Infrastructure (ELI) is part of a new generation of large European research facilities with the main goal of creating laser equipment with unique parameters. ELI's research projects will cover the interaction of light with matter at an intensity level ten times higher than current achievable values. The ELI Beamlines facility in the Czech Republic will provide ultra-short laser pulses of a few femtoseconds duration with peak power up to 10 PW. ELI Beamlines will create a portfolio of unique secondary sources covering photons in a broad spectrum of wavelengths as well as accelerated electrons, protons and ions for interdisciplinary applications in physics, medicine, biology and materials science. Specific applications are in cancer treatment, 3D diagnostic methods and material structures, among other areas. These state-of-the-art sources will be driven by ultra-intense lasers with the possibility of synchronising them in unique combinations with near-absolute precision. Two other centres will be set up in Hungary (ELI Attosecond – ultra-short optical pulses) and Romania (ELI Nuclear Physics – photonuclear physics).

BIOCEV www.biocev.eu	BIOCEV is a biotechnology and biomedicine centre of the Academy of Sciences and Charles University. There are six partner institutes of the Academy of Sciences (Institute of Molecular Genetics, Institute of Biotechnology, Institute of Microbiology, Institute of Physiology, Institute of Experimental Medicine, and Institute of Macromolecular Chemistry) and two faculties of Charles University in Prague (Faculty of Science and 1st Faculty of Medicine). The Centre builds upon three pillars of the knowledge triangle: teaching and education, research and development, and transfer of research results into practice. Among the main aims of R&D in BIOCEV are detailed study of cellular mechanisms at the molecular level, research and development of novel therapeutic strategies, early diagnostics, biologically active agents including chemotherapeutics, protein engineering and other technologies having an impact on the quality of life, development of the knowledge economy and the competitiveness of the Czech Republic.
Technical University of Ostrava – IT4Innovations National Supercomputing Center www.it4i.cz	The IT4Innovations national supercomputing center is a research institute at the VŠB -Technical University of Ostrava. IT4Innovations conducts research and provides state-of-the-art technologies and services in the fields of high performance computing and embedded systems. Since June 2013, IT4Innovationons operates the supercomputer Anselm, with performance of 94 TFLOPS (Rpeak). The main system, the supercomputer Salomon, with performance 2 PFLOPS (Rpeak) was put into operation in June 2015. This supercomputer ranked among the 50 most powerful supercomputers in the world and is the largest Intel(r) Xeon Phi(tm) coprocessor-based cluster in Europe. Since 2011, IT4Innovations has been a member of the prestigious Partnership for Advanced Computing in Europe (PRACE) research infrastructure.
The International Clinical Research Center – FNUSA – ICRC www.fnusa-icrc.org	The International Clinical Research Center of St. Anne's University Hospital Brno (FNUSAICRC) is a new-generation science and research centre focusing on finding new methods, technologies and medicines for effective prevention, early diagnostics and individualised treatment of cardiovascular and neurological diseases. The centre is based on the hospital's successful, long-term cooperation with Mayo Clinic (USA) and other partners both in the Czech Republic and abroad. Areas of research at the FNUSA-ICRC include cardiovascular and transplant surgery, heart-failure treatment and transplant programmes, interventional cardiology and acute coronary syndromes, cardiac and central nervous system electrophysiology and pacing, cardiovascular and metabolic disorders, development of new methods and interventions to reduce risk factors, tissue engineering in cardiovascular research, cerebrovascular disease research, neuroepidemiology and several research platforms.

Centre of Excellence Telč cet.arcchip.cz	The Centre of Excellence Telč (Institute of Theoretical and Applied Mechanics CAS) has been established for research on historic and other materials and structures. In particular, it is equipped with a unique infrastructure specially designed and manufactured with a view to obtaining fundamental knowledge and verifying the application and innovation potential of newly-developed technologies in the areas of diagnostics, lifecycle extension, preventive protection and conservation, including long-term sustainable use of the existing building stock and technical materials.
CzechGlobe www.czechglobe.cz	CzechGlobe - Global Change Research Institute of the Czech Academy of Sciences is a public research institution and European Centre of Excellence investigating the ongoing global climate change and its impact on the atmosphere, biosphere and human society through the use of the latest techniques and instrumentation. The research focuses primarily on the development of the climate and its future scenarios, the carbon cycle and the effects of changing conditions on the production and biodiversity of ecosystems and on the impacts on future development and behaviour of our society.
NTIS www.ntis.zcu.cz	NTIS - New Technologies for the Information Society is a modern research centre of the Faculty of Applied Sciences of the University of West Bohemia in Pilsen. The mission of the NTIS Centre is research, development and innovation in the priority areas of the information society and materials research. The centre's activities are focused on development of cybernetic and mechanical systems, and information and bio-engineering technologies. Its activities also involve research and development of new thin-film materials and plasma sources, processing of geo-spatial data and development of mathematical structures designed to support mathematical models of explored systems and processes. The NTIS Centre also supports competitiveness of the national and regional industry through technology transfer and cooperation with the application sphere.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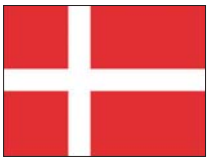
PART 7

DENMARK

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

DENMARK



Country Outline

- GDP: 277,339 mil. euros (Eurostat 2016)
- GDP per Capita: 45,700 euros (Eurostat 2016)
- Areas of marked S&T specialisations: Pharmaceutical, Biotech, Medtech, Clean Tech, Renewable Energy, ICT, Food, Agriculture

Contact Information

- Name / Position: Mr. Torben Orla Nielsen / Innovation & Research Counsellor
- Phone no. / e-mail: (+82) 2 795 4187 (EXT. 410) / torbni@um.dk

Public and private investments in research and development (R&D) have increased significantly in recent years in Denmark. It is one of six countries in the world, which invests more than three per cent of GDP on R&D. The scientific base in Denmark is strong with several world class universities. When it comes to scientific publications, Denmark ranks third in a comparison of OECD countries in both citations per publication and scientific publications in relation to the size of the country. Today, Denmark exceeds the world average for the 10% most highly cited publications (the top decile) by 35%.

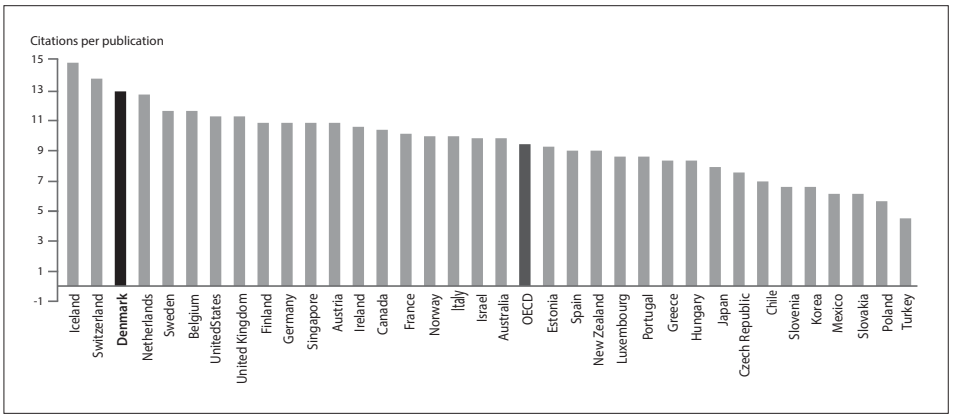
According to the Innovation Union Scoreboard 2016, Denmark is ranked as the second most innovative country in the European Union.

1. Policies and Strategies in Science, Technology and Innovation

The Ministry of Higher Education and Science is the main policy formulating and funding public body in Denmark with The Danish Agency for Science and Higher Education (DAFSHE) as the operationel body within policy development, statistics and analysis and implementation of funds to research, technology development and innovation.

All universities in Denmark are public. In 2007, the Danish university sector underwent a major restructuring where most sector specific research institutions were merged with universities. This means that the vast majority of public research today is being conducted at universities and research capacity at Danish universities is relatively high.

Figure 1. Citations per Publication, OECD, 2008–2012



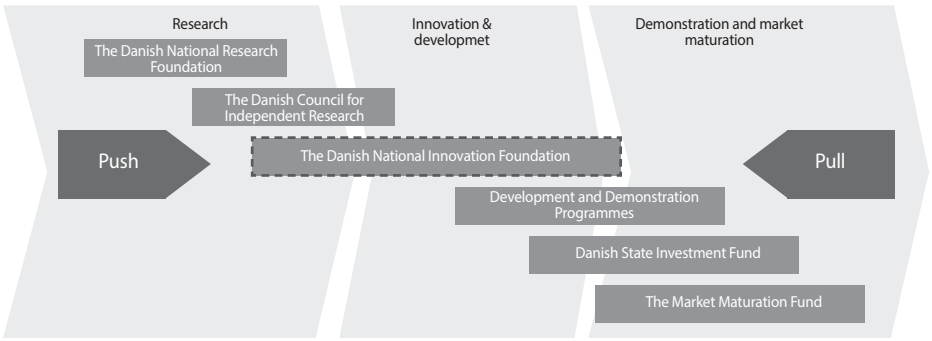
Denmark has one of the most effective research and innovation systems in the world, as can be seen in various OECD statistics, bibliometric analyses and on the Innovation Union Scoreboard 2016. The latter ranks Denmark as the second most innovative country in the European Union. The ambition for Denmark is to be among the leading countries in research and innovation. The overall focus is on societal challenges rather than technology areas and the idea is that this will trigger the demand for new solutions and thereby drive innovation. The success of this approach is measured by five key indicators for research and innovation:

- Share of innovative companies
- Private investments in research and development
- Share of highly educated employees in the private sector
- Public investments in research and development
- Share of external funding of public research

The goal for the first three indicators is to be in the top five among the OECD countries by 2020.

The new focus will be reached through a new and simplified structure of the public system which is more flexible and through closer cooperation between the public and private sector.

Figure 2. Danish funding organisations



Research and innovation in Denmark is funded partly through universities basic funding, and partly through external and competitive funds from various research and innovation financing bodies. The four most important sources of Danish research and Innovation are:

- Innovation Fund Denmark (IFD)
  Grants 215 million € in 2015 for activities within strategic research, tech. & innovation
- The Danish Council for Independent Research
  Grants 161 million € in 2015 to research based on researchers' own initiatives
- The Danish National Research Foundation
  Grants 67 million € in 2015 to basic research primarily of Centres of Excellence
- EU Horizon 2020
  Danish share of grants 160 million € in 2015 to research & Innovation
- Universities' basic funding
  1,200 million € per year (In addition, funding for education based on output)

In april 2014, the Innovation Fund Denmark (IFD) was created as a result of a merger between three national funding bodies creating one single organisation with a consolidated mission, vision and objective enacted in national law. The Board of Directors consists of a combination of corporate and scientific members securing a scientific background, however, with a potential to succeed for the market.

In addition to public funds, a number of private foundations provide reasearch funding. On average, the private foundations contribute 250 million € yearly. Major private research funding organisations are Novo Nordisk Foundation, Carlsberg Foundation and Lundbeck Foundation.

2. National Programmes and Initiatives

List of National Programmes open to the world

Programme Title	Contents
Korean-Danish Joint Mobility program	▪ Outline: Since 2015 joint mobility program between Denmark and Korea has been available. Next joint call is expected to be made public at the end of 2017. Joint fund of 80,000 € ▪ Research Fields: all ▪ Organisation: Danish Agency for Science and Higher Education & NRF ▪ Nationalities: Korean & Danish researchers can apply ▪ What is funded: joint research ▪ Duration: 1 years ▪ Deadline: TBA / Web page: TBA
Korean-Danish Joint research funds	▪ Outline: first joint research call was made in 2013 and next joint call is expected to be made public in the end of 2017. ▪ Research Fields: TBA ▪ Organisation: Innovation Fund Denmark & NST ▪ Nationalities: joint Korean/Danish research groups can apply ▪ What is funded: joint research ▪ Duration: 3-5 years ▪ Deadline: TBA / Web page: TBA
International Network Program (website)	▪ Outline: support to networking and matchmaking initiatives seeking to identify potential for bilateral research collaboration. ▪ Research Fields: all ▪ Organisation: Danish Agency for Science and Higher Education ▪ Nationalities: scientists from Denmark and from one or more of the following countries: China, India, Israel, Japan, USA, Brazil and South Korea. ▪ What is funded: operating expenses for workshops and conferences, international travel and research stay for a shorter period up to 90 days in the selected countries, DKK 200.000 excluding overhead expenses ▪ Duration: up to a year ▪ Deadline: May 17 ▪ Web page: http://ufm.dk/en/research-and-innovation/funding-programmes-for-research-and-innovation/eu-and-international-funding-programmes/international-cooperation/international-network-programme-1/calls-international-network-programme/the-international-network-programme-nineth-call-for-proposals8c5fc187000944238b61f774fae5a87c

Innovation Fund Denmark	▪ Outline: the fund invests in the development of new knowledge and technology creating growth and employment in Denmark. ▪ Research Fields: the Fund offers grants for activities within strategic research, technology and innovation. ▪ Organisation: Innovation Fund Denmark ▪ Nationalities: Danish researchers in cooperation with researchers of any other nationality ▪ What is funded: - Talent (for PhDs or candidates with entrepreneurship) - InnoBooster (For SMEs with a strong idea and a desire for new knowledge) - Grand Solutions (For a collaboration that addresses a societal challenge and creates growth) ▪ Duration: depends on the funding instrument ▪ Deadline: depends on the funding instrument ▪ Web page: https://innovationsfonden.dk/en
The Industrial PhD & Postdoc	▪ Outline: an Industrial PhD project is an industrially focused PhD project where the candidate is hired by a company or a public sector organisation and enrolled at a university at the same time. ▪ An Ind. postdoc divides time between company and research institution. ▪ Research Fields: all ▪ Organisation: Innovation Fund Denmark ▪ Nationalities: all nationalities, however, the Industrial PhD candidate and postdoc have to be employed in a Danish division of the company. ▪ What is funded: subsidy for wage, supervising etc. ▪ Duration: Industrial PhD: 3 years ▪ Industrial postdoc: 1-3 years ▪ Deadline Industrial PhD: January, May & September ▪ Web page: https://innovationsfonden.dk/en/application/erhvervsphd
The Danish Council for Independent Research	▪ Outline: the Danish Council for Independent Research (DFF) funds specific research activities which are based on the researchers' own initiatives and to internationalisation of Danish research ▪ Research Fields: all ▪ Organisation: The Danish Council for Independent Research ▪ Nationalities: application is not restricted by citizenship, ▪ What is funded: Individual Postdoctoral Grants ▪ Research projects from DKK 1,800,000 to DKK 8,300,000 excl. overhead ▪ Duration: Individual Postdoctoral Grants: Up to 3 years ▪ Research projects: up to 5 years ▪ Deadline: Individual Postdoctoral Grants: spring and autumn ▪ Research projects: autumn ▪ Web page: http://ufm.dk/en/research-and-innovation/funding-programmes-for-research-and-innovation/calls/2016/danish-council-for-independent-research-call-for-proposals-autumn-2016

Sapere Aude Programme	▪ Outline: Sapere Aude is a talent development programme for the elite. The goal is to develop the abilities of the best research talents, nationally and internationally. The programme supports Sapere Aude Research Talent, which aims at young excellent researchers at the postdoc level. ▪ Research Fields: all ▪ Organisation: The Danish Council for Independent Research ▪ Nationalities: The programme is for both Danish researchers and researchers from abroad, however, it is required that the research will benefit Danish research. ▪ What is funded: Sapere Aude: DFF–Starting Grants: DKK 4,900,000, excl. overhead ▪ Deadline: autumn ▪ Web page: http://ufm.dk/en/research-and-innovation/councils-and-commissions/the-danish-council-for-independent-research/for-applicants/what-can-you-apply-for/overview-of-instruments/the-sapere-aude-programme-the-3-steps
Centres of Excellence	▪ Outline: The Center of Excellence (CoE) programme is the primary funding mechanism and the flagship of the Danish National Research Foundation. A center grant is large and flexible and a center may have a lifetime of up to 10 years. Only top researchers with the most ambitious ideas will be awarded a CoE through fierce competition involving a two-stage application process. ▪ Several of the centres are headed by a foreign researcher and 60 pct. of the postdocs and almost 40 pct. of the PhD students at the centres are recruited from abroad. ▪ Research Fields: all ▪ Organisation: Danish National Research Foundation ▪ Nationalities: all nationalities ▪ What is funded: Centres of Excellence ▪ Duration: from 6-10 years ▪ Deadline: TBA ▪ Web page: http://dg.dk/en/centers-of-excellence-2/

3. Joint Activities with Korea

List of Joint Programmes or Activities with RoK in 2016

Programme Title	Contents
INNOVATION CAMPS & RESEARCH-BASED DELEGATIONS	
International Electronic Vehicle Expo (IEVE) – Danish Delegation	▪ Activity (Programme) outline: March 18-24 in Jeju Island ▪ Major topic or agenda: Electric Vehicle
Smart Building Innovation Camp	▪ Activity (Programme) outline: October 24–28 in Seoul & Songdo ▪ Major topic or agenda: Smart Building / Architecture ▪ Target Participants: Group of Danish and Korean stakeholders
Gaming & Playware Innovation Camp	▪ Activity (Programme) outline: June 13–16 in Seoul & Pangyo ▪ Major topic or agenda: Gaming & Playware ▪ Target Participants: Group of Danish and Korean stakeholders
Bio Korea	▪ Activity (Programme) outline: March 30–April 1 in COEX, Seoul ▪ Major topic or agenda: Biotech, Pharmaceuticals ▪ Target Participants: Group of Danish and Korean stakeholders
RESEARCH WORKSHOPS	
Arctic	▪ Activity (Programme) outline: April 11–12 at KOPRI (Korea Polar Research Institute) ▪ Major topic or agenda: from Application ▪ Target Participants: University of Copenhagen & KOPRI
Societal Challenges	▪ Activity (Programme) outline: April 18–20 in Denmark ▪ Major topic or agenda: Arctic, Plant Science, Health ▪ Target Participants: University of Copenhagen & Yonsei University
2nd Denmark-Korea Student Entrepreneurship Camp	▪ Activity (Programme) outline: October 23–28 at Yonsei University ▪ Major topic or agenda: Enterpreneurship ▪ Target Participants: Copenhagen Business School (CBS), University of Copenhagen, Yonsei University and YES Foundation

List of Planned Programmes or Activities with RoK in 2017

Programme Title	Contents
INNOVATION CAMPS & RESEARCH-BASED DELEGATIONS	
4th International Electronic Vehicle Expo	▪ Activity (Programme) outline: March 19-21 in Jeju Island ▪ Major topic or agenda: Electric Vehicle
Smart Textile and Lifestyle Camp	▪ Activity (Programme) outline: June 12–16 in Seoul & Daegu ▪ Major topic or agenda: Match-making and inspiration in lifestyle, fashion and technical textiles ▪ Target Participants: Danish and Korean companies and educational institutions
Entertainment Camp	▪ Activity (Programme) outline: June 6–9 or 19–22 in Seoul ▪ Major topic or agenda: film, animation and game/learning contents ▪ Target Participants: Danish and Korean companies, content developers and museums/entertainment parks
Drone Innovation Camp	▪ Activity (Programme) outline: September 11–14 in Seoul & Daejeon ▪ Major topic or agenda: Drones and UAS/UVS ▪ Target Participants: Danish Drone companies
RESEARCH WORKSHOPS	
1st Joint Committee Meeting on for Science and Technology between Denmark and Korea	▪ Activity (Programme) outline: April 25 in Copenhagen ▪ Major topic or agenda: Science and Technology Cooperation between the Danish Ministry of Higher Education and Science (MHES) and the Korean Ministry of Science, ICT and Future Planning (MSIP) ▪ Target Participants: MHES, MSIP, Danish Agency for Science and Higher Education, National Research Foundation, Innovation Fund Denmark, National Research Council of Science & Technology
3rd Denmark-Korea Student Entrepreneurship Camp	▪ Activity (Programme) outline: TBD ▪ Major topic or agenda: Enterpreneurship ▪ Target Participants: Danish and Korean students at designated universities (TBD)
Nordic Research Conference	▪ Activity (Programme) outline: at the end of 2017, in Seoul ▪ Major topic or agenda: TBD ▪ Target Participants: Nordic Embassies in Korea (Denmark, Sweden, Norway and Finland)
Denmark-Korea-Germany Drone Research Workshop	▪ Activity (Programme) outline: October 13 in Odense ▪ Major topic or agenda: Drones and UAS/UVS research collaboration between three countries ▪ Target Participants: Danish, German and Korean drone/UAS researchers

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
Innovation Centre Denmark, Seoul icdk.um.dk	▪ Innovation Centre Denmark facilitates research and innovations collaboration between Danish and Korean Universities and research institutions tech-based companies.
Danish Agency for Science and Higher Education (DAFSHE) www.ufm.dk	▪ Government agency under Ministry of Higher Education & Science responsible for university, research & innovation ▪ Future Plans: joint EUREKA call with KIAT
Innovation Fund Denmark www.Innovationsfonden.dk	▪ The main funding body in Denmark for research and innovation within: Applied research and experimental development
Universities in Denmark	▪ University of Copenhagen www.ku.dk ▪ Technical University of Denmark – DTU www.dtu.dk ▪ University of Southern Denmark www.sdu.dk ▪ Copenhagen Business School www.cbs.dk ▪ IT University www.itu.dk ▪ Aarhus University www.au.dk ▪ Aalborg university www.aau.dk
Cluster Organizations in Denmark (Innovation Networks)	▪ Innovation Network InnoBYG - construction (www.innobyg.dk) ▪ The Danish ICT Innovation Network – InfinIT (http://www.infinit.dk/) ▪ Innovation Network RoboCluster (http://www.robocluster.dk/) ▪ Danish Sound Technology Network (http://www.lydteknologi.dk/) ▪ Danish Lighting Innovation Network (http://www.dansklys.dk/) ▪ Innovation Network for Biotech (http://www.biopeople.dk/) ▪ Innovation Network for Environmental Techn (http://inno-mt.dk/) ▪ Clean Cluster (http://cleancluster.com/) ▪ Welfare Tech (http://www.welfaretech.dk/) ▪ MedTech Innovation (http://www.mtic.dk/)

PART 8

ESTONIA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

ESTONIA

Country Outline

- GDP: 20,916 mil. euros (Eurostat 2016)
- GDP per Capita: 13,500 euros (Eurostat 2016)
- Areas of marked S&T specialisations: ICT, Health Technologies and Services, More Effective Use of Resources, Health technologies and services, More effective use of resources

Contact Information

- Organisation: Ministry of Education and Research
- Name / Position: Mr. Taivo Raud / Head of Research Policy Department
- Phone no. / e-mail: (+372) 735 0134 / Taivo.Raud@hm.ee

In the last decade Estonian society and the economy have developed rapidly as a whole; as a result of the economic crisis, the structure of the economy is also changing. Ensuring further development requires increasing the attention paid to achieving a better position in the international value chain and to increasing the welfare of people living in Estonia. Estonia's R&D strategy "Knowledge-based Estonia" determines the directions for the development of research and development and innovation, on the basis of which one of the most important and central fields of activity in Estonian society can be managed in a more interconnected manner, where public financial resources can be better applied, and the competitiveness of the state and the welfare of the population can be increased.

1. Policies and Strategies in Science, Technology and Innovation

The overall aim of the development of RDI is to create favorable conditions for an increase in productivity and in the standard of living, for good-quality education and culture, and for the sustainable development of Estonia. **Knowledge based Estonia** establishes four main objectives for Estonia.

1) Research in Estonia is of a high level and diverse. It is internationally competitive and visible, and covers the main fields of higher education and culture. The efficient network of research institutions, the modern infrastructure, a new generation of researchers and innovators is ensured. Estonia is an attractive place for research and development, and a researcher career is popular.

2) Research and development (R&D) functions in the interests of the Estonian society and economy. It proceeds from the needs of society and the economy, and prioritizes research applications. Research institutions are motivated to undertake applied research and for productive cooperation with enterprises and government authorities. The state

is smart in commissioning applied research and development. Research carried out for socioeconomic objectives is efficiently organized.

3) R&D makes the structure of the economy more knowledge-intensive. RDI investments selected and managed by the smart specialization method encouraging the development of growth areas at heightened pace, which results to the increase of the share of knowledge intensive entrepreneurship and the added value exports in the economy. The selected growth areas are:

- Information and communication technology (ICT), horizontally through other sectors
- Health technologies and services
- More effective use of resources

4) Estonia is active and visible in international R&D cooperation as cross-border cooperation helps to solve the impending domestic and international issues. Estonia participates as a partner in the initiatives of the European Research Area, (incl. in the joint programming of research), European innovation partnerships, initiatives in the Baltic and Nordic region, and international research infrastructures. Enterprises have access to the world's newest RDI results, and cooperation opportunities and infrastructures are open to them.

Estonian Entrepreneurship Growth Strategy 2014–2020 is focusing on three main challenges in order to increase the wealth of Estonia: increasing productivity, stimulating entrepreneurship and encouraging innovation. Under "Estonia 2020", the strategy is to enhance productivity (up to 80% per employee of the EU average) and employment (by 76% in the age group 20-64). In order to increase productivity Estonia focuses both on raising the ambition of entrepreneurs as well as on enhancing research and development activities, innovation and investments and export.

2. National Programmes and Initiatives

List of National Programmes open to the world

Programme Title	Contents
Mobilitas Plus (Internationalisation of research and support for mobility and the next generation)	▪ Cooperation Type: mobility ▪ Funding Organisation: European Regional Development Fund and Estonian national budget ▪ Program duration: 2015-2022 ▪ Participation Qualification: Estonian Institutions and enterprises who wish to hire post-docs or top level researchers from foreign countries ▪ Project Duration: up to 5 years for top researchers; up to 2 years for post-docs ▪ Funding Scale and Funding Scheme: total budget 35 mil. euros; 5% self-financing for post-docs and 17% for top researchers ▪ Research Fields: all fields
R&D funding and mobility opportunities for researchers in Estonia	▪ Please find information about personal grants for start-ups and team grants online: http://researchinestonia.eu/funding/ ▪ For practical information on professional and daily life, as well as information on job and funding opportunities visit www.euraxess.ee.
Study opportunities and scholarships for international students in Estonia	▪ 2017 more than 100 degree programmes offered by Estonian higher education institutions are fully taught in English. ▪ STUDY IN ESTONIA is a cooperation platform of institutions of higher education in Estonia to increase visibility of Estonia as an attractive study destination and promote the possibilities for studying for international students. ▪ Please find detail information about scholarships opportunities for Master's, PhD, and some Bachelor's international students and about study programmes in English from http://www.studyinestonia.ee/
Investment aid to shared services and research and development centres	▪ Target group: an entrepreneur who has been registered in Estonia and belongs to an international group, and who also provides support services or serves the function of development activity in the group. ▪ Additional information: http://www.eas.ee/service/investment-aid-to-shared-service-and-research-development-centres/?lang=en

3. Joint Activities with Korea in 2016

Not Applicable

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
Estonian Research Council http://www.etag.ee/	▪ Organisation Type: research funding agency ▪ Major Activities with Korea: none ▪ Future Plans/Strategy: foster (fund and facilitate) basic and applied R&D, encourage international co-operation, represent Estonia at international organisations, manage the Estonian Research Information System, analyze Estonian R&D and raise public awareness about science and its importance to society. ▪ Contact Information: Andres Koppel, Head of Estonian Research Council, phone (+372) 730 0324, E-mail: andres.koppel@etag.ee
Enterprise Estonia http://www.eas.ee/	▪ Organisation Type: funding agency, Enterprise Estonia promotes business and innovation in Estonia. ▪ Major Activities with Korea: none ▪ Activities: national support system for enterprises by providing financial assistance, counselling, cooperation opportunities and training. ▪ Contact information: Phone (+372) 6 279 700, E-mail: eas@eas.ee

University of Tartu
www.ut.ee

- Organisation Type: public university
- Major Research Area: multidisciplinary
- Major Activities with Korea:

1) Entrepreneurship agreements

Licence agreement „Lactobacillus fermentum ME-3" with Namyang Dairy Products Co., Hyang Rim Corporation (2011-13).

2) Studies and teaching

- **Student exchange** under bilateral cooperation agreements with Pusan National University and Chung-Ang University, bilateral agreements also with University of Jeonju, Soongsil University.
- **Scholarship scheme** for incoming mobility for students and scholars under Erasmus Mundus Action 2 project IDEAS - Innovation and Design for Euro-Asian Scholars.
- **Faculty and research visits, guest lecturers and teaching staff** from Korea.
- **Korean language tuition. Courses on Korean culture and society** have been actively provided.

3) Centre of Asian of the University of Tartu.

Centre was established in 2016 as a consortium and Master's Program on Asian studies will be launched from the academic year 2018/19.

- Future Plans:

The University of Tartu is interested in reinforcing the cooperation with the Republic of Korea in the fields of research, technology, innovation and entrepreneurship.

The curriculum for Master Program on Asian studies in Tartu University will increase the capability and competitiveness, which, in its turn, will improve the competitiveness of UT as a whole. The curriculum will contribute to several strategic development directions of UT, including the development of educational and scientific activities, entrepreneurship and internationalization.

Contact Information:

Mr.Indrek Ots, Head of Research and Development Office, University of Tartu/ Phone (+372) 737 5614

Ms Kristi Kerge, Head of International Cooperation, Rectors Strategy Office University of Tartu/ Phone (+372) 737 6123

Ms Elo Süld, Head of Asian Centre of University of Tartu / Phone (+372) 737 5300

Others: conferences

- The conference on "Geopolitical changes, economic innovation and international relations' is granted by the Academy of Korean Studies in December 2017.

Tallinn University www.tlu.ee	▪ Organisation Type: public university ▪ Major Research Area/Product: educational research in Global Education Area, Developing joint curriculum "Global Education" for higher education ▪ Major Activities with Korea: joint research, exchange students, university teachers and researchers. a) Grant support for the "Employment of Teaching Staff for Korean Language" The Korea Foundation. b) Research project "Global Studies on Teacher Education" with Oulu University, Finland (leader) and Chungbuk National University, Korea c) "KE-LeGe (KOR-EU Leaders for Global Education)" - The consortium for the KE-LeGE, Leaders for Global Education, project consists of four universities. Central Ostrobothnia, University of Applied Sciences and University of Oulu (Finland), University of Innsbruck (Austria) and University of Tallinn (Estonia). Three universities from the Korean consortium: Chungbuk National University, Sunchon National University and Korea University. Major activities for this three year project are: 1) exchange of 40 undergraduate students with focus on pedagogy from each consortium, 2) mobility program for 24 EU faculty members and 9 members, and 3) development of courses for global education. Korea students will spend 5 months at hosting institutes taking courses in global education, English, and the local language as part of cultural learning, and teaching practice at local schools. EU students will have a similar 4-month experience supported by local universities and communities. ▪ Future Plans: carrying out joint Global Education Curriculum, research in Education, including teacher education ▪ Contact Information: Prof. Priit Reiska, Vice Rector for Academic Affairs, priit.reiska@tlu.ee
Tallinn University of Technology http://www.ttu.ee/en/	▪ Organisation Type: public university - Major Research Area/Product: Civil Engineering, Power Engineering, Information and Communication Technology, Chemistry and Biotechnology, Environment, Mathematics and Physics, Materials Science and Technology, Social Sciences (incl. Economics), Health, Production technologies, Mechanical and Instrumental Engineering ▪ Major Activities with Korea: - Student/researcher exchange, research co-operation, culture and language center. - "Tallinn King Sejong Institute" an institute that disseminates and teaches the Korean language as well as Korean culture to anyone who wants to learn the language. ▪ Contact Information: Mr. Reijo Karu, Head of International Cooperation, e-mail: reijo.karu@ttu.ee , phone (+372) 620 3503

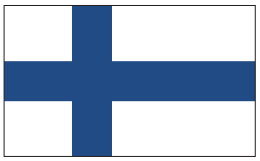
Estonian University of Life Sciences www.emu.ee	▪ Organisation Type: public university ▪ Major Research Area/Product: agriculture, veterinary and animal science, forestry, food science, environmental science, renewable energy, rural economics, plant science ▪ Future Plans: student/researcher exchange; development of bioeconomy research ▪ Contact Information: Estonian University of Life Sciences, Kreutzwaldi 1, 51014 Tartu, Estonia: e-mail: info@emu.ee

PART 9

FINLAND

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

FINLAND



Country Outline

- GDP: 214,062 mil. euros (Eurostat 2016)
- GDP per Capita: 34,500 euros (Eurostat 2016)
- Areas of marked S&T specialisations: ICT, Bioeconomy, Mobile Technologies, Cleantech, Renewable Energy, Health, Forest and Environmental Sciences, Sustainable and Urban Development, Smart Cities and Sustainability

Contact Information

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Finland is a Northern European country which invests heavily in research and innovation (3% of GDP in 2016). It is assessed by the Innovation Union Scoreboard as one of the European innovation leaders. With an efficient education and training system, skilled workforce, and stable institutions Finland is one of the world's most competitive economies. Finland has a strong specialization in ICT and it is moving fast towards digital economy. Other main focus areas include clean technologies, health care and bioeconomy. 16% of the country is covered by forests providing resources for the wood and paper industry and for recreational activities and tourism. The national research and innovation strategy encourages renewal of economies and setting up of new business start-ups. The Government is also increasing emphasis on service and creative sectors including marketing, design, branding and other consumer focused value creating activities.

1. Policies and Strategies in Science, Technology and Innovation

Key figures in R&D expenditure, 2014

	Finland	OECD
Gross domestic expenditure on R&D (GERD)		
USD million PPP, 2014	7,051	1,181,495
As a % of total OECD, 2014	0.6	100
GERD intensity and growth		
As a % of GDP, 2014	3.17	2.38
Annual growth rate, 2009-2014	-2.8	+2.3
GERD publicly financed		
As a % of GDP, 2014	0.88	0.61
Annual growth rate, 2009-2014	0.5	+2.5

(Source: OECD STI Outlook, 2016)

Finland invests in knowledge-based competence

The Government Programme stresses the role of research as the foundation of knowledge and know-how. In return, this promotes sustainable economic growth and immaterial as well as material welfare. In 2016, research and development expenditure represented about 3% of the gross domestic product (GPD) and that of public research funding was around 1%.

The Ministry of Education and Culture is responsible for the planning and implementation of higher education and science policy and preparing statutes, national budget proposals and government decisions that apply to these. Universities (14) focus on scientific research and education supporting it. Universities of applied sciences (23), on the other hand, offer pragmatic education that aims to respond directly to working life needs. The main emphasis of research, development and innovation at universities of applied science is on applied research and development. The science agencies and research institutes support the preconditions for research activities. More information on policies on science and higher education:
http://minedu.fi/en/frontpage

To ensure the freedom and independence of science and higher education, universities are autonomous actors and independent legal entities that have the right to make their own decisions related to their internal administration. The Academy of Finland is a key source of funding for scientific research in Finland and an active stakeholder in Finnish and international science and innovation policy. The Strategic Research Council (SRC) operates as part of the Academy of Finland.

The majority of the Academy's funds are channelled to the research carried out at universities, and it finances research projects, Academy Programmes, Centres of Excellence, researcher activities, research infrastructures as well as international cooperation. The Academy's research councils decide on funding allocation to research carried out in their respective fields. The Academy also handles the administration of EU research programs and international research organizations in cooperation with the Finnish Funding Agency for Innovation (Tekes).

Finland offers a competitive business environment

The World Economic Forum's Global Competitiveness Report (2015-2016) has ranked Finland as the eighth most competitive nation in the world and as one of the innovation driven nations. Finland is an easy operating environment for businesses, with minimal bureaucracy and stable and competitive economy. In the Innovation Union Scoreboard 2016 Sweden, Denmark, Finland, Germany and the Netherlands are the four innovation leaders in the European Union. Finland is the leader in financial framework conditions.

Finland's innovation policy guidelines include the Research and Innovation Council's policy guidelines, the underlying innovation strategy priorities, the Government Program, and separate decisions taken by the Government on innovation policy. Innovation policy has four focus areas for spurring renewal and growth in the Finnish business and industry: bioeconomy, cleantech, digitalization and health sector.

The Government is also increasing emphasis on the service and creative sectors, including marketing, design, branding and other consumer focused value creating activities and business models as sources for economic growth.

The Ministry of Employment and the Economy is responsible for most decisions on innovation policy. Development of Finland's innovation system is coordinated by the Research and Innovation Council led by the Prime Minister. The two main organizations regarding STI sector under the ministry are 1) VTT, the Technical Research Centre of Finland Ltd. and 2) Tekes – the Finnish Funding Agency for Innovations. More about the ministry's innovation policy:
http://tem.fi/en/innovation-policy

Tekes, the Finnish Funding Agency for Innovation is the main publicly funded expert organization for financing research, development and innovation in Finland. Tekes' budget for research and innovation is 450 million euros in 2017. Tekes' mission is to renew industries, increase the value added and productivity, improve the quality of working life, as well as boost exports and generate employment and wellbeing. Wide-ranging innovation activities are boosted in research communities, industry and service sectors. Tekes promotes a broad-based view on innovation: besides funding technological breakthroughs, the significance of service-related, design, business, and social innovations is emphasized. Digitalization as well as intangibility and value creation influence widely on all fields.

The service offering includes:

- Disruptive and pioneering business projects that originate from customers' own initiatives
- The main focus areas of substance based funding are the common services offered together with strategic partners
- Joint programs
- Comprehensive service packages that support innovation, growth and internationalization as a whole
- Services for developing businesses' competences and capabilities and support their growth into international markets
- Investments in venture capital funds through Tekes Venture Capital Ltd

The Centres for Economic Development, Transport and the Environment (ELY Centres) offer performance guidance for innovation environments, growth and business development that draw on the regions' specific strengths. More information: https://tem.fi/en/ely-centres

2. National Programmes and Initiatives

The main actors on this field in Finland are Tekes, the Finnish Funding Agency for Innovation, and the Academy of Finland.

List of National Programmes open to the world

Programme Title	Contents
Tekes www.tekes.fi	Currently Tekes the Finnish Funding Agency for Innovation implements 11 innovation programs. Programs are open to international cooperation. Tekes' funding is targeted on organizations and industries that are based in Finland. Korean (like other foreign) partners are expected to agree on their joint English project plans with their Finnish partners and to secure national co-funding Program examples: • Bits of Health (2014-2018) • 5th Gear (2014-2019) • Industrial Internet (2014-2019) • Arctic Seas (2014-2017) Cooperation Type: funding targets joint research or innovation activities and may include mobility between participating RIs, universities or companies Funding Organisation: Tekes in partnership with Korean/other foreign funding organisations Calls are announced on Tekes web site: https://www.tekes.fi/en/whats-going-on/application-schedules-2017/ More information: http://www.tekes.fi/en/programmes-and-services/tekes-programmes/ Tekes and KETEP, the Korea Institute of Energy Technology Evaluation and Planning, have an agreement by which they promote joint Finnish-Korean research, innovation projects and demonstration projects in the area of green energy technologies. Tekes and KIAT, the Korea Institute for the Advancement of Technology, have an agreement by which they stimulate Finnish-Korean research and innovation projects and cooperation in multinational projects such as EU RTI programs and EUREKA. Tekes and Finpro (organization for helping Finnish SMEs go international) will integrate their functions in the coming years and will together become "Business Finland".

EUREKA www.tekes.fi	As an associate member of the European Collaboration Scheme EUREKA Korea is invited to form bilateral and multilateral research projects with EUREKA countries. Companies from Finland and companies from Korea can form consortia in the area of innovation, industrial and service development and research. The companies will be supported by their respective National Funding Agencies in these joint activities
FiDiPro www.tekes.fi	FiDiPro – Finland Distinguished Professor Programme offers funding to projects recruiting highly merited international researchers in Finnish universities and research institutes to create long-term collaboration in science and technology. The applicant is a Finnish university or RI which co-operates with and invites a researcher from abroad. http://www.tekes.fi/en/programmes-and-services/grow-and-go-global/fidipro/
Academy of Finland www.aka.fi	Academy Programmes are science-driven, thematic and target-oriented bodies of research projects that are aimed at supporting scientific regeneration and increasing scientific and societal impact. Academy Programmes support multi- and interdisciplinary research of the highest quality, promote networking between researchers and provide platforms for international research cooperation. Academy of Finland is responsible for the national Strategic research funding (SRC) which funds research with great societal impact. The Academy of Finland and the National Research Foundation of Korea (NRF) have an agreement that enables the two organisations to organise joint calls to provide funding for Finnish-Korean research projects.
Finnish Government Scholarship Pool www.studyinfinland.fi	The Finnish Government offers scholarships of 3-9 months for Doctoral level studies and research at Finnish universities or public research institutes. The Finnish Government Scholarship Pool programme is open to young researchers from all academic fields. The scholarship cannot be applied for Master's level studies or post-Doctoral studies/research.

3. Joint Activities with Korea

List of Joint Programmes or Activities with RoK in 2016

Programme Title	Contents
VTT-KICT collaboration	▪ VTT and Korea Institute of Civil Engineering and Building Technology (KICT) collaborate for sharing knowledge, research and expertise ▪ Joint Conference in Seoul on September 30, 2016 ▪ Researcher Exchange in October and November 2016 ▪ Education Program at KICT in November

List of Planned Programmes or Activities with RoK in 2017

Programme Title	Contents
Bilateral Science and Technology Consultations	▪ Bilateral consultations between Finnish Ministry of Economy and Employment and MOTIE ▪ Latter part of 2017
Planned: Education Seminar	▪ in the margins of ASEM Education Ministers' Meeting ▪ November 2017 ▪ Finnish and Korean collaboration

4. Others

Research Institutes

A total of 12 state research institutes operate under ministries. In addition to producing research data and expertise, the state research institutes perform various expert tasks, controlling, training, guidance and other official tasks as well as service activities, some of which are subject to a fee.

By their volume of research funding the largest research institutes are the VTT Technical Research Centre of Finland in the administrative sector of the Ministry of Employment and the Economy, the Finnish Forest Research Institute and MTT Agrifood Research Finland in the administrative sector of the Ministry of Agriculture and Forestry as well as the National Institute for Health and Welfare in the administrative sector of the Ministry of Social Affairs and Health. Research Institutes: http://minedu.fi/tiedelaitokset-ja-tutkimusorganisaatiot

Universities and Universities of Applied Sciences

Please find the links to all 14 Finnish universities here: http://minedu.fi/yliopistot and links to all 23 AUS here: http://minedu.fi/ammattikorkeakoulut

Key Research Organisations and Companies

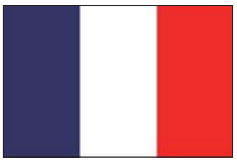
Organisation Name	Detailed information
VTT Technical Research Centre of Finland Ltd. www.vtt.fi	▪ Organisation type: non-profit and state-owned limited company ▪ Major Research Area/Product: multitechnological R&D&I organization ▪ Major Activities with Korea: collaboration with research institutes, universities and industry ▪ Future Plans: strenghten the co-operation ▪ Contact Information: Mr. Antti Knuuti, antti.knuuti@vtt.fi (+358) 40687 9865
Aalto University www.aalto.fi	▪ Organisation type: university ▪ Major Activities with Korea: several partner universities (student and staff exchange, STI projects); Korea Advanced Institute of Science and Technology KAIST, Chungnam National University, and Gwangju Institute of Science and Technology are partnering with Aalto in EU Erasmus Mundus Action 2 project "Technologies for Information and Communication Europe-East Asia Mobilities" (2014-2018). ▪ Future Plans: new partners, potential seen in e.g. health & wellbeing technologies
University of the Arts Helsinki https://www.uniarts.fi/en	▪ Organisation type: university ▪ Major Activities with Korea: Korea National University of the Arts (student and teacher exchange, artistic cooperation) ▪ Future Plans: increased activity in above-mentioned areas, especially in the field of artistic activity

PART 10

FRANCE

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

FRANCE



Country Outline

- GDP: 2,228,857 mil. euros (Eurostat 2016)
- GDP per Capita: 31,700 euros (Eurostat 2016)
- Areas of marked S&T specialisations: Aeronautics or Space Automobiles and Transport Technologies, Chemistry and Nanotechnology, IG, Agronomy, Health Science, Ocean Science

Contact Information

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France is a major R&D country, well connected in Europe and internationally, equipped with large world-class research infrastructures. With EUR 48.6 billion of global R&D expenses in 2015, France is the second major player in the EU, just behind Germany. The research effort came both from private sector, which carried out 65% of all R&D conducted in France in 2014 (EUR 31.6 billion), and public sector with R&D completed in large part by dedicated research institutions (54%), as well as higher education institutions (46%). More than half a million people (nearly 575,300 in 2014) were involved in R&D activities, amongst which 266 200 researchers (30% of women).

SMEs contributed 13% of gross domestic expenditure on R&D (GERD), more than half of which was invested in the service sector. Large enterprises, which accounted for 58% of GERD, focused three quarters of their funding on high and medium-high technologies. More than 54% of these expenses were dedicated to six fields: automotive industry, aeronautics and space, pharmaceutical, specialised scientific and technical activities, ICT and chemicals. A big part was also dedicated to transversal fields such as new materials, nanotechnology, digital, biotechnology and environment. In industries, research projects are mainly conducted by engineers (88%).

In terms of scientific publications, France was ranked 7th worldwide in 2015 (3.3%) with an increase of its impact index. France's disciplinary profile is well balanced with the exception of a marked specialisation in mathematics. In terms of patent filling, according to the European system, France ranked 4th in 2014 (6.3% of patent issued) with a significant role in transportation, nanotechnology, organic chemistry and pharmaceutical.

1. Policies and Strategies in Science, Technology and Innovation

In recent years, France has substantially reformed its research and innovation system to improve its competitiveness.

Enshrined by the law on Higher Education and Research enacted on July 22, 2013, the French National Strategy for Research (FNSR) was released on March 2015 and will be review in 2020.

The FNSR, developed in line with European policies for science and innovation and Horizon

2020, is based on a consultation with scientific, academic, economic and social partners. The FNSR aims for several objectives:

- Meet the scientific, technological, environmental and societal challenges which France will face in the coming decades by defining a limited number of scientific and technological priorities;
- Promote basic science as the essential foundation for the development of a high-level science;
- Enhance the results of research by promoting innovation, technology transfer, and capacity of expertise and support to public policies, the development of scientific, technical and industrial culture;
- Strengthen the place of humanities which can play a major and transversal role in all those societal challenges.

The FNSR identifies 10 societal challenges and outlines 5 action programmes, which will be the priority for the French research bodies and will define the strategic plan of public funding agencies such as French National Research Agency.

The 10 societal challenges are:

- **Management of resources and adaptation to climate change:** including the intelligent monitoring of planet Earth, the sustainable management of natural resources, the evaluation and control of climate and environmental risks, the development of eco-and biotechnologies and the study of the coastline.
- **Clean, safe and efficient energy:** comprising the dynamic management and multi-scale governance of energy system, energy efficiency, the reduction of the dependence on strategic materials and the search of fossil carbon substitutes.
- **Industrial renewal:** including the digital economy, green industry, human-centred manufacturing procedures, and design of new materials, sensors and instrumentation.
- **Health and well-being:** focusing on the multi-scale analysis of diversity and life evolution, the processing and collection of biological data and the establishment of a national network of centres of excellence for research and healthcare.
- **Food security and demographic challenge:** aiming at the achievement of healthy and sustainable food supply, an integrated approach for productive systems and the production and diversified use of biomass.
- **Sustainable cities and transports:** creating observatories for cities, new mobility concepts, new tools and technologies to ensure sustainability in urban environments

and integrating infrastructures and urban networks for resilience.

- **Information and communication society:** focusing on the development of 5G network infrastructure, IoT, Big Data and man-machine collaboration.
- **Innovative, integrative and adaptive societies:** aiming at the study of cultures and integration factors, and their abilities to innovate as well as the exploitation of data to understand the societies and the development of social, cultural and educational innovations.
- **Space:** building on the French expertise on spatial science, development of new services for earth observation and universe exploration, of the telecommunication and navigation sectors.
- **Freedom and security of European territory, citizens and residents:** aiming at the prevention and anticipation of risks and threats, the integrated approach to crisis management and the resilience of security systems.

Five action programmes are implementing in the following areas:

- **Big data:** focusing on the research of generalised solutions for the analysis of non-structured data adapted to the use of a wide range of interested parties, the programme will also comprise the establishment of interdisciplinary communities targeting specific challenges, the development of infrastructures for the storage and big data processing and the training of data and knowledge scientists.
- **Earth system:** Observation, forecast and adaptation: this programme will focus on the conception and development of disruptive technologies for the observation infrastructure and processing of associated data, favouring the development of climate and environmental services and a sustainable food production system with optimal use of biomass through experimentation within living labs.
- **Synthetic biology:** this programme aims at the establishment of a scientific community and multidisciplinary centres on this subject with a view of favouring the training of researchers and the collection of "omic" (e.g. genomic, proteomic, etc.) data for modelling life mechanisms.
- **From bench to bedside:** this programme will support research projects with a strong potential of fast technology transfer to society and/or industry, thus stimulating health innovation.
- **Human culture:** this programme will support the development of multidisciplinary platforms, large data infrastructures on the study of human culture and behaviour, research on the influence of human factor on risk management and the transfer of humanities and social science research into the socioeconomic world.

However, the French research policy can't be based solely on those matters. The government aims at finding a balance between those set priorities and the other research projects with no defined objective. Targeted areas of cooperation between France and Korea are new materials and nanotechnologies; health and economics of ageing; aeronautics and space; life science and biotechnologies; information and communication technology; environmental sciences, climate and oceanography.

2. National Programmes and Initiatives

List of National Programmes open to South Korea

Programme Title	Contents
PHC STAR www.campusfrance.org/fr/star	▪ Cooperation Type: mobility ▪ Funding Organisation: Ministry of science (MENESR) ▪ Call Opening/Closing Date: 22/12/2016–01/02/2017 ▪ Participation Qualification: research institute / university ▪ Project Duration: 2 years ▪ Funding Scale and Funding Scheme: from 5,000 € to 15,000 € / year ▪ Matching fund from Korean government: NRF (Provides funds for the Korean researcher) ▪ Research Fields: new materials and nanotechnologies, life and health sciences, biotechnologies, basic sciences, ICT, aeronautics and space, environment sciences, societal challenge
Joint research program between CNRS and NRF http://www.cnrs.fr/derci/IMG/pdf/texte_appel_2017.pdf	▪ Cooperation Type: mobility ▪ Funding Organisation: CNRS ▪ Call Opening/Closing Date: 01/03/2017–02/05/2017 ▪ Participation Qualification: research institute / university ▪ Project Duration: 2 years ▪ Funding Scale and Funding Scheme: 7,000 € / year ▪ Matching fund from Korean government: NRF (Provides funds for the Korean researcher) ▪ Research Fields: all
TEAM – Erasmus Mundus http://www.team-mundus.eu/	▪ Cooperation Type: doctorate / post-doctorate in European, Japanese, Korean universities or research institute ▪ Funding Organisation: European Commission ▪ Call Opening/Closing Date: 27/03/2017–15/05/2017 ▪ Participation Qualification: open to European, Japanese and Korean researchers ▪ Project Duration: 6 to 10 months ▪ Funding Scale and Funding Scheme: 1,500–1,800€/month ▪ Research Fields: ICT

3. Joint Activities with Korea

List of Joint Programmes or Activities with RoK in 2016

Programme Title	Contents
Winter school of CNRS – Ewha International Research Center	▪ Activity (Program) Outline: - Date: Jan. 25th–Jan. 28th, 2016 - Venue: Ewha Women's University, Seoul ▪ Major topic or agenda: functional advanced materials ▪ Target Participants: graduate students, researchers and professors
IBS CNRS RNA Symposium	▪ Activity (Program) Outline: - Date: Mar. 21th–Mar. 22th, 2016 - Venue: Seoul National University, Center for RNA Research, IBS, Seoul ▪ Major topic or agenda: functional advanced RNA studies ▪ Target Participants: graduate students, researchers and professors
KIOST – IFREMER Symposium	▪ Activity (Program) Outline: - Date: May 25th–26th, 2016 - Venue: Korea Institute of Ocean Science and Technology (KIOST), Ansan ▪ Major topic or agenda: Underwater Exploration Technologies and Marine Environmental Issues ▪ Target Participants: graduate students, researchers and professors
"9000 km for one robot" Challenge	▪ Activity (Program) Outline: - Date: Jan–Apr 2016 - Venue: Gwacheon National Science Museum, Seoul & Universcience, Paris ▪ Major topic or agenda: co-construction of a robot between two French and Korean teams ▪ Target Participants: pupils, students, makers, researchers and professors
Creative France Lectures Series	▪ Activity (Program) Outline: - Date: Mars–December 2016 - Venue: Kyobo Life Insurance Building, Seoul ▪ Major topic or agenda: French award-winning personalities including scientists' lectures series ▪ Target Participants: open to everybody
French-Korean meetings on Higher Education, Research and Innovation	▪ Activity (Program) Outline: - Date: Oct. 17th, 2016 - Venue: Shilla Hotel, Seoul ▪ Major topic or agenda: bilateral cooperation and major joint research projects ▪ Target Participants: researchers, professors, students

Space Forum	▪ Activity (Program) Outline: - Date: Dec. 12th, 2016 - Venue: Shilla Hotel, Seoul ▪ Major topic or agenda: bilateral cooperation and development strategy ▪ Target Participants: CEOs and professionals of the space industry, researchers

List of Planned Programmes or Activities with RoK in 2017

Programme Title	Contents
Exhibitions	▪ Activity (Program) Outline: - Date: 2017 - Venue: science museums in South Korea ▪ Major topic or agenda: promote French scientific excellence ▪ Target Participants: pupils
French-Korean meetings on Higher Education, Research and Innovation	▪ Activity (Program) Outline: - Date: last quarter of 2017 - Venue: France ▪ Major topic or agenda: bilateral cooperation and major joint research projects ▪ Target Participants: researchers, professors, students
Space Forum	▪ Activity (Program) Outline: - Date: last quarter of 2017 - Venue: France ▪ Major topic or agenda: bilateral cooperation and development strategy ▪ Target Participants: CEOs and professionals of the space industry, researchers

4. Others

French-Korean laboratories:

- One **International Joint Research Unit**
  - UMI 2B-FUEL (official launching in 2017)
- Three **international associated laboratories**
  - Functional nanostructures: morphology, nanoelectronics and ultrafast optics
  - France-Korea Particle Physics Laboratory (FKPPL)
  - Centre de photonique et nanostructures (CPN)
- Three **international research networks**
  - Nano et Microsystèmes (NAMIS)
  - Functional Material for Organic Optics, Electrics and Devices (FUN MOOD)
  - Reaction-Diffusion Network in Mathematics and Biomedicine (ReaDiNet)

Key Research Organisations and Companies

Organisation Name	Detailed information
CNRS www.cnrs.fr	▪ Organization type: public organization under the responsibility of the French Ministry of Education and Research ▪ Major Research Area: all fields of science, technology and society ▪ Major Activities with Korea: physics and chemistry
Institut Pasteur www.pasteur.fr	▪ Organization type: private international research institute ▪ Major Research Area/Product: science, medicine and public health ▪ Major Activities with Korea: Institute Pasteur Korea (www.ip-korea.org/)
CNES https://cnes.fr	▪ Organization type: French National Space Agency ▪ Major Research Area/Product: space technology and its applications ▪ Major Activities with Korea: Korean Aerospace Research Institute (KARI)
CEA www.cea.fr	▪ Organization type: Government-funded technological research organization ▪ Major Research Area/Product: alternative energies and atomic energy ▪ Major Activities with Korea: Korea Atomic Research Institute (KAERI), Korea Institute of Energy Research (KIER) and Korea Institute of Science and Technology (KISTI) agreements
Ifremer www.ifremer.fr	▪ Organization type: Government-funded technological research organization ▪ Major Research Area/Product: oceans, environment and fisheries ▪ Major Activities with Korea: Korea Institute of Ocean Science and Technology (KIOST)

PART 11

GERMANY

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea

GERMANY

Country Outline

- GDP: 3,134,070 mil. euros (Eurostat 2016)
- GDP per Capita: 34,500 euros (Eurostat 2016)
- Areas of marked S&T specialisations: Automotive & Traffic Technologies, Aviation Technologies, Biotechnology, Energy Technologies, Environmental Technology, Health Research, Humanities, ICT, Maritime Technologies, Materials Technology, Medical Technologies, Natural Sciences, Nanotechnology, Optical Technologies, Photonics, Plants, Production Technologies, Security Research, Services, Social Sciences, Space Technology

Contact Information

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- Phone no. / e-mail: (+82) 02 748 4114 / info@seou.diplo.de

Germany is a land of science and research. The development of innovative technologies and products is an important foundation of the German economy. Germany invests roughly 90 billion euros a year in R&D, two thirds of which are coming from the private sector. In 2014 Germany invested 2.87% of GDP in R&D. Germany is thus among the countries leading in the field with a very high R&D intensity. Alongside R&D resources the number of people working in R&D is the most important indicator of R&D resources. More than half a million people work in this area in Germany – in business, in research institutions and at universities.

Germany offers various research locations: universities, non-university research institutes, companies and institutions run by federal or state authorities. All in all there are about 800 publicly funded research institutions. Additionally more than a quarter of all industrial enterprises in Germany are active in research including many SMEs. The automotive industry, the electrical industry, the chemicals and pharmaceuticals sector and engineering companies all have a high demand for R&D personnel. Close cooperation between science and industry in research and development is one of the traditional strengths of the German innovation system.

1. Policies and Strategies in Science, Technology and Innovation

High-Tech Strategy

Research, development and innovation form the sustenance for Germany's prosperity and competitiveness. Viable solutions for environmentally friendly energy, efficient health care, sustainable mobility, secure communication and secure production cannot be developed without progress in science and technology. To better approach the urgent challenges of our time the German government launched the High-Tech Strategy in 2006 which was further developed in 2010 and 2014 as a comprehensive, interdepartmental innovation strategy.

"The new High-Tech Strategy – Innovations for Germany" aims to strengthen growth and prosperity in Germany by accelerating the extension from scientific discovery to practical application. It focuses on the most urgent tasks of the future. It is concentrating on research subjects that are especially relevant to societies and to future growth and prosperity:

- Digital economy and society
- Sustainable business and energy
- Innovative workplace
- Healthy life
- Intelligent mobility
- Civil security

Internationalisation Strategy

The challenges Germany is facing are global challenges, which are also concerned by other countries in Europe and countries across the world. That is why the German Federal Government adopted an updated strategy for the internationalisation of science and research in December 2016 as a response to the challenges of globalization like climate change, questions of nutrition and food production, securing our future energy supply, combating poverty and infectious diseases.

The internationalisation of the German science and innovation system has developed considerable momentum over the last few years. Both the state and the private sector have made many resources available to secure and extend the scope of Germany's international competitiveness. German stakeholders from the worlds of science, business and politics are heavily engaged in the international arena and numerous initiatives have been launched. Internationalisation is now firmly rooted in politics, science and business. In our globalized world scientific and technological progress are no longer achievable by individual countries but depend on cooperation and the exchange of ideas with leading international experts. The five main objectives of the internationalisation strategy are: (1) Strengthening excellence through global cooperation; (2) Developing Germany's strength in innovation on the international stage; (3) Internationalising vocational training and qualification; (4) Working with emerging and developing countries to shape the global knowledge-based society and; (5) Overcoming global challenges together.

2. National Programmes and Initiatives

The German research landscape is diverse and multifaceted. Germany is the home of nearly 400 higher education institutions, more than half of which are universities of applied sciences. Universities and other higher education institutions offer a broad spectrum of research activities including basic research, applied research and development.

Two examples of academies of sciences and humanities are the National Academy of Sciences Leopoldina (www.leopoldina.org/en/) and acatech – National Academy of Science and Engineering (www.acatech.de/uk). Founded in 1652 Leopoldina is one of the oldest academies of science in the world. In 2008 it was appointed as National Academy of Sciences and it provides academic advice to both policymakers and society as a whole. Acatech – the National Academy of Science and Engineering – represents the interests of German science and technology communities at home and abroad. It provides scientific opinion and recommendation to policymakers and society.

Besides the academic field non-university research institutes play an important role in Germany. The following table gives an overview of the German Research Organisations as well as the Research Funding Organisations including information about activities in international cooperation and funding programmes.

List of National Programmes open to the world

Programme Title	Contents
Max Planck Society (MPG) www.mpg.de/en	▪ Currently, the MPG operates 83 institutes. ▪ The Max Planck institutes (MPI) carry out basic research in the life sciences, natural sciences and the social and the humanities. Research must meet the Max Planck Society's excellence criteria. ▪ 18 Nobel laureates have emerged from the ranks of MPG scientists. ▪ Instruments of international cooperation: ▪ Max Planck Centres. 14 Max Planck Centres worldwide. Two of them are located in Korea: The Max Planck POSTECH Centre for Attosecond Science and the Max Planck POSTECH Centre for Complex Phase Materials. ▪ MPG Partner Groups. More than 40 MPG Partner Groups worldwide. One Partner Group is located in Korea: The MPI for molecular biomedicine cooperates with the Partner Group at Ulsan National Institute of Science and Technology (UNIST). ▪ German Max Planck Institutes cooperate in at least 30 projects with Korean Partners. ▪ Funding Programmes: Foreign Visiting Researchers at Max Planck Institutes, Head of a Max Planck Research Group at a Max Planck Institute, Individual Doctoral Projects at Max Planck Institutes, International Max Planck Research Schools, Max Planck grants for Advanced Postdoctoral Training.

Fraunhofer Society (FhG) www.fraunhofer.de/en.html www.fraunhofer.kr	▪ Fraunhofer is Europe's largest application-oriented research organisation with 69 research institutes. ▪ Research focus: health, security, communication, energy and the environment. ▪ Fraunhofer Institutes are cooperating with partners worldwide. ▪ Many Fraunhofer Institutes have cooperation projects with Korean partners with a focus on ICT and Micro-electronics, display technologies, energy and life sciences. For example, Fraunhofer Institutes ISE, IZI, IKTS etc. operate research projects with Korean counterparts, such as city of Seoul, Chonnam National University or ETRI. ▪ Fraunhofer Representative Office in Seoul ▪ Funding Programmes: Fraunhofer Attract, Fraunhofer Bessel Research Award, Individual Doctoral Projects at Fraunhofer Institutes.
Helmholtz Association of German Research Centres www.helmholtz.de/en	▪ Helmholtz is Germany's largest research organisation. ▪ Interdisciplinary research which contributes to solving the great challenges facing society, science and industry. ▪ Almost all of the 18 Helmholtz research centres are cooperating with Korean partners. ▪ 6 research fields: Energy; Earth and Environment; Health; Key Technologies; Matter; Aeronautics, Space and Transport. ▪ 3 International Offices: Brussels, Moscow, Beijing. ▪ UNIST-Helmholtz Jülich Future Energy Innovation Research Center ▪ Funding Programmes: Helmholtz Postdoc Programme, Helmholtz Young Investigators Group, Individual PhD Thesis at Helmholtz Centres, International Helmholtz Research Schools and Graduate Schools
Leibniz Association www.leibniz-gemeinschaft.de/en/	▪ 88 non-university research institutes are part of the Leibniz Science Association. ▪ The Leibniz Association is divided into five sections: humanities and educational research; economics, social sciences, spatial research; life sciences; mathematics, natural sciences and engineering and environmental research. ▪ In 2013, Leibniz institutions were involved in more than 4,500 international cooperation in 111 different countries. There are many cooperation projects with partners in Korea. ▪ Funding Programmes: International Visiting Scholars at Leibniz Institutes, Leibniz DAAD Research Fellowships, Leibniz Graduate School

Alexander von Humboldt Foundation (AvH) www.humboldt-foundation.de	▪ The Humboldt Foundation promotes academic cooperation between excellent scientists and scholars from Germany and abroad. ▪ It grants more than 700 fellowships and awards per year with the aim of bringing excellent scientists and scholars from all over the world to Germany to collaborate and work together. ▪ The alumni network of the AvH is outstanding. Over 200 Korean Alumni are members of the Humboldt Club Korea and the Humboldt Society in Korea. Ambassador Scientist in Korea: Prof. Kim Kang-sik from Aerospace University in Seoul. ▪ Every year the Humboldt Foundation organises two major colloquia abroad. One of those colloquia was held in Seoul in November 2015. ▪ Funding Programmes: Alexander von Humboldt Professorship, Anneliese Maier Research Award, Fraunhofer-Bessel Research Award, Friedrich Wilhelm Bessel Research Award, Georg Forster Research Award, Georg Forster Research Fellowship for Experienced Researchers, Georg Forster Research Fellowship for Postdoctoral Researchers, Sofija Kovalevskaja Award.
German Academic Exchange Service (DAAD) www.daad.de/en/ www.daad.or.kr	▪ The DAAD is the organisation of German higher education institutions and their student bodies. It is devoted to internationalising the academic and scientific research system. ▪ The DAAD provides scholarships for students and researchers. ▪ 70 branch offices and Information Centres worldwide. ▪ There is one DAAD Information Centre in Seoul, Korea. ▪ Funding Programmes: Bilateral Exchange of Academics, Leibniz DAAD Research Fellowships, Re-invitation Programme for Former Scholarship Holders, Research Fellowships in Space, Aeronautics, Energy and Transportation Research, Research Grants for Doctoral Candidates and Young Academics and Scientists, Research Stays for University Academics and Scientists.
German Research Foundation (DFG) www.dfg.de/en/	▪ The DFG is a self-governing research funding organisation, which is largely funded by the state. ▪ It funds research projects at universities and other research institutions in all branches. ▪ Korean Partner: NRF ▪ Funding Programmes: Clusters of Excellence, Collaborative Research Centres, Emmy Noether Programme, Graduate Schools, Grants to Support the Initiation of International Collaboration, Heisenberg Programme: Fellowship/Professorship, Mercator Fellowship, Research Grants, and Research Training Groups.

3. Joint Activities with Korea

Many German Universities as well as many institutes of the Fraunhofer Society, the Helmholtz Association, the Leibniz Association and the Max Planck Society and other research organisations are cooperating on individual project basis with Korean partners.

On the government level there is a tradition of supporting international bilateral research cooperation between Germany and Korea through the instrument of bilateral calls. Examples are listed in the table below.

List of Joint Programmes or Activities with RoK in 2016

Programme Title	Contents
Bilateral German-Korean Mobility Programme	▪ Annual call ▪ Last call 07/2016 - 09/2016: - German side: Health research, Environmental Technology, Information Technology, Nano-risk research - Korean side: BT, ET, IT, https://www.bmbf.de/foerderungen/bekanntmachung-1203.html ▪ Budget: Up to 20,000 Euro per project from the German side ▪ Requirement: Bilateral programme, Korean and German partners are required. ▪ Hosting agencies: German Federal Ministry for Education and Research (BMBF), Korean Ministry of Science, ICT and Future Planning (MSIP) ▪ Supporting agencies: The International Bureau of the DLR (German side), National Research Foundation (Korean side) ▪ www.internationales-buero.de, www.nrf.re.kr
Bilateral 2+2-Project Call	▪ Korean-German bilateral first Call on 2+2-Projekts 09/2016-12/2016 ▪ R&D-Projects with at least one German and Korean partner from a research institution + one German SME + one Korean industrial partner ▪ https://www.bmbf.de/foerderungen/bekanntmachung-1256.html ▪ 3 Projects will be funded for 3 years ▪ Hosting agencies: German Federal Ministry for Education and Research (BMBF), Korean Ministry of Science, ICT and Future Planning (MSIP) ▪ Supporting agencies: The International Bureau of the DLR (German side), National Research Foundation (Korean side) ▪ www.internationales-buero.de, www.nrf.re.kr

Bilateral University Cooperation Programme	▪ Korean-German bilateral continuation of a former call for joint research structures in the Asian Pacific Research Area (APRA) ▪ Pilot call in 2012 ▪ Open to research fields addressed within the German High-Tech Strategy. ▪ Budget: 100,000 Euro per year and project ▪ Hosting agencies: German Federal Ministry for Education and Research (BMBF), Korean Ministry of Science, ICT and Future Planning (MSIP) ▪ Supporting agencies: The International Bureau of the DLR (German side), National Research Foundation (Korean side) ▪ www.internationales-buero.de, www.nrf.re.kr
Bilateral programme for joint R&D projects for SMEs	▪ First German-Korean call for joint R&D projects for SMEs in July 2014 ▪ 4th call April 2017 ▪ Joint R&D projects, focusing on developing innovative products and applications in all technological and application areas ▪ Open for SMEs ▪ German Federal Ministry for Economic Affairs and Energy (BMWi), Korean Ministry of Technology, Industry and Energy (MOTIE)

List of Joint Programmes or Activities with RoK in 2017

Programme Title	Contents
ADeKo Joint Korean-German Conference 2017 "Engineering for our Future!"	▪ Annual science conferences in cooperation with Korean and German organisations ▪ 16th–18th of Oct. 2017, Gwangju ▪ Topics: - Sustainable Energy and E-Mobility - Robotics and Automation - Medical Engineering - Smart Urban Transformation
Climate Change and Human Migration	▪ 2017 IBS Conference ▪ 27th of Nov.–1st of Dec. 2017, Busan ▪ Topis: - Climate Change, Anthropology, and Human Migration - Climate and Food Security - Climate and Civilization - Climate Justice - Drought and Water Management - Sea Level Rise and Relocation - Climate Forecasts and Humanitarian Crisis Management
Science Circle	▪ 4 times per year ▪ Science talks with German and Korean speakers

PART 12

GREECE

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

GREECE

Country Outline

- GDP: 175,888 mil. euros (Eurostat 2016)
- GDP per Capita: 17,100 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: ICT, Health, Agro-food including Fisheries and Aquaculture, Marine Science and Technology, Micro-Nano Electronics

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1. Policies and Strategies in Science, Technology and Innovation

A new Operational Programme for Entrepreneurship, Competitiveness and Innovation 2014-2020, based on the National Research and Innovation Smart Specialization Strategy has been developed. In parallel, 13 Regional Operational Programmes (one for each of the 13 Greek regions), including research and innovation items have been adopted as well. In line with the European practices, an Indicative Multiannual Investment Plan for RIS - Research and Innovation Infrastructures has already been prepared for the same time frame, available at http://www.gsrt.gr/Financing/Files/ProPeFiles20203/ex-ante-1-2_Nov%202016%20V.11.pdf.

In Greece, the efforts so far to mobilize key players through the development and support of structures that promote research and innovation and through financial support for research in the public and private sector, led to an improvement of the country's performance. However, it was not possible to reduce the gap from the European average or to achieve the national targets concerning domestic expenditure on Research and Development (R&D). The total gross domestic expenditure on research as a percentage of Gross Domestic Product (GDP) increased from 0.57% in 2003 to 0.80% in 2013, while the relevant EU-28 indicator increased during the same period from 1.85% to 2.06%. This increase was mainly due to the fall of national GDP during this period as well as due to the full activation of funding through the NSRF 2007-2013.

The Greek Research, Technological Development and Innovation (RTDI) System shows strengths including good performance in co-financed EU Framework Programmes, a substantial Greek representation in international research networks and projects of the

European Research Infrastructure Road Map, a strong Greek research community abroad, manpower quality and 'islands' of excellence in the public research institutions and the private sector, and also successful Greek presence regarding scientific publications (above the EU average). On the other hand, the main weaknesses include low participation of the private sector to the research effort, extremely low performance in patent filing as well as underperformance in risk financing and venture capital. Recent economic crisis has dramatically affected some critical aspects of the Greek RTDI system, such as research careers and opportunities, leading to severe brain drain of junior and senior scientists to advanced countries in Europe, in the US and beyond.

Responding to the current situation, the Smart Specialization Strategy (RIS3) is inspired by the vision of Greece that gives priority to people and society, with high quality of life and low environmental footprint, and takes advantage of the cultural heritage and creation. The objective of RIS3 is the targeted reform of the country's productive sector, having as main driving forces RTDI activities, in order to better balance the existing regional disparities and to create sustainable employment to the benefit of people and society preserving environment and culture. In the new emerging era, the innovation policy goes beyond the simple strengthening of research and technological development in businesses and the research fabric. It aims to support the improvement of the innovation system as a whole. Components of the this whole are the human factor producing the new knowledge, the firms, especially those who experiment on new ideas, technologies and business models to grow and become more competitive, and a system that creates and diffuses new knowledge removing the barriers to innovation.

Research bodies (Universities and Research Centres) have an important role to play in ensuring the robustness of RIS3 as they form the dynamic and internationally recognized part of the national innovation system and they provide the broad technological base that is necessary for innovations. One of the concerns of the strategy is not to trap the spectrum of activities of research institutions through sectoral specialization, but to ensure their mobilization towards the new business model of the country, increasing the synergies between public and private investments.

On the other hand, the emergence of new innovative firms and the strengthening of those who currently persist and are distinguished internationally are important in order for the country not "invent here, exploit elsewhere". Key factor in this effort is the encouragement of risk taking attitudes and the identification of opportunities arising from the uncertainty of RTDI activities. In this direction, the "learning from failure" process is also element of RIS3. Thus, RIS3 ensures the development of all RTDI types:

- Innovation from the "market needs" (demand driven)
- Innovation from scientific curiosity (curiosity-driven) and
- Innovation produced to fulfill strategic mission (mission-led)

To achieve the vision, the country has set a target, in the context of the Medium Term Fiscal Strategy and the National Reform Program, that investments in research will reach 1.2% of GDP in 2020 starting from 0.80% in 2013. Respectively, business investment in research is expected to rise from 0.27% of GDP in 2013 to around 0.38% of GDP in 2020. These targets could be amended upwards in the mid-term revision of RIS3.

Through the process of entrepreneurial discovery carried out so far, the National RIS3 identifies 8 priority sectors, as follows:

- Agrofood
- Life Sciences & Health – Medicine
- Information and Communication Technologies
- Energy
- Environment and Sustainable Development
- Transport and logistics
- Materials - Construction
- Culture - Tourism - Cultural & Creative Industries.

The most important financial tools for the implementation of RIS3 are the European Structural and Investment Funds.

2. National Programmes and Initiatives

BILATERAL R&D AGREEMENTS

About

Bilateral research agreements aim to enhance cross-border research collaboration.

Trends and background

Bilateral research agreements are a well-established practice for Greece. Although at first the budget was relatively small and participants were mainly academics, lately calls of significant larger budget (around 5 Million €) have been launched with the participation of enterprises (cases of China, Israel, Greece).

The following specific calls in the context of respective agreements between the States have been launched since 2009 and have been finalized within 2015:

- Bilateral Cooperation with France (2009)
- Bilateral Cooperation with France2 (2013)
- Bilateral Cooperation with Hungary (2009)
- Bilateral Cooperation with Turkey (2011-2012)
- Bilateral Cooperation with Turkey2 (2013-2015)
- Bilateral Cooperation with Romania (2012)
- Bilateral Cooperation with Czech Republic (2011-2013)
- Bilateral Cooperation with Slovakia (2011-2012)
- Bilateral Cooperation with Germany (2013-2015)
- Bilateral Cooperation with China (2012-2015)
- Bilateral Cooperation with Israel (2013-2015)

Under the frame of the new operational programme period the following calls are in process:

- Greece-Germany
- Greece-Russia
- Greece- Israel

While a call Greece-China is under preparation and planned to be launched in due time.

Instruments

Bilateral research agreements mainly support networking and visits as well as the implementation of common research projects. The research areas selected for funding are chosen on the basis of the common interests. Selected areas are for example ICT, biotechnology, life-sciences, agro-food, fisheries, marine sciences, agriculture, health, renewable energy, energy saving and environment. Collaboration with Romania includes research on cultural heritage. The beneficiaries of agreements are enterprises, universities, technological institutes, research and technological organizations and public organizations.

Target population: enterprises, universities, PRIs

Budget / Cost estimate: USD 31.3 million ppp (EUR 23 million)

EUROPEAN R&D COOPERATION (P2P cooperation)	**About** The Government supports the Greek participants to the Joint Initiative ERA-NETS and INCO-NETS (7th Framework programme and Horizon 2020) in specific thematic areas. The main objectives are to facilitate the networking of Greek research teams and dynamic SMEs in terms of European and International Cooperation in specific sectors and the exchange of technological know-how and best practice. **Instruments** The beneficiaries are universities, technological institutes, research and technological organizations, enterprises and public organizations which participate successfully to evaluation procedures of Joint Actions and Calls of the respective Networks. **Target population**: universities, PRIs **Budget / Cost estimate** Proposal for 16,000,000 (EUR million) through the new operational programme 2014-2020 The currently supported ERANETS by the Greek side are: COFASP, ERANET-MED, ERANET-RUS-PLUS, E-RARE, EURONANOMED, TRANSCAN, PRIMA, FLAG-ERA. **ERA-NET Cofund action "FLAG-ERA II"** The main objectives of "FLAG-ERA II" will be to coordinate national and regional research programmes to fund Partnership Projects (PPs) of the two EU FET Flagships Iniatives (GRAPHENE and Human Brain Project) through a joint transnational call for proposals and other joint activities between the participating funding agencies in support of the two Flagships. Partnering Projects will allow researchers to complement the current Flagship projects and to collaborate towards the achievement of their vision. The Greek Government (Ministry of Education, Research and Religious Affairs) intends to participate in "FLAG-ERA II" in order to support the participation of Greek organizations in international collaborative projects that are expected to become Partnership Projects (PPs) for the GRAPHENE Flagship. Greece's contribution to the Joint Transnational Call for GRAPHENE PPs will amount to approximately 700,000€ In addition Greece participates in JU-EXSEL without national funding. Furthermore Greek participation in others JTIs and JPIs is under consideration.

NATIONAL CLUSTERS DEVELOPMENT PROGRAMME CORALLIA

About

The Corallia Clusters Initiative was established in Greece for the management and development of Innovation Clusters, in knowledge-intensive and exports-oriented technology segments, where Greece has the capacity to build sustainable innovation ecosystems. In those clusters, Corallia acts as Cluster Facilitator implementing targeted support actions, which involve all innovation ecosystem actors.

Trends and background

- Corallia has supported, up to date, the development and facilitation of three highly-specialised Innovation Clusters with more than 152 members (SMEs, large companies, international design centres, startups, universities) that collaborate towards the development and growth of the respective industries: the mi-Cluster (nano/microelectronics-based systems and applications cluster); the si-Cluster (space technologies and applications cluster); and the gi-Cluster (gaming and creative technologies & applications cluster). Additionally, Corallia and GSRT have performed preparatory actions and has contributed to the kick-off of clusters in other sectors.
- The National Programme also pushes forward the hyper-concentration of industrial members of clusters in thematic Business Innovation Centres (BICs) in order to accelerate synergies, the bonding of cluster members and establish reference points for the thematic sectors it supports. Corallia is a full member of the world-leading network EBN, was awarded with the EU|BIC certificate and internationally recognised as a quality-certified business support organisation, which dedicates its efforts and resources to help entrepreneurs with innovative ideas to turn those ideas into viable, successful and sustainable businesses.
- Aiming at intensifying cluster and network collaboration across borders and sectoral boundaries Corallia is also one of the founding members of three European Strategic Cluster Partnerships in the fields of semiconductors, space and creative industries, that are established under an initiative supported by the European Commission. These partnerships, representing more than 2.000 companies and partner institutions including many SMEs, share a joint strategy to promote cross-sectoral cooperation and facilitate SME internationalisation in new "rising star" areas. They implement a number of coordinated support actions in order to unleash the innovative capacity of SMEs, improve their performance and increase their competitiveness as well as nurture cross-sectoral innovation through the development of new industrial competitive value-chains based on the combination of competences of SMEs. In this respect, Corallia has implemented a significant number of internationalisation activities (roadshows, exhibitions, etc.) including roadshows to Korea (2007).

NATIONAL CLUSTERS DEVELOPMENT - PROGRAMME CORALLIA	**Instruments** Example: *"Phase-2 Microelectronics" programme* The aim of the project was to support the Microelectronics and Embedded Systems cluster in Greece in order to become a tangible world-class competitive cluster that would attract Foreign Direct Investment, leverage talented human capital, and fuel growth and development at National and EU level. The assessment of the programme certified that the members of the cluster showed even higher growth rates compared to the targets already set in turnover (+145.3%), exports (+108.4%), employment (+69.7%), patent applications (+177.2%), investments from private sector (+269.3%) and joint PhDs in collaboration with the Academia (+106.0%).

3. Joint Activities with Korea

Joint Bilateral activities with Korea are not currently implemented.
However Greece cooperates with Korean in R&D issues in the context of the EU Framework Programmes for Research, Technological Development and Innovation, by participating research institutions/enterprises of both countries in joint projects.
Specifically, under the European Union's Research and Innovation funding programme for 2007-2013 (FP7), participants from Greece and the Republic of Korea cooperated in 15 projects. The majority of those projects (10) were under the Cooperation programme while the others were under the Capacities programme.

Within the current E.U. Research and Innovation programme (Horizon 2020) multiple collaborations between partners from Greece and the Republic of Korea have already been formed. Specifically there are 3 ongoing projects involving Greek and Republic of Korea beneficiary's under the policy sectors "Industrial Leadership" and "Societal Challenges".

4. Others

In order to promote cooperation between Korea and Greece in various areas including S&T, a meeting was held in Athens with delegations from the two countries on 30/4/2013.

A detailed description of all Research & Technological Organizations under the supervision of GSRT is provided in the following link:
http://www.gsrt.gr/Financing/Files/ProPeFiles74/Entypo%20GGET%20EU_white.pdf

PART 13

HUNGARY

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

HUNGARY

Country Outline

- GDP: 112,399 mil. euros (Eurostat 2016)
- GDP per Capita: 11,200 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Advanced Materials, Agricultural Sciences, Automotive industry, Biotechnology, Brain Research, Energy Technologies, Health Research, ICT, Laser science, Material Sciences, Natural Sciences, Nuclear Research, Pharma industry, Physics, Thermohydraulics.

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Hungary was the first country from the Eastern Bloc that established diplomatic relations with South-Korea. Since 1989 bilateral cooperation has increased rapidly, with business partnership becoming a key dimension of our relationship. South-Korean companies have invested more than 2 billion USD and employed 25,000 people in Hungary. Large enterprises, such as Samsung or Hankook Tire, are regarded as stable investors with a strong commitment to the country. KDB (Korean Development Bank) brought its regional centre to Hungary. Korean statistics show that in 2016, Hungary ranked as 49th and 47th concerning the volume of Korean exports and imports, respectively. In Central and Eastern Europe, however, Hungary is Korea's third largest trade partner.

Research and Development

In Hungary the Gross Domestic Expenditure on R&D (GERD) is increasing constantly. The GERD / GDP ratio in 2015 reached 1.378 per cent but is still below the 1.98 (2015) per cent average of the European Union.

The performance of the EU national innovation systems is measured by the Summary Innovation Index, which is a composite indicator obtained by aggregation of 25 indicators. The Member States are classified into four performance groups based on their average innovation performance. Hungary is a Moderate Innovator. The country's innovation performance, despite some fluctuations, has improved between 2008 and 2016. According to the 2016 European Innovation Scoreboard, Hungary for more than half of the indicators, performance has improved. High growth is observed for R&D expenditures in the business sector (10%), community trademarks (8.1%) and population with completed tertiary education (6.3%).

In Horizon 2020 the main condition of successful participation is high-level excellence. A composite indicator is developed to measure the research excellence in Europe, meaning the effects of the European and national policies on the modernization of research institutions, the

vitality of the research environment and the quality of research outputs in both basic and applied research. According to the research excellence indicator Hungary has the highest value among the countries of our region.

1. Policies and Strategies in Science, Technology and Innovation

The Hungarian Government adopted the National Research and Development and Innovation (2013-2020) Strategy (RDI strategy) – Investment in the Future in July 2013.

The RDI strategy sets the goal of renewing and strengthening the innovation system as a whole by strengthening the knowledge bases, knowledge diffusion and knowledge utilization. A policy mix serves the purpose of advancing the objectives of the strategy: the direct instruments (more than 2 billion EUR is dedicated to R&D&I in the Economic Development and Innovation Operative Programme 2014-2020), the indirect instruments (tax allowances in particular for the intramural R&D activity) and the demand-side instruments. The systematic interventions are directed to support the completion of the national innovation system through encouraging inter-sectorial relationships, networking or developing policy management, official acts or services.

The goal of the strategy is expressed by quantified objectives complying with the undertakings of the National Reform Programme submitted to the European Commission in 2011 and elaborated in relation to the Europe 2020 strategy:

Hungary will increase its gross domestic expenditure on R&D to 1.8% by 2020 and to 3% by 2030. As a complementary objective, the business enterprise expenditure on R&D will rise to 1.2% by 2020. Additional quantified objectives based on the main components of the strategy complement the overall vision:
During the seven years of the strategy in Hungary, by 2020:

+30 larger research and technological development groups will join the "world's elite";
+30 R&D research centres of large global companies will be established/ strengthened;
+30 R&D intensive macro-regional medium-sized enterprises will produce and provide services;
+300 RDI and growth oriented small enterprises ("gazelles") will find their place in the global market
+1000 innovative start-ups will get the funding required for starting their activities;
many innovative supplier companies with national decision making centres will provide services to the multinational companies that have already been established or will be established in Hungary.
(The "+" marking in the objectives listed above indicates the new, additional capacities to be introduced in the national innovation system compared with the current status.)

2. National Programmes and Initiatives

National Smart Specialisation Strategy (S3)

In order to achieve the objectives aimed at enhancing the research-development and innovation performance of Hungary undertaken in the National Reform Programme related to the Europe 2020 Strategy, the government has negotiated and adopted the National Smart Specialisation Strategy (S3).

Széll Kálmán Plan 2.0

The national reform programme of Hungary in 2012 defines the mid-term and long term aims of the government and is aligned to the EU2020 documents.

Széll Kálmán Plan 1.0

The Széll Kálmán Plan 1.0 was introduced in March 2011. As a structural reform plan, its main objectives were to reduce the public debt and foster the economic growth through 26 objectives.

The Stipendium Hungaricum scholarship was established to provide support for foreign students studying in Hungarian higher education institutions. Based on the Eastern Opening, the program primarily finances the studies of students from Far East countries, Central Asian countries, Arabic countries and from the Western Balkans. 736 students from 30 countries study at 20 Hungarian universities in the 2014/15 academic year.

3. Joint Activities with Korea in 2016

1) KSP (Knowledge Sharing Programme) Hungary

Korea's Knowledge Sharing Program (KSP) is a policy research and consultation program which utilizes Korea's knowledge and experiences to assist the development of partner countries. Based on a MoU signed by the two governments the KSP with Hungary started in 2013 in the following fields: crisis management; industrialisation and export promotion; knowledge-based economy; economic development strategy; and human resources development.

2) KSP (Knowledge Sharing Programme) V4

A new form of co-operation between the Visegrad Group countries (V4 countries: Czech Republic, Hungary, Poland, and Slovakia) was launched in 2016. The V4-RoK research programs in the first year were designed in the field of innovative economy.

3) Relevance of biotechnology, pharma industry, brain research

Brain research is of high societal and economical interest in all Member States of the EU, including Hungary. World Health Organization (WHO) data indicate that brain disorders together account for one-third of the burden of all diseases in the wealthy part of the world. The Hungarian Government decided to launch a national research program called "Hungarian Brain Research Program" (HBRP) with a budget of HUF 12 billion (€40 million), for a period of four years (2013-2017). The European Brain Prize holder, Professor Tamás Freund is leading the program. He is directing Hungarian participation in the FET (Future and Emerging Technologies) Flagship program "Human Brain Project" launched by the European Commission. Pharmaceutical Research, Bionic and Infobionic Research are parts of the programme. Neuroscientist László Acsády, winner of an ERC Advanced Grant, the most prestigious grant of the European Research Council fostering discovery research, has set the objective to explore the so far virtually unknown links between the frontal lobe of the cerebral cortex and the thalamus.

4. Others

List of Key Research Organisations and Companies

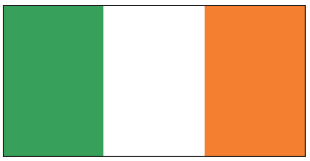
Organisation Name	Detailed information
National Research Development and Innovation Office (NKFIH) http://nkfih.gov.hu/english	▪ Organisation type: research funding organisation ▪ Major Research Product: funding research projects in all branches. ▪ Major Activities with Korea: joint research projects ▪ Future Plans: expand research collaboration ▪ Contact Information: nkfihivatal@nkfih.gov.hu
Hungarian Academy of Science (MTA) http://mta.hu/english	▪ Organisation type: Academy of science ▪ Major Research Area: research in all branches. ▪ Major Activities with Korea: joint research projects and joint labs ▪ Future Plans: expand research collaboration ▪ Contact Information: info@titkarsag.mta.hu
Institute of Experimental Medicine (KOKI) http://koki.hu/english	▪ Organisation type: research organisation ▪ Major Research Area/Product: brain research ▪ Major Activities with Korea: joint projects ▪ Future Plans: expand research collaboration ▪ Contact Information: info@koki.mta.hu
Wigner Research Center for Physics http://wigner.mta.hu/en	▪ Organisation type: research organisation ▪ Major Research Area/Product: particle and nuclear physics, solid state physics and optics. ▪ Major Activities with Korea: joint projects ▪ Future Plans: expand research collaboration ▪ Contact Information: titkarsag@wigner.mta.hu
National Agricultural Research and Innovation Center (NAIK) http://www.naik.hu/en/	▪ Organisation type: research organisation ▪ Major Research Area/Product: agricultural research ▪ Major Activities with Korea: joint projects ▪ Future Plans: expand research collaboration ▪ Contact Information: megyery.szandra@naik.hu
Gedeon Richter https://www.richter.hu	▪ Organisation type: Gedeon Richter Plc. ▪ Major Research Area/Product: almost all important therapeutic areas, including gynecology, central nervous system, and cardiovascular ▪ Major Activities with Korea: on-going dialogues with Korean partners ▪ Future Plans: strengthen cooperation with Korean partners ▪ Contact Information: t.pazmany@richter.hu

PART 14

IRELAND

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2017
4. Others

IRELAND



Country Outline

- GDP: 265,835 mil. euros (Eurostat 2016)
- GDP per Capita: 51,400 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Immunology, Animal and Dairy, Nanoscience, Computer Science and Materials Sciences

Contact Information

- Name / Position: Mr. David Murphy / Deputy Head of Mission
- Phone no. / e-mail: (+82) 2 721 7212 / seoulembassy@dfa.ie

The importance of investment in science, technology and innovation to Ireland's on-going and future economic and social development has been well recognised by the Irish Government. The increase in investments over the last decade and a half has resulted in the build-up of a very strong science base which has yielded results in terms of economic and societal impact.

Globally, Ireland is ranked:

- 1st in the world for the availability of skilled labour [Source: IMD World Competitiveness Yearbook];
- 1st in the world for Knowledge Diffusion [Source: Cornell University, INSEAD and WIPO 2016]
- 7th in the Global Innovation Index 2016 (out of 128 countries) [Source: Cornell University, INSEAD and WIPO 2016]
- 13th in the world for university-industry collaboration on R&D [Source: Global Competitiveness Report 2016-2017]

Ireland is ranked 10th in the world for overall scientific citations [Source: Thomson Reuters international citation rankings]. Ireland's scientific output is now of leading international quality in a number of areas:

- 2nd in Animal and Dairy
- 2nd in Immunology
- 2nd in Nanotechnology
- 3rd in Materials Sciences
- 4th in Agricultural Sciences
- 5th in Chemistry

[Source: Thomson Reuters Essential Science Indicators March 2017]

Ireland is ranked first in the EU according to the most recent review of the "Performance of Innovators" [Source: European Commission Innovation Union Scoreboard 2015], which measures the rate at which firms are involved in innovative activities, providing a subsequent increase in linked employment growth.

1. Policies and Strategies in Science, Technology and Innovation

In Ireland, the policy of investing in our science base has had a very positive impact on our industrial development and highlights how research, development and innovation contribute significantly to job creation and economic prosperity.

It has been based on an ambitious two-pronged strategy:

1) Investing in people, infrastructure and associated facilities to build the science base across many areas of scientific research in both our higher education institutions and other public research organisations;

Science Foundation Ireland supports investment in academic researchers, cutting-edge technologies and competitive enterprises in the fields of ICT, health and life sciences, energy and manufacturing competitiveness. This includes the funding of research, as well as public engagement to promote science, technology, engineering and maths. In collaboration with industry, Science Foundation Ireland has, to date, funded twelve world leading SFI Research Centres. Each of these national Centres of excellence is targeted towards strategic areas of importance to Ireland with a focus on delivering scientific excellence with economic and societal impact - Pharma, Big Data, Medical Devices, Nanotechnology/Materials, Marine Renewable Energy, Food for Health/Functional Foods, Perinatal Research, Applied Geosciences, Software, Digital Content, Telecommunications and Medical Devices. Four new SFI Research Centres will be formally announced in September 2017. These new Centres (representing investment of €72 million from Science Foundation Ireland and €38 million from industry over six years) will focus on areas of strategic importance such as smart manufacturing, additive manufacturing, neuroscience and the bioeconomy.

2) Direct support to the enterprise sector to help individual companies to build their capacity for research and development

Enterprise Ireland supports three categories of investments:

(i) Transforming Research Development and Innovation activity in companies
(ii) Encouraging Industry Collaboration between industry and third level sector research organisations and
(iii) Commercialising the outputs of research.

In addition, Ireland operates an R&D tax credit scheme to encourage additional business expenditure on Research and Development by foreign owned and indigenous companies.

2. National Programmes and Initiatives

Science Foundation Ireland has a suite of programmes aimed at supporting science, technology, maths and engineering research in Ireland. Each SFI programme has a variable funding level depending on the focus. Ireland does not have specific programmes targeted at Korea however, there are a range of programmes which can facilitate interactions (both industry and academic) with Korean counterparts.

List of National Programmes open to the world

Programme Title	Contents
SFI Industry Fellowships	▪ The purpose of the Industry Fellowships Programme is to facilitate the placement of researchers in industry or academia to stimulate excellence through knowledge transfer and training. Fellowships will enable access for researchers to new technology pathways and standards and will facilitate training in the use of specialist research infrastructure. Fellowships can be awarded to academic researchers wishing to spend time in industry worldwide or to individuals from industry anywhere in the world (including Ireland) wishing to spend time in an eligible Irish Research Body ▪ Funding Organisation: Science Foundation Ireland ▪ Call Opening/Closing Date: rolling call with two review periods ▪ Participation Qualification: Please review call document for eligibility criteria ▪ Project Duration: 12 months full time/24 months part time ▪ Funding Scale and Funding Scheme: up to €100,000 direct costs per fellowship ▪ Research Fields: Science, Technology, Engineering and Maths Website: http://www.sfi.ie/funding/funding-calls/programmes-for-industry.html Email: industry.fellowship@sfi.ie
SFI Partnerships	The SFI Partnerships Scheme provides a flexible funding mechanism intended to support ambitious research projects of scale between industry and academia. The scheme provides an opportunity for industry to engage with world class academic researchers and have access to infrastructure and intellectual property using a shared risk funding model in which SFI matches the investment made by industry. A key feature of the Partnerships Scheme is the recognition that collaboration with industry must be responsive and flexible. For this reason, the scheme employs adaptive partnership models that have been developed to meet industry partner needs. ▪ Funding Organisation: Science Foundation Ireland ▪ Call Opening/Closing Date: rolling call ▪ Participation Qualification: Please review call document for eligibility criteria ▪ Project Duration: Various ▪ Funding Scale and Funding Scheme: There are no set funding scales, however the programme is targeted at projects of scale. ▪ Research Fields: Science, Technology, Engineering and Maths Website: http://www.sfi.ie/funding/funding-calls/open-calls/sfi-partnerships.html Email: partnerships@sfi.ie

SFI Research Centres	These are world-leading, large-scale Research Centres with a major economic impact for Ireland. They consolidate research activities across higher education institutes to create a critical mass of internationally leading researchers in strategic areas which will lay the foundation for effective and productive academic and industrial partnerships. SFI Research Centres can receive €1.5 million a year in direct costs. SFI funds up to 70% of the overall Research Centre budget. A minimum of 30% of the budget must be secured from industry partners, at least one-third of which must be cash. SFI currently funds 12 Research Centres in areas of strategic importance. Note, four new SFI Research Centres will be formally announced in September 2017. See http://www.sfi.ie/investments-achievements/sfi-research-centres/ for details on each Centre. ▪ Funding Organisation: Science Foundation Ireland ▪ Call Opening/Closing Date: Fixed Call – currently closed ▪ Participation Qualification: Please review call document for eligibility criteria ▪ Project Duration: up to 6 Years ▪ Funding Scale and Funding Scheme: €1-5 Million per year Direct Costs ▪ Research Fields: Science, Technology, Engineering and Maths
SFI Research Centre Spokes	The SFI Spokes Programme provides a mechanism to allow new industrial and academic partners and projects to join the existing 12 SFI Research Centres, allowing the Centres to expand and develop in line with new priorities and opportunities. This will ensure that the Research Centres retain their ability to do cutting edge research and their industrial relevance, and so enhance their sustainability. ▪ Funding Organisation: Science Foundation Ireland ▪ Call Opening/Closing Date: Fixed Call Rolling call ▪ Participation Qualification: Please review call document for eligibility criteria ▪ Project Duration: minimum 12 months, maximum 60 months ▪ Funding Scale and Funding Scheme: no maximum award limit. Industry Partner must make a minimum 50% cash contribution ▪ Research Fields: Science, Technology, Engineering and Maths ▪ Email: spokes@sfi.ie

The President of Ireland Future Research Leaders Programme	The Future Research Leaders Programme a recruitment-only programme designed to attract to Ireland outstanding new and emerging research leaders in both scientific and engineering domains, where candidates may have both academic and/or industry relevant backgrounds with a focus on research excellence with impact. The programme aims to address current gaps in leadership, methodologies and skill sets in specific discipline areas. ▪ Funding organisation: Science Foundation Ireland ▪ Call Opening/Closing Date: Fixed call - currently closed ▪ Participation Qualification: Please review call document for eligibility criteria ▪ Project Duration: up to 5 years ▪ Funding Scale and Funding Scheme: up to €1 million in direct costs. ▪ Research Fields: Science and Engineering Website: http://www.sfi.ie/funding/funding-calls/programmes-for-early-and-mid-career-researchers.html Email: FRL@sfi.ie.
SFI Academic Led Programmes	SFI's suite of programmes supports research that has the potential for economic and societal impact. Academic led programmes such as the SFI Investigators Programme address crucial research questions that expand educational projects and career opportunities in Ireland, in science and engineering and prepare the research community to lead and win in Horizon 2020 and other non-exchequer funding programmes. SFI also has a range of programmes to attract leading researchers to Ireland at various career stages, from early-career researchers through to world-leading professors. Full details on all programmes may be viewed at http://www.sfi.ie/funding/funding-calls/open-calls/

3. Joint Activities with Korea in 2017

While there are no joint government programmes, there are ongoing collaborations between Science Foundation Ireland (SFI) funded researchers and Korean researchers.

4. Others

Knowledge Transfer Ireland (KTI)

http://www.knowledgetransferireland.com/

Knowledge Transfer Ireland (KTI) takes a national perspective on the knowledge transfer (KT) system in Ireland. Its mission is to support business and the research base to maximise innovation from State funded research by getting technology, ideas and expertise into the hands of business, swiftly and easily for the benefit of the public and the economy.

KTI enables business to leverage the commercial potential of Irish research and innovation through connecting businesses with cutting-edge research, expertise and opportunities, making it easier to find technology, IP and expertise in Ireland from our Higher Education Institutes (HEI's) and State research organisations and to find the right people to talk to.

KTI takes the guesswork out of knowledge transfer through providing a predictable knowledge transfer system for Ireland. KTI works with business, investors, research funders and Technology Transfer Offices (TTO's) which focus on the commercialization of University expertise to review, recommend and implement changes to the way in which Ireland approaches managing IP and contracting.

KTI directly supports the development of Ireland's knowledge transfer infrastructure. Through engagement with business, investors and technology transfer offices to shape practice. And through allocating and managing funding to support knowledge transfer offices within Ireland's HEIs and State funded research organisations our objective is to provide the capacity and capability to deliver first class service for research commercialisation.

List of Key Research Organisations and Companies

Organisation Name	Detailed information
National Directory of Research Centres	▪ Organisation type: National Intellectuel Property (IP) Protocol Organisation ▪ Major Research Area/Product: KTI works with Ireland's Universities, Institutes of Technology and other publicly funded research organisations and research funding agencies to make it easy for business and investors to access technology, IP and expertise ▪ Major Activities with Korea: N/A ▪ Future Plans: N/A ▪ Contact Information: http://www.knowledgetransferireland.com/

PART 15

ITALY

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

ITALY

Country Outline

- GDP: 1,672,438 mil. euros (Eurostat 2016)
- GDP per Capita: 25,900 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Life Sciences, Biotechnology, Aerospace, Aeronautics, Biomedicine, Engineering, Food Sciences, Oil Industry, Microelectronics, Physics, Material Sciences, Advanced Materials, ICT, Robotics, Environment and Energy, Transportation, Automotive

Contact Information

- Organisation: Embassy of Italian Republic
- Name / Position: Prof. Francesco Canganella / Science and Technology Counsellor
- Phone no. / e-mail: (+82) 2 750 0240 / seoul.science@esteri.it

The public research system, with HERD (High Education Research and Development) of 0.39% and GOVERD (Government Expenditure on R&D) of 0.18% of GDP in 2014, performs the greater part of R&D. Higher education and PRIs contribute to innovation in a number of ways but their co-operation with business firms needs to be improved. In order to improve public research performance, a reform of funding mechanisms for and management of universities was approved in 2010 by Parliament and is being implemented. The reform of the PRIs under MIUR has also recently been undertaken.

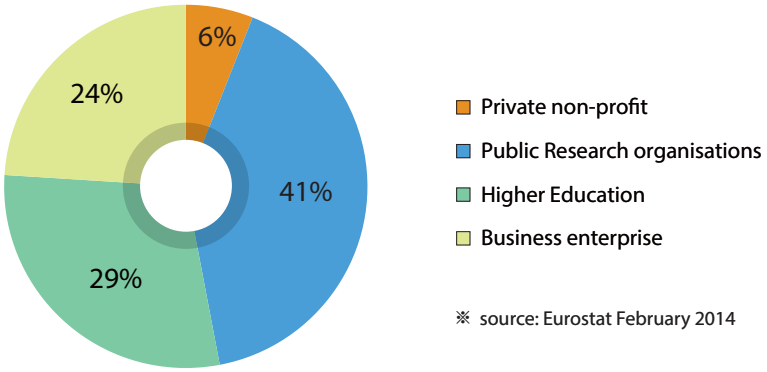
Various initiatives aim at bridging the gap between academia and industry. Technological districts and high technology poles as well as public-private laboratories are established in different parts of the country. The National Innovation Fund (FNI) was created in 2012 by MiSE to facilitate the financing of innovative projects based on the exploitation of industrial designs and patterns. In addition, the Innovation Package introduced in 2011 supports the patenting activity of SMEs. The National Technology Platforms and Industrial Innovation Network (RIDITT) were set up in 2010 to ensure dissemination of innovation and technology between research system and enterprises.

Italy is addressing various cross-cutting research issues considered crucial for enhancing economic growth, e.g. research on the natural and cultural heritage and on the complex systems of smart cities. Moreover Italy has improved its Revealed Technological Advantage (RTA) in environment-related technologies over the past decade and will soon develop a specialization if this trend continues.

15

1. Policies and Strategies in Science, Technology and Innovation

Government funding for R&D by sector of performance



STI policy governance: The Ministry for Economic Development (MISE) is in charge of industrial innovation, and the Ministry for Education, University and Research (MIUR) is responsible for the national education system, including higher education, but also for promoting research at national and international level. The National Agency for the Evaluation of Universities and Research Institutes (ANVUR) has operated under MIUR since 2010.

Science policy: The public research system, with HERD of 0.39% and GOVERD of 0.18% of GDP in 2014, performs the greater part of R&D. Higher education and PRIs contribute to innovation in a number of ways but their co-operation with business firms needs to be improved. In order to improve public research performance, a reform of funding mechanisms for and management of universities was approved in 2010 by parliament and is being implemented. The reform of the PRIs under MIUR has also recently been undertaken.

Business R&D and innovation: As in other OECD countries, there has been a shift towards indirect funding of R&D in recent years. As stated in the National Reform Programme 2011, for 2011/12, tax incentives have been strengthened for research commissioned by firms to universities and PRIs as well as for research developed in collaboration with them.

Public-sector innovation: The e-Government Plan 2012 of the Department for Public Administration defines a set of digital innovation projects to modernize the public

administration, to make it more efficient and transparent, and to improve the quality of services and reduce costs. The plan sets out some 80 projects and 27 targets to be achieved by 2013.

Knowledge flows and commercialization: Various initiatives aim at bridging the gap between academia and industry. Technological districts and high technology poles as well as public-private laboratories are established in different parts of the country. The National Innovation Fund (FNI) was created in 2012 by MiSE to facilitate the financing of innovative projects based on the exploitation of industrial designs and patterns. In addition, the Innovation Package introduced in 2011 supports the patenting activity of SMEs. The National Technology Platforms and Industrial Innovation Network (RIDITT) were set up in 2010 to ensure dissemination of innovation and technology between research system and enterprises.

Globalization: The Strategy for the Internationalization of Italian Research (SIRIT 2010-15) integrates the national research priorities, notably the EU's 2020 Strategy. Italy actively participates in EU R&D programmes, the European Strategy Forum on Research Infrastructures (ESFRI) and other European initiatives such as EUREKA (for international S&T cooperation) and Erasmus (for mobility of students and researchers).

Emerging technologies: Italy is addressing various cross-cutting research issues considered crucial for enhancing economic growth, e.g. research on the natural and cultural heritage and on the complex systems of smart cities.

Green innovation: Italy has improved its RTA in environment-related technologies over the past decade and will soon develop a specialization if this trend continues. The government provides a number of incentives for renewable energy production. The Energy Account (Conto Energia) initiative promotes solar photovoltaic, and a Kyoto Fund was set up to finance measures to reduce greenhouse gas emissions. Green Certificates (CV) promote electrical energy produced from renewable sources and White Certificates – energy efficiency labels (TEE) – encourage energy-saving measures. A package of fiscal incentives for energy efficiency interventions in existing and new buildings was approved by Parliament in 2011.

2. National Programmes and Initiatives

The last National Research Plan, for the period 2015–2020, identified several thematic priorities for the national research policy. These include energy, sustainable mobility, the environment, and 'made in Italy' –a programme promoting the industrial sectors that characterized national productivity. The plan aimed to promote research by strengthening business sector co-operation with the public sector and supporting the internationalisation of research.

The Industry 2015 programme (2006-15) sets out to support business networks and industrial innovation projects and includes a fund for enterprise finance. However, the National Reform Programme 2011-12 requires general policies to have a small impact on the national budget. The country's south and SMEs have attracted special attention in STI strategies and policies. The National Strategic Framework 2007-13 includes the National Operational Programme (PON) Research and Competitiveness 2007-13, funded by the European Regional Development Fund (ERDF) and by the national Revolving Fund (Fondo di Rotazione), which is of high importance for regional cohesion and competitiveness.

To put the economy on a sustainable growth path based on sound macroeconomic fundamentals, the Italian government has embarked since 2011 on a substantial process of fiscal consolidation and structural reform. Innovation will be crucial for boosting competitiveness and sustainable growth in the longer term. Although many indicators point to a modest level of STI activity, attention is being given to increasing it. In 2014 GERD (Gross Expenditure on R&D) was just 1.32% of GDP, about half of the OECD average, and more in line with the R&D intensity of emerging economies. The business sector performs only around half of GERD, a low share for an advanced economy. At 0.76% of GDP BERD lags behind the OECD average, with business sector innovation performance varying across firms and regions. In fact, a segment of innovative firms, including flexible SMEs, coexists with many non-innovative firms operating at low levels of productivity. Moreover, much R&D and innovation capacity is concentrated in northern and central regions of the country. The low share of industry-financed public R&D is indicative of weak industry-science linkages. Venture capital is in short supply and the patenting rate of young firms is low. In general, Italy tends to perform better on indicators of non-R&D-based innovation (for example, it leads in Community designs)

3. Joint Activities with Korea

List of Programmes of Activities with RoK in 2016

Programme Title	Contents
Bilateral symposium on personalized medicine	▪ Activity (Programme) Outline: April/ The Plaza Hotel, Seoul ▪ Major topic or agenda: Biomedicine, biopharma, biotechnology, immunology, oncology ▪ Target Participants: Private and public research bodies, scientists, students, national research agencies, governmental institutions
Bilateral symposium on brain sciences	▪ Activity (Programme) Outline: May/ KAIST, Daejeon ▪ Major topic or agenda: Neurosciences, brain physiology, neuro-disorders ▪ Target Participants: Private and public research bodies, scientists, students, national research agencies, governmental institutions
Bilateral workshop on membrane technologies	▪ Activity (Programme) Outline: June/ KRICT, Daejeon ▪ Major topic or agenda: Membrane technologies, advanced materials, water treatments, nanosciences
Bilateral symposium on water systems and hydraulic engineering	▪ Activity (Programme) Outline: September/ Gyeongju ▪ Major topic or agenda: Water systems and hydraulic engineering ▪ Target Participants: Private and public research bodies, scientists, students, national research agencies, governmental institutions
Bilateral symposium on quantum probability	▪ Activity (Programme) Outline: September/ KIAS, Seoul ▪ Major topic or agenda: Theoretical physics, quantum probability ▪ Target Participants: Private and public research bodies, scientists, students, national research agencies, governmental institutions
Bilateral symposium on technologies applied to cultural heritage	▪ Activity (Programme) Outline: October/ KNUCH, Seoul ▪ Major topic or agenda: Cultural heritage, technologies, preservation, restoration ▪ Target Participants: Private and public research bodies, scientists, students, national research agencies, governmental institutions
Bilateral symposium on sustainable fishery and responsible development	▪ Activity (Programme) Outline: November/PKNU, Busan ▪ Major topic or agenda: Sustainable fishery, technologies, responsible development, climate change ▪ Target Participants: Private and public research bodies, scientists, students, national research agencies, governmental institutions

Joint labs:

- CNR/ Hanyang University - Membrane technologies and applications
- ENEA/ KIST - Fuel Cells and Hydrogen applications

Other bilateral projects:

- ISMAR-CNR/ KIOST-NRF-Marine biology, climate changes and coral-associated microbial communities
- Polytechnic of Milano/ Gwangju Institute of Science and Technology- Nanostructured Target for Laser-Driven Ion Acceleration and High-Field Plasmonics

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
National Research Council www.cnr.it	▪ Organisation type: Research Organisation ▪ Major Research Area: All basic sciences and applied sciences ▪ Major Activities with Korea: Joint projects, joint labs, MoUs ▪ Future Plans: Expand research collaboration and technology transfer opportunities at a bilateral level ▪ Contact Information: virginia.codanunziante@cnr.it
Italian Institute of Technology www.iit.it	▪ Organisation type: Research Organisation ▪ Major Research Area/ Product: Applied sciences ▪ Major Activities with Korea: MoU ▪ Future Plans: Expand research collaboration and technology transfer ▪ Contact Information: Francesca.Cagnoni@iit.it
National Institute of Metrology www.inrim.it	▪ Organisation type: Research Organisation ▪ Major Research Area/ Product: Basic and applied sciences regarding metrology ▪ Major Activities with Korea: MoU ▪ Future Plans: Expand research collaboration and technology transfer ▪ Contact Information: inrim@inrim.it
Stazione Zoologica di Napoli www.szn.it	▪ Organisation type: Research Organisation ▪ Major Research Area/ Product: Marine sciences ▪ Major Activities with Korea: MoU ▪ Future Plans: Expand research collaboration and technology transfer ▪ Contact Information: stazione.zoologica@szn.it

Politecnico di Milano www.polimi.it	▪ Organisation type: University ▪ Major Research Area/ Product: Basic and applied sciences/Education ▪ Major Activities with Korea: MoU, joint projects, research collaborations ▪ Future Plans: Expand research collaboration, education, and technology transfer ▪ Contact Information: marco.imperadori@polimi.it
Politecnico di Torino www.polito.it	▪ Organisation type: University ▪ Major Research Area/ Product: Basic and applied sciences/ Education ▪ Major Activities with Korea: MoU, joint projects, research collaborations ▪ Future Plans: Expand research collaboration, education, and technology transfer ▪ Contact Information: enrico.macii@polito.it
University of Bologna www.unibo.it	▪ Organisation type: University ▪ Major Research Area/ Product: Basic and applied sciences/ Education ▪ Major Activities with Korea: MoU, joint projects, research collaborations ▪ Future Plans: Expand research collaboration, education, and technology transfer ▪ Contact Information: verdiana.bandini@unibo.it
University of Udine, Department of Agriculture www.uniud.it	▪ Organisation type: University ▪ Major Research Area/ Product: Basic and applied sciences/ Education ▪ Major Activities with Korea: MoU ▪ Future Plans: Expand research collaboration, education, and technology transfer ▪ Contact Information: paolo.ceccon@uniud.it
University of Milano www.unimi.it	▪ Organisation type: University ▪ Major Research Area/ Product: Basic and applied sciences/ Education ▪ Major Activities with Korea: Joint projects, research collaborations ▪ Future Plans: Expand research collaboration and technology transfer ▪ Contact Information: angela.bassoli@unimi.it
University of Gastronomic Sciences www.unisg.it	▪ Organisation type: University ▪ Major Research Area/ Product: Basic and applied sciences/ Education ▪ Major Activities with Korea: Joint projects, research collaborations ▪ Future Plans: Expand research collaboration and technology transfer ▪ Contact Information: g.morini@unisg.it
ICRA www.icra.it	▪ Organisation type: Research Institute ▪ Major Research Area/ Product: Basic and applied sciences ▪ Major Activities with Korea: MoU, joint projects, research collaborations ▪ Future Plans: Expand research collaboration and technology transfer ▪ Contact Information: Ruffini@icra.it
STmicroelectronics (www.st.com)	▪ Organisation type: SME ▪ Major Research Area/ Product: Microelectronics for automotive, mobile and telecommunication industries ▪ Major Activities with Korea: Marketing, product development, manufacturing and design ▪ Future Plans: Expand research collaboration, technology transfer, and business ▪ Contact Information: nunzio.abbate@st.com

Valvitalia www.valvitalia.com	▪ Organisation type: SME ▪ Major Research Area/ Product: equipments and components intended for the petroleum, water, natural gas industries, and petrochemical industry as well as electrical power stations ▪ Major Activities with Korea: marketing, sales ▪ Future Plans: expand research collaboration, technology transfer, and business ▪ Contact Information: aldo.nonna@valvitalia.com
Indena www.indena.com	▪ Organisation type: SME ▪ Major Research Area/ Product: active principles derived from plants, for use in the pharmaceutical, health-food and personal care industries ▪ Major Activities with Korea: marketing, sales ▪ Future Plans: expand research collaboration, and business ▪ Contact Information: paolo.morazzoni@indena.com

Bilateral projects selected within the frame of the Italy-Korea Executive Programme 2016-2018

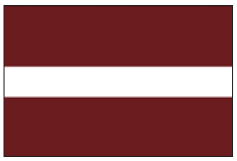
Area	ITalian Coordinator	Korean Coordinator	Title
Basic Sciences	PUGLIESE	PARK SUNG KEUN	New gaseous detector technologies for science and life
Nanosciences and Advanced Materials	PELLEGRINI	LEE GWAN-HYOUNG	Large-area solar energy harvesting device based on two-dimensional crystals
Energy and Environment	RUFFO	KIM DO KYUNG	Investigation on earth-abundant electrode materials with high power and long lifetime for Naion batteries
ICT, Robotics and Automotive	DAMIANI	JEON GWANGGIL	Joint demosaicking and denoising in digital images
Biotechnologies and Health	PERI	HONG SUNG YOU	Synergic modulation of Toll-Like Receptors (TLRs) via small molecule-nanoparticle conjugates: vaccine adjuvants and therapeutics
Agriculture and Food	VAROTTO	KYOUNG HEE	Understanding the roles of brassinosteroid and BAK1 in abiotic stress responses

PART 16

LATVIA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

LATVIA



Country Outline

- GDP: 25,021 mil. euros (Eurostat 2016)
- GDP per Capita: 11,000 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Knowledge-based Bio-economics, Bio-medicine, Medical Technologies, Bio-pharmacy and Biotechnologies, Advanced Materials, Technologies and Engineering Systems, Smart Energy, ICT.

Contact Information

- Name / Position: Dr. Inga Jekabsone / Deputy Director of European Union Issues of the Higher Education, Science and Innovation Department, Ministry of Education and Science of the Republic of Latvia
- Phone no. / e-mail: (+371) 67 047 963 / inga.jekabsone@izm.gov.lv

Latvia is a country with strong scientific traditions. The future goals for research in Latvia as defined in the Smart Specialization Strategy is to specialize in bioeconomy, biomedicine, biopharmacy, biotechnology, smart materials and technology, engineering systems, smart energetics and information and communication technology. Reforms of research and development sector are aimed towards the increase of the R&D potential by 2020 by consolidation of its research potential in 20 internationally competitive institutes that are integrated with higher education and industry.

As a result, the share of high technology products in Latvia's exports is gradually increasing from 4.8% in 2010 to 9.8% in 2015. The goal of public R&D investments is to increase the total R&D investment to 1.5% of GDP by 2020. These investments should also include an increase in private R&D funding from current 25% to 48% in 2020.

1. Policies and Strategies in Science, Technology and Innovation

Latvian National Innovation Strategy – RIS3 has the following priorities:

1) High added-value products
2) Productive Innovation System
3) Energy Efficiency
4) Modern ICT
5) Modern education
6) Knowledge base(Bio-economy; biomedicine, medical technologies, biopharmacy and biotechnology; smart materials, technology and engineering, smart energy; ICT)
7) Polycentric development

Facts and figures about Latvian research

Number of Scientific institutions	22 state funded Research Institutes
Excellence of Latvian research institution	15 internationally competitive scientific institutes or their separately evaluated departments
Number of researchers	7,827 researchers, 15% of which are working in business and industry
Investment in Research	In 2015, 152.2 million EUR was invested in R&D (6.5% less than in 2014). R&D expenditure is 0.62% of GDP in 2015 (the target goal in 2020 is 1.5%).
PhD holders	Amongst the population aged 25–34 about 1% are PhD holders (considerable increase over previous years)
Gender equality in research	56% of all PhD graduates in 2015 are women. Proportion of women researchers in 2013–52% (the highest rate in the EU, average in the EU–33%)
STEM	Students studying in STEM fields (natural sciences, computer sciences, math, engineering, manufacturing and construction) are defined as a priority: in the 2015/2016 academic year 91% of all students in state owned higher education institutions were studying in STEM and 67% of STEM students were studying in state funded study places.
Mobility in higher education	In the 2016/17 academic year, foreign students constitute 10% of all students in Latvia (constant increase over previous years).
Strengths sides in research	According to the research institutions and science and innovation system assessment carried out in 2013, Latvia internationally is recognised by achievements in Natural Science & Mathematics and Life Sciences & Medicine.
Technology transfer and commercialization	The Investment and Development Agency of Latvia as the National Technology Transfer Centre provides different kinds of activities to support technology transfer and cooperation between research institutions and industry. The agency supports international cooperation opportunities for foreign investors, researchers, enterprises and governmental organisations.

2. National STI Programmes and Initiatives

Overall Latvia has signed over 50 intergovernmental and interdepartmental agreements on cooperation in education and science. Most of them provide grants for students, researchers and faculty members from European and other countries. Based on these agreements, every year about 50 students, researchers and teachers use the opportunity to study, do research or work in Latvian universities, or take part in summer courses. The Agreement between the Government of the Republic of Latvia and the Government of the Republic of Korea on Cooperation in the Fields of Culture, Education, Youth and Sports encourages direct cooperation between universities, and research and educational institutions of their respective countries.

List of National Programmes open to the world

Programme Title	Contents
Latvian fellowships for research work http://www.viaa.gov.lv/eng/international_cooperation/scholarships_gov/latvian_scholarships/	▪ Cooperation Type: joint research / mobility / individual funding ▪ Funding Organisation: State Education Development Agency ▪ Call Opening/Closing Date: around 1st April each year ▪ Participation Qualification: Master Diploma, including transcript (if the PhD degree is not obtained yet) or PhD diploma ▪ Project Duration: up to 3 months ▪ Funding Scale and Funding Scheme: fellowship is 30 EUR per day and max. 300 EUR for accommodation per month ▪ Research Fields: any
Scholarships for studies http://www.viaa.gov.lv/eng/international_cooperation/scholarships_gov/latvian_scholarships/	▪ Cooperation Type: joint research / mobility / individual funding ▪ Funding Organisation: State Education Development Agency ▪ Call Opening/Closing Date: around 1st April each year ▪ Participation Qualification: completed at least one year of first level higher education ▪ Project Duration: up to 11 months ▪ Funding Scale and Funding Scheme: 500 EUR/month for Bachelor and Master's studies and 670 EUR/month for Doctoral studies ▪ Research Fields: any

3. Joint Activities with Korea

Not Applicable

4. Others

In order to promote the development of young scientists' and researchers' skills in their careers, research institutions or enterprises can implement post-doctoral research in cooperation with Latvian or foreign researchers, who have obtained a PhD degree no earlier than five years before the research application with the support of the EU Funds programme "Support for Postdoctoral Research".

In order to facilitate the preparation of qualified specialists, research institutions or enterprises can apply for the EU Funds programme "Support for Practical Research Projects" for research implementation in order to attract not only experienced scientific employees of Latvian research institutions, but also to attract foreign researchers, thereby encouraging the exchange of knowledge and experience.

Key Research Organisations and Companies

Organisation Name	Detailed information
University of Latvia www.lu.lv	▪ Organisation type: university & research institutes ▪ Major Research Area/ Product: The University of Latvia with its 13,000 students, 13 faculties and more than 20 research institutes is the largest research university in the Baltic States, with major research fields in Natural Sciences, Humanities, Medicine, Education and Social Sciences. It is the only higher education institution in Latvia that is ranked in QS World Top Universities ranking. ▪ Major Activities with Korea: University of Latvia has concluded bilateral cooperation agreements with the following universities in South Korea: Kyungpook National University, University of Incheon, Pukyong National University. In the 2016/2017 academic year, 18 students from South Korea study at the UL. For local students the UL offers to study Asian Studies, including Korean regional studies module (e.g. courses like "Contemporary Korean Society", "Philosophical and Religious Streams in Korea") at both bachelor and master levels. It is possible to study Korean language at 4 different levels of difficulty. In March 2016, the Korean Study Centre was established at the University of Latvia. In July 2015, the student-sportsmen of the UL participated in the Summer Universiade in Gwangju, Korea. ▪ Future Plans: UL plans to intensify the exchange of students and staff by preparing proposal for Erasmus+ mobility scheme with several South Korean universities. ▪ Contact Information: www.lu.lv, International Relations Department ad@lu.lv

Riga Technical University http://www.rtu.lv/en/	▪ Organisation type: university & research institutes ▪ Major Research Area/Product: Riga Technical University (RTU) is the largest university in Latvia and leading engineering university in Baltic States with more than 15,000 students in nine faculties. RTU offers engineering and business programmes, e.g. Business Management, Civil Engineering, Chemistry, Chemical Technology, Mechanics, Computer Systems, Telecommunications, Aviation Transport, Power Engineering, Medical Engineering, Applied Linguistics, at bachelor, master and doctoral level fully in English. Modern laboratories and approaches in all engineering, natural science and business study programmes. Students from more than 50 countries. Multicultural Environment at the university campus and all university faculties. ▪ Major Activities with Korea: Riga Technical University has bilateral cooperation agreements with following universities in South Korea: Kyungpook National University, Pukyong National University, Kongju National University, Handong Global University. Riga Technical University has been working with exchange students from Korea since 2007. In the 2016/2017 academic year, there are 29 students from South Korea. In September 2016, the Riga King Sejong Institute opened at the Riga Technical University. ▪ Contact Information: RTU Foreign Students Department Address: 1 Kalku Street, Riga LV-1658, Latvia Phone: (+371) 67 089 766 Fax: (+371) 67 089 020 E-mail: info@rtuasd.lv www.fsd.rtu.lv

The Institute of Solid State Physics University of Latvia http://www.cfi.lu.lv/eng/	▪ Organization type: research insistute ▪ Major Research Area/ Product: The Institute of Solid State Physics is one of the largest institutes in Latvia. The main field of its research is material science, with emphasis on nanoscience and nanotechnology of new advanced functional materials, with a special focus on materials applicable for sustainable energetics. The Institute is modern and well-run. A major concern of its management and staff is regarding further development, which is understood as the realization of important and up-to date research topics, ongoing collaboration with other national and international centres and continuous involvement of the young generation in the performed work. The Institute is a national coordinator and leader in several projects. It has an active International Supervisory Board consisting of internationally recognized experts. The mission of the Institute is to carry out high-level scientific activity, and to use its knowledge in the fields of education and innovation. The Institute of Solid State Physics, University of Latvia (ISSP UL) is the only scientific institution in the Baltic Sea region, which was granted support from the European Commission for the Horizon 2020 programme "Spreading Excellence and Widening Participation". The project CAMART2 (Excellence Centre of Advanced Material Research and Technology Transfer) from Latvia was ranked as the 5th best project. The European Commission has granted 15 million Euro for the development of the Centre of Excellence during the next seven years. In addition, more than 16 million Euro from the European Regional Development Funds, administrated by the Ministry of Education and Science of Latvia and Ministry of Economics of Latvia, will be invested in the development of research and technology transfer infrastructure, thus making the total investment amount more than 30 million Euro. ▪ Contact Information: Address: 8 Kengaraga street, Riga, LV-1063, Latvia Phone: (+371) 67 187 816 Fax: (+371) 67 132 778 E-mail: issp@cfi.lu.lv

Latvian Institute of Organic Synthesis http://www.osi.lv/en/	▪ Organization type: research institute ▪ Major Research Area/ Product: The Latvian Institute of Organic Synthesis (IOS) is a large research unit devoted mainly to drug discovery. IOS received the best score (5) among all Research Organizations in Latvia in "Research Evaluation Exercise", which was a part of the international assessment "Latvia in Innovation System Review and Research Assessment Exercise". IOS develops very important activities in the fields of chemistry, pharmacy, pharmacology and biology. The work of the Institute resulted in a high number of patents, which are hold together with industrial partners. Several drugs developed at IOS are on the market. However, beside the synthetic work driven by the need to fulfil the capital risks investors, basic research is nevertheless performed. A very large number of doctoral students are being trained and educated at IOS. ▪ Contact Information: Latvian Institute of Organic Synthesis VAT: LV90002111653 Aizkraukles 21, LV-1006, Riga, Latvia Tel: (+371) 67 014 801 Fax: (+371) 67 550 338 Email: sinta@osi.lv

PART 17

LITHUANIA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

LITHUANIA

Country Outline

- GDP: 38,637 mil. euros (Eurostat 2016)
- GDP per Capita: 12,000 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Health Technologies and Biotechnology, Novel Production Processes, Materials and Technologies, Agro-Innovation and Food Technologies

Contact Information

- Organisation: Ministry of Education and Science of the Republic of Lithuania
- Name / Position: Ms Kristina Babelytė-Labanauskė / Head, Technology and Innovation Division
- Phone no.: (+370) 5 219 1220

The major share of R&D in Lithuania is funded by the public sector and carried out by public research institutions. Investments in the five integrated science, study and business centres – 'valleys' - over 2007-2013 was meant to constitute the most important instrument for concentrating research, study and knowledge-intensive business potential in specific geographical areas with common or interrelated infrastructure, geared towards building a knowledge economy and thus enhancing Lithuania's economic competitiveness.

Lithuania's Progress Strategy "Lithuania 2030" approved by the Seimas (Parliament) of Lithuanian in 2012 has set out a vision for the country wherein changes will take place resulting in Smart society, Smart economy, and Smart governance. Lithuania's Progress Strategy cogently states that success will follow those that will be ready to timely adapt to changes, embrace innovations and boldly take competition challenges.

With the initiative for the EU countries' design of their research and innovation strategies for smart specialisation (RIS3) with the aim of implementing economic transformation agendas, in 2012 a process for defining national R&I 'smart specialisation' priorities in Lithuania was launched.

1. Policies and Strategies in Science, Technology and Innovation

Lithuania with a population of approximately 3 million is the seventh smallest country in the EU. However, Lithuania spends a respectful share of its GDP on the public investments in R&D. One of the main goals of STI policy is to reach the R&D target of 1.9% of GDP by 2020. The Lithuanian Progress Strategy 2030 projects that Lithuania should be 15th in the EU28 according to BERD*/GDP figures by 2020, and 10th – by 2030. Moreover, R&D is done by universities, research institutions and private businesses.

Main Figures about Lithuania

▪ 23 universities and 23 colleges	▪ 200,000 students for 3 million population
▪ 5 Valleys-integrated Science and Business Centres	▪ 10,7% scientists involved in business and industry
▪ 35 science institution	▪ Over 18,000 researchers working in various fields
▪ 5 Integrated science, research and business centres	▪ Globally recognized achievements in physics, laser, biotech, IT

Science, Technology and Innovation fields of 5 valleys

▪ Santara	▪ Biotechnologies, innovative medicine, biopharmacy, ecosystems, ICT, laser and lightechnologies, nanotechnologies, semiconductors technologies and electronics, civil engineering.
▪ Sauletekis	
▪ Nemunas	▪ Agro biotechnologies, bioenergy and forestry, food technologies, safety and wellness, sustainable chemistry and pharmacy, mechatronics, future energy and ICT.
▪ Santaka	
▪ Maritime Valley	▪ Maritime technologies and maritime environment.

Structure and main actors of the Science, Technology and Innovation system

Since joining the EU, Science, Technology and Innovation policy has rapidly grown in importance. The breakthrough was achieved after the government reached an agreement to invest a significant amount of fund (10% of the total EU structural assistance for 2007-2013) into research. In 2008, the Government of the Republic of Lithuania adopted a resolution on the establishment of five integrated centres of science, studies and business ("Valleys"). The aim is to concentrate the scientific research, studies and knowledge intensive business potential in specific geographical areas. Valley means concentration (totality of entities) of the capacities in research, studies and knowledge-intensive business generally in one area, with common or interrelated infrastructure, geared towards building knowledge economy and thus enhancing Lithuania's economic competitiveness.

STI priority areas and priorities.

Priority areas	Priorities (sub-fields in which tangible structural changes can be expected)
Energy and sustainable environment	▪ Smart systems for generators, grids and users energy efficiency, diagnosis, monitoring, accounting and management ▪ Energy and fuel production from biomass or waste, storage and disposal of waste ▪ Smart low energy buildings development and maintenance technology – digital construction ▪ Solar energy equipment and their use for power, heat and cool production
Health technologies and biotechnology	▪ Molecular technologies for medicine and biopharmacy ▪ Intelligent applied technologies for personal and public health ▪ Advanced medical engineering for early diagnostics and treatment
Agricultural innovation and food technologies	▪ Safer food ▪ Functional food ▪ Innovative development, improvement and processing of bioresources (biorefinery)
New processes, materials and technologies for industry	▪ Photonic and laser technologies ▪ Functional materials and coatings ▪ Construction and composite materials ▪ Flexible technological systems for product design and manufacturing
Transport, logistics and ICT	▪ Intelligent transport systems and information as well as communication technologies ▪ Models/technologies for management of the international transport corridors and integration of different types of transport ▪ Technologies for developing advanced e-content and information interoperability ▪ Solutions and services for ICT infrastructure and cloud computing
Inclusive and creative society	▪ Modern learning technologies and processes ▪ Technologies and processes for breakthrough innovations

Main policy documents

Seimas of the Republic of Lithuania (the Parliament) approved the **National Progress Strategy 'Lithuania 2030'** in May 2012. The National Progress Strategy 'Lithuania 2030' indicates a long-term vision for Lithuania and lists priorities for change in three key areas named Smart Economy, Smart Society and Smart Governance. On the basis of 'Lithuania 2030', on 28 November 2012 the Government approved the National Progress Programme for Lithuania for the period 2014-2020 (NPP). This Programme will provide a basis for the European Structural Funds support for the next programming period. The investment priorities concerning research and innovation policy are discussed in the priority fields of

'Smart Economy' and 'Smart Society'. It is projected that at least 11.44% of all NPP (national and EU SF) funds will be invested into the development of the networked economy, oriented towards the creation of higher value added. The policy focus is on innovation networks and research collaboration, joining global networks and entering global value chains as well as fostering innovation in business and demand for innovation. Another 14.23% of funds will be invested in education, culture and basic research (e.g. mobility, research infrastructures, competitive research funding, etc.).

The Lithuanian Innovation Development Programme for 2014-2020 was approved by the Resolution of the Government of the Republic of Lithuania on the 18th of December 2013. The strategic goal of the Programme is creating effective innovation system to increase competitiveness and innovation performance. The Programme aims to achieve better commercialisation of R&D results.

The National Programme for the Development of Studies, Research and Experimental (social and cultural) Development for 2013–2020 was adopted on 5 December 2012. This Programme is aimed at strengthening the country's competitiveness and increasing welfare by developing the study, R&D and innovation systems. The strategic objective of the Programme is to encourage the sustainable development of people and society which improves the country's competitiveness and creates conditions for innovation by developing higher education and implementing studies, R&D development.

2. National Programmes and Initiatives

List of National Programmes open to the world

Programme Title	Contents
Support to Research Activities of Scientists and other Researchers (Global Grant) www.lmt.lt/en/rnd/ grant.html	▪ Cooperation Type: research projects leaded either by individual researchers or research group ▪ Funding Organisation: Research Council of Lithuania ▪ Call Opening/Closing Date: TBC ▪ Participation Qualification: different participation qualifications for young and advanced researchers; different participation qualifications for Social Sciences and Humanities and natural and Technical Sciences groups ▪ Project Duration: up to 48 months ▪ Funding Scale and Funding Scheme: implementation costs can be covered up to 330,000 € (including indirect costs); Grant Agreements are signed with Host institution ▪ Research Fields: any ▪ Matching fund from Korean government: no

Postdoctoral fellowships www.postdoc.lt/en/ news	▪ Cooperation Type: research projects leaded by individual post-docs. Any higher education institution, research institute, research centre or other research establishments and enterprises in Lithuania can act as a Host Institution ▪ Funding Organisation: Research Council of Lithuania ▪ Call Opening/Closing Date: next call expected 1st half of 2015 ▪ Participation Qualification: young researchers awarded a Ph.D. degree within the period of 3 years (maternal and childcare leave are not taken into account) ▪ Project Duration: up to 24 months ▪ Funding Scale and Funding Scheme: implementation costs can be covered up to €100,000 (including indirect costs); grant agreements are signed with Host institution ▪ Research Fields: any ▪ Matching fund from Korean government: no
Exchange of research ideas www.lmt.lt/en	▪ Cooperation Type: short term visits to Lithuanian higher education and research institution ▪ Funding Organisation: Research Council of Lithuania ▪ Call Opening/Closing Date: first call expected the second half of 2015 ▪ Participation Qualification: TBC ▪ Project Duration: TBC
Exchange of research ideas www.lmt.lt/en	▪ Funding Scale and Funding Scheme: implementation costs will differ by the duration and aim of the visit; In case of incoming visits, application provider will be Lithuanian institution; grant agreements will be signed with Host institution ▪ Research Fields: Any ▪ Matching fund from Korean government: No
Brain Gain and Reintegration www.lmt.lt/en	▪ Cooperation Type: individual research projects ▪ Funding Organisation: Research Council of Lithuania ▪ Call Opening/Closing Date: first call expected the second half of 2015 ▪ Participation Qualification: TBC ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: implementation costs will be covered up to €140,000 (including indirect costs); grant agreements will be signed with Host institution ▪ Research Fields: any ▪ Matching fund from Korean government: no

Researcher teams' projects

Researcher teams' projects are intended as a way for a researcher or a group of researchers to obtain funding for their own scientific research in the field the Research Council of Lithuania calls for. The funding is granted for project proposals selected by holding public tender, encompassing areas of humanitarian, societal, physics, biomedical as well as technologies and agriculture sciences. However other types of proposals can be accepted as well under certain circumstances (i.e. aimed at international collaboration or technological development of research teams.

National Research Programmes

The goal of National Research Programmes (NRP) is to initiate scientific research for definite problems concentrating national research potential and fuelling it with appropriate funding. Each Programme is a sum of research, methodologies and measures all tailored to a specific theme providing most optimal conditions for a country to solve strategically important problems. In order to focus on the most competent research approaches and to promote Lithuanian research competitiveness the funding under these Programmes are given to the winning tenders in a public competition.

3. Joint Activities with Korea in 2016

List of Programmes or Activities with RoK in 2016

Programme Title	Contents
Mykolas Romeris University http://www.mruni.eu/ en/	▪ Organisation Type: university ▪ Major Research Area/Product: law, economics and finance, political sciences and management, social technologies, business and media ▪ Major Activities with Korea: implementation of joint study bachelor's degree programme "Informatics and Digital Contents", development of joint study master's degree programme "Visual Content and Informatics", student mobility and staff training programmes, Korean language courses and culture lectures ▪ Contact Information: Rasa Vilnienė / Head of Asian center Ateities st. 20, LT-08303 Vilnius Lithuania Tel: (+370) 5 271 4543, e-mail: asiancentre@mruni.eu
Kaunas University of Technology ktu.edu	▪ Organisation Type: university / research ▪ Major Research Area: physical, technological, social, biomedical sciences and humanities ▪ Major Activities with Korea: studies, research, professional development, know-how transfer, smart environments and information technology, sustainable growth and social-cultural development, technologies for sustainable development and energy ▪ Contact Information: Director Assoc. Prof. Leonas Balasevičius / Department of Research Affairs K. Donelaičio St. 73–420, LT-44029 Kaunas/ Tel: (+370) 37 300 702, e-mail: leonas.balasevicius@ktu.lt
Vilnius Gediminas Technical University http://www.vgtu.lt/ index.php?lang=2	▪ Organisation Type: university / research ▪ Major Areas: architecture, business management, IT, civil engineering, electronics, mechanical engineering and creative industries, IT ▪ Major Activities with Korean HEIs: students mobility for studies and placements, staff mobility ▪ Future Plans: development of student mobility, include Korean partner institutions into Erasmus+ application, development of partnership activities with aforementioned Research institutions ▪ Contact information: Director Aušra Pelėdienė / International Relations Office Saulėtekio al. 11, LT-10223 Vilnius/ Tel: (+370) 5 274 4958, e-mail: ausra.pelediene@vgtu.lt

Vilnius University http://www.vu.lt/en/	▪ Organisation Type: university ▪ Major Areas: law, history, chemistry, mathematics and informatics, economics, political sciences, biochemistry, biotechnology, theoretical physics and astronomy ▪ Major Activities with Korean HEIs: Korean language courses, students mobility, staff mobility, researchers mobility, joint research projects, joint events in the field of research ▪ Contact information: Leva Skinder, Marketing Officer International Programmes and Relations Office Universiteto 3, LT-01513 Vilnius/ Tel: (+370) 5 268 7156, e-mail: ieva.skinder@cr.vu.lt
National Cancer Institute http://www.nvi.lt/index.php?-1330073846	▪ Organisation Type: institute ▪ Major Areas: scientific research in oncology and related fields ▪ Major Activities with Korean HEIs: working on cooperation agreement with Yonsei Cancer Center / Yonsei University College of Medicine ▪ Future Plans: to sign cooperation agreement on May 2015 ▪ Contact information: Ph. D. Vydmantas Atkočius Deputy Director for Science and Education Tel: (+370) 5 219 0960, e-mail: Vydmantas.Atkocius@nvi.lt

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
Lithuanian Research Centre for Agriculture and Forestry http://www.lammc.lt/	▪ Organisation type: research centre ▪ Major Research Area/Product: Agriculture and Forestry ▪ Contact Information: Tel: (+370) 347 37271 / 37057, fax: (+370) 347 37096, e-mail: lammc@lammc.lt, http://www.lammc.lt
Lithuanian Energy Institute http://www.lei.lt	▪ Organisation type: research institute ▪ Major Research Area/Product: Hydrogen and fuel cells, Enegy, and Biofuel ▪ Contact Information: Director Sigitas Rimkevičius, dr Tel: (+370) 37 401924, e-mail: sigitas.Rimkevicius@lei.lt
Nature Research Centre http://www.gamtostyrimai.lt/lt/pages/view/?id=2	▪ Organisation type: research centre ▪ Major Research Area/Product: Ecology, Botany, Mycology, Microbiology, Virology, Zoology, Parasitology and Geosciences ▪ Contact Information: Scientific secretary Dr. Jurgifa Sorokaite Tel: (+85) 272 93 25, e-mail: jurgita.sorokaite@gamtostyrimai.lt
Center for Physical Sciences and Technology http://www.ftmc.lt	▪ Organisation type: research centre ▪ Major Research Area/Product: Laser technologies, Optoelectronics, Nuclear physics, Organic chemistry, Bio and Nanotechnologies, Electrochemical Material science, Functional materials, and Electronics ▪ Contact Information: Tel: (+370) 5264 9211, 266 1640/1643, Fax: (+370) 5260 2317, e-mail: office@ftmc.lt

PART 18

LUXEMBOURG

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

LUXEMBOURG

Country Outline

- GDP: 54,195 mil. euros (Eurostat 2016)
- GDP per Capita: 83,700 euros (Eurostat 2016)
- Areas of marked S&T specialisations: Environment

1. Policies and Strategies in Science, Technology and Innovation

Key figures, 2013

Economic and environmental performance	LUX	OECD	Gross domestic expenditure on R&D	LUX	OECD
Labour productivity			GERD		
GDP per hour worked, USD ppp, 2013	85.1	47.7	Million USD ppp, 2011	692	1,107,398
(annual growth rate, 2008-13)	(-0.8)	(+0.8)	As a % of total OECD, 2011	0.1	100
Green productivity			GERD intensity and growth		
GDP per unit of CO_2, emitted, USD, 2011	4.0	3.0	As a % of GDP, 2012	1.46	2.40
(annual growth rate, 2007-11)	(+3.2)	(+1.8)	(annual growth rate, 2007-11)	(-1.9)	(+2.0)
Green demand			GERD publicly linanced		
NNI per unit of CO_2, emitted, USD, 2011	4.0	3.0	As a % of GDP, 2012	0.44	0.77
(annual growth rate, 2007-11)	(-0.5)	(+1.6)	(annual growth rate, 2007-11)	(+8.5)	(+2.8)

(Source: OECD STI Policy Outlook 2014)

The steady increase in the public R&D budget between 2000 and 2009 reflects the government's resolve to make investment in RDI part of a long-term policy for Luxembourg's economic development and diversification. The country's national RDI strategy is founded on multi-annual planning and focuses on targeted priorities. Following the establishment of the public research centres (PRCs) and of the university between 1987 and 2003 key steps have included the OECD review of Luxembourg's national research system in 2006 and a Foresight Study in 2006, 2007 that identified the thematic domains which now make up the CORE public research funding programme. A major outcome of the OECD review was the recommendation to implement performance contracts between the ministry and the National Research Fund (FNR), the university, the PRCs and Luxinnovation. Two important draft laws are currently in the legislative process, with adoption expected in 2014:

- The first one aims to consolidate the public research organisations with, in particular,

the merger of the Tudor and Lippmann Public Research Centres. This merger should allow for the building of critical mass in areas with major prospects for cooperation with Luxembourgish industry such as materials and sustainable development with some less-promising research subjects being discontinued.

- The second one aims to reform FNR which allocates funds on a competitive basis. This reform targets better valorisation of research results notably through enabling actions to support 'proof-of-concept'. In this context a reform of the FNR's researchers training scheme (AFR) is foreseen. It will foster inter-sectoral (public/private) mobility. Many initiatives have been developed to foster private R&D, public-private cooperation, innovation and entrepreneurship:

  - The law of 5 June 2009 provides state aid for the private sector with a special focus on SMEs and services-sector innovation. The law of 18 February 2010 provides public aid to the private sector in the field of eco-innovation. The law on Intellectual Property (IP) tax incentives (21 December 2007) encourages companies to patent and licence the results of their R&D work, and also fosters spinoffs and start-ups based on IP.

  - Measures to encourage the development of small innovative companies include: IP/spin-off requirements in PRCs' performance contracts, the creation of a Master's degree in Entrepreneurship and Innovation, the setting up of business incubators, a partnership with a business accelerator located in Silicon Valley (Plug and Play Tech Centre) in order to help start-ups in Luxembourg to gain access to the United States market.

  - The massive (EUR 565 million) infrastructure project Cité des Sciences aims at reinforcing relations between research, education and innovation, by hosting on one site all of Luxembourg's major public R&D institutes, as well as private and start-up companies, a new technical school, the university campus, the national archives and some cultural centres. It will provide facilities for public-private partnerships and a business incubator.

  - Luxembourg has set up a cluster programme around five thematic clusters (in materials, ICT, space, bio-health, and eco-innovation). This policy was reinforced in 2013, with new missions given to clusters in relation to internationalisation and business developments as well as the setting up of a new cluster in the automotive field.

Moreover the new government announced its intention to put in place a process to enable public research organisations and firms to develop common research agendas focused on middle- and long-term targets.

2. National Programmes and Initiatives

List of National Programmes open to the world.

Programme Title	Contents
Luxembourg National Research Fund (FNR)'s CORE http://www.fnr.lu/funding-instruments/core	▪ Programme definition: It is the central programme of the FNR as well as a multi-annual thematic research programme. ▪ Cooperation Type: research funding ▪ Funding Organisation: Luxembourg National Research Fund ▪ Call Opening/Closing Date: 2016 annual call deadline is 21 April 2016 ▪ Participation Qualification: early career stage researchers and principal investigators; public institutions performing research in Luxembourg ▪ Project Duration: 2 to 3 years ▪ Funding Scale and Funding Scheme: the total budget allocated to the CORE programme for the period 2014-2017 is EUR 70 million ▪ Research Fields: Innovation in Services (IS), Sustainable Resource Management in Luxembourg (SR), New Functional and Intelligent Materials and Surfaces and New Sensing Applications (MS), Biomedical and Health Sciences (BM), Societal Challenges (SC)

3. Joint Activities with Korea in 2016

Not Applicable.

4. Others

Key Research Organisations and Companies

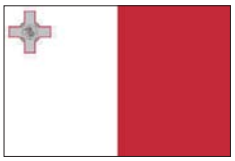
Organisation Name	Detailed information
Luxembourg Institute of Science and Technology http://www.list.lu/	▪ Organisation type: research centre ▪ Major Research Area/Product: environment, IT, materials ▪ Major Activities with Korea: None ▪ Future Plans/Strategy: contribute to Luxembourg's reputation, participate in the socio-economic development ▪ Contact Information: Phone (+352) 275 888 1, Fax (+352) 275 885, e-mail: info@list.lu

PART 19

MALTA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

MALTA



Country Outline

- GDP: 9,896 mil. euros (Eurostat 2016)
- GDP per Capita: 20,000 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: ICT, Tourism Product Development, Maritime Services, Aviation and Aerospace, Health (with a focus on healthy living and active ageing and E-health), Resource-efficient Buildings, High Value-added Manufacturing with a Focus on Processes and Design and Aquaculture

Contact Information

- Organisation: Council for Science & Technology
- Name: Dr. James Foden
- E-mail: james.foden@gov.mt

With preparations for Malta's accession to the EU in 2004 research increased a lot and the research policy in Malta gained substantial momentum. Malta's vision is to place research and innovation (R&I) at the heart of the Maltese economy in order to spur knowledge-driven and value-added growth and to sustain improvements in the overall quality of life.

The first Maltese national strategy for R&I was developed in 2007 with its main thrust being the development of a research framework and building research capacity in the areas of human resources and infrastructure. The strategy had a strong business orientation emphasising the importance of collaboration between industry and academia as well as the exploitation of research results for economic benefit.

In February 2014, a new National R&I Strategy 2020 was formally published. This builds upon the previous strategic plan introducing a number of new elements whilst retaining the same underpinning vision. The strategy articulates three main goals as follows: (1) building a comprehensive R&I ecosystem; (2) developing a stronger knowledge base; and (3) smart specialisation.

In Malta the business sector is the largest R&D performer accounting for 60% of GERD while the higher education sector accounted for 36% of GERD in 2012. R&D expenditure by public research organisations is just over 3% of GERD.

Industry in Malta consists of a small number of large foreign-owned manufacturing enterprises and a large number of indigenous SMEs which undertake little R&D. Most of this research is undertaken in the pharmaceuticals and electronics sectors, as well as service-oriented sectors such as consultancy and information programming activities. Malta has one public university, the University of Malta, which has an old pedigree and traces its origins back to the 16th century. It is the main research performer in the academic sector with its research activity focused on Social Sciences followed by Medical Sciences, Engineering, Humanities and Natural Sciences in that order.

Many of the developments in the research and innovation system in recent years relate to the availability of funding with the introduction by Malta Enterprise of a number of schemes in 2009 and 2010. Concurrently national funding for the R&I programme administered by the MCST more than doubled over the period 2009 to 2011. Funding schemes for PhD grants were also introduced utilising both national and EU finance.

ERDF funding was also leveraged to strengthen the research infrastructure at the University of Malta with significant funds being allocated to the development of a number of laboratories.

(Source: 'ERAWATCH Country Reports 2013: Malta')

1. Policies and Strategies in Science, Technology and Innovation

Malta's new National Research and Innovation Strategy 2020, launched in June 2014, sets out the national strategy for the forthcoming seven year period. The ultimate goal of this Strategy remains that of embedding research and innovation at the heart of the Maltese economy to spur knowledge-driven and value-added growth and to sustain improvements in the quality of life.

The Mission of this strategy is to provide an enabling framework for achieving this vision building up on past achievements as well as lessons learnt along the way. This Strategy and its implementation do not provide all the building blocks of a knowledge-based economy by themselves but are a crucial step towards this. The achievement of this stated Mission depends on putting in place the necessary 'building blocks' identified as the three goals of:

a) A comprehensive R&I support ecosystem - The achievement of this goal would be an important building block towards Malta's transformation to a knowledge economy as it would facilitate innovative ventures to take shape and flourish. This support ecosystem would be independent of thematic specialisations thus providing a baseline level of support for all players and embedding flexibility to support any new specialisation areas which emerge over time.

b) Investing in a stronger knowledge base - The achievement of the second goal is to be seen as a longer-term investment the fruits of which may or may not be reaped within the timeframes of this Strategy. This goal balances the overarching orientation of this Strategy towards close-to-market R&D and innovation by building capacity and excellence in the earlier stages of the R&D process. Given the magnitude of investments required and resource limitations, priority should be focused on identified thematic specialisations.

c) Smart, flexible specialisation - This goal targets the establishment of a knowledge-based economy by prioritising its achievement in a number of thematic areas. It is a very innovation-oriented approach which however does not exclude the involvement of research activities. In addition, the prioritisation of long-term investments in a stronger knowledge base in identified thematic areas serves to embed stronger foundations over the longer term, thus consolidating the knowledge base of these thematic areas.

The Strategy can be accessed at:
http://www.mcst.gov.mt/sites/default/files/pa_documents/strategy_visual_27_5.pdf

The Strategy also includes the mechanism for communication management and co-design of implementing measures among different stakeholders, knowledge based policy design as well as monitoring and review. To this end the Strategy identifies a set of seven indicators (balanced between input and output indicators) to monitor performance in implementing the Strategy effectively. One of the targets set in this Strategy is the EU2020 R&D expenditure target for Malta which has been fixed at 2%. The latest figures available on Eurostat indicate a final figure for R&D expenditure of 0.87% 2012 and a 0.85% provisional figure for 2013.

Further to the finalisation of the new R&I Strategy Malta is presently in the process of developing a roadmap through an R&I action plan which will align existing and planned efforts towards the achievement of the Strategy's objectives including the achievement of Malta's new target for R&D and the specialisation areas. Work on the Action Plan started in late 2013 through an initial information gathering exercise was followed up with bilateral meetings with all relevant stakeholders. The measures in the action plan will reflect government's financial commitments to R&D over the coming years. The R&I Action Plan will be finalised by mid-2015 and will be regularly updated and recalibrated to reflect changing circumstances. Nonetheless, it will retain its focus on the overall goal of the Strategy's objectives and targets. Within this context discussions are ongoing on the piloting of actions under smart specialisation.

2. National Programmes and Initiatives

The Malta Council for Science and Technology manages the national R&I funds. FUSION, the R&I Programme, aims to raise the level and profile of locally funded research and ingrain research and innovation at the heart of the Maltese economy to spur knowledge-driven and value-added growth and sustain improvements in quality of life. FUSION is composed of two main programmes:

a) Commercialisation Voucher Programme

Commercialization is the fundamental aim of the Malta Council for Science and Technology's research and innovation fund. This programme supports the assessment of such commercialization potential prior to the actual undertaking of any research and development. This Programme consists of 6 different Vouchers covering IP Check, Market Research & Product Development Costing, Economic Impact & Risk Profile, Business Plan, Initial Patent Application and Investors' Meetings. A number of Service Providers have been selected through an open call to undertake such consultancy services.

b) Technology Development Programme (TDP)

The focus of the Programme is to fund the actual development of the research and innovation proposal with the possibility of having a prototype of the proposed solution. This programme will build on the outcomes of the first five vouchers covered by the Commercialization Voucher Programme. Projects would typically have a duration of between one and three years, with a project value ranging between €50,000 and €200,000.

The funding is available for local public, academic, and private sector stakeholders. International partners are welcome to participate in projects but are not eligible for funding from the National Programme.
Webpage: http://www.mcst.gov.mt/fusionri-programme

List of National Programmes open to the world

Programme Title	Contents
National R&I Funding Programme ('Fusion') www.mcst.gov.mt/national-funding/ri-programme/current-ri-programme	▪ Cooperation Type: research funding ▪ Funding Organisation: Malta Council for Science and Technology ▪ Call Opening/Closing Date: Commercialisation Voucher programme (January-February and May-June); Technology Development Programme (open call) ▪ Participation Qualification: independent scientific evaluation, commercialisation potential, research implementation through consortium ▪ Project Duration: Voucher Programme (6 months), TDP (1-3 years) ▪ Funding Scale and Funding Scheme: National Funding Scheme. ▪ TDP up to €200,000 ▪ Research Fields: aligned with Malta's Smart Specialisation Areas ▪ Matching fund from Korean government: no

3. Joint Activities with Korea in 2016

Not Applicable

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
Malta Life Sciences Park www.lifesciencespark.com/	▪ Organisation type: research centre ▪ Major Research Area/Product: mechanical engineering, physical sciences, electronic engineering, chemical engineering and occupational health ▪ Major Activities with Korea: No ▪ Contact Information: Phone (+356) 2542 0000, email info@lifesciencespark.com
University of Malta http://www.um.edu.mt/research/	▪ Organisation type: university ▪ Major Research Area/Product: biology, chemistry, geosciences, mathmatics, physics, statistics and operations research ▪ Major Activities with Korea: No ▪ Contact Information: Phone (+356) 2340 2340, Fax (+356) 2340 2342

PART 20

NETHERLANDS

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

NETHERLANDS

Country Outline

- GDP: 702,641 mil. euros (Eurostat 2016)
- GDP per Capita: 39,500 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: High Tech Systems & Materials, Water, Chemistry, Agro-food, Horticulture, Energy, Creative Industry, Logistics, and Life Science

Contact Information

- Organisation: Embassy of the Kingdom of the Netherlands
- Name / Position: Mr. Peter Wijlhuizen / Senior Officer for Innovation, Technology & Science
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The Netherlands is one of the most competitive and innovative countries worldwide. As 'innovation leader' it ranks 9th in the Global Competitiveness Index and 4th in the Global Innovation Index (2016). The Brainport region around Eindhoven (home of Philips) was declared the 'World's Most Intelligent Community' in 2011. Wageningen UR (WUR) holds a leading position worldwide in agro-food and life sciences research. The Netherlands is also home to ESTEC (European Space Research and Technology Centre), the technical heart of the European Space Agency.

1. Policies and Strategies in Science, Technology and Innovation

Science Policy

The Ministry of Education, Culture and Science (Min. OC&W) focuses on scientific research and education. It is responsible for funding basic research and for the public research infrastructure. The policies of the Min. OC&W's are implemented by agencies and research institutes that fall under its remit.

November 2014, the government's new white paper on science was released: "Vision for Science 2025. Choices for the Future." It identifies three challenges that the Netherlands need to tackle in order to maintain a leading position: increasing international competition, the need for closer ties between sciences on the one hand and society and industry on the other, and the increasing pressure on the Dutch scientist.

Science in the Netherlands is funded from several different sources:

- The private sector funds around half of all research in the Netherlands, mainly its own in-house research, but also research performed by public research institutions (universities and public-private institutions).
- The government funds a little over a third of the total. Some government funding is channeled through intermediary organisations like NWO, KNAW and RVO.

- Other national funding sources: public institutions' own resources and public private funds (Health Funds).
- Foreign funding source, via foreign companies and EU research funding, particularly under Horizon 2020.

Innovation policy

Innovation policy is closely related to science policy. The Ministry of Economic Affairs (EZ) bears primary responsibility for innovation policy in the Netherlands. It focuses on fostering knowledge development in companies and on collaboration between research institutions and companies.

The core of the policy is the government's plan to make targeted investments in nine leading sectors of the economy. The idea is to tackle problems hampering growth in these sectors. The cooperation between enterprises, scientific institutions, regions and the government will be continued within a new financial framework. The government has chosen nine sectors in which the Netherlands excels as a result of its geography and history: water, agro-food, horticulture, high-tech systems & materials, life sciences, chemicals, energy, logistics and creative industries.

Over the next few years the government plans to tackle administrative problems. This will involve improving professional education, removing obstacles to trade, strengthening the infrastructure, scrapping unnecessary rules and ensuring easier access for knowledge workers. In addition, 1.5 billion euros of research funding will be targeted at the nine leading sectors across the entire government budget. Entrepreneurs, the authorities and research institutions in each sector have drawn up their joint research agendas.

Cooperation between enterprises, knowledge institutes and the government will be important. It will take place in so called Topconsortia for Knowledge and Innovation (TKI) with research initiatives in the chain from basic research to market innovations. It is the ambition of the government that TKI's will spend some € 500 million from 2015 onwards of which 40 percent is privately funded.

In 2014, Dutch companies and research institutes spent over 13 billion euros on R&D. Companies and higher education institutes increased their spending on R&D while public research institutes spent less. The government invested just over 4 billion euro in R&D via direct and indirect funding. Most direct funding goes via intermediary organisations (like NWO and RVO). Indirect funding are tax incentives whereby the Dutch government pays a proportion of the wage costs and other costs (e.g. equipment) associated with research and development. The total R&D expenditures in the Netherlands in 2014 amounted to 2

percent of Dutch GDP.

In September 2016, Korea and the Netherlands signed an agreement to have a Joint Innovation Committee. In December 2016, a delegation from MOTIE went to the Netherlands to have a preliminary meeting with the Dutch ministry of Economic Affairs. In 2017, details of the JIC will be finalized.

For more detailed information, please visit:

- http://www.rathenau.nl/en/web-specials/the-dutch-science-system.html
- http://www.government.nl/files/documents-and-publications/reports/2014/12/08/2025-vision-for-science-choices-for-the-future/visie-wetenschap-eng-web.pdf
- http://www.government.nl/issues/entrepreneurship-and-innovation/investing-intop-sectors
- http://www.government.nl/files/documents-and-publications/reports/2012/ 08/30/quality-in-diversity/2212-1025-qualityindiversity-web2.pdf
- http://www.government.nl/documents-and-publications/leaflets/2012/04/17/thescience-system-in-the-netherlands.html

2. National Programmes and Initiatives

List of National Programmes opens to the world

Programme Title	Contents
Horizon 2020	http://ec.europa.eu/programmes/horizon2020/
JTI/Eureka clusters	http://www.eurekanetwork.org/clusters
Eurostars2	https://www.eurostars-eureka.eu/
WBSO/RDA	Tax incentive for companies and institutes located in the Netherland for costs related to R&D (e.g. wages and equipment). http://english.rvo.nl/subsidies-programmes/wbso-rd-tax-credit-andrda-research-and-development-allowance

3. Joint Activities with Korea

List of Programmes or Activities with RoK in 2016

Programme Title	Contents
Bigdata project	Statistics Netherlands Agency (CBS) and the KOSTAT have made an MoU to collaborate in production and utilization of Bigdata in 2016. More specifically they will research and develop on analyzation and utilization of bigdata, methodology of linking statistical data and so on. Furthermore, they will also plan for staff exchange program.
Offshore wind energy	The PIB Wind project ended in 2016. But there has been a great success as Korea and the Netherlands are continuously cooperating with each other in the offshore wind energy sector. One of the examples is that TNO and Jeju University have made a MoU to join research and develop program together and have a study exchange program for future researchers.
*PIB tapinto	Ten companies developing and producing tools and equipment for the semiconductor industry have formed a consortium. With the support of the Dutch government, they are looking for cooperation in Korea. In 2016, the consortium members visited Korea to attend seminars and introduce their innovative technologies. Due to their active promotion, one of the consortium members has found a Korean partner to do business in Korea

** Partners for International Business (PIB) = focuses on group of companies which want to enter a foreign market jointly. Research institutes can be part of the group. The ministry of foreign Affairs has initiated this program in order to eliminate trade and investment barriers. This allows entrepreneurs capitalize on opportunities*

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
Energy Center Netherlands(ECN) www.ecn.nl/home	ECN has been researching sustainable energy use for decades. It develops innovative solutions for specific energy requirements. ECN also does research commissioned by government authorities and companies into the impact of energy use and energy production on the environment. Main topics include: solar energy, wind energy, energy efficiency/saving and biomass.
Netherlands Organisation for Applied Scientific Research(TNO) www.tno.nl	TNO is an independent research organisation that employs some 3,000 specialists. It focuses on transitions or changes in five social themes: - Industry: from economic stagnation to growth in high-technology industry - Healthy Living: from illness and treatment to health and behaviour - Defence, Safety & Security: from a wide range of threats to controllable risks - Urbanization: from urbanization bottlenecks to urban vitality - Energy: from conventional sources to sustainable energy systems.

WUR https://www.wageningenur.nl	WUR is collaboration between Wageningen University and the DLO foundation. It has a staff of 6,500 and 10,000 students from over 100 countries. The domain of Wageningen UR consists of three related core areas: Food and food production, living environment and health, lifestyle and livelihood.
Maritime Research Institute Netherlands (MARIN) www.marin.nl/	MARIN is a research organization founded in 1929 by the Dutch government and industry. The organization is specialized in offshore technology. As early as 1970, MARIN extended its activities to include nautical research and training. For this purpose a modern Vessel Traffic Simulator and two full-mission simulators are available today. At present, approximately 350 people work at MARIN with turnover of 42 million EURO.
Netherlands Aerospace Centre (NLR) http://www.nlr.org/	NLR is a research organisation founded in 1919 by the Dutch government. It was focused on developing civil aviation, but in 1937, the organization turned into a foundation which conducted scientific research for the national aircraft industry. Now NLR has responded to public concern for sustainable, safe and efficient air transport, carrying out numerous projects with national and international collaborations. In 2015, NLR and Saemangeum Development and Investment Agency have made a MoU to establish a Dutch research institute. The Korean government has secured 6.65 million EURO for 5 years to build the research institute. Various international seminars will be held at Saemangeum after the establishment of the research institute.
DELTARES https://www.deltares.nl/en	Deltares is an independent institute for applied research in the field of water and subsurface. It works on smart solutions, innovations and applications for people, environment and society. The main focus is on deltas, coastal regions and river basins. The institute works closely with governments, businesses, research institutes and universities domestically and internationally. In 2015, Deltares and Korea Institute of Civil Engineering and Building Technology (KICT) has signed a MoU to increase cooperation between vegetation patchiness and river hydraulics.
Dutch Polymer Institute(DPI) http://www.polymers.nl/	DPI is an international collaborative platform for industrially relevant research in the field of polymers. It was established in 1997, and it is widely recognized independent institute that specialises in bringing together industrial needs and academic capabilities in a world-class pre-competitive research programme.
Brainport http://www.brainport.nl/en	Brainport is an innovative high-tech region, responsible for a quarter of all private investment in R&D in the Netherlands. Brainport generates 37 percent of all patents registered in the Netherlands each year. Focus areas are renewable energy, safe mobility and smart remote care.
Holst Centre http://www.holstcentre.com/	Holst Centre is an independent open-innovation R&D centre that develops generic technologies for Wireless Autonomous Sensor Technologies and flexible electronics. A key feature of Holst Centre is its partnership model with industry and academia based around shared roadmaps and programs. It is this kind of cross-fertilization that enables Holst Centre to tune its scientific strategy to industrial needs

PART 21

POLAND

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

POLAND

Country Outline

- GDP: 424,269 mil. euros (Eurostat 2016)
- GDP per Capita: 11,200 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Energy, Maths, Physics, IT, Astronomy, Quantum Electronics, Life Science

Contact Information

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- Phone no. / e-mail: (+48) 22 390 74 99 / andrzej.wajs@ncbr.gov.pl

Poland has a large population of young skilled researchers and one of the highest scholarisation indexes in Europe (51%). Poland has consistently devoted more resources to science and supporting R&D. Since 2008, Poland's R&D expenses have more than doubled.

The Innovation Union Scoreboard 2015 classified Poland as a moderate innovator – 24th place out of 28. Poland ranks one place higher than in 2014. In 2010, the total budget for research accounted for 0.74% GDP. The aim is to reach 2% of GDP in 2020. One of the most important instruments that address innovation in Poland is the Operational Programme Smart Growth, with a budget of almost USD 7 billion available in 2014-2020.

According to the most recent (December 2015) data provided by Poland's Central Statistical Office, the country's GERD in 2014 amounted to USD 4.25 billion, which means a 12% increase compared to 2013. This means that 0.94% GDP was devoted to R&D funding (0.87% GDP in 2013). These figures confirm the trend observed in the world standings. As the results of the Global Innovation Index 2015 show, in the period 2008-2013, and therefore during the economic crisis, Poland occupied the first place in terms of growth of private sector R&D expenses (BERD). In the same period, Poland was second only to China in terms of GERD growth.

The year 2014 saw a record increase in the private sector's R&D spending. Businesses allocated almost USD 2 billion on R&D, a 19.7% increase compared to 2013. The private sector's expenses now account for 46.6% of Poland's total R&D expenditure, compared with 43.6% in 2013 and 37.2% in 2012.

Poland is heavily supported by structural and cohesion funding, whose majority was first spent on infrastructure and increasing people's qualifications. The current drive is to make use of that infrastructure and qualified personnel to conduct world-class R&D. There are opportunities for the RoK to become a supplier of services, provider of training and manager of large R&D projects.

Looking at research collaboration, Poland offers excellence in the areas of energy, maths, physics, IT, astronomy, life sciences and quantum electronics. This is perhaps where strategic bilateral collaboration could be fostered under the Horizon 2020 funding programme (more information on this and other programmes on offer can be found on the following pages).

1. Policies and Strategies in Science, Technology and Innovation

In February 2016, Poland's new government accepted a resolution concerning a long-term economic development plan for the country. The programme is based on five pillars: reindustrialisation, the development of innovative companies, foreign expansion, sustainable social and regional development as well as increased savings.

The author of the concept, Deputy Prime Minister/Development Minister Mateusz Morawiecki (hence "the Morawiecki Plan") identified five challenges that Poland faces. These are they: the middle-income trap, lack of balance between Polish and foreign capital, the lack of innovative products, the demographic trap, and the weak institutions trap.

In order to overcome them, the government singled out strategic economy sectors which will be supported by the state. R&D spending is set to reach 2% GDP, compared to 0.8% at present. Under the plan, USD 250 billion will be spent on investments in the coming years. The sum is to come from EU funds, Polish companies' savings and state-owned companies. Up to USD 20 billion will be delivered in development programmes carried out in co-operation with international institutions, such as the European Bank for Development and Reconstruction, and the World Bank.

One of the key ideas of the plan is the establishment of the Polish Development Fund as a result of a merger of existing institutions, including the Export Credit Insurance Corporation (KUKE), development bank BGK, the Polish Agency for Enterprise Development (PARP), the Polish Information and Foreign Investment Agency (PAIiIZ), Industrial Development Agency (ARP) and Polish Investments for Development (PIR).

Welcomed by the European Commission, the plan sets ambitious aims. It envisages that by 2020, Poland's GDP will stand at 79% of the EU average, the level of investment will reach 25% GDP, the number of SMEs will grow to 22,000 while Poland's outward FDIs will increase by 70%.

Hot STI issues

- Bridging the gap between Poland and more developed countries
- Innovating to contribute to structural adjustment and a new approach to growth
- Improving the design and implementation of the STI policy
- Reforming and improving public research (including tertiary education research)
- Strengthening public R&D capacity and infrastructure
- Business innovation, entrepreneurship and SMEs

Key figures

- http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/oecd-science-technology-and-industry-outlook-2014_sti_outlook-2014-en#page401
- http://stat.gov.pl/en/topics/science-and-technology/science-and-technology/science-and-technology-in-poland-in-2014,1,10.html
- 2017 Bloomberg's Global Innovation Index: Poland – 22nd place

(Source: Warsaw Business Journal)

2. National Programmes and Initiatives

List of National Programmes open to the world

Programme Title	Contents
Smart Growth (EU international programme)	▪ Cooperation Type: Joint Research Consortium with a Polish company – SME or micro-sized enterprise ▪ Funding Organisation: EU ▪ Call Opening/Closing Date: 2014-2020 ▪ Participation Qualification: depends on the competition under the Programme ▪ Project Duration: depends on the competition under the programme ▪ Funding Scale and Funding Scheme: approx. USD 6.8 billion ▪ Research Fields: R&D on technologies and products to develop the companies' activities and to strengthen their competitive edge ▪ No matching fund from Korean government
POWER (EU international programme)	▪ Cooperation Type: Jointly with a Polish university ▪ Funding Organisation: EU ▪ Call Opening/Closing Date: 2014-2020 ▪ Participation Qualification: depends on the competition under the Programme - http://www.ncbr.gov.pl/en/news/art,4036,more-than-pln-890-million-for-universities.html ▪ Project Duration: 5 years ▪ Funding Scale and Funding Scheme: USD 232 million for 7 competitions in 2016 ▪ Research Fields: boosting students' entrepreneurship as well as interpersonal and analytical competencies ▪ No matching fund from Korean government

PBSE	▪ Cooperation Type: Joint Research Consortium with a Polish company/university/research unit ▪ Funding Organisation: National Centre for Research and Development ▪ Call Opening/Closing Date: Q3/Q4 2017 ▪ Participation Qualification: please contact pbse@ncbr.gov.pl ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: USD 31 million, TBC ▪ Research Fields: conventional and renewable energy, electro-energy networks, biomass, biogas, water energy, waste energy, energy storage, prosumer energy, ICT ▪ No matching fund from Korean government
GameINN	▪ Cooperation Type: Joint Research Consortium with a Polish company/university/research unit ▪ Funding Organisation: National Centre for Research and Development ▪ Call Opening/Closing Date: May/July 2017 ▪ Participation Qualification: please contact gameinn@ncbr.gov.pl ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: USD 14 million, TBC ▪ Research Fields: video & computer games ▪ No matching fund from Korean government
IUSER	▪ Cooperation Type: Joint Research Consortium with a Polish company/university/research unit ▪ Funding Organisation: National Centre for Research and Development ▪ Call Opening/Closing Date: Q4 2017/Q1 2018 ▪ Participation Qualification: iuser@ncbr.gov.pl ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: USD 39 million, TBC ▪ Research Fields: energy storage in end-user systems, energy efficiency, ICT for critical infrastructure networks. ▪ No matching fund from Korean government
INNOSBZ	▪ Cooperation Type: Joint Research Consortium with a Polish company/university/research unit ▪ Funding Organisation: National Centre for Research and Development ▪ Call Opening/Closing Date: Q3/Q4 2017 ▪ Participation Qualification: please contact innosbz@ncbr.gov.pl ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: USD 13 million, TBC ▪ Research Fields: UAVs and UGVs ▪ No matching fund from Korean government

INNOSTAL	▪ Cooperation Type: Joint Research Consortium with a Polish company/university/research unit ▪ Funding Organisation: National Centre for Research and Development ▪ Call Opening/Closing Date: Q3/Q4 2017 ▪ Participation Qualification: please contact innostal@ncbr.gov.pl ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: USD 25.4 million, TBC ▪ Research Fields: new and improved steel products and their production technologies, new and improved feed materials and alloys for metallurgical production, optimization of energy consumption, feedstock, media, tools and metallurgical equipment, innovative systems and technologies reducing harmful emissions to the environment, innovative solutions to modernise and support technological processes in metallurgy ▪ No matching fund from Korean government
Fast track for micro and large enterprises as well as SMEs	▪ Cooperation Type: Joint Research Consortium with a Polish company– business participation is required ▪ Funding Organisation: National Centre for Research and Development ▪ Call Opening/Closing Date: September/December 2017 – micro- and SMEs as well as large enterprises ▪ Participation Qualification: please contact konkurs1.1.1@ncbr.gov.pl ▪ Project Duration: until 2018 ▪ Funding Scale and Funding Scheme: approx. USD 260 million for micro and SMEs, approx. USD 91 million for large enterprises ▪ Research Fields: random ▪ No matching fund from Korean government

3. Joint Activities with Korea

List of Programmes or Activities with RoK in 2016

Programme Title	Contents
Activity A	▪ NB. A new form of co-operation between the Visegrad Group countries (V4-Poland, Czech Republic, Hungary and Slovakia) and RoK is currently being defined. It envisages joint V4-RoK research programmes, with the first one dedicated to advanced materials technologies and materials engineering. First call for proposals was launched in November 2016 and closed on 22 February 2017. All of the 18 projects submitted were accepted, with 17 of them including Polish participants.
Activity B	▪ KONNECT (Strengthening STI Cooperation between the EU and Korea, Promoting Innovation and the Enhancement of Communication for Technology-related Policy Dialogue). The NCBR joined KONNECT in late 2015 in a joint Call on Resources and Sustainability. ▪ Other institutions participating in the call are Czech Academy of Sciences, National Research Foundation (RoK), German Federal Ministry of Education and Research, Belgian National Fund for Scientific Research, Korea Institute for Advancement of Technology, Slovak Academy of Sciences and the Scientific and Technological Research Council of Turkey. ▪ Polish participants of international projects under KONNECT submitted their applications in April 2016. Three such projects were selected and will be carried out until end August 2018.

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
War Studies University	▪ Organisation type: university ▪ Major Research Area: Security & Defence ▪ Major Activities with Korea: bilateral agreement on co-operation with Korea National Defense University ▪ Future Plans: N/A ▪ Contact Information: Mr Jerzy Pietras, Tel (+48) 22 681 36 51, j.pietras@akademia.mil.pl

Samsung R&D Institute, Poland	▪ Organisation type: research unit ▪ Major Research Areas: digital television, platform convergence, mobile systems, smart solutions and enterprise solutions ▪ Major Activities with Korea: self-evident ▪ Future Plans: N/A ▪ Contact Information: Tel (+48) 22 377 80 01, office.rd@samsung.com
Wrocław University of Technology	▪ Organisation type: university ▪ Major Research Area: Technology ▪ Major Activities with Korea: bilateral agreement on student and academics exchanges as well as joint research endeavours with the University of Incheon and Kyungpook National University ▪ Future Plans: N/A ▪ Contact Information: Ms Ewa Mroczek, Deputy Head, International Office, Wroclaw University of Technology, Tel (+48) 71 320 43 46
Jagiellonian University, Cracow	▪ Organisation type: university ▪ Major Research Area: various ▪ Major Activities with Korea: bilateral agreement on student exchanges with Hankuk University of Foreign Studies (HUFS) in terms of Korean language and culture ▪ Future Plans: N/A ▪ Contact Information: Ms Anna Wyżykowska, anna.wyzykowska@uj.edu.pl, Tel (+48) 12 663 30 15
Poznań University of Economics and Business	▪ Organisation type: university ▪ Major Research Area: business and economics ▪ Major Activities with Korea: student exchange with Chonnam National University ▪ Future Plans: N/A ▪ Contact Information: Ms Cha Eunhui, Chacha1052@jnu.ac.kr, Coordinator for European/African Region Exchange Program, Office of International Affairs, Chonnam National University
Duo Korea Fellowship Programme	▪ Major activities with Korea: 1:1 student exchange programme ▪ Future plans: N/A ▪ NB. Active in the academic year 2015/16, more information at http://www.asemduo.org/

PART 22

PORTUGAL

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

PORTUGAL

Country Outline

- GDP: 184,934 mil. euros (Eurostat 2016)
- GDP per Capita: 16,900 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Fisheries, Marine and Freshwater Biology, Materials Science-Composites, Ocean Engineering, Agricultural Engineering, Applied Chemistry, Oceanography, Ceramic Materials, Biomaterials, Thermodynamics, Civil Engineering, Chemical Engineering, Textile Materials Science and Construction and Building Technologies

Contact Information

- Organisation: Embassy of Portugal
- Name / Position: Mr. Carlos Antunes / Deputy Head Of Mission
- Phone no. / e-mail: (+82) 10 2173 1963

The National Research and Innovation System has been catching up, over the last decade, reducing its gap to EU average. R&D expenditure (GERD) as percentage of GDP has registered the fastest average annual growth rate, in the past decade.

Portugal has registered significant progress in the number of new doctoral graduates per thousand population aged 25-34 years and the share of researchers in the labour force.

Portugal is an innovation growth leader among the group of moderate innovators countries.

1. Policies and Strategies in Science, Technology and Innovation

ENEI – National Research and Innovation Strategy for Smart Specialisation will underpin research and innovation policy and funding instruments for 2014-2020 period.

2020 Vision: Portugal should have its leadership in the green economy, in the digital economy and in the blue economy throughout its revealed advantages in ICT, new materials and sustainable use of its endogenous resources, namely of the sea, of the forest and minerals ones. The societal challenges such as climate change in order to reduce its derived risks, biodiversity, water resources and ageing will be object of special emphasis/ focus.

The four pillars of the ENEI Vision for 2020:

Digital Economy:

- Portugal has a European Player in ICT

Portugal a country of science and creativity:

- to exploit the existing capacity in Energy, Biotechnology and Health
- to stimulate culture and creative industries
- to value the national identity and tourism

To intensify the technological capacity of manufacturing:

- to reinforce the technological intensity of manufacturing
- integration in the international value chains
- to exploit the existing capacity in new materials
- to develop the existing capacities in the automobile, aeronautics and space and in transports and logistics

To value the differentiated endogenous resources:

- To develop high value added innovative products and eco sustainable products
- Sea Economy (Blue economy), Forest, Mineral Resources and Agri – Food

Five structural objectives have been defined in order to answer the challenges identified in the "Analysis of the Portuguese Research and Innovation System. Challenges, Strengths and Weaknesses towards 2020", and five thematic axes, which gather the fifteen smart strategic priorities:

Axis 1: Crosscutting Technologies and its Applications

- Energy
- ICT
- Raw Materials and Materials

Axis 2: Manufacturing and Manufacturing Technologies

- Manufacturing Technologies and Product Manufacturing
- Manufacturing Technologies and Process Manufacturing

Axis 3: Mobility, Space and Logistics

- Automobile, Aeronautics and Space
- Transports, Mobility and Logistics

Axis 4: Natural Resources and Environment

- Agri-Food
- Forest
- Blue Economy (Sea Economy)
- Water Resources and Environment

Axis 5: Health, Well-being and Territory

- Health
- Tourism
- Culture and Creative Industries
- Habitat

2. National Programmes and Initiatives

FCT: Foundation for Science and Technology is the Funding Agency for Science and Research in Portugal. FCT supports the scientific community in Portugal through a range of funding schemes, tailored for individual scientists, research teams or R&D centres. Through its funding schemes, FCT supports graduate education, research and development, establishment and access to research infrastructures, networking and international collaborations, conferences and meetings, science communication and interactions with industry. Scientists from all nationalities, and in any research area, may apply to FCT for funding.

List of National Programmes open to the world

Programme Title	Contents
FCT Investigator Programme http://www.fct.pt/apoios/contratacaodoutorados/investigador-fct/index.phtml.en	▪ Programme definition: The FCT Investigator Programme aims to create a talent base of scientific leaders, by providing 5-year funding for the most talented and promising researchers, across all scientific areas and nationalities. ▪ Cooperation Type: Individual Funding ▪ Funding Organisation: FCT ▪ Call Opening/Closing Date: annual call ▪ Participation Qualification: post-doctoral researchers ▪ Project Duration: 5-year funding
FCT Investigator Programme http://www.fct.pt/apoios/contratacaodoutorados/investigador-fct/index.phtml.en	▪ Funding Scale and Funding Scheme: Grants are of three types: 1. **Starting Grant** – for researchers with more than 3 and less than 8 years post-PhD experience at the time of application and an excellent track record. Prior experience of independent research is not required; 2. **Development Grant** – for researchers with an excellent track-record and significant experience of independent research (as group leaders, principal investigators on research projects or senior/corresponding authors on publications); 3. **Consolidation Grant** – for established independent researchers, with an outstanding curriculum and proof of leadership in his/her research area ▪ Research Fields: all scientific areas ▪ Others: This call is aimed at researchers holding a PhD, of Portuguese or foreign nationality

PhD Studentships, PhD Studentships in Industry and Post-Doctoral fellowships http://www.fct.pt/apoios/bolsas/concursos/individuais2015.phtml.en	▪ Programme definition: To support the best graduates who wish to pursue research leading to a PhD degree, and to the most creative post-doctoral researchers in pursuing cutting-edge projects, in Portuguese or foreign research centres, in all fields of research. ▪ Cooperation Type: Individual Funding ▪ Funding Organisation: FCT ▪ Call Opening/Closing Date: annual call ▪ Participation Qualification: PhD Studentships – Master Degree; Post-Doctoral Fellowships - PhD ▪ Project Duration: variable ▪ Funding Scale and Funding Scheme: 1. **Post-doctoral Fellowships** are available for PhD holders, preferentially with less than six years post-doctoral experience. Fellowships have a maximum duration of six years, upon mid-term approval and budget availability. 2. **PhD Studentships** support research projects of graduates who comply with the requirements to apply for PhD studies. Studentships have a maximum duration of four years, and must run for a minimum of three consecutive months. 3. **PhD Studentships in Industry** support graduates who wish to carry out research projects in an industry setting, leading to a PhD. Studentships have a maximum duration of four years, and must run for a minimum of three consecutive months. ▪ Research Fields: all scientific areas ▪ Others: Portuguese citizens and citizens of EU member states may apply, as well as citizens of other countries, as long as they are resident in Portugal or are citizens of countries with which Portugal has exchange agreements. Foreign researchers who are non-residents in Portugal may apply to post-doctoral fellowships, as long as their application is supported by a Portuguese institution and the research project is to be carried out entirely in Portugal.

FCT PhD Programmes http://www.fct.pt/apoios/programasdoutoramento/index.phtml.en	▪ Programme definition: FCT PhD Programmes aim to bring together higher education institutions (HEI), research institutions and industry (when relevant), to: 1. Promote world-class graduate education and research-based training; 2. Foster collaborations and sharing of resources between Portuguese institutions, to bolster the international quality and status of these institutions; 3. Equip students with the necessary transferable skills to become excellent scientists as well as active members of the communities they may find themselves in. ▪ Funding Organisation: FCT ▪ Project Duration: selected PhD programmes are funded for four years. Additional funding is under a FCT decision, based on a FCT PhD Programmes Evaluation Committee. ▪ Funding Scale and Funding Scheme: FCT PhD Programmes may be one of three types: 1. National - should involve at least one HEI and one research institution (both Portuguese); 2. With Industry – should involve at least one research institution, one industrial R&D partner, and one Portuguese HEI; 3. International – should involve at least one HEI and one research institution (both Portuguese) and an overseas HEI or R&D institution. ▪ Research Fields: all scientific areas ▪ Others: In each call, a restricted number of PhD Programmes are approved, based on the decision of an international, independent evaluation panel.

3. Joint Activities with Korea in 2016

Programme Title	Contents
H2020 - M-ERA-NET 2	▪ ERA-NET in the field of materials science and engineering including Micro and Nano technologies, production processes and technologies. ▪ Participants: FCT - Foundation for Science and Technology - Portugal. KIAT - Korea Institute for Advancement Technology - Republic of Korea.
H 2020 - ICT	▪ Federated Interoperable Semantic IoT/ cloud Testbeds and Applications ▪ Participants: Unparallel Innovation Lda - www.unparallel.pt - Enterprise - Portugal. Associação Porto Digital - https://portodigital.pt/ - Portugal Ubiwhere Lda - www.ubiwhere.com/en/ - Enterprise - Portugal Korea Electronics Technology Institute - Research Centre - Republic of Korea. Korea Advanced Institute of Science and Technology - Enterprise - Republic of Korea
H2020 - Healthy Aging	▪ My Active and Healthy Aging ▪ Participants: Associação Fraunhofer Portugal Research - Research Centre - Portugal Seoul National University - Higher Education - Republic of Korea
H2020 - Widening	▪ Enabling precision chemical methodologies applied to natural-based systems for the development of multifunctional biomedical devices. ▪ Participants: Universidade do Minho - Higher Education - Portugal Universidade de Aveiro - Higher Education - Portugal Korea Advanced Institute of Science and Technology - Enterprise - Republic of Korea.
EUREKA - EUROSTARS OUTERMOST	▪ Towards Autonomous Large Area Mass Production Sputtering Plants ▪ Technological area: Surface Treatment (painting, galvano, polishing, CVD, PVD) ▪ Market area: Process control equipment and systems ▪ Participants: Universidade de Coimbra - Higher Education - Portugal (Edmundo Monteiro - Edmundo@dei.uc.pt) Korea Institute of Materials Science (Lee Gun-Hwan - ghlee@kims.kr)

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
Universidade do Minho	▪ Signature of three Memorandum of Understanding (MoU) between Minho's University and Korean Institutions for the reinforcement of the cooperation within the scope of stem cells, tissue engineering and regenerative medicine (July, 2014): • Korea Institute of Science and Technology • Chonbuk National University • Global Stem Cell & Regenerative Medicine Acceleration Center/GSRAC in collaboration with the European Institute of Excellence on Tissue Engineering and Regenerative Medicine ▪ Contact Information: http://www.uminho.pt/en/home_en
Universidade Católica Portuguesa	▪ The Portuguese Catholic University signed a Protocol of Cooperation with the University of Seoul (July, 2014). ▪ Contact Information: http://www.ucp.pt/site/custom/template/ucptplportalhome.asp?sspageID=1&lang=2
Instituto Superior Técnico (Universidade de Lisboa)	▪ The Instituto Superior Técnico signed a Protocol of Cooperation with the University of Seoul (July, 2014). ▪ Contact Information: https://tecnico.ulisboa.pt/en/

In the field of Antarctic logistics the Portuguese Polar Program has been cooperating with the Korean Polar Research Institute (KOPRI) since 2011 and recently signed a Letter of Understanding promoting cooperation on support to scientists and transportation by aircraft between Chile and Antarctica. Korea cooperates with station and aircraft support to Portuguese scientists and Portugal provides aircraft support to Korean personnel.

Furthermore on the scientific component the University of Lisbon through CEG/IGOT and CERENA/IST cooperates with the Korean Polar Research Institute (KOPRI) on the research on climate change and impacts in terrestrial ecosystems since 2011.

Such a cooperation includes field work in the Antarctic station King Sejong in King George Island as well as bilateral visits and PhD co-supervision

PART 23

ROMANIA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

ROMANIA

Country Outline

- GDP: 169,578 mil. euros (Eurostat 2016)
- GDP per Capita: 7,600 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Energy, Environment and Climate change, Advanced Materials

Contact Information

- Organisation: Embassy of Romania
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The quality of the research infrastructures is high in Romania. Romania has now top-level research infrastructures and is considered as more than competitive by the highest Western standards. This could support the implementation of successful and complex H2020 projects. There is an excellent infrastructure available, not only in universities, but also at the national level. Romania is hosting one European research infrastructure with global impact – the Eli Extreme Light Infrastructure, with an estimated starting date in 2016 and other 10 research infrastructures of pan European interest in engineering, energy, socio-economic sciences, physics, environmental, marine and Earth sciences, material sciences, chemistry and nanotechnologies, and life sciences.

1. Policies and Strategies in Science, Technology and Innovation

Romania has recently adopted the *National Strategy for Research, Development and Innovation which sets the framework for the period 2014-2020.* Following a policy dialogue phase between the coordinating consortia and MECS, the final set of four priorities was decided: (i) Bioeconomy; (ii) ICT, Space and Security; (iii) Energy, Environment and Climate Change; (iv) Eco-nano Technologies and Advanced Materials. In addition, the national priorities include: Basic Research, Health, Heritage and Cultural Identity and New and Emerging Technologies – the latter being more of a framework for public procurement of innovation than a pre-determined set of technologies, flexible enough to allow a fast response to the challenges of pre-competitive public procurement of innovation during the National Strategy for Research, Development and Innovation 2020 implementation.

The RDI policies are implemented by the Romanian Government through the MECS, and subsequently through the National Authority for Scientific Research and Innovation.

2. National Programmes and Initiatives

List of National Programmes open to the world

Programme Title	Contents
Extreme Light Infrastructure – Nuclear Physics (ELI-NP) http://www.eli-np.ro/	▪ ELI-NP will create a new European laboratory to consistently investigate a very broad range of science domains, from new fields of fundamental physics, new nuclear physics and astrophysics topics, to applications in material science, life sciences and nuclear materials management. ▪ The project is co-financed by the European Regional Development Fund. To be built in Bucharest-Magurele, ELI-NP will be one of the three pillars of ELI - THE EXTREME LIGHT INFRASTRUCTURE, along with the facilities dedicated to the study of secondary sources (Dolni Brezany, near Prague) and to second pulses (Szeged).
DANUBIUS – International Centre for Advanced Studies for River-Delta-Sea Systems http://www.danube-delta-blacksea.eu/index.html	▪ It is coordinated by the National Institute of Research and Development for Biological Sciences (www.dbioro.eu) and the National Research and Development Institute for Marine Geology and Geoecology (www.geoecomar.ro). This is a Romanian initiative for a Pan European R&D infrastructure in the field of integrated management of rivers-deltas-seas focused on Danube-Black Sea macrosystem with a hub in Danube Delta, at Murighiol, Tulcea County, and having nodes as leading facilities and research centres dealing with processes, research methodologies and offering access to other parts to the Danube – Black Sea macrosystem. ▪ Danubius' mission is to provide science-based innovative solutions for major actual environmental-related problems and set the framework for sustainable development of Danube – Danube Delta – Black Sea system, as best practice for large river – delta – sea systems worldwide. ▪ DANUBIUS was unanimously elected in 2013 as flagship Project within European Union Strategy on the Danube Region Priority Axis 7 (SUERD).
Engage in the Romanian Research Infrastructure System www.erris.gov.ro	▪ ERRIS (Engage in the Romanian Research Infrastructure System) is a platform developed and hosted by the Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI), within the framework of the "Improving the efficiency of the electronic data monitoring of R&D activities" European funded project. ▪ ERRIS is the first Romanian online platform which connects the research infrastructure owners with potential clients (researchers and company representatives).

Cluj Innovation City http://www.clujinnovationcity.com/	▪ Cluj Innovation City is the major project of our community for our community and the region. Cluj Innovation City is bringing together the local authorities, the universities and the business community to foster the development of the city, the region and the country. Cluj Innovation City is planned as a collaboration ecosystem and synchronized urban development project based on education, innovation and entrepreneurship, with the main goal to create a sustainable community in years to come. ▪ Cluj-Napoca has built a solid reputation in recent years as the most important development centre in Romania, second only to Bucharest. Cluj is already the national 'number one' in IT services exports. The local municipality offers diverse assets, including the leading university and academic establishment within the country, a leading medical community and the Romania's foremost IT industry. These assets combined make Cluj-Napoca a strong regional economic development pole. ▪ Based on the local assets, the close collaboration with the leading universities, and the rich entrepreneurship environment, Cluj Innovation City is aiming at becoming a significant Eastern European Innovation Hub. Start-ups can rely on local highly skilled human capital. Companies can also develop more competitive advantages by collaborating with applied research centres owned by universities. The current academic environment is already becoming more industry-oriented. Current discoveries by local scientists in artificial blood and brain research confirm their international competitiveness and pedigree, and will furthermore contribute to the EU competitiveness with results in medical and agricultural field.

3. Joint Activities with Korea in 2016

Joint activities are currently being undertaken at the university level, researchers are free to engage in research activities in the preferred fields without coordination of the central government or structures subordinated. Such researches take place especially in the fields of bio-technology, waste management, energy, and they involve exchanges of experts between Romania and Korea.

4. Others

Key Research Organisations in Romania

Organisation Name	Detailed information
National Authority for Scientific Research and Innovation http://www.research.ro/en	▪ The RDI policies are implemented by the Romanian Government through the MECS, and subsequently through the National Authority for Scientific Research and Innovation ▪ Contact Information: Phone no. (+40) 21 319 23 26 e-mail: letitia.stanila@ancs.ro
Executive Agency for Higher Education, Research, Development and Innovation Funding – UEFISCDI http://uefiscdi.gov.ro/	▪ UEFISCDI is the government institution which has coordinated during 2007-2013 the project-based funding schemes of PNCDI2. Aside from the policy support function, UEFISCDI also plays a policy advisory role by its constant involvement in R&I and higher education (HE) policy analysis and policy formulation process ▪ An ongoing project implemented by UEFISCDI has recently mapped 177 active TTO (accelerators, centres for information, and technological transfer, clusters, hubs, incubators, industrial parks and science and technological parks); the regional distribution of the TTO is available at: https://public.tableau.com/profile/marius.mitroi#!/vizhome/Facilitators/Facilitators

PART 24

SLOVAKIA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2016
4. Others

SLOVAKIA

Country Outline

- GDP: 80,958 mil. euros (Eurostat 2016)
- GDP per Capita: 14,500 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Materials and Nanotechnology, Biomedicine and Biotechnology, Environment and Agriculture, Sustainable Energy.

Contact Information

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While Slovakia has become for RoK in the past decade a country with one of the most intensive foreign investments in the whole Europe, as well as top 5 export destination in the EU, cooperation in S&T has only started recently. So far, the cooperation between Republic of Korea and Slovakia in the field of S&T has been developing mainly through various mobility programmes, minor individual projects and multilateral research platforms. However, year 2017 promises a new breakthrough on bilateral level. Based on the Agreement on S&T cooperation between the governments of both countries that entered into force in 2014, the first Joint Committee took place in October 2016. Launching of the Joint Committee creates new windows of opportunity for Korean and Slovak researchers, students and science related capacities to participate in diverse and appealing S&T projects in years to come.

Moreover, during the summit of V4+RoK in December 2015, two new MoU were signed to boost S&T cooperation. One is related to platform V4 and RoK and the other MoU was signed between the Slovak Academy of Science and Korean Institute of Material Science. As for many developed economies, science and innovation has become one of the focal points of Slovakia for sustainable economic development, employment and future growth. However some challenges still remain, such as the gap in R&D expenditure compared to the rest of the EU (1% of GDP), as well as an issue to get more private companies involved in the research and innovation process. The aim is to increase private funds in R&D and achieve ratio at least 2:1 between private and public funds, while the total expenditure in R&D is planned to double in the near future.

1. Policies and Strategies in Science, Technology and Innovation

The main science and innovation objectives of the Slovak Republic are defined in **"Research and Innovation Strategy for Smart Specialisation" (RIS3)**, which was approved by the Slovak Government on 13th November, 2013. It has identified seven thematic areas of scientific research as follows:

In the area of research and development priorities:

1) **Material Sciences and Nanotechnology** (e.g. lightweight structural materials and composites, organic materials, steel and special materials, etc.)
2) **Information and Communication Technologies** (e.g. technological process management systems, processing of large databases, cloud solutions, etc.)
3) **Biomedicine and Biotechnology** (e.g. diagnostics and therapeutic approaches for cancer, heart disease, blood vessels and brain, pharmacological and industrial biotechnologies, etc.)

In the field of technology priorities:

4) **Industrial Technologies** (e.g. automation control, robotics, technology for cutting and forming, logistic technologies, processing of polymers, wood, etc.)
5) **Sustainable Power Engineering and Energy** (e.g. reduction of energy intensity, emission reduction program ALEGRO, smart grid technology, safety of nuclear plants, etc.)
6) **Agriculture and Environment** (focus on advanced technologies and practices in agriculture and food production, better utilisation of the forests, etc.)

In the field of social priorities:

7) **Selected areas of social sciences** (e.g. The ageing population and quality of life, Multiethnicity, social inclusion and poverty problems, Employment of young people in the changing conditions, etc.)

The key authority for the implementation of RIS3 is the Government Council for Science, Technology and Innovation with two independent agencies appointed for implementation: Research Agency and Technological Agency, which are undergoing a transformation process.

The main tools of funding of research and development under current legislation

Slovak Research and Development Agency (SRDA) – the main agency for distribution of public finances for research and development on the competitive basis in Slovakia. SRDA is responsible for research and development promotion in all research fields, including international research cooperation. In the 2014-2020 period there are planned expenditure on operations and programmes of SRDA in total sum of EUR 316 million, which is supposed to be tripled by 2020 (http://www.apvv.sk/).

Incentives for research and development are provided to entrepreneurs. In the 2014-2020 period, expenditures on R & D incentives in total amount of EUR 108 million are planned and doubles by 2020. It is an essential tool for promoting business sector.

Grants to legal persons and natural persons and Grants for scientific and technical services are available in the 2014-2020 period, with a planned budget of EUR 115 million and of EUR 73 million respectively.

The main executive and self-governing scientific institution in **Slovakia is Slovak Academy of Science** which comprises of 23 research institutes and 69 organisations (www.sav.sk).

As an **example of excellent R&D work** can serve one of the latest break-through in R&D projects with worldwide potential called **AeroMobil** (a flying car) http://www.aeromobil.com/.

2. National STI Programmes and Initiatives

Most of the scientific programmes and international S&T cooperation projects that Slovakia offers or takes part in are co-financed by EU funds, therefore the details and application can be found on official web pages of European Commission or through the major R&I programme of EU - Horizon 2020. Among the programmes that can be chosen are e.g. EURECA, EIT, COST, EUROSTARS, etc.

On the level of national programmes there are regularly mobility initiatives available, such as SASPRO (http://www.saspro.sav.sk/). Please check more for current mobility initiatives at www.sav.sk.

3. Joint Activities with Korea in 2016

The main joint activity between RoK and SR for 2016 was launching of the Joint Committee in the field of S&T cooperation. Apart from joint research projects mentioned below, other activities include mainly individual scholarships/mobility initiatives/exchange programmes.

List of Programmes or Activities with RoK in 2016

Programme Title	Contents
Intergovernmental Joint committee meeting	▪ Activity: Initial Joint Committee meeting based on a bilateral Agreement on Scientific and Technological Cooperation between the Government of Republic of Korea and the Slovak Republic; May 2016 ▪ Major topic or agenda: set up and definition of the joint committee ▪ Target Participants: government officials and selected universities and research institutes ▪ Relevant Information: cooperation in the field of S&T, promotion of mobility of experts and scientists; major Korean partners MSIP, NRF Korea
JEM-EUSO	▪ Activity: joint research ▪ Major topic or agenda: research of Extreme Universe Space Observatory Onboard Japan Experiment Module ▪ Relevant Information: Duration 2010-2017; Participation of Institute of Experimental Physics SAV Bratislava, Ehwa University and others
K2 Mobility	▪ Activity: joint research ▪ Major topic or agenda: Research of Sustainable Vehicle Technology ▪ Relevant Information: Duration 2013-2017; Participation of Institute of Materials and Machine Mechanics SAV Bratislava, University of Science and Technology Pohang

4. Others

Key Research Organisations and Universities involved in cooperation with RoK

Organisation Name	Detailed information
University of Zilina www.uniza.sk	▪ Organisation type: university ▪ Major Research Area/ Product: Transportation, Construction, New materials, Mechanical Engineering, Smart Buildings, Renewable Energy Sources ▪ Major Activities with Korea: project EU-Korea - Student Mobility in Intercultural, Language Skills and ECVET by the EU - ICI Korea SMILES ▪ Contact Information: http://vyskumnecentrum.sk/kontakty ▪ Others: cooperation with Yeungjin College, Daegu

Slovak Technical University Bratislava www.stuba.sk	▪ Organisation type: university ▪ Major Research Area/Product: architecture, civil engineering, geodesy, cartography, chemical technologies, food processing, machinery, electrical engineering, electronics, informatics, ICT, applied physics, mathematics, economics and social science ▪ Major Activities with Korea: project Eurre-KPS: Estimation of Uncertainty in Rainfall Runoff modelling, Korea, Poland and Slovakia ▪ Contact Information: science@stuba.sk ▪ Others: cooperation with Chungbuk National University
Technical University of Kosice www.tuke.sk	▪ Organisation type: university ▪ Major Research Area/ Product: mining, ecology, metallurgy, geotechnology, mechanical, electrical and civil engineering, economics, ICT, aeronautics ▪ Major Activities with Korea: cooperation with Yeungjin College, Daegu ▪ Contact Information: http://www.tuke.sk/tuke/contact-info ▪ Others: preparation of exchange of students in the field of electrical and mechanical engineering
SAV Slovak Academy of Science(SAS) www.sav.sk	▪ Organisation type: National Science Institute ▪ Major Research Area/Product: 23 research institutes http://www.sav.sk/?lang=en&doc=activity-offers-results-products ▪ Major Activities with Korea: various partnership programmes, such as ▪ ALICE experiment at the CERN LHC: a study of strong interacting matter properties at high energy densities. ▪ K2 Mobility - Sustainable Vehicle Technology ▪ Cooperation in FP EU in project KONNECT ▪ JRP Program V4 (SAS) - Korea ▪ The Korea Institute of Materials Science (KIMS) and Slovak Academy of Science (SAS) MoU ▪ Contact Information: barancik@up.upsav.sk; galik@up.upsav.sk ▪ Others: MoU with Korean Institute of Material Science (KIMS), preparation of MoU with National Research Foundation of Korea (NRF)
Ministry of Education, Science, Research and Sport of the Slovak Republic www.minedu.sk	▪ Organisation type: Ministry ▪ Major Research Area/Product: the main ministry overlooking implementation of major policies and programmes in S&T ▪ Major Activities with Korea: initial phase of implementation of the Agreement on S&T cooperation with MSIP ▪ Contact Information: kami@minedu.sk, marek.hajduk@minedu.sk ▪ Others: preparation of Joint committee meeting in 2016

PART 25

SLOVENIA

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea

SLOVENIA

Country Outline

- GDP: 39,769 mil. euros (Eurostat 2016)
- GDP per Capita: 18,400 euros (Eurostat 2016)

1. Policies and Strategies in Science, Technology and Innovation

Research and Innovation Strategy of Slovenia 2011-2020 (RISS) is a programme document for achieving social objectives, such as improved living standards for all and improved quality of life. These objectives will be achieved through the establishment of modern research and innovation system, which will contribute to increased knowledge and understanding of society, respond to its challenges, increase the value added per employee and provide quality workplaces and living environment. It is based on Development Strategy of Slovenia and in accordance with Europe 2020 and its flagship initiatives.

In the preparation is Smart Specialisation Strategy of the Republic of Slovenia. The Smart Specialisation Strategy constitutes a different approach to determining policy of the Member States in research, development and innovation to promote efficient and effective investments of funds in areas that have the greatest value added and contribute most to the objectives of sustainable inclusive growth and development. Smart specialisation is a strategy for strengthening the competitiveness of economy, innovation capacity and the diversification of the existing industry as well as the growth of new and booming industries and companies respectively.

2. National Programmes and Initiatives

At the moment there is no national programme but RISS envisaged a preparation of an Action plan for International cooperation which is currently under preparation.

3. Joint Activities with Korea

Joint activities with Korea are undertaken on the basis of the Agreement on scientific and technological cooperation between the Government of the Republic of Slovenia and the Government of the Republic of Korea, signed in Seoul on May 30, 1994. On the basis of this protocol Ministry of Education, Science and Research cooperate with National Research Foundation (NRF). Last decision document was approved in July 2013 were both sides agreed to jointly fund the five research projects. Slovenia is interested to launch a common call for the period 2016-2017. The subjects of the call are all scientific fields.

PART 26

SPAIN

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

SPAIN

Country Outline

- GDP: 1,113,851 mil. euros (Eurostat 2016)
- GDP per Capita: 23,700 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Food, Agriculture and Fisheries, Transport Technologies, Construction Technologies, Environment and Biotechnologies

Contact Information

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1. Policies and Strategies in Science, Technology and Innovation

Spain's investment in research and development (R&D) suffered a drastic reduction on public R&D expenditure in 2011 and following years in response to the financial crisis. Since 2015 R&D budgets are on the rise, along with efforts for more quantitative and qualitative results in domestic and international R&D programs.

Despite the fact that excellence in science and technology is behind the EU average, it has seen a slight but steady improvement over the last five year period as reflected in knowledge-intensive activities over the percentage in total employment, an indicator of the intensity of knowledge in the economy. As an example, it can be seen in higher contribution of high and medium-high-tech goods to the trade balance, helping raise the Spanish economic competitiveness not only on cost factors, but also technology wise.

Key indicators of research and innovation performance	
R&D intensity 2012: 1.30% (EU: 2.07%; US: 2.79%) 2007-2012: +0.5% (EU: 2.4%; US: 1.2%)	Excellence in S&T[1] 2012: 33.2 (EU: 47.8; US: 58.1) 2007-2012: +0.4% (EU: +2.9%; US: -0.2%)
Innovation Output Indicator 2012: 80.8 (EU: 101.6)	Knowledge-intensity of the economy[2] 2012: 38.0 (EU: 51.2; US: 59.9) 2007-2012: +2.1% (EU: +1.0%; US: +0.5%)

1 Composite indicator that includes PCT per population, ERC grants per public R&D, top universities and research institutes per GERD and highly cited publications per total publications.

2 Composite indicator that includes R&D total expenditure, skills, sectorial specialisation, international specialisation and internationalisation sub-indicators.

Areas of marked S&T specialisations:	HT + MT contribution to the trade balance
Food, agriculture and fisheries, transport technologies, construction technologies, environment and biotechnologies	2012: 3.3% (EU: 4.23%; US: 1.02%) 2007-2012: +15.9% (EU: +4.8%; US: -32.3%)

(Source: Commission Staff Working Document "Research and Innovation performance in the EU. Innovation Union progress at country level 2014")

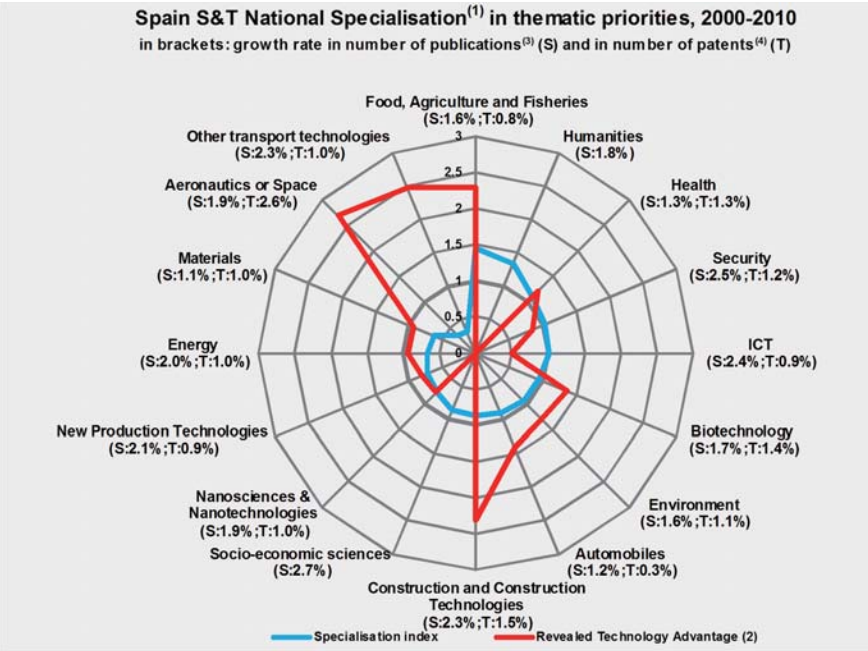
The total expenditure in R&D amounted to 1.24% of the GDP with a total of USD 17,960 million in 2013, showing a rebound from the previous year, yet somehow constrained by the fiscal reforms that the country of Spain had been forced to, which inevitably reduced public investment. A note of consideration while measuring the R&D investment intensity is that in the business-sector over the period prior to the financial crisis, the total BERD was growing at the staggering pace of 13.7%, and since then a correction took place of an average of -3.2% over the last five years. Nonetheless, the trend has shifted and currently is picking back up again showing robust symptoms of growth by both the private and public investment -in a ratio of 78% investment made by company's own resources.

In terms of international cooperation, it is noteworthy that the outstanding performance of Spain in the Framework Program (FP7) well above the European Union average and with a sustained positive growth. And also Spain, as increased the number of international scientific co-publications, is well recognised along with similar European economies, which is the result of Spain managed to gradually connect itself to major European research hubs. In regard with the Horizon 2020 (H2020), as per the publication of the Commission on the 1st results for the 100 published calls to date, the country of Spain ranked 4th close to 12.000 eligible proposals, with a success rate slightly over 14%. The number of signed grant agreements, an indicator that shows the contribution to Spainish economy, was around 11%, ranking third among all participant countries to the H2020.

Based on the FP7 thematic priorities, the graph below illustrates the areas where Spain shows scientific and technological specialisation, counting the number of patent in following areas: aeronautics and space, transport, food & agriculture & fisheries, construction; to a less degree: automobiles, energy, environment, materials, bio and health.

A study of the specialisation index by the most-cited publications shows that the largest number of scientific articles is produced in order of health, information and communications technologies and food, agriculture and fisheries.

In 2013 the Spanish Strategy for Science, Technology and Innovation and the State Plan for Scientific and Technical Research and Innovation were adopted with objectives well aligned



Source: DG Research and Innovation - Analysis and monitoring of national research policies
Data: Science Metrix - Canada, Univ. Bocconi - Italy
Notes: (1) Values over 1 show specialisation, under 1 lack of specialisation.
(2) The Revealed Technology Advantage is calculated based on the data corresponding to the WIPO-PCT number of patent applications by country of inventors. For the thematic priorities with less than 5 patent applications over 2000-2010, the Revealed Technological Advantage (RTA) is not taken into account. Patent applications in "Aeronautics or Space" refers only to "Aeronautics" data.
(3) The growth rate index of the publications (S) refers to the periods 2000-2004 and 2005-2009.
(4) The growth rate in number of patents (T) refers to the periods 2000-2002 and 2003-2006.

with those of Europe 2020, the Innovation and H2020. The main issues addressed are governance system, knowledge transfer between actors, human resources and funding allocation. Especially, funding allocation strategy is to simplify the funding system for R&D via two main agencies: the new national research agency (AEI) focused on basic science, and the agency for innovation (CDTI) supporting applied research.

2. National Programmes and Initiatives

List of National Programmes open to the world

Programme Title	Contents
Programme Individual & Cooperation R&D Projects PID http://www.cdti.es/index.asp?MP=7&MS=20&MN=3 Innoglobal Programme http://www.cdti.es/index.asp?MP=7&MS=785&MN=3	▪ Cooperation Type: joint research ▪ Funding Organisation: CDTI ▪ Call Opening/Closing Date: by modalities: PID open. Innoglobal until October 2nd. ▪ Participation Qualification: registered and R&D activities carried in Spain ▪ Project Duration: from 12 to 36 months ▪ Funding Scale and Funding Scheme: • PID minimum budget for a) Individual R&D project minimum 175,000 EUR, and b) group of affiliated or associated companies 500,000 EUR. Maximum budget covers up to 75% of the total approved budget, in a combined modality of loan (Euribor one-year interest rate) and grant (ranging between 5 to 33% of financed amount depending upon the characteristics of the project and the beneficiary) • Innoglobal in the form of grant of up to 50% depending upon the type of beneficiary. ▪ Research Fields: horizontal ▪ Matching fund from Korean government: no ▪ Others: beneficiaries have to do their research activities in the territory of Spain
Programme CIEN http://www.cdti.es/index.asp?MP=7&MS=793&MN=4&r=1366*768asp?MP=7&MS=793&MN=4&r=1366*768	▪ Cooperation Type: joint research ▪ Funding Organisation: CDTI ▪ Call Closing Date: 4th July 2017 ▪ Participation Qualification: registered and R&D activities carried in Spain ▪ Project Duration: from 36 to 48 months ▪ Funding Scale and Funding Scheme: financing up to 75% of the activities with a combination of loan (Euribor one-year interest rate) and grant (30%). Financing from a minimum of 5,000,000 to a maximum of 20,000,000 EUR ▪ Research Fields: strategic for Spain ▪ Matching fund from Korean government: no ▪ Others: beneficiaries have to do their research activities in the territory of Spain

H2020 http://bit.ly/2r3Rt1W	▪ Cooperation Type: joint research ▪ Funding Organisation: H2020 ▪ Call Opening/Closing Date: Thematic Call for Proposals (1 or 2 / year) ▪ Participation Qualification: registered R&D activities carried in Spain, and within an international consortium ▪ Project Duration: not fixed ▪ Funding Scale and Funding Scheme: between 50% to 75% of eligible costs in the form of subsidy ▪ Research Fields: Thematic ▪ Matching fund from Korean government: no (though highly recommended)
EUREKA NETWORK & CLUSTER http://bit.ly/2qV8AWi EUROSTARS http://www.cdti.es/index.asp?MP=7&MS=554&MN=3	▪ Cooperation Type: joint research ▪ Funding Organisation: CDTI ▪ Call Opening/Closing Date: contingent to the subprogram and type of agreements with partner agencies ▪ Participation Qualification: registered R&D activities carried in Spain, and within an international consortium, including enterprises as lead investigators, as well as research institutes and universities ▪ Project Duration: from 12 to 36 months ▪ Funding Scale and Funding Scheme: two formulas are available, • Eureka, up to 75% of eligible costs in the form of loan at 0% with a relative grant of up to 33%; Grant of up to 50% of eligible costs. • Eurostars, in the form of grant ranging between 40% to 55% of eligible costs ▪ Research Fields: Thematic ▪ Matching fund from Korean government: yes (highly recommended)

3. Joint Activities with Korea

Spain and the Republic of Korea have signed Agreements with MSIP for basic research collaboration and with MOTIE for applied research collaboration covering various forms of joint collaboration. The following table shows only the programs for joint applied research collaboration.

List of Joint Programmes or Activities with the RoK in 2016

Programme Title	Contents
Korea -Spain Bilateral Call for Proposals in EUREKA http://www.eurekanetwork.org/	▪ Activity (Programme) Outline: EUREKA bilateral call for proposals, as follows: Call 1 with closing date of 31st March, 2017; and, call 2 with closing date of 31st August, 2017 ▪ Major topic or agenda: bilateral Call for Proposals between Spain and South Korea under the EUREKA programme, EUROSTARS and CLUSTER (to name SMART). Managed by KIAT in Korea and CDTI in Spain. ▪ Target Participants: companies with joint R&D proposals. Additionally, research institutes and universities are encourage to participate ▪ Relevant Information: The objective is to promote, assist and fund the development of joint technology cooperation between South Korea and Spain in areas of mutual interest for the purpose of generating economic benefit for both countries. Relevant information can be found in the web page of EUREKA (search "spain and korea call for proposals")
Steering Committees	▪ Joint Committee MEIC (Spain) – MSIP (Korea) on Science and mobility of researchers, framing ad hoc collaboration research activities ▪ Joint Committee MEIC (Spain) – MOTIE (Korea) on applied research

4. Others

In the current year, Spain holds the Chairmanship of the Eureka Initiative, and a series of activities have been taken to strengthening the status and position of Korea within the program. Additionally, it served to build stronger networks among potential stakeholders, resulting in a stronger R&D collaboration.

PART 27

SWEDEN

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

SWEDEN

Country Outline

- GDP: 462,058 mil. euros (Eurostat 2016)
- GDP per Capita: 42,500 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Life Science, Mining, Minerals and Steel, Forest Products and Biomass, Sustainable Urban Management, Aerospace, Energy and ICT

Contact Information

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- Name / Position: Dr. Niklas Kviselius / Science & Innovation Counsellor
- Phone no. / e-mail: (+82) 2 3703 3721 / Niklas.Kviselius@gov.se

Sweden is an innovation leader. The country once again received the highest rank in the EU assessment of the member states' innovation performance for 2016 (according to the Innovation Union Scoreboard, Sweden's performance relative to the EU-average is 135%). The indicators show that Sweden especially stands out in international scientific co-publications, PCT patent applications and license and patent revenues from abroad. Sweden invests heavily on R&D (3.26% of its GDP), promotes cross-sectoral collaboration and opens to international influences.

1. Policies and Strategies in Science, Technology and Innovation

Innovative Country

Sweden, a country of Nobel Prize, ranked the top in the European Innovation Scoreboard 2016. Not only the country ranked at the top end of the scale in various innovation dimensions (OECD) but also took the first position in Doing Business climate ranking (Forbes 2017). Its innovative climate, strong global connections and talents helped its capital city Stockholm to be the second in number of unicorns per capita after Silicon Valley. Also, Sweden's R&D expenditure as % of GDP is 3.26%, recorded the top among the EU Member States in 2015 (Eurostat 2017).

Innovation Policy

The country has put consistent effort to expand its innovative capacity and create a better climate for innovation in order to promote its economic growth, sustainable development and job creation. Sweden's Research and Innovation bill is adopted every four years and managed mainly by the Ministry of Education and Research and the Ministry of Enterprise and Innovation. The Bill for 2017-2020 was published in November 2016 and included the orientation of research and innovation policy, funding frame as well as its perspective towards 2026.

The government has established the National Innovation Council to promote Sweden as a country of innovation and strengthen its competitiveness. The Council takes the advisory role and covers various issues in innovation policy sphere. It also presents proposals that can enhance the innovation climate of Sweden. The Council identified three areas (digitalization, life science and environment & climate technology) that are crucial to tackle the societal challenges by cross-sectoral collaboration. Five innovation partnership programmes (IPPs) were also selected; next generation's travel and transport, smart cities, circular and bio-based economy, life science and connected industries and new materials. The Council emphasized the importance of partnerships among public, business and academia. The Prime Minister is a chair of the Council and the Council consists of five ministers and ten advisory members from the business and research sectors.

The government believes that Sweden's open research environment culture has fostered team work and cross-disciplinary collaboration that often drives innovation. To make the Swedish research and innovation areas more open and attractive, Sweden has allocated the significant amount of investment in research infrastructure. For example, MAX IV Laboratory and the European Spallation Source (ESS) have been launched and the government speculates that they would form a key hub in Europe's joint research.

To expand Sweden's innovative capacity, Sweden has tried to provide more comprehensive innovation policy by supporting different actors. For example, the government supports SMEs in getting access to capital and demonstration opportunities. For the development of biological drug program, 60 million USD was funded to the Research Institutes of Sweden Holding AB (RISE AB) in late 2016.

Also, the government has developed an initiative called "Strategic Innovation Areas (SIO)" to make Sweden more attractive and unique to investors. The SIO is expected to create a shared platform for better cooperation among different sets of actors. Although this initiative might not give a significant impact on the relationship between research inputs and innovation outputs, the stronger link between inputs and outputs is expected. Various grants are available and 16 different innovation areas (e.g., Manufacturing 2030, graphene and smart grid) have been selected. Sweden also focuses on stable and sustainable development of the society. The Challenge Driven Innovation (CDI) program has been launched to tackle social challenges, such as aging population and climate change. The government has tried to change perspective of these issues from problems to opportunities. The program consists of four different areas; health care of the future, sustainable industrial development, sustainable and attractive cities and the information society.

Research Policy & Funding

The Swedish government pursues Sweden to be a prominent research nation in which R&D is conducted with top quality, contributes to the development of society and helps the private sector's competitiveness. The country's R&D expenditure was 16.2 billion USD, equal to 3.26% of its GDP in 2015. About 70% of this R&D spending comes from the industry. The Swedish Parliament grants R&D funds and the Ministry of Education and Research is responsible for overall coordination of research policy in the government offices.

There are four biggest research funding agencies in Sweden. The Swedish Research Council (VR) is the largest civil recipient of the R&D fund in Sweden and provides 720 million USD worth of grants to researchers annually. The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Formas) supports basic and needs-driven research in the fields of environment, land-based industries and spatial planning. Formas distributed about 150 million USD in 2016. The Swedish Research Council for Health, Working Life and Welfare (Forte) supports and initiates basic and needs-driven research in the fields of the labour market, work organization, work and health, public health, welfare, and social relations. The organization distributed 67 million USD in 2016. Last but not least, the Swedish Governmental Agency for Innovation Systems (VINNOVA) distributed 305 million USD in 2016.

The RISE AB (Research Institutes of Sweden Holding AB), a single holding entity which is a group of public research institutes, also receives the government funding. The overall objective of the RISE AB is to support sustainable development of Sweden and help the country to gain more international competitiveness. The RISE is expected to serve as a knowledge partner for businesses, an intermediary between academia and industry, and a nexus for participation in EU R&D projects.

There are also a number of researches funding foundations, established in the mid-1990s based on capital from the former wage earner investment funds. These foundations include the Swedish Foundation for Strategic Research (SSF), the Foundation for Strategic Environmental Research (MISTRA), the Knowledge Foundation (KK) and the Swedish Foundation for International Cooperation in Research and Higher Education (STINT). Annually, about 180 million USD is contributed for basic research by these four foundations. The support from public research foundations is also one of the important contributions to research. For example, the Bank of Sweden Tercentenary Foundation (RJ), created public funding and supports research in Humanities and Social Sciences.

Not only public but also many private financiers provide a significant contribution to research in Sweden. For example, the Wallenberg Foundations distributes 190 million USD worth of grants every year. Sweden's second biggest research oriented foundation (based

on assets) is Torsten Söderbergs stiftelse. The foundation provides grants of up to 14 million USD each year. The third largest private research foundation is Jan Wallanders and Tom Hedelius Stiftelse. The foundation provides funding in finance and economic sector research. It contributed 21 million USD worth of grants in 2016. Grants are primarily intended to fund research in the fields of medicine, technology and natural sciences. In addition, the Swedish Cancer Society distributed 51 million USD in 2015 for research in its field.

2. National Programmes and Initiatives

Programme Title	Contents
Korea-Sweden STI Joint Research Programme	▪ The Swedish Research Council (SRC/ VR) has an ongoing bilateral collaboration with the National Research Foundation of Korea, NRF. A typical project lasts two years with 50,000 USD per year provided by each side. ▪ Calll for the 2016 program had opened in April/May and closed in September/ October. The research field for the call was 'Drug discovery research through cell differentiation control (stem cell, cancer cell, immune cell, neuron cell, etc.). ▪ 'NRF and SRC have selected 5 projects for this field in 2016. SRC used a Lead Agency Procedure with NRF. For the 2016 program, NRF took a role of a lead agency. ▪ The next call will open in the similar period of 2018 with a certain research field. ▪ In 2017, NRF and SRC will support 5 projects as continuing projects. ▪ More info: http://www.vr.se/inenglish/ ▪ Contact person: Annette.MothWiklund@vr.se
Korea-Sweden Research Cooperation Program (STINT)	▪ STINT, the Swedish Foundation for International Cooperation in Research and Higher Education, supports research projects between Korean and Swedish universities in cooperation with National Research Foundation of Korea (NRF) for up to 3 years. ▪ STINT invests up to SEK 750 000 per project (about USD 84 000) and NRF invests a corresponding amount to the Korean side. Since 2008 STINT has supported 57 projects together with NRF (and KOSEF before NRF was founded). The call is open to all fields of science. ▪ The cooperation type is mobility and calls open to various research fields. Calls usually open approximately in August/September and close in September/October for the next year program. Applications submitted for the 2017 program are in the process of evaluation. Calls for the 2018 program would open in August 2017. ▪ www.stint.se/en/scholarships_and_grants/korea-sweden ▪ Contact person: mattias.lowhagen@stint.se

Program for Korea Collaboration (SSF)	▪ The Swedish Foundation for Strategic Research (SSF) and the National Research Foundation of the Republic of Korea (NRF) launched a joint programme with a purpose of stimulating collaborative, focused research projects involving highly qualified groups in Korea and Sweden. ▪ NRF and SSF have set aside the equivalent 3.65 million USD each to cover these Korean-Swedish collaborative projects of the highest international scientific standard. ▪ SSF and NRF have selected 9 projects that have been supported by research grants for joint seminars, conferences, workshops and exchanges of individuals between the applying groups over a period of six years. The research fields include material science, biomedical engineering, and ICST. 9 projects have been running for three years and will be subjected to midterm evaluation this summer (2017). About 7 out of 9 projects would be funded for the additional three years at the same level, starting September 1. ▪ Contact person: Joakim.Amorim@stratresearch.se

3. Joint Activities with Korea

For information on upcoming events and activities please visit the website of the Embassy of Sweden: http://www.swedenabroad.com/ko-KR/Embassies/Seoul/

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
Chalmers http://www.chalmers.se/en/Pages/default.aspx	Chalmers is a highly progressive technical university situated in Gothenburg, Sweden. Recently, nine researchers from Sweden and nine from South Korea received a total of 7.3 million USD for research collaboration of the highest international standards. The initiative is funded by the Swedish Foundation for Strategic Research (SSF) in conjunction with the National Research Foundation of the Republic of Korea (NRF). Two of the researchers are from Chalmers (physical chemistry and quantum device physics)
Royal Institute of Technology http://www.kth.se/en	KTH Royal Institute of Technology in Stockholm is the largest and the oldest technical university in Sweden. No less than one-third of Sweden's technical research and engineering education capacity at university level is provided by KTH. For a number of years KTH and KAIST have had collaborative agreements such as reciprocal two-year postdoc positions and six-month guest research positions in the field of medical engineering.
Linköping University http://www.liu.se/?l=en	Linköping University is a research-based university with excellence in education. The university is a multi-faculty university in which research and education are equally important. Linköping University has been an innovator since the establishment in the late 1960s creating new study programmes and new ways to tackle research problems. Linköping University's current research collaboration with Korea includes material science and biotechnology.
Lund University http://www.lunduniversity.lu.se/	Lund University (LU) is ranked as one of the top 100 in the world. LU tackles complex problems and global challenges. The university tries to ensure that knowledge and innovations benefit society. LU provides education and research in engineering, science, law, social sciences, economics and management, medicine, humanities, theology, fine art, music and drama. LU has collaboration with Korean counterparts (e.g. Chemical Physics).
Karolinska Institutet http://ki.se/en/ki/startpage-kise	Karolinska Institutet (KI) is one of the world's leading medical universities. KI accounts for over 40% of the medical academic research conducted in Sweden and offers the country's broadest range of education in medicine and health sciences. KI has a wide range of research collaboration with Korean counterparts, including cancer therapy.
Uppsala University http://www.uu.se/en/	Established in 1477, Uppsala University is Sweden's oldest university. Uppsala University has been placed as one of the 100 best universities in the world during the last number of years with only a few exceptions. Concrete research collaboration with Korea includes cardiovascular diseases, stroke and neurodegenerative diseases like Alzheimer's.

PART 28

UNITED KINGDOM

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea in 2017-18
4. Others

UNITED KINGDOM

Country Outline

- GDP: 2,366,912 mil. euros (Eurostat 2016)
- GDP per Capita: 31,400 euros (Eurostat 2016)
- Areas of Marked S&T Specialisations: Biotechnology, Maths, Advanced Materials, Control Systems, Electronics, Engine Technology & Management, Green Manufacturing Energy, Aeronautical Engineering, Formulation Science, Specialty Chemicals, Novel Pharmaceuticals, and Automobiles

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The United Kingdom enjoys a long history of excellence in both basic and applied sciences. With only 4.1% of the world's researchers globally and 3.2% of global R&D expenditure, the UK generates 11.6% of all citations and 15.9% of the world's most cited papers. The UK was ranked third overall in the 2016 WIPO Global Innovation Index and second in the WEF Global Competitiveness Report 2016-17 for quality of research institutions. Four of the world's top ten universities are in the UK (QS World University Rankings 2017).

1. Policies and Strategies in Science, Technology and Innovation

Please note that the following information is correct at time of writing, but may be subject to revision as a result of policy change following the UK General Election on 08 June 2017.

In January 2017, the UK's Department for Business, Energy and Industrial Strategy (BEIS) published the first phase of the development of a new UK Industrial Strategy. Recognising the importance of STI at the centre of UK long term economic prosperity, the framework has highlighted science, research and innovation as the first of ten key pillars for the strategy.

Alongside this policy development, BEIS announced in April 2017 the creation of a new GBP 1 billion 'Industrial Strategy Challenge Fund' to support development in six key areas: healthcare and medicine; robotics and artificial intelligence; batteries for clean and flexible storage; self-driving vehicles; manufacturing and materials of the future; satellites and space technology.

An important development within the UK's STI environment has been the creation of the UK's innovation support agency, Innovate UK. With a budget of over GBP 560 million for the financial year 2016-17, Innovate UK provides a range of services and funding programmes

to support the commercialisation of the best of UK research. Under the oversight of Innovate UK, a network of Catapult Centres have been created in targeted innovation fields to provide a translational infrastructure to support and close the gap between universities and industry. Eleven Catapults are now in operation.

Cell and Gene Therapy Catapult
Compound Semiconductor Applications Catapult
Digital Catapult
Energy Systems Catapult
Future Cities
High Value Manufacturing Catapult
Medicines Discovery Catapult
Offshore Renewable Energy Catapult
Precision Medicine Catapult
Satellite Applications Catapult
Transport Systems Catapult

In May 2016 it was announced that the UK's seven Research Councils (see below for details) and Innovate UK would be brought together to form a new single, strategic organisation for the support of all UK publically funded science and research activity. This new organisation, called UK Research & Innovation (UKRI), will have a combined budget of over GBP 6 billion. While the Research Councils and Innovate UK will continue to have the autonomy and authority to pursue their own individual strategies, UKRI will seek to coordinate and deliver greater and more efficient support for UK academic and industry research.

For further information on the above:

Building our Industrial Strategy: Green Paper
www.gov.uk/government/consultations/building-our-industrial-strategy

Industrial Strategy Challenge Fund:
www.gov.uk/government/collections/industrial-strategy-challenge-fund-joint-research-and-innovation

Innovate UK
www.gov.uk/government/organisations/innovate-uk

Catapult Centres
www.catapult.org.uk

2. National Programmes and Initiatives

List of National Programmes open to the world

Programme Title	Contents
UK-Korea Focal Point Programme	▪ Cooperation Type: Networking and Knowledge Exchange ▪ Funding Organisation: UK Department for Business, Innovation and Skills ▪ Call Opening/Closing Date: June 2017, next call for projects will be in 2019. ▪ Participation Qualification: UK and Korean researchers interested in exploring collaboration within a topic area of strategic interest to both countries to identify future bilateral cooperation research opportunities. ▪ Project Duration: up to two years ▪ Funding Scale and Funding Scheme: up to GBP 15,000 for UK participants. Typically five networking activities are selected each year. ▪ Research Fields: Basic sciences in line with bilateral strategic interests. ▪ Matching fund from Korean government: Korean funding supported by the Ministry of Science, ICT and Future Planning.
Medical Research Council – Korea Health Industry Development Institute Partnering Awards	▪ Cooperation Type: Networking and Knowledge Exchange ▪ Funding Organisation: Medical Research Council (MRC) ▪ Call Opening/Closing Date: Opening November and closing in January. ▪ Participation Qualification: UK and Korean researchers interested in exploring new and developing existing healthcare research collaborations, with the aim to identify projects and programmes for longer term, larger scale national funding. ▪ Project Duration: One year ▪ Funding Scale and Funding Scheme: up to GBP 10,000 for UK participants, with an equal amount of matched funding provided to Korean participants. Up to 10 proposals will be funded each year. Funding can be used to support travel, visits and access to facilities, workshops and networking, researcher exchange, and other similar collaborative activities. ▪ Research Fields: All fields within the basic sciences in line with bilateral strategic interests. ▪ Matching fund from Korean government: Korean funding supported by the Ministry of Health and Welfare. ▪ Further information can be found via the MRC website – see below.

3. Joint Activities with Korea in 2017-18

For information on upcoming events or to request information regards interest in specific sector collaborations, please visit the British Embassy Seoul website at www.gov.uk/government/world/south-korea or contact our team at sinkorea@fco.gov.uk.

4. Others

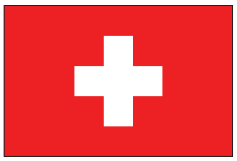
Key Research Organisations and Companies

Organisation Name	Detailed information
Arts and Humanities Research Council (AHRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.ahrc.ac.uk
Biotechnology and Biological Sciences Research Council (BBSRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.bbsrc.ac.uk
Economic and Social Sciences Research Council (ESRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.esrc.ac.uk
Engineering and Physical Sciences Research Council (EPSRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.epsrc.ac.uk
Medical Research Council (MRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.mrc.ac.uk
Natural Environment Research Council (NERC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.nerc.ac.uk
Science and Technology Facilities Council (STFC)	▪ Organisation type: Research Funding and Infrastructure Support Agency ▪ Contact Information: www.stfc.ac.uk

SWITZERLAND

1. Policies and Strategies in Science, Technology and Innovation
2. National Programmes and Initiatives
3. Joint Activities with Korea
4. Others

SWITZERLAND



Country Outline

- GDP: 590,960 mil. euros (Swiss Federal Statistical Office FSO, 2017)
- GDP per Capita: 71,350 euros (Swiss Federal Statistical Office FSO, 2017)
- Areas of marked S&T specialisations: Engineering & MEMS, Physics & Chemistry, Life Sciences & Medical Technology

Contact Information

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Switzerland is recognized as one of the most innovative countries in the world. It is also considered as a global centre of R&D, where scientists in globally acclaimed public and private institutions are involved in ground-breaking research. As Switzerland does not dispose of any natural resources, education, research and innovation have always been pivotal for the country. In addition to boasting the world's highest number of Nobel Prizes per capita, collaboration between the private industry and public research has always been strong and Switzerland's innovation output is highly productive, ranking 1st in with regard to the number of patents/capita. In addition, Switzerland is one of the world's most internationalised countries in research and innovation, a fact that adds to its attraction and strength.

1. Policies and Strategies in Science, Technology and Innovation

Switzerland recognises that excellent education, research and innovation are crucial for the economic competitively, sustainable development and the welfare of the country. Therefore, the Swiss Government is strongly focused of sustaining excellent framework conditions for the different stakeholders. The Swiss Government pursues a bottom-up policy for a successful education, research and innovation sector, meaning that basic research is supported heavily and with long-term predictable funding. Public expenditure for research is mainly the result of personal initiatives on the part of researchers and awarded on a competitive basis. In research commercialisation, Switzerland does not have an innovation policy but rather strongly supports networking, collaboration and knowledge transfer of public and private actors.

Main players in education, research and innovation in Switzerland:

- State Secretariat for Education, Research and Innovation (SERI):
  Government Ministry responsible for strategy, overview and resource plans as well as pursuing international activities

- 26 Cantons:
  Co-responsible with federal government for supporting basic funding of universities, universities of applied sciences and education
- Swiss National Science Foundation (SNSF):
  Foundation mandated by the Government to support basic science projects and careers in all academic disciplines (937m CHF in 2016).
- Commission for Technology and Innovation (CTI):
  CTI is the Federal innovation promotion agency, including start-up support and coaching. CTI is to be renamed Innosuisse and will become a fully-fledged foundation mandated by the Government.
- Federal Institutes of Technology (ETH Zürich and EPF Lausanne):
  Switzerland's excellent two federal universities focusing on teaching and conducting research in natural sciences, engineering and related fields and part of the ETH domain (Budget over 2400m CHF for 2016)
- Other institutions of the ETH domain:
  - **PSI:** Paul Scherrer Institute; Switzerland's largest research centre for natural sciences and engineering
  - **WSL:** Institute for forest, snow and landscape research
  - **Empa:** Interdisciplinary research institute and service provider for materials science and technology
  - **Eawag:** Aquatic research institute
- 10 Swiss universities (Geneva, Lausanne, Neuchatel, Fribourg, Bern, Basel, Lucerne, Zurich, St-Gallen, Ticino):
  Supported by the cantons and the federal government, these public universities conduct excellent research.
- 7 Universities of Applied Sciences:
  Practically-oriented public universities. They have close connections and many common R&D projects with local industry.

Switzerland's Education, Research & Innovation Strategy 2017-2020

Every four years, the government presents its strategy for the area of education, research and innovation. Available public funding for education and R&D is planned to rise by at least 2% annually over the next years, totalling 26bn CHF (29.7 trillion KRW) for this strategic period. Furthermore, the Swiss Government has defined four strategic goals for 2017-2020:

- Strengthening of Professional Education (PET): Improving the already well-functioning Swiss Vocational and Professional Education System (VET/PET) by increased financial support for students pursuing additional qualifications.
- Supporting young scientists: Highly qualified and excellent young scientists are crucial to the competitiveness of Swiss research and innovation. Universities should introduce

measures to support young scientists.

- Medicine: More financial means for supporting increased programs in educating medical professionals. Several universities such as ETH Zürich will newly start to offer medical degrees.
- Innovation: Increased focus on supporting bottom-up networks between public and private to commercialise research. Several new funding programs will be introduced to support the whole innovation value chain as well as increased promotion of the Swiss Innovation Park as a location for innovation.

Focus on Private Sector R&D

The private sector is responsible for almost 70% of all R&D activities in Switzerland. The leaders are Roche and Novartis in the pharmaceutical sector, Nestlé in nutrition and ABB in engineering. Various hidden champions, small- and medium-sized companies with technological strengths, also invest strongly in R&D. R&D activities of the Swiss private industry is often conducted in partnership with Swiss Federal Institutes of Technology (ETH Zürich and EPF Lausanne), universities or Universities of Applied Sciences. International partners often form part of R&D activities and networks.

Switzerland and the EU

Although Switzerland is not a member of the European Union, its research and innovation is strongly tied to the EU. Switzerland was a fully associated country in the EU's FP7 framework program (2007-2013) and is currently a partly associated country in the Horizon 2020 program.

2. National Programmes and Initiatives

List of National Programmes open to the world

Programme Title	Contents
Bilateral R&D Projects	▪ Outline: Innovation projects including a Swiss company, Swiss research institution and a foreign research institution (e.g. Korean) ▪ Research fields: all ▪ Organisation: CTI (Commission for Technology and Innovation) ▪ What is funded: Application-oriented projects in any research-based innovative field. Only research institutions/universities get funding, not companies. ▪ Deadlines: every month, depending on field. See website. ▪ Webpage: www.kti.admin.ch → Funding opportunities → For companies → bilateral R&D projects
EUREKA Network	▪ Outline: Intergovernmental network supporting market-oriented R&D projects. Different instruments exist, e.g. network projects, eurostars, clusters, umbrellas. ▪ Research fields: all ▪ Organisation: Eureka (every country has a National Contact Point (NCP) ▪ What is funded: Market-driven innovative research and development projects. ▪ Deadlines: depends. See webpage. ▪ Webpage: www.eurekanetwork.org
Other Opportunities	▪ Outline: The Swiss National Science Foundation (SNSF) offers other funding opportunities for researchers or young professors from abroad who wish to lead an independent project at a Swiss higher education institution. ▪ Website: www.snf.ch/en → Funding → Careers

3. Joint Activities with Korea

Swiss and Korean universities and research institutions actively collaborate on an individual or institutional basis. For example, EPFL and KAIST have a strategic partnership and ETH Zürich and DGIST have a common research centre in micro-robotics. The two governments signed an Agreement on Science & Technology Cooperation since 2008 and run several collaboration programs under this agreement (see below). In addition, the Science & Technology Office at the Swiss Embassy in Seoul is co-organising many events and programs in Korea to support bilateral R&D. All funding opportunities are presented on the website: www.stofficeseoul.ch → Funding Opportunities.

List of Joint Programmes or Activities with RoK in 2017

Programme Title	Contents
Korean-Swiss Science and Technology Programme	▪ Outline: Basic science research project funding with co-funding from Switzerland and Korea (collaboration MSIP-SERI) ▪ Research fields (from previous call): Neuroscience, Molecular physics, technologies and methodologies for big data. The research field is not defined yet for the next call. ▪ Organisations: Swiss National Science Foundation (SNSF); National Research Foundation of Korea (NRF) ▪ Deadline: TBD, probably 2018 ▪ Website: www.snf.ch/en → Funding → Programmes → Bilateral programmes → South Korea
Switzerland – Korea Joint Call for R&D Innovation	▪ Outline: Innovation projects including a Swiss consortium (company, Swiss research institution) and a Korean consortium (company, research institution ▪ Research fields: open ▪ Organisations: CTI (Commission for Technology and Innovation); KIAT (Korea Institute for the Advancement of Technology) ▪ What is funded: Application-oriented projects in any research-based innovative fields. Only research institutions/universities get funding in Switzerland, companies do get funding in Korea. ▪ Deadline: 19 June 2017. ▪ Website: www.kti.admin.ch → Funding opportunities → For companies → international R&D projects (South Korea)

PhD exchange Program	▪ Outline: Exchange program to enable mobility of young researchers, e.g. PhD students for research stays of up to 3 months. ▪ Research fields: open including humanities. ▪ Organisations: ETH Zürich, National Research Foundation of Korea (NRF) ▪ What is funded: Living allowance, airfare for maximum 3 months stay in the other country. ▪ Deadline: tbdTBD ▪ Website: www.ethz.ch/en → The ETH Zurich → Global → Bilateral programs → South Korea
Swiss-Korean Life Science Initiative	▪ Outline: Collaboration platform for R&D collaboration in life sciences and medical technologies including medical doctors, engineers, companies and start-ups ▪ Research fields: life sciences, medical technologies ▪ Organisations: Embassy of Switzerland, Science & Technology Office & Ministry of Health and Welfare, Korea Health Industry Development Institute (KHIDI) ▪ What is funded: No direct funding. Events, delegations and individual matchmaking and guidance towards existing public and private funding. Main targets are medical doctors, engineers and start-ups wishing to do R&D. ▪ Deadline: none. ▪ Website: www.stofficeseoul.ch → Information → Bilateral Collaboration → Swiss-Korean Life Science Initiative

4. Others

Key Research Organisations and Companies

Organisation Name	Detailed information
Science & Technology Office, Embassy of Switzerland	▪ Description: Connecting Swiss and Korean institutions and individuals for collaboration in research & innovation ▪ Contact Information: Ji-Hyun Lim, Deputy Head, Science & Technology Office jihyun.lim@eda.admin.ch ▪ Webpage: www.stofficeseoul.ch
CTI (Commission for Technology and Innovation)	▪ Description: Collaborate actively with Korea (KIAT) in R&D funding and support Swiss start-ups expanding to Korea in all tech fields ▪ Contact Information: Barbara Pfluger, Project Promotion and Knowledge & Technology Transfer (KTT) support barbara.pfluger@kti.admin.ch ▪ Webpage: www.kti.admin.ch
SNSF (Swiss National Science Foundation)	▪ Description: Collaborate actively with Korea (NRF) in funding basic research collaboration ▪ Contact Information: Jean-Luc Barras, Head of Division, Interdisciplinary and International Co-operation jean-luc.barras@snf.ch ▪ Webpage: www.snf.ch
ETH Board (Korean webpage available)	▪ Description: Strategic management and supervisory body of the ETH domain. Have a webpage about ETH domain institutions in Korean ▪ Webpage: http://www.ethrat.ch/ko
ETH Zürich	▪ Description: Switzerland's highest-ranking university, leading house of Swiss science & technology collaboration, active research cooperation projects with Korean universities and industry, such as SNU, DGIST, POSTECH and SAIT. ▪ Contact Information: Rahel Byland, Programme Manager (for Korea), ETH Global rahel.byland@sl.ethz.ch ▪ Webpage : www.ethz.ch
EPFL	▪ Description: Switzerland's brilliant young technical university, leading in basic science and working strongly with industry. Special relationship with KAIST and research projects with Samsung Electronics. ▪ Contact Information: Louisa Busca Grisoni, Head of Corporate Relations, Vice Presidency for Innovation louisa.buscagrisoni@epfl.ch ▪ Webpage: www.epfl.ch

PSI	▪ Description: Switzerland's largest research centre. Close collaboration with Postech and Korean research institutes such as KIMM. ▪ Contact Information: Giorgio Travaglini, Head, Technology Transfer giorgio.travaglini@psi.ch ▪ Webpage: www.psi.ch
WSL	▪ Description: Swiss Federal Institute for Forest, Snow and Landscape Research ▪ Contact Information: Konrad Steffen, Director konrad.steffen@wsl.ch ▪ Webpage: www.wsl.ch
Empa	▪ Description: Application and technology-focused research institute for materials and technology (materials & surfaces, civil engineering, biomaterials, energy) ▪ Contact Information: Gabriele Dobenecker, Head Marketing, Knowledge and Technology Transfer gabriele.dobenecker@empa.ch ▪ Webpage: www.empa.ch
Eawag	▪ Description: Aquatic research center promoting the transfer of research to practice ▪ Contact Information: Anne Dietzel, Knowledge Transfer & Continuing Education/ anne.dietzel@eawag.ch ▪ Webpage: www.eawag.ch
CSEM	▪ Description: Private research centre fostering innovation in microtechnology and ICT ▪ Contact Information: Georges Kotrotsios, Vice-President, Marketing & Business Development/ georges.kotrotsios@csem.ch ▪ Webpage: www.csem.ch
Universities of Applied Sciences	▪ Description: 7 different Universities of Applied Sciences. Active in applied research close to industry ▪ FHO: University of Applied Sciences Eastern Switzerland; www.fho.ch ▪ BFH: University of Applied Sciences Bern; www.bfh.ch ▪ FHNW: University of Applied Sciences Northwestern Switzerland; www.fhnw.ch ▪ HSLU: University of Applied Sciences Lucerne; www.hslu.ch ▪ HES-SO: University of Applied Sciences Western Switzerland; www.hes-so.ch ▪ SUPSI: University of Applied Sciences of Southern Switzerland; www.supsi.ch ▪ ZHAW: Zurich Universities of Applied Sciences; www.zhaw.ch

2017 Science, Technology and Innovation in Europe

Delegation of the European Union
to the Republic of Korea
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