2019 Science, Technology and Innovation in Europe

and Joint Activities with South Korea

Delegation of the European Union
to the Republic of Korea
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2019 Science, Technology and Innovation in Europe

European Commission

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2019

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

Foreword

Science, Technology and Innovation play a pivotal role in shaping industry and economy in the twenty-first century. They provide instruments to tackle many of the economic and social challenges such as climate change, disease, poverty and security, to name 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 population, the European Union takes up 20% of the global R&D expenditure, 27% of patent applications, and 32% of all high-quality scientific publications. 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.

More than half a century ago, the European Union (EU) and the Republic of Korea established diplomatic relations. Since then, the EU and Korea have become major international actors, making a real difference on global issues. We would like not only to share but also develop jointly science, technology and innovation. Therefore I am pleased to present you in this book the wide range of relevant programmes of the EU and its Member States.

The ambitious research and innovation support programme, 'Horizon2020' running 2014-2020, brings together numerous researchers and companies within and outside of Europe, enabling them to acquire knowledge and expertise in the fields of science and technology and to be deeply inter-connected through extensive networks and research grants. Since its inception in 2014 Korean researchers and innovators are already parts of this common endeavour. Now the European Commission (EC) is preparing for the next EU research and innovation programme from 2021 to 2027, 'Horizon Europe' where more international cooperation for science, technology and innovation is expected to take place to ensure mutual access to talent, knowledge, know-how, facilities and markets worldwide, to effectively tackle global challenges and to implement global commitments.

In addition to this Europe wide strategy each individual EU Member States 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

2019
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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 Science, Technology and Innovation of the EU

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PART 1

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 **Funding and Tenders**: 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 R&I**: 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 R&I 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 (2010), a Free Trade Agreement (2011) and a Crisis Management Agreement (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, 53 Korean entities participate in 41 Horizon 2020 projects: 36 in collaborative projects, 16 in MSCA actions, and 1 ERC grant. The success rate for South Korean applicants has been 20%. South Korean participants have received €0.7 million from the European Commission and have contributed with €12.8 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, the first joint call launched under the 2016-17 Work Programme of Horizon 2020 addressed 5G communication networks, Internet of Things and brokerage of mobile cloud services. The second ICT joint call launched under the Horizon 2020 WP 2018-20 addressed 5G technological validation in application contexts and interoperability and integration of 5G vertical testbeds in heterogeneous environments, combining Cloud, IoT and Artificial Intelligence (AI) technologies. Projects were launched in July 2018 and will continue until 2021.
- In the non-nuclear energy area, EU and Korean researchers are engaged in twinning activities in the area of technologies and processes for post- and/or pre-combustion CO2 capture, following calls in 2016-17. EU-Korea cooperation also takes place on acceleration of clean energy innovation through the Mission Innovation initiative.
- In the area of nanotechnology, since 2015, both sides have cooperated through Nanoreg, the initiative for regulatory testing of nanomaterials, and strong cooperation also takes place in advanced nanoelectronics technologies developments.
- In the area of health and bio-medical challenges, cooperation continues in the context of the GloPID-R initiative, the Global Research Collaboration for Infectious Disease Preparedness. The EU and South Korea is also participating in the International Rare Diseases Research Consortium, IRDiRC, the International Human Epigenome Consortium, IHEC, and the Joint Programming Initiative on Antimicrobial Resistance, JPIAMR.
- In the area of satellite navigation, the EC-Korea Satellite Navigation Cooperation Agreement, which entered into force on 1 July 2016 promotes joint research activities and, so far, two projects have been launched under Horizon 2020.
- For highly automated driving systems, Horizon 2020 calls include topics on testing, validation and certification procedures, networking activities and impact assessment, and human-centred design.
- For disaster-resilient societies, Horizon 2020 calls encourage EU-Korea cooperation in the area of technologies for first responders.
- In the area of polar research, Horizon 2020 calls include new opportunities for EU-Korea cooperation on addressing knowledge gaps in climate science and the changing cryosphere.

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

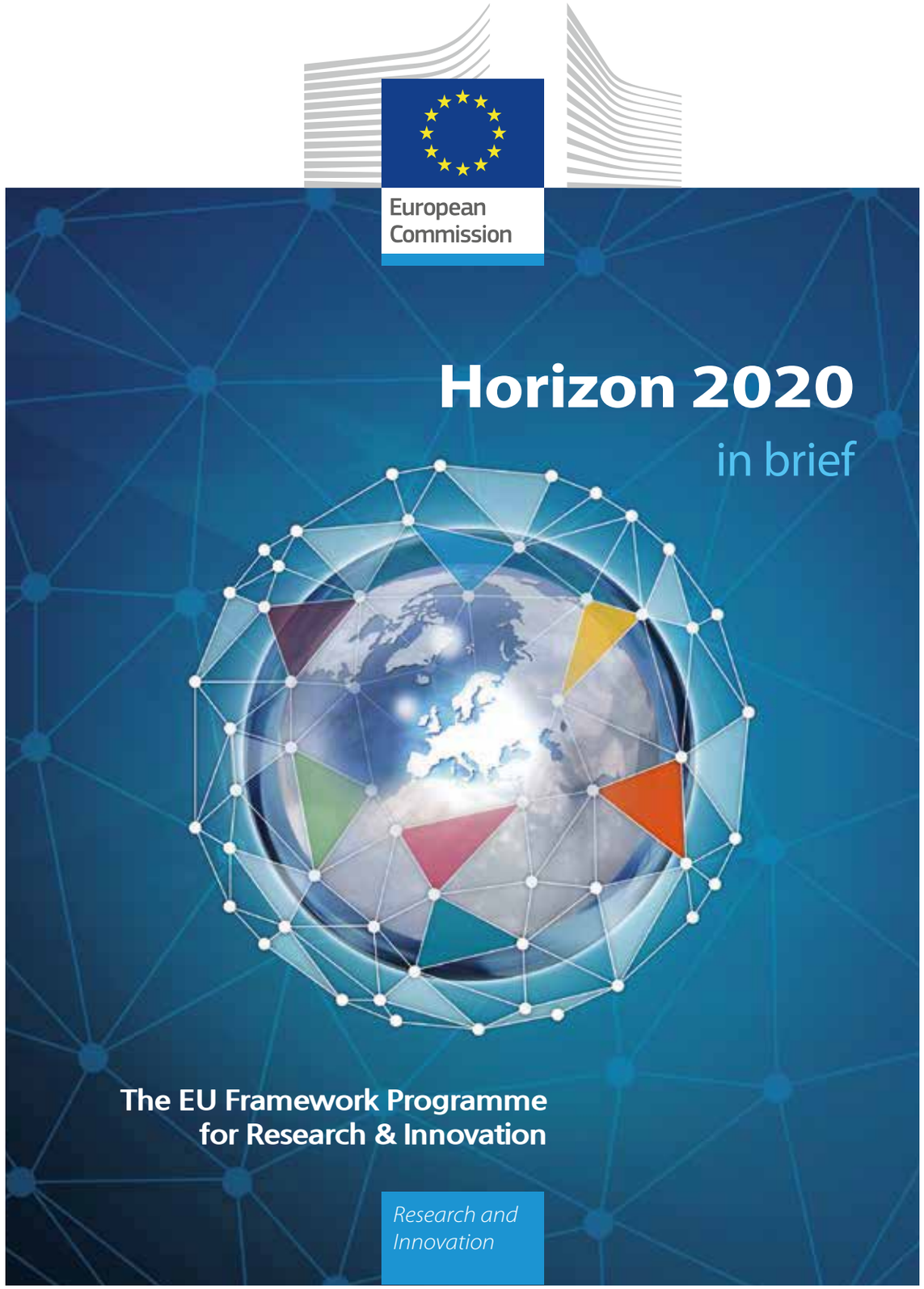
The two sides have agreed on early exchange of programme information to enable provision of such co-funding and to allow for monitoring of the cooperation intensity, as well as to continue to support efforts of multiplayers, notably National Contact Points, for facilitating access to information and partnering of R&I stakeholders. Moreover, both sides have agreed to jointly organise EU-Korea Research & Innovation Day as of 2018 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. In order to promote and support Korean researchers, EURAXESS South Korea, European Commission's initiative supporting international researcher mobility and research cooperation, was newly launched in July, 2018.

PART 2

Horizon 2020 in brief



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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 billion[1)] 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

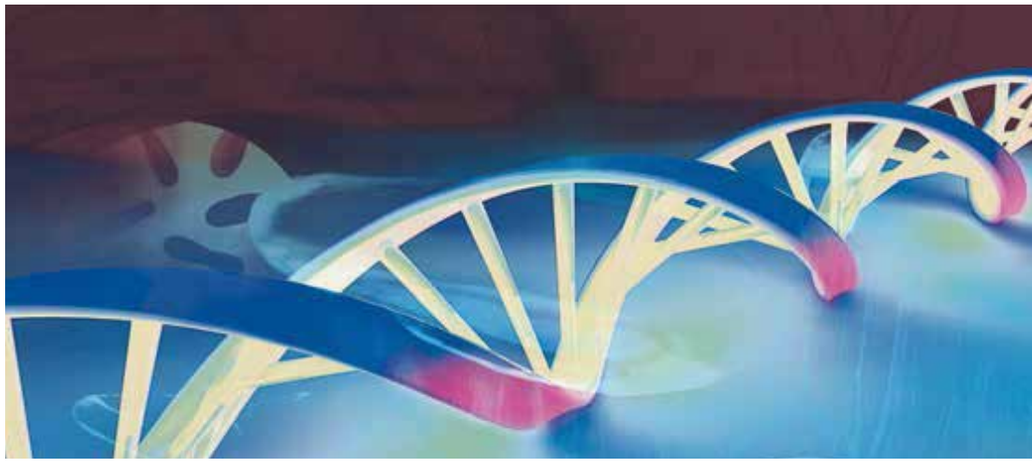
The EU has identified seven priority challenges where targeted investment in research and innovation can have a real impact benefitting the citizen:

- 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

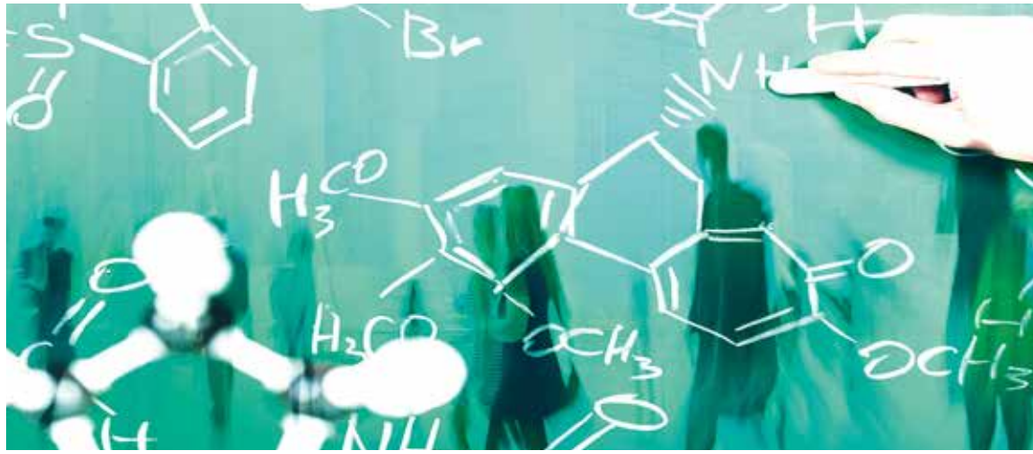
Synergies with other policies

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

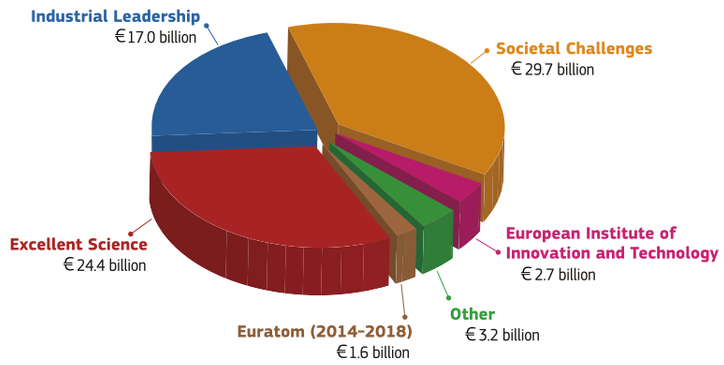
Once a proposal passes the scientific evaluation stage (duration five months), applicants are informed about the outcome. For the proposals which are selected for funding, the European Commission then draws up the grant agreement.

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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Horizon 2020 in brief
Luxembourg: Publications Office of the European Union
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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

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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(*):

00 800 6 7 8 9 10 11

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

More information about the European Union is available on the internet **(http://europa.eu).**
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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

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.

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

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	HOST APPLIES	FUNDER APPLIES
	IF Individual Fellowships	**ITN** Innovative Training Networks	**RISE** Research and Innovation Staff Exchange	**COFUND** Co-funding of regional, national and international programmes
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.	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.
Profile of the researchers	Experienced researchers of any nationality.	Early-stage researchers of any nationality.	All research and innovation staff of the participating organisations.	Early stage researchers in doctoral programmes and experienced researchers in fellowship programmes.
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.	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
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.	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.

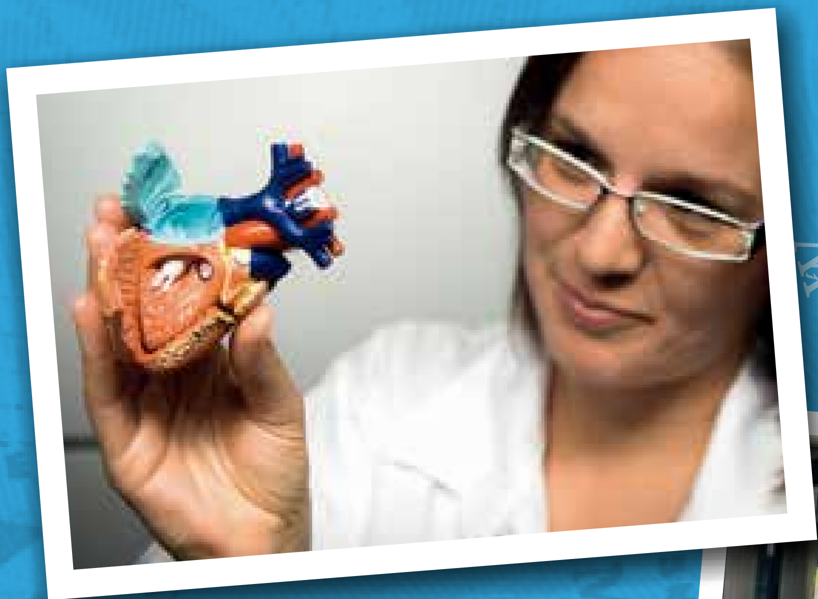
In the Career Restart Panel (IF) and the Reintegration Panel (IF), researchers must not have resided or carried out their main activity in the country of their host organisation for more than 3 years in the 5 years immediately prior to the relevant deadline for submission of proposals.

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

PART 4

Horizon Europe (2021-2027)

Horizon Europe

is the Commission proposal for a **€ 100 billion** research and innovation funding programme for seven years (2021-2027)

- **to strengthen the EU's scientific and technological bases**
- **to boost Europe's innovation capacity, competitiveness and jobs**
- **to deliver on citizens' priorities and sustain our socio-economic model and values**

Additional **€ 4.1 billion** are proposed to be allocated for defence research, in a separate proposal for a European Defence Fund

Horizon Europe – Why?

Horizon Europe: investing in R&I to shape our future

- The vision:

  " a Europe that protects, a Europe that empowers, a Europe that defends"

  Jean-Claude Juncker

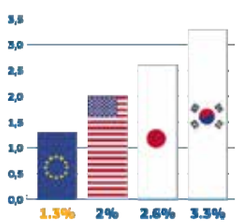
- Tackling **climate change** (35 % budgetary target)
- Helping to achieve **Sustainable Development Goals**
- Boosting the Union's **competitiveness and growth**

Credits: https://www.un.org/sustainabledevelopment/sustainable-development-goals/

While benefiting from world–class research and strong industries…

Our knowledge and skills are our main resources.

- → **7%** of the world's population
- → **20%** of global R&D
- → **1/3** of all high-quality scientific publications



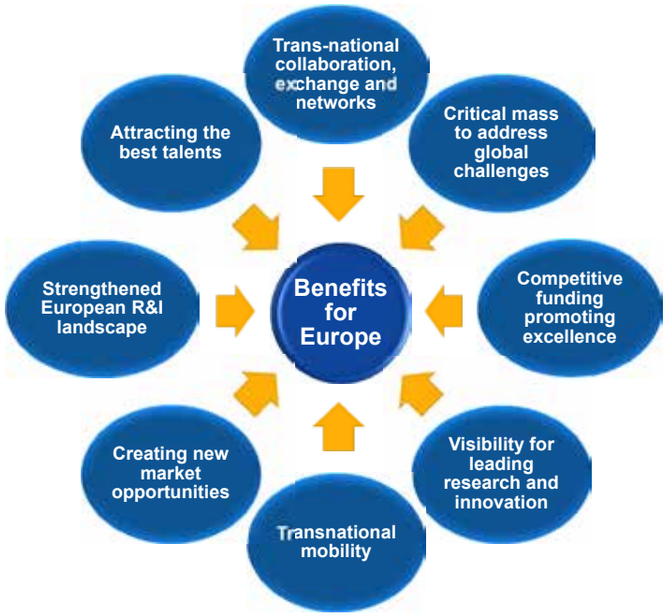
1.3%
EU business R&D investment

…Europe fails to transform leadership in science into leadership in innovation and entrepreneurship

We need a new level ambition and a renewed R&I agenda to be in pole position

- **Ensuring essential investment and stimulating private investment**
- **Making regulatory frameworks fit for innovation**
- **Becoming a front runner in market-creating innovation**
- **Reconnecting R&I with citizens through EU-wide R&I missions**
- **Supporting the dissemination of innovation throughout the Union**
- **Investing in skills and empower universities to become more entrepreneurial and interdisciplinary**

Added value through Horizon Europe:



Horizon Europe – What?

Horizon Europe: evolution not revolution

Specific objectives of the Programme

Support the creation and diffusion of high-quality knowledge

Strengthen the impact of R&I in supporting EU policies

Foster all forms of innovation and strengthen market deployment

Optimise the Programme's delivery for impact in a strengthened ERA

Pillar 1
Open Science

- European Research Council
- Marie Skłodowska-Curie Actions
- Research Infrastructures

Pillar 2
Global Challenges and Industrial Competitiveness

Clusters
- Health
- Inclusive and Secure Society
- Digital and Industry
- Climate, Energy and Mobility
- Food and natural resources

Joint Research Centre

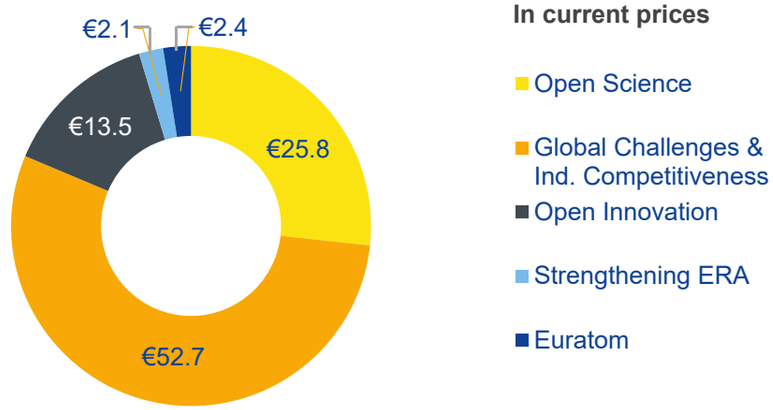
Pillar 3
Open Innovation

- European Innovation Council
- European innovation ecosystems
- European Institute of Innovation and Technology

Strengthening the European Research Area

- Sharing excellence
- Reforming and Enhancing the European R&I system

Budget: €100 billion* (2021-2027)



* This envelope includes EUR 3.5 billion allocated under the InvestEU Fund.

Horizon Europe – What's new?

Lessons Learned
from Horizon 2020 Interim Evaluation

Key Novelties
in Horizon Europe

Lessons Learned	Key Novelties
Support breakthrough innovation	European Innovation Council
Create more impact through mission-orientation and citizens' involvement	R&I Missions
Strengthen international cooperation	Extended association possibilities
Reinforce openness	Open science policy
Rationalise the funding landscape	New approach to Partnerships

European Innovation Council

Support to innovations with breakthrough and disruptive nature and scale up potential that are too risky for private investors.

European Innovation Council

Helping innovators create markets of the future, leverage private finance, scale up their companies,

Innovation centric, risk taking & agile, pro-active management and follow up

Two complementary instruments bridging the gap from idea to investable project

Pathfinder: grants
(from early technology to pre- commercial)

Accelerator: grants & blended finance
(from pre-commercial to market & scale-up)

R&I Missions

R&I Missions

Relating EU's research and innovation better to society and citizens' needs; with strong visibility and impact

A mission is a portfolio of actions intended to achieve **a bold and inspirational as well as measurable goal** within a set timeframe, with impact for science and technology, society and citizens that goes beyond individual actions

- Horizon Europe proposal defines mission characteristics and elements of governance
- Specific missions will be **co-designed with Member States, stakeholders and citizens** and programmed within the Global Challenges and Industrial Competitiveness pillar (drawing on inputs from other pillars)

International Cooperation

International Cooperation

Tackling together global societal challenges; access to the world's best talents, expertise and resources; enhanced supply and demand of innovative solutions

Extended openness to association

- Third countries with good capacity in science, technology and innovation
- Taking into account objective of driving economic growth in Europe through innovation

- General opening for international participation
- Intensified targeted actions (flagship initiatives, joint calls, etc.)

Open Science across the programme

Open Science

Better dissemination and exploitation of R&I results and support to active engagement of society

- **Mandatory Open Access to publications:** beneficiaries must ensure the existence of sufficient rights to comply with open access requirements
- **Mandatory Data Management Plan for FAIR (Findable, Accessible, Interoperable, Re-usable) and Open Research Data :** for all research data with possibilities to opt-out from open access requirements

- Support to researcher skills in and reward systems for open science
- Use of European Open Science Cloud

New approach to European Partnerships

New generation of objective-driven and more ambitious partnerships in support of agreed EU policy objectives

Key features

- **Simple architecture and toolbox**
- **Coherent life-cycle approach**
- **Strategic orientation**

Co-programmed

Based on Memoranda of Understanding / contractual arrangements; implemented independently by the partners and by Horizon Europe

Co-funded

Based on a joint programme agreed by partners; commitment of partners for financial and in-kind contributions & financial contribution by Horizon Europe

Institutionalised

Based on long-term dimension and need for high integration; partnerships based on Articles 185 / 187 of TFEU and the EIT-Regulation supported by Horizon Europe

Horizon Europe – In detail

Pillar 1

OPEN SCIENCE:

reinforcing and extending the excellence of the Union's science base

European Research Council

- Frontier research by the best researchers and their teams

€ 16.6 billion

Marie Skłodowska-Curie Actions

- Equipping researches with new knowledge and skills through mobility and training

€ 6.8 billion

Research Infrastructures

- Integrated and inter-connected world-class research infrastructures

€ 2.4 billion

Pillar 2

Global Challenges & Industrial Competitiveness:

boosting key technologies and solutions underpinning EU policies & Sustainable Development Goals

Clusters implemented through usual calls, **missions & partnerships**	Budget (€ billion)
Health	*€ 7.7*
Inclusive and Secure Societies	*€ 2.8*
Digital and Industry	*€ 15*
Climate, Energy and Mobility	*€ 15*
Food and Natural Resources	*€ 10*
Joint Research Centre supports European policies with independent scientific evidence & technical support throughout the policy cycle	€ 2.2

Pillar 3

OPEN INNOVATION:

stimulating market-creating breakthroughs and ecosystems conducive to innovation

European Innovation Council

- Support to innovations with breakthrough and market creating potential

€ 10.5 billion, incl. up to € 500 million for ecosystems

European innovation ecosystems

- Connecting with regional and national innovation actors

European Institute of Innovation and Technology (EIT)

- Bringing key actors (research, education and business) together around a common goal for nurturing innovation

€ 3 billion

Strengthening the European Research Area:

optimising strengths & potential for a more innovative Europe

Sharing Excellence

- Teaming (institution building)
- Twinning (institutional networking)
- ERA Chairs
- COST

€ 1.7 billion

Budget doubled

Reforming and enhancing the European R&I system

- Scientific evidence & foresight
- Open Science
- Policy Support Facility
- Attractive researcher careers
- Citizen science, Responsible Research & Innovation
- Gender equality

€ 0.4 billion

Horizon Europe – How?

Simple and fit for purpose rules

- Further alignment to the Financial Regulation
- Increased use of **simplified forms of grants** where appropriate (building on the H2020 lump sum pilot experience)
- Broader acceptance of **usual cost accounting practices**
- Enhanced **cross-reliance on audits** benefiting beneficiaries taking part in several Union programmes

while ensuring continuity and consistency for beneficiaries by maintaining

- Attractive H2020 funding model, including up to 100% funding rate
- Single set of rules principle

Strategic planning to define multiannual work programmes and calls for proposals

- Transparency and stakeholder involvement
- Prioritisation and flexibility to align to political priorities
- Internal programme coherence & synergies with other programmes

Multiannual Strategic R&I Plan

*** Multiannual orientations and priorities in one document**
*** Areas for partnerships and missions**

Strategic discussions with Member States and European Parliament

Consultation with stakeholders

Work Programmes

Next steps

Ongoing — Parliament and Council negotiations on Union budget 2021-2027, including budget for Horizon Europe

From 7 June 2018 — Parliament and Council negotiations on the basis of the Commission proposal for Horizon Europe

2nd half 2018/2019 — Strategic planning to prepare first work programmes under Horizon Europe, including co-design of missions and setting up of partnerships

1 January 2021 — Envisaged start of Horizon Europe

Follow us and keep up to date via:

#HorizonEU

@Moedas *@EUScienceInnov* *@EU_H2020* *@HorizonMagEU*

https://www.facebook.com/EUScienceInnov/
https://www.facebook.com/cmoedas/

Horizon Europe dedicated website
http://ec.europa.eu/horizon-europe

European Innovation Council
http://ec.europa.eu/research/eic

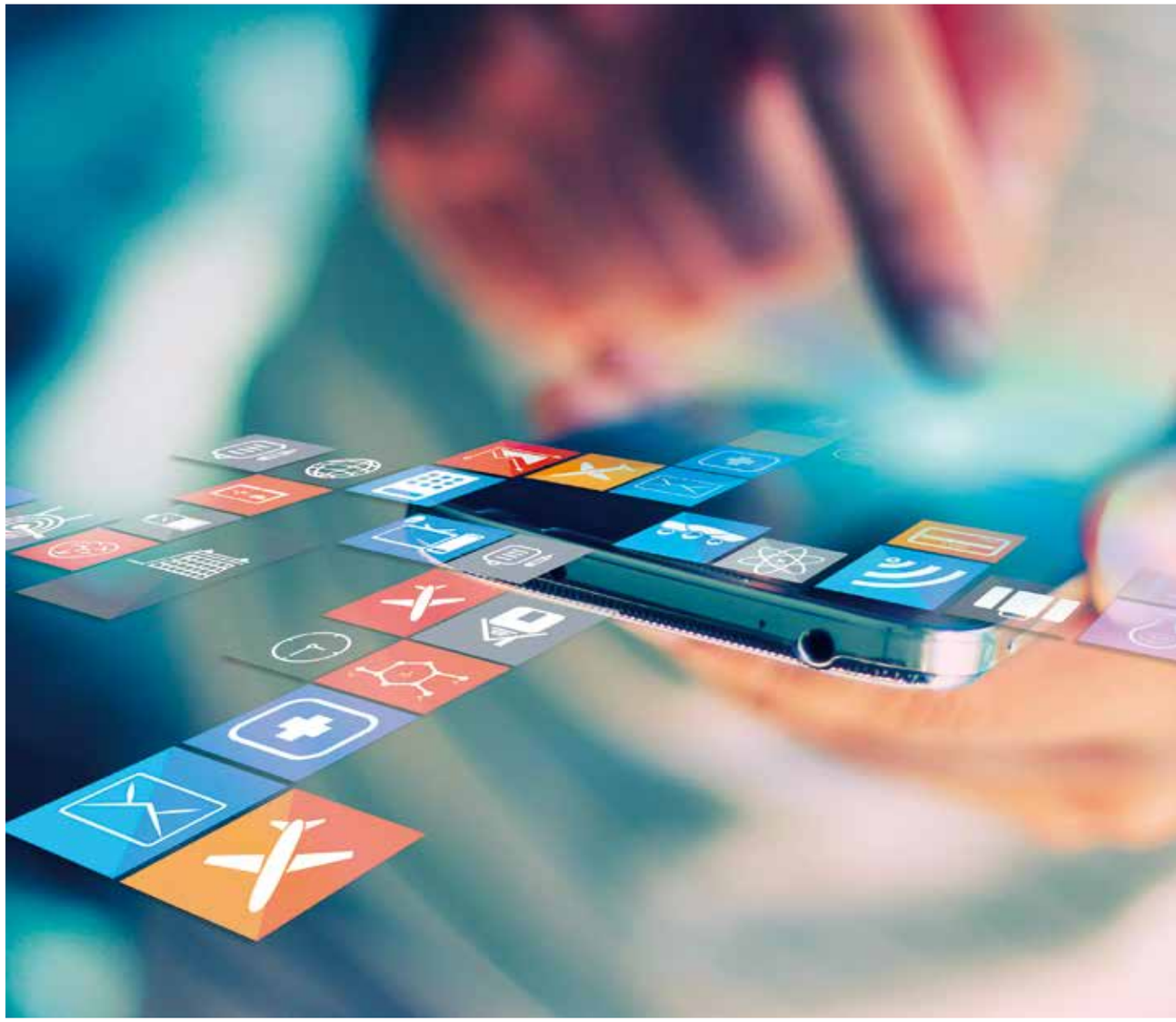
EU budget for the future
http://ec.europa.eu/budget/mff/index_en.cfm

European Commission

Thank you!

#HorizonEU

http://ec.europa.eu/horizon-europe



3 EURAXESS: EU Research Support Service

Delegation of the European Union to the Republic of Korea

1. What is EURAXESS

"EURAXESS – Researchers in Motion" is a European Commission initiative that aims to support development of the European Research Area (ERA) by addressing barriers to the mobility of researchers and to enhance scientific collaboration between Europe and the world. EURAXESS is supported by 40 participating countries across Europe (EU member states and countries within the Horizon 2020 Associated Countries list). Designed as a comprehensive tool-set, it provides researchers access to a complete range of information and support services that are structured around five areas: *Jobs and Funding, Career Development, Information and Assistance, Partnering and Worldwide*. Through its portal (euraxess.ec.europa.eu) it provides a single access point for career development resources and jobs, funding and hosting opportunities in Europe, as well as information on the conditions of living and working in European countries as a researcher. EURAXESS also provides personalised assistance to incoming and outgoing researchers through its network of more than 500 Service Centres in Europe. The international arm of the EURAXESS initiative links Europe to the rest of the world through its 7 hubs outside of Europe (ASEAN, China, India, Japan, Latin American and Caribbean States, North America and Korea).

2. EURAXESS network's services to researchers and institutions

All EURAXESS tools provide services to researchers and Research Performing Institutions (RPOs) independently of their origin, country of affiliation, research domain – including humanities and social sciences, institution area (private R&D, public research institutes, universities and higher education institutions, etc), or career level – from PhD candidate level to senior profiles. In particular:

- The **Jobs and Funding** section provides, via a fully open online platform (jobs.euraxess.org), access to the largest European job portal for research related jobs that also includes PhD positions. Korean or Korea-based individual researchers can not only look for jobs in Europe, but also create their profiles and CVs online with the aim to be spotted by potential employers. Korean research institutions may register to the portal so as to be given the authorisation to post job offers. Publication of offers is free. This section also provides access to a funding database maintained by research and innovation funding agencies all around Europe that researchers can use to look for funding programmes that meet their needs for funding for international cooperation or mobility projects. The funding database also includes travel grants and fellowships. In addition, researchers can find hosting offers on EURAXESS - Expressions of Interest from research institutions in supporting applications to the Marie Skłodowska-Curie Actions Individual Fellowships calls, as well as offers from institutions which dispose of research infrastructures.

- The **Information and Assistance** section provides, via a central portal (services.euraxess.org) and via 40 national portals (euraxess.ec.europa.eu/choose-your-country) a full range of useful information to researchers intending to relocate to Europe, comprising 17 topics (in alphabetical order): access to the culture of the host country & language courses; accommodation; banking; career development; day care, schooling & family related issues; departure conditions & formalities; entry conditions & visas; funding opportunities; health insurance; intellectual property rights; medical care; pension for researchers; recognition of diplomas; taxation & salaries; unemployment; and work permit. In addition to the online information services, more than 550 centres and contact points in the 40 countries participating in EURAXESS respond to researchers' requests by phone or personal visits and more than 1,500 staff yearly answer to 350,000 of these requests.

- The **Partnering** section provides an online networking tool (euraxess.ec.europa.eu/partnering) to researchers and RPOs who have created a profile on the EURAXESS portal, with which they can connect to other individuals or institutions for their research collaboration or mobility projects.

- The **Career Development** section (euraxess.ec.europa.eu/career-development) on the portal includes resources for both researchers and research supporting organisations.

- The **Worldwide** section (worldwide.euraxess.org) provides information and networking services both online and offline to researchers from specific regions or countries outside of Europe.

3. What is EURAXESS Korea

EURAXESS Worldwide, the international branch of EURAXESS, launched in May 2018 its services in a seventh location, Korea. It aims at increasing and improving researcher mobility and research cooperation between Korea and Europe. Its objectives are:

- To promote ERA from the angle of mobility and research funding opportunities and programmes available;

- To provide tailored and relevant information to Korea-based researchers: from PhD candidate level to professor level, all disciplines, in academia and industry;

- To create opportunities for networking for researchers; and

- To grow a community of international-minded researchers.

All EURAXESS Korea services are free, and of easy access via its website: korea.euraxess.org.

4. EURAXESS Korea's services to Korea-based researchers and institutions

EURAXESS Korea mainly provides three services:

- Information services, through its website korea.euraxess.org and social media (@ EURAXESS_Korea) where funding, job opportunities, policy developments, events and networking opportunities of interest to Korean researchers and Korean RPOs are provided in the form of a curated newsfeed, both in English and in Korean.

- Events and seminars, where detailed explanation of EURAXESS services, and also European funding programmes such as Horizon 2020, Horizon Europe, European Research Council grants or Marie Skłodowska-Curie Actions grants is provided directly to students, researchers and research administrators.
  Among events, the European Alumni Research Nights are regularly held in Seoul to permit emulation and exchange of knowledge and know-how about researcher mobility to Europe.
  Among seminars, the EURAXESS Korea Tour serves as a platform for Korean institutions to stimulate and train their researchers to participate in mobility or research cooperation programmes with Europe.

- Community building aims at better information exchange between Korea-based researchers so as to increase Korea-Europe research exchanges.

EURAXESS Korea is operated by Dr. Matthieu Py and Dr. Tomasz Wierzbowski – they can be reached at korea@euraxess.net.

EURAXESS Korea Office:
Room 1008, the Main Building of Hankuk University of Foreign Studies
Seoul Campus: 107 Imun-ro, Dongdaemun-gu, 02450 Korea

4 Science, Technology and Innovation of the European Countries

Delegation of the European Union to the Republic of Korea

PART 1

AUSTRIA

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

AUSTRIA

AUSTRIA

Country Outline

- GDP: 386,094 mil. euros (Eurostat 2018)
- GDP per Capita: 39,300 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Life Sciences, Physics, Energy & Environment

Contact Information

- Organisation: Advantage Austria / Embassy of Austria Commercial Section
- Name / Position: Dr. Franz Schroeder / Commercial Counsellor
- Phone no. / e-mail: (+82) 2 732 7330 / seoul@advantageaustria.org

With research and development accounting for 3,19% (2018) 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 12.3 billion, it is the business enterprise sector that accounts for the biggest share of R&D expenditure in terms of total expenditure at approx. 49.5% (or EUR 6.1 billion), with a - by international comparison - high share of foreign investment at EUR 2 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 since 2000 comprehensive measures to strengthen the competitiveness of the Austrian economy. 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 delegated 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 STI Programmes and Initiatives

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 addition, funding by several thematic funding programs is also accessible to Korean researchers in transnational R&D projects. Moreover, the M-ERA.NET network is open for Korean participation in advanced materials. 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 hhttps://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, there are 7 projects including project partners from Austria and Korea.

AUSTRIA

3. Joint Activities with Korea

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: - 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) and KOTRA.

4. Science, Technology and Innovation Cooperation Partners

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 Centers 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. https://bmbwf.gv.at/english/home/studies/studying-in-austria/austrian-universities-universities-of-applied-sciences-private-universities-overview/

PART 2

BELGIUM

BELGIUM

BELGIUM

Country Outline

- GDP: 450,506 mil. euros (Eurostat 2018)
- GDP per Capita: 39,500 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Chemistry, Pharmaceuticals, Space

Contact Information

- Organisation: Embassy of Belgium
- Name / Position: Mrs. Eva Morre / Attaché
- Phone no. / e-mail: (+82) 2 749 0381 / eva.morre@diplobel.fed.be

Belgium is a federal country with a federal government and three different regions and three communities. There is no hierarchy of powers between the federal government and the regional governments. It is the regional entities that are primarily responsible for science, technology, education and economic policies. As such they control the main levers for innovation policy.

Some responsibilities remain at the federal level: space research; polar research; international programmes and institutes; fiscal measures (taxes); scientific research institutes that focus on federal competences; and the access to the labour market, social security, scientific visa, regulatory framework, etc.

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.

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 the strongest country of the EU in innovation linkages and collaboration according to the European Innovation Scoreboard 2018 (European Commission, 2018) and over time, performance has increased relative to that of the EU in 2010. 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 characterized 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, 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). The multi-annual plans that are in place in 2019 are namely: the Flanders in Action initiative (VIA)/ PACT 2020; the Brussels-Capital Regional Innovation Plan (PRI 2016-2020); the Walloon "Marshall Plan 4.0" (2015-2019) and the Wallonia-Brussels partnership for researchers.

The key R&I relevant aspects of Belgium's National Reform Programme 2018 sets out the structural measures taken by the Belgian governments over the last twelve months. These can be summarized as follows:

(1) Continue **fiscal consolidation** and accelerate the reduction of the general government debt ratio, distribute the corresponding objectives among the levels of governance, remove distortive tax expenditures, and create room for infrastructure investment. Among the measures with a significant effect on economic potential, there are lower corporate tax, an exemption on dividend taxes, and increased flexibility in the labor market. The second phase of the tax shift was implemented with a reduction in employer's social security contributions, and adjustments to the personal income tax system. The third and final phase will take place in 2019-2020.

(2) Ensure that the **most disadvantaged groups** have equal opportunities as other people to participate in education and the labor market. The fight against social dumping in the construction industry was stepped up, including with a phased reduction of wage costs for shift work on construction sites. In 2020, this reduction will have reached cruising speed and amount to 604 million euros.

(3) **Promote investments in knowledge-based capital** by way of measures to increase digital technologies adoption and diffuse innovation diffusion, and increase competition in business services, retail trade and network industries. The national pact on strategic investments is in line with the European Investment Plan. It is intended to be an incentive for public and private investments in strategic sectors, such as transport and communication, as well as education and healthcare.

(4) Meet the **objectives of the Europe 2020 Strategy** in the fields of work, R&D and innovation, education and training, energy and climate, and social inclusion.

Basic indicators for R&D investments

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GDP per capita (euro per capita)	32,300	33,500	34,500	35,000	35,300	35,800	36,500	37,500		
Value added of services as share of the total value added (% of total)	76.39	75.97	76.27	76.67	77	77.26	77.07	77.16		
Value added of manufacturing as share of the total value added (%)	14.28	14.72	14.25	14.08	13.98	14.05	14.33	14.26		
Employment in manufacturing as share of total employment (%)	12.6	12.11	11.97	11.75	11.52	11.18	10.84	1071		
Employment in services as share of total employment (%)	78.7	79.27	79.43	79.67	79.98	80.46	80.91	81.1		
Share of Foreign controlled enterprises in the total nb of enterprises (%)		0.28	0.27	0.26	0.24	0.23	0.22			
Labour productivity (Index, 2010=100)	97.8	100	99.5	99.3	100	101.1	102.3	102.4		
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	1.04	1.18	0.77	1.27	1.31	1.36	1.37			
Summary Innovation Index (rank)	8	6	7	7	7	7	7	9		
Innovative enterprises as a share of total number of enterprises (CIS data) (%)				55.9		64.2				
Innovation output indicator (Rank, Intra-EU Comparison)				10	10	11	12			
Turnover from innovation as % of total turnover (Eurostat)		12.4		11.2						

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Country position in Doing Business (Ease of doing business index WB)(1=most business-friendly regulations)						41	43	42	42	52
Ease of getting credit (WB GII) (Rank)						80	81	84		
Venture capital investment as % of GDP (seed, start-up and later stage)	0.053	0.025	0.03	0.033	0.026	0.032	0.015			
EC Digital Economy & Society Index (DESI) (Rank)						5	5	5	6	
E-Government Development Index Rank		16		24		25		19		
Online availability of public services-Percentage of individuals having interactions with public authorities via Internet (last 12 months)	41	45	47	50	50	55	52	55	55	
GERD (as % of GDP)	1.99	2.05	2.16	2.27	2.33	2.39	2.47	2.49		
GBAORD (as % of GDP)	0.66	0.65	0.63	0.64	0.64	0.68	0.62	0.64		
R&D funded by GOV (% of GDP)	0.5	0.52	0.5	0.56	0.57		0.55			
BERD (% of GDP)	1.31	1.38	1.48	1.59	1.62	1.67	1.72	1.73		
Research excellence composite indicator (Rank)	7	8	8	8	8	8				
Percentage of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country		12.36	12.43	12.65	12.88	12.55				
Public-private co-publications per million population	63.7	68.17	74.63	70.39	76.24	71.73	61.05			
World Shate of PCT applications	0.73	0.72	0.69	0.67	0.57	0.61	0.64			
Global Innovation Index				21	23	25	23	27		

(source: Kelchtermans, S, and Robledo-Bottcher N, RIO Country Report 2017: Belgium, EUR 29152 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-81195-1, doi:10.2760/066103, JRC111253.)

2. National STI Programmes and Initiatives

International Cooperation Programmes/Initiatives

Programme Title	Contents
Grants Programme ASEM DUO – Belgium/Wallonia-Brussels https://www.ares-ac.be/en/relations-internationales/asem-duo-grant	▪ Cooperation Type: Mobility ▪ Funding Organisation: Wallonia-Brussels-International (WBI) ▪ Call Opening/Closing Date: April 30th – October 31st ▪ 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, Bangladesh, Brunei, Cambodia, China, India, Indonesia, Japan, Kazakhstan, South Korea, Laos, Malaysia, Mongolia, Myanmar, New-Zealand, Pakistan, Philippines, Russia, Singapore, Taiwan, Thailand and Vietnam or intends to have one within the next 2 years. ▪ Project Duration: 1 to 3 months ▪ Funding Scale and Funding Scheme: 5,000€ per month for the two professors (or a total amount of 15,000€ for a three-month exchange for the pair). ▪ Research Fields: All ▪ Others: 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 centre 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.
Scholarships for Excellence program – IN.WBI http://www.wbi.be	▪ Cooperation Type: Mobility ▪ Funding Organisation: Wallonia-Brussels-International (WBI) ▪ Call Opening/Closing Date: Please check website ▪ Participation Qualification: Researchers from any country who have obtained a PhD degree ▪ Project Duration: Long-term scholarships (minimum 1 year, renewable once) at postdoctoral level ; Short-term scholarships (1 to 3 months, non-renewable) at postdoctoral level. ▪ Funding Scale and Funding Scheme: Please check website ▪ Research Fields: Particularly focused on sectors of the Marshall Plan 4.0: Transport and logistics ; Mechanical engineering ; Life sciences ; Agriculture-industry ; Aero-space ; and Environmental technologies. Other fields will also be considered.

Programme Title	Contents
FWO Junior/Senior Research Project https://www.fwo.be/en/fellowships-funding/research-projects/junior-and-senior-research-projects	▪ Programme name: FWO Research Project ▪ Cooperation Type: Research Project ▪ Funding Organization: The Research Foundation-Flanders ▪ Call Opening/Closing Date: December 2019 - 01/04/2020 (tentative dates) ▪ Participation Qualification: The objective of an FWO research project is to advance fundamental scientific research. Non-Flemish universities can be included ▪ Project Duration: 4 years ▪ Funding Scale and Funding Scheme: Non-Flemish universities can receive up to 10% of the total budget requested at FWO ▪ Research Fields: Fundamental research in all domains ▪ Matching fund from Korean government: No
Odysseus Program https://www.fwo.be/en/fellowships-funding/research-projects/odysseusprogramme/	▪ Programme name: FWO Odysseus program ▪ Cooperation Type: Research Project ▪ Funding Organization: The Research Foundation-Flanders (FWO) ▪ Call Opening/Closing Date: Next call deadline in 2020 (tentative date) ▪ Participation Qualification: The Odysseus program supports outstanding researchers who have built up a career outside Flanders. The program provides start-up funding in order to develop a research group within a Flemish university or to set up a research line and become progressively more involved in the Flemish research establishment. (see program website) ▪ Project Duration: 5 years ▪ Funding Scale and Funding Scheme: See program website - Depending on the program type up to €1,500,000 per year ▪ Research Fields: Fundamental research in all domains ▪ Matching fund from Korean government: No
Strategic Basic Research Program (SBO) https://www.fwo.be/en/fellowships-funding/research-projects/sbo-projects	▪ Programme name: FWO Strategic Basic Research Program (SBO) ▪ Cooperation Type: Research Project ▪ Funding Organization: The Research Foundation-Flanders ▪ Call Opening/Closing Date: See website ▪ Participation Qualification: The SBO program focuses on innovative research that has a clear relationship with practice and which, if scientifically successful, opens prospects for subsequent sustainable economic or societal applications. One or more R&D research centers from outside Flanders may be included ▪ Project Duration: max. 4 years ▪ Funding Scale and Funding Scheme: Budget for non-Flemish research centers may not exceed 20% of total project budget ▪ Research Fields: Strategic basic research with economic or societal finality ▪ Matching fund from Korean government: No
Innovation mandates (IM) https://www.vlaio.be/nl/subsidies-financiering/innovatiemandaten/innovation-mandates	▪ Cooperation Type: Joint research ▪ Funding Organisation: Agency for Innovation by Science and Technology (IWT) ▪ Call Opening/Closing Date: 2 deadlines per year ▪ Participation Qualification: open to anyone who holds a PhD degree ▪ Project Duration: around 2 years ▪ Funding Scale and Funding Scheme: There are various types of mandates: spinoff 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 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 Societal finality (TBM) https://www.fwo.be/en/fellowships-funding/research-projects/tbm-projects	▪ Programme name: FWO Applied Biomedical Research with a Primary Societal finality (TBM) ▪ Cooperation Type: Research Project ▪ Funding Organization: The Research Foundation-Flanders ▪ Call Opening/Closing Date: Beginning of December / end of March ▪ Participation Qualification: Focuses on niche in biomedical research: Late-stage translational research with a pronounced societal applicability, but no industrial interest. 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: See website ▪ Research Fields: Biomedical research ▪ Matching fund from Korean government: No
FWO Excellence of Science (EOS) https://www.fwo.be/en/fellowships-funding/research-projects/eos-research-project	▪ Programme name: FWO Excellence of Science (EOS) ▪ Cooperation Type: Research Project ▪ Funding Organisation: The Research Foundation-Flanders: www.fwo.be and the Fonds de la Recherche Scientifique (F.R.S.-FNRS): www.fnrs.be/en/ ▪ Call Opening/Closing Date: Next call deadline in 2021 ▪ Participation Qualification: The EOS programme wants to promote joint fundamental research between researchers in the Flemish and French-speaking communities of Belgium. Non-Belgian research partners can be included ▪ Project Duration: 4 years ▪ Funding Scale and Funding Scheme: Overall budget for non-Belgian research partners may not exceed 10% of total budget. Project budget up to €1,000,000 per year ▪ Research Fields: Fundamental research in all domains ▪ Matching fund from Korean government: No

Programme Title	Contents
STEREO III https://eo.belspo.be/en	▪ Cooperation Type: Belgian R&I programme open to international partner(s) ▪ Funding Organisation: Belgian Science Policy Office (BELSPO) ▪ Call Opening/Closing Date: 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
Federal Research Programme Drugs http://www.belspo.be/belspo/drugs/program_en.stm	▪ Cooperation Type: Joint research ▪ Funding Organisation: Belgian Science Policy Office (BELSPO) ▪ Call Opening/Closing Date: Every year ▪ Participation Qualification: Foreign research fundable up to 20% of total budget of proposal/project ▪ Project Duration: 2 years average ▪ 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

3. Joint Activities with Korea

Activities with the RoK in 2019-2020

Programme Title	Contents
Call for joint FWO-NRF mobility projects https://www.fwo.be/en/fellowships-funding/international-collaboration/scientific-cooperation/cooperation-with-south-korea	▪ Cooperation Type: Joint Mobility Project ▪ Funding Organization: The Research Foundation-Flanders www.fwo.be and The National Research Foundation http://www.nrf.re.kr/eng/main ▪ Call Opening/Closing Date: see website for upcoming calls ▪ Participation Qualification: see program website including guidelines ▪ Project Duration: 2 years ▪ Funding Scale and Funding Scheme: costs for exchange of researchers ▪ Research Fields: Fundamental research in all domains ▪ Matching fund from Korean government: Yes by NRF ▪ Others: Promotion of international collaboration between Flanders and South Korea

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
Belgian Nuclear Research Centre (SCK-CEN) http://www.sckcen.be	▪ Organisation type: research organisation ▪ Major research areas/products…: nuclear science and technology and ionizing radiation ▪ Contact point: 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) www.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
VITO https://vito.be	▪ Organisation type: research organisation ▪ Major Research Area/Product: energy, materials, chemistry, health and land use (including earth observation) ▪ Contact Information: vito@vito.be
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
Competitiveness Clusters in Wallonia www.clusters.wallonie.be	▪ Organisation type: competitiveness clusters in various fields ▪ Major Research Area/Product: transport and logistics, aerospace, green chemistry and durable materials, biotechnology and health, food industry, mechanical engineering ▪ Contact Information: info@logisticsinwallonia.be, contact@greenwin.be, contact@biowin.org, info@wagralim.be, info@polemecatech.be

PART 3

BULGARIA

BULGARIA

BULGARIA

Country Outline

- GDP: 55,182 mil. euros (Eurostat 2018)
- GDP per Capita: 7,800 euros (Eurostat 2018)

Contact Information

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

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 Bulgaria's 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 STI 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

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 STI Programmes and Initiatives
3. Joint Activities with Korea
4. Science, Technology and Innovation Cooperation Partners

CROATIA

CROATIA

Country Outline

- GDP: 51,468 mil. euros (Eurostat 2018)
- GDP per Capita: 11,800 euros (Eurostat 2017)
- 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.: (+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 and 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 STI Programmes and Initiatives

Not Applicable

3. Joint Activities with Korea

Not Applicable

4. Science, Technology and Innovation Cooperation Partners

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 STI Programmes and Initiatives
3. Joint Activities with Korea
4. Science, Technology and Innovation Cooperation Partners

CYPRUS

CYPRUS

Country Outline

- GDP: 20,731 mil. euros (Eurostat 2018)
- GDP per Capita: 23,800 euros (Eurostat 2018)
- 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) 22602874 / 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 STI 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

Not Applicable

4. Science, Technology and Innovation Cooperation Partners

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.

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 22894288
Cyprus University of Technology www.cut.ac.cy	▪ Organisation type: University ▪ Contact Information: +357 25002500

CYPRUS

PART 6

CZECH REPUBLIC

CZECH REPUBLIC

CZECH REPUBLIC

Country Outline

- GDP: 207,772 mil. euros (Eurostat 2018)
- GDP per Capita: 19,600 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Nanotechnologies, Molecular Medicine, Biotechnology, Optics and laser research

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_seoul@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 or electron microscopy.

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 the Prime Minister).

In the field of applied research, the Technology Agency of the Czech Republic 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 STI Programmes and Initiatives

In February 2019 the Czech Government has approved the Innovative Strategy 2019 – 2030 that defines main goals and ways to achieve them. The Czech Republic should become one of world leaders in innovative technologies in next 10 years.

Czech 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.

International Cooperation Programmes/Initiatives

Programme Title	Contents
DELTA 2 PROGRAMME www.tacr.cz	▪ Programme name: DELTA 2 PROGRAMME ▪ Cooperation Type: Joint Collaborative Research ▪ Programme for the support of bilateral international collaboration of Czech companies and research organizations in applied research with their foreign partners. ▪ Funding Organisation: Technology Agency of the Czech Republic ▪ Project Duration: The duration of the DELTA programme is 5 years (2020-2025), individual projects can be funded up to 3 years. ▪ Participation Qualification: Company from the CR (research organizations from the CR only together with the company) that has a partner in a country the TA CR agreed on collaboration in a call ▪ Research Fields: Bottom-up approach ▪ Funding Scale and Funding Scheme: TA CR is funding only Czech R&D institutions ▪ In 2019, a Czech-Korean call is scheduled between the TA CR and the (Korea Institute for Advancement of Technology).
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 FOUNDATION www.gacr.cz	▪ Bilateral cooperation with National Research Foundation of Korea (NRF).

3. Joint Activities with Korea

Activities with the RoK in 2019-2020

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 2 programme (for details see above) ▪ On Korean side funding institutions is KIAT ▪ The call will be launched on 25 June 2019 ▪ Evaluation period will take place since 23 August till 30 December 2019
Korea-V4 Knowledge Sharing Program	▪ Knowledge sharing project between V4 countries and RoK ▪ On Korean side the responsible institution is Korea Development Institute (KDI) ▪ The Ministry of Industry and Trade is responsible for the 2019/2020 round cooperation ▪ Experts from different academic institutions cooperate on research studies ▪ The Czech Republic assumes Presidency of V4 countries since July 2019 and plays a role of leader of V4 countries in KSP programme in 2019/2020

4. Science, Technology and Innovation Cooperation Partners

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 m2 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.

Organisation Name	Detailed information
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).
Technical University of Ostrava – IT4Innovations National Supercomputing Center www.it4i.cz	IT4Innovation The National Supercomputing Center is conducting research to provide the latest technologies and services in high performance computing and embedded systems.
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.

Organisation Name	Detailed information
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.
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'ssuccessful, 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.

Organisation Name	Detailed information
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 the 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.

PART 7

DENMARK

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

DENMARK

DENMARK

Country Outline

- GDP: 298,277 mil. euros (Eurostat 2018)
- GDP per Capita: 51,500 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Clean Tech, Renewable Energy, ICT, Urban solutions, Clean air, Pharmaceutical, Biotech, Medtech, Food, Agriculture

Contact Information

- Organisation: Embassy of Denmark, Innovation Centre
- Name / Position: Mr. Eske Bo Rosenberg / Innovation & Research Counsellor
- Phone no. / e-mail: (+82) 10-2824-4187 / eskros@um.dk

In Denmark, research is the key motor for growth and societal development. Continuous international development is causing great challenges for the future, which is affecting Danish growth possibilities. Companies are experiencing challenges in regards to rethinking the way they run their businesses in accordance with new standards for sustainability and digitalization. The society is heavily affected by the challenges of implementing new technology across many different functions within society. In order to overcome these challenges, Denmark is ambitiously investing in research and is the world's 7th strongest research nation measured in gross domestic expenditure on R&D. Ambitions are founded in creating continued growth and development in the public as well as the private sector, while also contributing to some of the pressing challenges of the future. In 2018, the Innovation Union Scoreboard once again ranked Denmark among the top three European countries, highlighting human resources and the innovation friendly environment as strongholds.

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. The Danish Agency for Science and Higher Education (DAFSHE) is the operational driver of policy development, statistics and analysis and implementation of funds to research, innovation and technology development.

As of 2018, the Ministry has set out an ambitious strategy for future Danish research and innovation evolving around two main goals:

1) Danish research must be of the highest international quality by 2020 and onwards
2) Research should, to the greatest possible extent, create societal benefits.

These goals will be reached through a trailblazing research infrastructure and a clear prioritization aligned with the demand for research within specific fields. This prioritization,

the so-called 'Research2025', has been initiated by DAFSHE, Danish universities, research institutions and the business community. Four different pillars has been selected in accordance with megatrends and technological development: 1) new technological possibilities 2) green growth 3) people and society 4) better health.

2. National STI Programmes and Initiatives

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 the Innovation Union Scoreboard. The latter ranks Denmark as the second most innovative country in the European Union, fourth year in a row, with a particularly solid performance creating good framework conditions for innovation, HR and attractive research systems.

All universities in Denmark are public and due to a merger of most sector specific research institutions in 2007, the majority of public research today is conducted at universities.

Furthermore, the Danish research infrastructure includes nine independent 'Approved Technological Institutions (GTS)' that foster the link between research and business communities by spreading the most recent knowledge and state-of-the-art technology to the business community.

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. In addition to public funds, a number of private foundations provide research funding. On average, the private foundations together contribute with EUR 430 million yearly. The major public and private research funding organisations are as follows:

Public foundations	Private industrial foundations	Private foundations and associations
Innovation Fund Denmark (IFD)	The Novo Nordisk Foundation	Velux Foundation
The Danish Council for Independent Research	The Carlsberg Foundation	Villum Foundation
The Danish National Research Foundation	The Obel Family Foundation	Realdania
Universities' basic funding	The Danish Industry Foundation	Tryg Foundation
	Lundbeckfonden	The Danish Cancer Society
	Nordea-fonden	
	A.P. Møller Fonden	

International Cooperation Programmes/Initiatives

Programme Title	Contents
International Network Program https://ufm.dk/en/research-and-innovation/funding-programmes-for-research-and-innovation/calls/2019/international-network-programme-2019-call	▪ Outline: Support to networking and matchmaking initiatives seeking to identify potential for bilateral research collaboration. ▪ Research Fields: All ▪ Funding Organisation: Danish Agency for Science and Higher Education ▪ Participation Qualification: Scientists from Denmark and from one or more of the following countries: China, India, Israel, Japan, USA, Brazil and South Korea ▪ Funding Scale and Funding Scheme: Operating expenses for workshops and conferences, international travel and research stay for a shorter period up to 90 days in the selected countries, EUR 27000 excluding overhead expenses ▪ Project Duration: Up to one year ▪ Call Closing Date: May 18th 2019 at 12:00 noon (Decisions on funding will be announced no later than November 2019)
InnoBooster: https://innovationsfonden.dk/en/programmes/innobooster	▪ Outline: Knowledge-based innovation projects from SMEs, startups and companies established by researchers with commercially promising results ▪ Research Fields: Development a new product or service or on significantly improving a process within the company in an innovative way, significantly improving the company's competitiveness. ▪ Funding Organisation: Innovation Fund Denmark ▪ Participation Qualification: Company must be a start-up or fall within the European Commission's definition of an SME. Company must have a CVR. Specifically, they invest in projects from: 1) Small and medium sized companies with growth potential 2) New and promising start-ups, including researchers with commercially promising ideas and results. ▪ Funding Scale and Funding Scheme: Between EUR 7000 and EUR 700.000 ▪ Project Duration: Up to 2 years Call Opening/Closing Date: On-going submit possible
Grand Solutions: https://innovationsfonden.dk/en/programmes/grand-solutions	▪ Outline: Grand Solutions projects are characterised by their high risk profile and focus on ambitious results with high value creation. ▪ Research Fields: All ▪ Current possibilities: - Open Call - Digital technologies to boost competence levels - Circular Plastics Economy - Drones and Robotics - National Centre for Research on Digital Technologies ▪ Funding Organisation: Innovation Fund Denmark ▪ Participation Qualification: Any legal entity in or outside Denmark, directly involved in the project activities. ▪ Evaluation criteria: Quality of R&D, value creation, efficiency and executive ability ▪ Funding Scale and Funding Scheme: Between EUR 2.000.000 and EUR 13.000.000 ▪ Call Closing Date: No later than 12:00 CET on Tuesday, August 20, 2019. ▪ Project Duration: 2-5 years

Programme Title	Contents
The Industrial PhD Project: https://innovationsfonden.dk/en/programmes/industrial-researcher/industrial-phd	▪ 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 ▪ Research Fields: All ▪ Funding Organisation: Innovation Fund Denmark ▪ Participation Qualification: All nationalities, however, the Industrial PhD candidate and postdoc have to be employed in a Danish division of the company. ▪ Funding Scale and Funding Scheme: Subsidy for wage, supervising etc. ▪ Project Duration: 3 years ▪ Call Opening/Closing Date: April 30th, 2019 – 12:00 CET

3. Joint Activities with Korea

Activities with the RoK in 2019-2020

Programme Title	Contents
INNOVATION CAMPS & RESEARCH-BASED DELEGATIONS	
Innovation Sprint	▪ Major topic or agenda: The Innovation Sprint is involving young academics' perspectives, skills and talents in the future generation of Korean-Danish partnerships to reach the Sustainable Development Goals (SDGs). Three SDG-driven challenges, defined by Danish/Korean companies, are shared with student groups. For 2.5 days, the students will hack the challenges with the intention to bring forward new ideas, perspectives and approaches. ▪ Target Participants: Young academics from Denmark and Korea ▪ Date and Venue: May 20th-22nd, 2019 KAIST Seoul Campus, 85 Hoegiro, Dongdaemun-gu, Seoul 02455
NORDtalks	▪ Major topic or agenda: "Climate Change and Green Transition". NORDtalks is a collaborative project executed by the Embassies of Sweden, Norway, Finland and Denmark in Korea. The main objective is to strengthen the dialogue and cooperation between Nordic and Korean stakeholders and the public on topics of common interest. ▪ Target Participants: Researchers, government officials, the Korean Public, start-ups and SMEs ▪ Date and Venue: June 27th, 2019, Oil Tank Culture Park, Mapo-gu, Seoul
Welfare Camp: KORECA	▪ Major topic or agenda: Danish SMEs are invited to Busan City to tailor their business to the Asian market and to scout out potential business and R&D partners in Korea. ▪ Target Participants: Danish start-ups and SMEs ▪ Date and Venue: June 27th - 29th, 2019 Bexco, 55, APEC-ro, Haeundae-gu, Busan
UWC drone/UAV related seminar	▪ Major topic or agenda: Danish-Koeran Seminar in connection to 'Unmanned System World Congress in Seoul'. ▪ Target Participants: Researchers and companies in Korea and Denmark ▪ Date and Venue: July 10th-12th, 2019 COEX Hall D, Seoul
Smart City Summit	▪ Major topic or agenda: Bringing together smart city frontrunners from around the world to share high-tech IoT and ICT solutions and realize their smart city needs, the Smart Cities Summit 2019 will be the biggest smart cities event throughout Asia! This year the event will take place at KINTEX in Seoul, Korea. ▪ Target Participants: Danish companies ▪ Date and Venue: September 3rd-6th, 2019 Kintex, 217-60, Kintex-ro, Ilsanseo-gu, Goyang-si, Gyeonggi-do
SCALEit Korea	▪ Major topic or agenda: TBD ▪ Target Participants: TBD ▪ Date and Venue: TBD
SCALEit CPH	▪ Major topic or agenda: TBD ▪ Target Participants: TBD ▪ Date and Venue: TBD
Edtech Innovation Camp in China/Korea	▪ Major topic or agenda: Innovation Centre Denmark Seoul and Innovation Centre Denmark Shanghai are arranging a 5-day camp for selected Danish EdTech SMEs and start-ups with EdTech Denmark. The camp will allow you to introduce your technology to the Korean and Chinese business environment, and will open doors into high-level executives and technology specialists in the R&D environment. ▪ Target Participants: Danish EdTech SMEs and start-ups ▪ Date and Venue: September 2nd-6th, 2019 venue TBD
Fine dust and Clean air seminar	▪ Major topic or agenda: The Clean Air ambassador in Denmark will visit Seoul Metropolitan Government together with Danish companies who have competences on Indoor climate, air filtration and pollution monitoring. The seminar will have inspirational talk from both countries and provide idea of cooperative area for R&D and business. ▪ Target Participants: Governmental officials, Danish SMEs ▪ Date and Venue: TBD
Arctic Partnership Week	▪ Major topic or agenda: TBD ▪ Target Participants: TBD ▪ Date and Venue: TBD

4. Science, Technology and Innovation Cooperation Partners

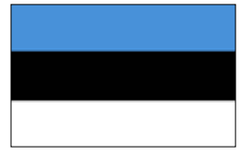
Organisation Name	Detailed information
Innovation Centre Denmark, Seoul icdk.um.dk	▪ Innovation Centre Denmark facilitates research and innovations collaboration between Danish and Korean universities, research institutions and tech-based companies.
Danish Agency for Science and Higher Education (DAFSHE) www.ufm.dk	▪ Government agency under Ministry of Higher Education & Science responsible for university, research & innovation
Innovation Fund Denmark www.Innovationsfonden.dk	▪ The main funding body in Denmark for research and innovation within: Applied research and experimental development ▪ Future Plans: Joint EUREKA call with KIAT
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 ▪ Roskilde University www.ruc.dk
Cluster Organizations and Innovation Networks in Denmark	Please find a list of the networks through this link: https://ufm.dk/en/research-and-innovation/cooperation-between-research-and-innovation/collaboration-between-research-and-industry/innovation-networks-denmark/list-of-danish-innovation-networks

PART 8

ESTONIA

ESTONIA

ESTONIA



Country Outline

- GDP: 25,657 mil. euros (Eurostat 2018)
- GDP per Capita: 19,500 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Information and communication technology, Health technologies and services, More effective use of resource

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

Estonian Research and Development and Innovation Strategy 2014-2020 "Knowledge-based Estonia" and Estonian Entrepreneurship Growth Strategy 2014–2020 are the basis of Estonian policies in field of 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 network of research institutions operates efficiently. The infrastructure is modern. 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 (RD) 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) RD makes the structure of the economy more knowledge-intensive. RDI investments selected and managed by the smart specialization method encourage the development of growth areas at heightened pace. The share of knowledge intensive entrepreneurship in the economy and the added value of exports will increase significantly. 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 RDI cooperation. Cross-border cooperation helps to solve the tasks that Estonia, and the world as a whole, is facing. 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. The general goal of the strategy is to facilitate the achievement of umbrella objectives within the competitiveness plan "Estonia 2020" to enhance productivity (to increase productivity per employed person to 80% of the EU average) and employment (to raise the employment rate in the age group 20-64 to 76%). 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.

The strategy focuses on two main issues:
- Activity areas with major growth potential (growth-areas)
- Groups of enterprises with major potential

The strategy builds on the following principles:
- Strategic customer management
- Enterprise development
- Less direct grants and more financial instruments (loans, guarantees, funds, venture capital) including the development of capital markets

2. National STI Programmes and Initiatives

Programme Title	Contents
Mobilitas Pluss (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: Proposals are expected from Estonian R&D 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	▪ If you are going to work as a researcher at an Estonian R&D institution, you can apply for personal research grants (start-up grants or team grants). Please find more information about the grants from http://researchinestonia.eu/funding/ ▪ In case you are looking for a practical information on professional and daily life, as well as information on job and funding opportunities visit www.euraxess.ee. EURAXESS Network gives information and assistance to researchers (PhD students, postdoctoral scholars, researchers, and other academic staff) wishing to come to Estonia or for those looking for jobs in research abroad.
Study opportunities and scholarships for international students in Estonia	▪ In 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 for international students and about study programmes in English from http://www.studyinestonia.ee/ ▪ Most of scholarships provided by Estonian universities and government are for Master and PhD students, however there are some support schemes available for Bachelor students as well.

Programme Title	Contents
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
Invest in Estonia programme	▪ One-stop investment consultancy services, free of charge, which are always tailored to meet potential and existing investors' precise needs. ▪ Services include: Detailed business information, site visits to Estonia and assistance in setting up a business. ▪ Additional information: https://investinestonia.com/en/
E-residency programme	▪ Estonia is the first country to offer e-Resiedncy, a government issued digital identity that empowers entrepreneurs around the world to set up and run a location-independent business. ▪ Additional information: https://e-resident.gov.ee/
Start-Up Estonia programme	▪ The programme aims at strengthening the Estonian start-up ecosystem; carrying out programs for start-ups; educating the local investors; eliminating regulative barriers. Among other activities the programme invests in accelerators. ▪ Target group: Start-ups, potential start-ups and investors. ▪ Additional information: http://www.startupestonia.ee/
Work in Estonia programme	▪ Target group: Companies registered in Estonia looking for foreign highly qualified workforce. ▪ Additional information: https://www.workinestonia.com/
Innovation and development vouchers	▪ Innovation voucher (eur 4,000) enables a small and medium-sized entrepreneur (SME) who is cooperating with a higher education institute, test laboratory, or intellectual property experts, to develop innovative solutions for development obstacles, carry out tests with new materials, gather knowledge on technologies, conduct studies in intellectual property databases etc. The next step for an SME interested in further development, is development voucher which is a larger grant (eur 20,000) ▪ Target group: SMEs ▪ Possibility for foreign R&D service providers to provide services to Estonian SMEs via voucher scheme, but these service providers have to be validated. ▪ Additional information: http://www.eas.ee/service/innovation-voucher/?lang=en http://www.eas.ee/service/development-voucher/?lang=en
E-Estonia Showroom	▪ The success story of e-Estonia ▪ Additional information: https://e-estonia.com/e-estonia-showroom/

3. Joint Activities with Korea

Not Applicable

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
Estonian Research Council http://www.etag.ee	▪ Organisation Type: Research funding agency ▪ 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. ▪ Activities: National support system for enterprises by providing financial assistance, counselling, cooperation opportunities and training. ▪ Future Plans/Strategy: Long-term goal is to help Estonia become one of the most competitive countries in the world. ▪ Contact information: Phone: +372 6 279 700, E-mail: eas@eas.ee
Kredex http://www.kredex.ee	▪ Organisation Type: Funding agency ▪ Activities: Financing institution with the main aim of helping Estonian enterprises develop quicker and expand to foreign markets, offering loans, venture capital, credit insurance and guarantees with state guarantee.
Estonian Private Equity and Venture Capital Association (ESTVCA) http://www.estvca.ee	▪ Organisation Type: Representative body of Private Equity & Venture Capital Industry in Estonia ▪ Activitie: Development of sustainable and attractive ecosystem for the benefit of entrepreneurs, fund managers, institutional investors and increase the output of innovative and high-growth potential companies in Estonian economy.
Estonian Business Angels Network (ESTBAN) http://www.estban.ee	▪ Organisation Type: Representative body of Estonian Business Angels ▪ Activities: Seeking investment opportunities in Estonia and its neighbouring regions with an aim to grow the quantity and quality of local seed stage investments.

Organisation Name	Detailed information
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+ mobility scheme. • **Facuwlty and research visits, guest lecturers and teaching staff** from Korea. • **Korean language tuition. Courses on Korean culture and society** have been actively taught at the University of Tartu College of Foreign Languages and Cultures since 2014, the visiting lectureship programme initially supported by the Academy of Korean Studies and since 2016 by the Korea Foundation. 3) Centre of Asian of the University of Tartu. Centre was established in 2016 as a consortium, which combines and coordinates activities related with Asian societies and economies. One of the main efforts will be to launch Master Program on Asian studies in Tartu University starting 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. • Master Program on Asian studies in Tartu University The curriculum will increase the capability and competitiveness of UT's curricula, 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. Taivo Raud** Grant Office of the University of Tartu Lossi St. 3, 51003 TARTU / Phone: (+372) 737 6193 **Ms. Kristi Kerge** Head of International Cooperation Rectors Strategy Officeof the University of Tartu, Ülikooli 18, 50090 TARTU / Phone: (+372) 737 6123 **Ms. Elo Süld** Head of Asian Centre of the University of Tartu Ülikooli 18, 50090 TARTU /Phone: (+372) 737 5300
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)" ▪ 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. "The King Sejong Institute Headquarters" a representative organization that manages the establishing and operating of King Sejong Institute supported by the Ministry of Culture - Existing cooperation agreements with 8 universities in Korea. ▪ Future Plans: Student/Researcher exchange, cooperation projects (research, industry relations) ▪ 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

ESTONIA

PART 9

FINLAND

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

FINLAND

FINLAND

Country Outline

- GDP: 232,096 mil. euros (Eurostat 2018)
- GDP per Capita: 42,100 euros (Eurostat 2018)
- Areas of marked S&T specialisations: ICT, Digital Health, Smart Cities, Bioeconomy, Mobile Technologies, Cleantech, Renewable Energy, Forest and Environmental Sciences, Sustainable and Urban Development, and Sustainability

Contact Information

- Organisation: Embassy of Finland in Seoul
- Name / Position: Ms. Jaana Montonen / Head of Economic and Trade Affairs
- Phone no. / e-mail: +82 2 370 103 03 / jaana.montonen@formin.fi

Finland is a Northern European country which invests heavily in research and innovation (about 2.7% of GDP). Finland 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, digital health care and bioeconomy. 16% of the country is covered by forests providing resources in a sustainable way 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.

1. Policies and Strategies in Science, Technology and Innovation

Central government R&D funding and its share in government expenditure in 2018 and 2019

	EUR million	EUR million
	2018	2019
Total R&D funding	1 883,2	1 991,1
Total Central government expenditure	55 675,0	55 347,0
R&D funding share of Central government expenditure (excluding debt servicing)	3,5	3,7

Finland invests in knowledge-based competence

The Government Programme stresses the role of research as the foundation of knowledge and know-how. This promotes, in return, sustainable economic growth and immaterial as well as material welfare. Research and development expenditure represent about 2.7% of the GDP and in 2019 the share of public research funding is estimated to be around 0.83%. (https://www.stat.fi/til/tkker/2019/tkker_2019_2019-02-21_kat_001_en.html)

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 (13 in total) focus on scientific research and education supporting it. Universities of applied sciences (23 in total), 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 Business Finland.

Finland offers a competitive business environment

The World Economic Forum's Global Competitiveness Report (2018) has ranked Finland as the eleventh most competitive nation in the world and tenth under the innovation capability pillar. Finland is an easy operating environment for businesses, with minimal bureaucracy and stable and competitive economy. In the Innovation Union Scoreboard 2018 Sweden, Denmark, Luxembourg, the United Kingdom, the Netherlands and Finland are the top innovation leaders in the European Union.

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 Ministry of Economic Affairs and Employment 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) Business Finland, Inc. Innovation Finland.

- More information about the ministry's innovation policy: http://tem.fi/en/innovation-policy.

In the beginning of 2018, a new organization called Business Finland emerged from former Finpro and Tekes. Finpro offered services for internationalization of businesses, investments and tourism promotion, and Tekes offered funding for innovation activities. Now the both services are available from one organization. Business Finland's budget for research and innovation funding is 451 million EUR in 2019.

Business Finland provides funding for projects by research organizations, with the target of benefitting companies and also for companies and researchers to work together as equal partners. Funding services in new Business Finland include:

- Co-creation
- Co-innovation
- New Business from research ideas

Co-creation is for research organizations that aim to work closely with companies on a co-innovation joint project. This is meant especially for the development of new radical innovations and for the creation of new cooperation. This funding is targeted at research organizations and companies that are developing a research idea together. The goal is a joint co-innovation, joint project of companies and research. Funding will ensure demand for the research goal and solution model, develop the idea of interest for companies, and build a cooperation network for a possible co-innovation joint project.

Co-innovation funding enables a joint action that may involve several research organizations or groups and several companies. The joint action must include at least one research organization and three companies, of which at least two have applied for funding for their R&D projects from Business Finland. Research organizations and companies will jointly develop new knowledge and innovations for business needs. Funding is expected to accelerate the utilization of research data. The results of a public research project must be widely exploited. The research topics are based on research ideas and needs that are developed jointly by research organizations and companies.

New business from research ideas is aimed at research groups and researchers in research organizations who want to create new business with their research and commercialize their ideas. The researchers also get to develop their own commercialization expertise.

Also, under the guidance of Ministry of Employment and Economy, 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 STI Programmes and Initiatives

International Cooperation Programmes/Initiatives

Programme Title	Contents
Business Finland & Innovation Finland www.businessfinland.fi/en	Several programs and funding opportunities. Calls are ongoing throughout the year. Business Finland provides funding for projects by research organizations, with the target of benefitting companies and companies and researchers to work together as equal partners.
EUREKA www.businessfinland.fi/en	EUREKA is a pan-European network for market-oriented and industry-related R&D. It promotes the competitiveness of European companies by creating links and networks of innovation. Business Finland is the coordinator of EUREKA activities in Finland. Finland was one of the founding members of EUREKA in 1985.
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 organizations to organize 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

Activities with the RoK in 2019-2020

Programme Title	Contents
NORDTalk events	▪ Date: January, April, June 2019 ▪ Outline: Three NORDTalk events in collaboration with the embassies of Denmark, Finland, Norway and Sweden in Seoul and the Seoul Metropolitan Government. ▪ Topics: Education and Employment in the 4th Industrial Revolution; Gender Equality and Quality of Life; Climate Change and Environment
Primo 5G	▪ Date: 2018-2020 ▪ Outline: Joint Call between Yonsei University and Aalto University ▪ Topics: Demonstrate and end-to-end 5G system providing immersive video services for moving objects. Cross-continental testbeds that integrate radio access and core networks.
Study in Europe Fair	▪ Booth in the study fair to present Finnish education possibilities. ▪ Universities from Finland participating.

4. Science, Technology and Innovation Cooperation Partners

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.

- More information on research Institutes: http://minedu.fi/tiedelaitokset-ja-tutkimusorganisaatiot.

Universities and Universities of Applied Sciences

More information on all 13 Finnish universities here: http://minedu.fi/yliopistot and links to all 23 AUS here: http://minedu.fi/ammattikorkeakoulut.

Key Research Organisations and Companies

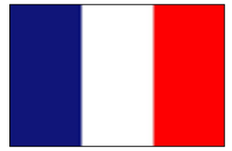
Organisation Name	Detailed information
VTT Technical Research Centre of Finland Ltd. www.vtt.fi	▪ Organisation type: Non-profit and state-owned limited company ▪ Major Research Area/Product: Multi-technological R&D&I organization ▪ Major Activities with Korea: Collaboration with research institutes, universities and industry ▪ Future Plans: Strenghten the cooperation ▪ Contact Information: Mr. Antti Knuuti / antti.knuuti@vtt.fi / +358406879865
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). EMBA program together with Seoul School of Integrated Sciences & Technologies. ▪ 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

FRANCE

FRANCE



Country Outline

- GDP: 2,353,090 mil. euros (Eurostat 2018)
- GDP per Capita: 35,000 euros (Eurostat 2018)
- Areas of marked S&T specialisations:

Contact Information

- Organisation: Embassy of France
- Name / Position: Mr Denis FOURMEAU / Scientific and Academic Cooperation Attaché
- Phone no. / e-mail: +82 2 317 8530 / denis.fourmeau@institutfrancais-seoul.com

France is a major R&D country, well connected in Europe and internationally, equipped with large world-class research infrastructures. In 2016, its gross domestic spending on R&D (GERD) amounted to 2.22% of the country's PNB. With EUR 49.5 billion of global R&D expenses in 2016, France is the second major player in the EU, just behind Germany. The research effort came from the private sector, which carried out 65% of all R&D conducted in France in 2016 (EUR 32.2 billion), and the public sector (35%, EUR 17.4 billion). 431,056 people in 2016 (full time equivalent) were involved in R&D activities, 59.2% of which in the private sector.

In 2016, SMEs (including micro-firms) contributed to one-sixth of GERD. Large enterprises, which accounted for more than half of GERD, focused three quarters of their funding on high and medium-high technologies. EUR 23.1 billion (71.9%) were dedicated to industry, while the remaining EUR 7.5 billion (23.3%) were dedicated to services and EUR 1.6 billion (4.9%) to energy and construction. The automotive industry (12.8%), aeronautics and space (10.8%), pharmaceutical industry (9.4%) and chemical industry (5.6%) made up almost 40% of those expenses.

In terms of scientific publications, France was ranked 7th worldwide in 2017 (3.27%). In terms of patent filing, according to the European system, France ranked 4th in 2018 (6% of patent issued) with a significant role in transportation, energy, medical technology and computer technology.

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. Its R&D expenditure has increased yearly by 1.6% for the last 15 years. As of 2017, 1.5% of the population in France was involved in R&D activities. 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 reviewed in 2020. Under this plan, France aims to allocate 3% of its PNB to R&D before 2023, which amounts to a budget increase of 1 billion euros every year.

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 identified 10 societal challenges and outlined 5 action programmes, which are the priority for the French research bodies and will define the strategic plan of public funding agencies such as French National Research Agency. Those 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. France ranks 5th in number of publications on earth science and 4th for atmospheric science, which means it is an area in which France already has some expertise.
- **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. France ranks 5th in basic biological research and can rely on a renowned academic system to meet this challenge.
- **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. France plans to rely on its National Institute of Agricultural Research (INRA) and on public-private partnerships in this area.
- **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. This is an area of research that is relatively new in France but can rely on well-established economical actors, particularly when it comes to the mobility and water management technologies.
- **Information and communication society**: focusing on the development of 5G network infrastructure, IoT, Big Data and man-machine collaboration. In this area, researchers can rely on a dense and reliable digital infrastructure as well as on an industry base of high technicality.
- **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. France is the first space power in Europe and the second in the world in terms of public effort by inhabitants.
- **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.

In addition to the FNSE, France aims to promote the development of Artificial Intelligence (AI) technologies, as stated in the Villani Report that was released in March 2018. The objective is to allow for better circulation of data in order for the public authorities, public research actors and smaller economic actors to benefit from them. France aims to create "data commons" and a single-window for AI technologies. The Villani report highlights four priority areas: health, transport, environment and defence. Presented in November 2018, the French AI research strategy has two objectives: establish France as a global expert in AI and make the country a European leader in AI research. Four AI research institutes have been launched in Grenoble, Nice, Paris and Toulouse.

On March 2019, France presented the Nano Plan 2022, which is a programme of work and investment in R&D and pre-industrialisation aimed at controlling the production of new generations of electronic components to meet the need of the automotive, 5G communications, embedded AI, connected objects, aerospace and security sectors.

However, the French research policy can't be based solely on those strategic papers. The government has embarked on a Big Investment Plan worth EUR 57 billion, which will respond to four major challenges facing France: carbon neutrality, access to employment, competitiveness through innovation and the Digital State.

2. National STI Programmes and Initiatives

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.

International Cooperation Programmes/Initiatives

Programme Title	Contents
PHC STAR https://www.campusfrance.org/fr/star	▪ Cooperation Type: Researchers' mobility ▪ Funding Organisations: Ministry for Europe and Foreign Affairs ▪ Call Opening/Closing Date: 2019/01/07 to 2019/02/13 ▪ Participation Qualification: Research institutes / universities ▪ Project Duration: 2 years ▪ Funding Scale and Funding Scheme: from EUR 5,000 to 15,000 / year ▪ Matching fund from Korean government: Ministry of Science and ICT which provides funds for Korean researchers through the National Research Foundation ▪ Research Fields: New materials and nanotechnologies, life and health sciences, biotechnologies, basic sciences, information and communication technologies ICT, aeronautics and space, environment sciences, societal challenges
Joint Research Program between CNRS and NRF 2020 – 2021 https://www.cnrs.fr/derci/spip.php?article1900	▪ Cooperation Type: Researchers' mobility ▪ Funding Organisation: CNRS ▪ Call Opening/Closing Date: 2019/04/04 to 2019/06/14 ▪ Participation Qualification: Researchers working in a CNRS unit ▪ Project Duration: 2 years ▪ Funding Scale and Funding Scheme: EUR 7,000 / year ▪ Matching fund from Korean government: NRF which provides funds for Korean Researchers ▪ Research Fields: All
French-Korean Joint Call on Artificial Intelligence http://www.institutfrancais-seoul.com/fonds-intelligence-artificielle	▪ Cooperation Type: Research cooperation ▪ Funding Organisation: Ministry for Europe and Foreign Affairs ▪ Call Opening/Closing Date: 2019/04/08 – 2019/05/ ▪ Participation Qualification: Research institutes / universities ▪ Project Duration: 1 year ▪ Funding Scale and Funding Scheme: EUR 50,000 / project ▪ Matching fund from Korean government: Ministry of Science and ICT which provides funds for Korean researchers through the National Research Foundation ▪ Research Fields: Artificial intelligence including proposals regarding AI's ethics, in order to address technological, economic and social challenges

3. Joint Activities with Korea

Activities with the RoK in 2019-2020

Programme Title	Contents
Infinités Plurielles	▪ Date: 2019/03/08 – 2019/03/24 ▪ Venue: National Assembly of Korea ▪ Major Topic: Inspire more women to pursue scientific careers and take action for a more equal workplace ▪ Target Participants: MPs, pupils, young women
Institut Pasteur Korea 15th Anniversary Ceremony	▪ Major topic: AI-driven phenomic-based drug discovery ▪ Date and Venue: 2019/04/24, Institut Pasteur Korea ▪ Target Participants : Researchers
8th joint international workshop of FKPPL and FJPPL/TYL	▪ Major topic: On-going collaborative research projects and future ones (high energy physics experiments, new particles and new fundamental properties of the universe, R&D developments for the next-generation of particle detectors and interdisciplinary science) ▪ Date and Venue: 2019/05/08 to 2019/05/10, Jeju ▪ Target Participants: Researchers from France-Korea Particle Physics Laboratory (FKPPL) and France-Japan Particle Physics Laboratory / Toshiko Yuasa Laboratory (FJPPL/TYL)
Third France-Korea Space Forum	▪ Major topic: Expanding bilateral cooperation and development strategy in the space sector ▪ Date and Venue: 2019/05/17, Seoul Conrad Hotel ▪ Target Participants: CEOs and professionals of the space industry, researchers
France-Korea Meeting on Higher education, Research and Education	▪ Major topic: Expanding bilateral cooperation ▪ Date and Venue: 2019/07/09 to 2019/07/10, Paris Science Museum ▪ Target Participants: Representatives of higher education institutions and research centers

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
CNRS www.cnrs.fr	▪ Public organization under the responsibility of the French Ministry of Higher Education, Research and Innovation ▪ All fields of science, technology and society
CEA www.cea.fr	▪ Public research entity focusing on applied research ▪ Alternative Energies, Atomic Energy, New technologies
CNES https://cnes.fr	▪ Public organization ▪ Space technology and its applications
IFREMER www.ifremer.fr	▪ Government-funded technological research organization ▪ Oceans, Environment and Fisheries
IFPEN www.ifpenergies nouvelles.fr	▪ Public research and training organization ▪ Earth science, fuel cell engineering; chemistry, catalysis, applied mechanics, mechatronics, economy
INRA www.inra.fr	▪ Public research organization ▪ Food, agriculture, environment
INRIA www.inria.fr	▪ Public research organization ▪ Respond to multidisciplinary and practical challenges of the digital transition (applied mathematics, computing, simulation, algorithms, software, networks, cognition and interaction, digital planet)
INSERM www.inserm.fr	▪ Public research organization under the joint authority of the French Ministry of Health and French Ministry of higher Education, Research and Innovation ▪ Human health
Institut Pasteur www.pasteur.fr	▪ Private and non-profit foundation ▪ Biomedical research
IRSTEA www.irstea.fr	▪ Public research organization ▪ Research in environment and agriculture: water, ecotechnologies, land management

French-Korean laboratories:

- One **International Joint Research Unit**:
  - UMI 2B-FUEL (Building Blocks for FUture Electronics Laboratory) devoted to the development of functionalized two-dimensional (2D) materials-based multilayer heterostructures and molecularly-thin devices for future printed, organic, and large-area flexible electronics towards autonomous and integrated smart systems.
- One **international associated laboratory**:
  - France-Korea Particle Physics Laboratory (FKPPL)
- Two **international research networks**:
  - Nano and Micro Systems (NAMIS)
  - Reaction-Diffusion Network in Mathematics and Biomedicine (ReaDiNet)
- **Institut Pasteur Korea** (www.ip-korea.org)

PART 11

GERMANY

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

GERMANY

GERMANY

Country Outline

- GDP: 3,344,370 mil. euros (Eurostat 2018)
- GDP per Capita: 40,300 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Automotive & Traffic Technologies, Aviation Technologies, Biotechnology, Energy Technologies, Environmental Technology, Health Research, Humanities, Information & Communication Technologies, Maritime Technologies, Materials Technology, Medical Technologies, Natural Sciences, Nanotechnology, Optical Technologies, Photonics, Plants, Production Technologies, Security Research, Services, Social Sciences, Space Technology

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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 2015 Germany invested approximately 3% of GDP in R&D. 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. Basic research plays as important a role as applications-oriented research.

Germany offers various research locations: universities, non-university research institutes, companies and institutions run by public authorities. All in all there are over 1000 public or publicly funded institutions of science, research and development. 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 companies and research institutes is a traditional strength of the German research system.

** For detailed information have a look at: www.research-in-germany.org.*

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, 2014 and 2018 as a comprehensive, interdepartmental innovation strategy.

"The High-Tech-Strategy 2025" 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:

Healthcare, Sustainability, Climate Protection and Energy, Mobility, City and Country, Security Economy and Work 4.0

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 STI Programmes and Initiatives

The German research landscape is diverse and multifaceted. Germany is the home of about 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.

International Cooperation Programmes/Initiatives

Programme Title	Contents
Max Planck Society (MPG) www.mpg.de/en	▪ Currently, the MPG operates 84 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 Centers: 23 Max Planck Centers worldwide. One is located in Korea: Max Planck-POSTECH/Hsinchu Centre for Complex Phase Materials. - MPG Partner Groups. More than 70 MPG Partner Groups worldwide. Example: The MPI for molecular biomedicine cooperates with Partner Groups at Ulsan National Institute of Science and Technology (UNIST) and Konkuk University in Seoul. ▪ German Max Planck Institutes cooperate in at least 52 projects with Korean Partners. ▪ Funding Programmes: International Visiting Researchers at Max Planck Institutes, Max Planck Research Group Leader at a Max Planck Institute, Individual Doctoral Projects at Max Planck Institutes, International Max Planck Research Schools, Max Planck grants for Advanced Postdoctoral Training.

Programme Title	Contents
Fraunhofer Society (FhG) www.fraunhofer.de/en.html www.fraunhofer.kr	▪ Fraunhofer is Europe's largest application-oriented research organisation with 72 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. ▪ The Fraunhofer Institute for Chemical Technology (Fraunhofer ICT) and the Korean technical university of Ulsan UNIST operate the Fraunhofer Project Center for Composites Research FPC@UNIST. ▪ 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 organization. ▪ The 19 Helmholtz Centres have numerous unique research infrastructures at their disposal. ▪ Interdisciplinary research which contributes to solving the great challenges facing society, science and industry. ▪ Almost all Helmholtz centers are cooperating with Korean partners, for example UNIST-Jülich Cooperation in Energy Research. ▪ 6 research fields: Energy; Earth and Environment; Health; Key Technologies; Matter; Aeronautics, Space and Transport. ▪ 4 International Offices: Brussels, Israel, Moscow, Beijing. ▪ 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	▪ 93 non-university research institutes are part of the Leibniz 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; environmental sciences. ▪ In 2015, Leibniz institutions were involved in more than 4,600 international cooperation in 137 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 and Leibniz ScienceCampi, Individual Doctoral Projects at Leibniz Institutes
Alexander von Humboldt Foundation (AvH) www.humboldt-foundation.de/en	▪ 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 Humboldt FoundationAvH is outstanding. Over 200 Korean Alumni are members of the Humboldt Club Korea and the Humboldt Society in Korea. Ambassador Scientist in Korea: Prof. Tsche Kwang-Jun, Kyung Hee 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, Capes-Humboldt Research Fellowships, Humboldt Research 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, Bi-nationally Supervised Doctoral Degrees
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. Support for Early Career researchers within Collaborative Research Centers.

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.

Activities with the RoK in 2019-2020

Programme Title	Contents
Bilateral 2+2-Project Call Robotics	▪ Korean-German bilateral call on 2+2-Projects ▪ Pilot call: April 2018 ▪ Topic: Robotics – Nursing robot, elderly care robot, robot therapist, social robot with artificial emotion and intelligence, collaborative robot including disaster robots ▪ R&D-Projects with at least one German and Korean partner from a research institution + one German SME + one Korean industrial partner ▪ Funding: 450.000 EUR per project for 36 months from German side. ▪ German Federal Ministry for Education and Research (BMBF) ▪ Korean Ministry of Trade, Industry and Energy (MOTIE) ▪ Supporting agencies: The International Bureau of the DLR (German side), Korean Institute for the Advancement of Technology (KIAT) (Korean side) ▪ www.internationales-buero.de, www.kiat.or.kr
Bilateral 2+2-Project Call	▪ Korean-German bilateral first Call on 2+2-Projekts ▪ Pilot call: December 2016 ▪ R&D-Projects with at least one German and Korean partner from a research institution + one German SME + one Korean industrial partner ▪ 3 Projects will be funded for 3 years ▪ German Federal Ministry for Education and Research (BMBF) Korean Ministry of Science and ICT (MSIT) ▪ Supporting agencies: The International Bureau of the DLR (German side), National Research Foundation (Korean side) ▪ www.internationales-buero.de, www.nrf.re.kr
University Cooperation Programme	▪ German continuation of a former bilateral call for joint research structures in the Asian Pacific Research Area (APRA) ▪ Unilateral call: December 2016 ▪ Focus research areas: Medical research incl. medical technology Sustainable cities Renewable energy and energy efficiency Environmental technologies and water technologies ▪ Budget: 100.000-150.000 EUR per year and project for 5 years ▪ German Federal Ministry for Education and Research (BMBF) ▪ Supporting agency: The International Bureau of the DLR (German side) ▪ www.internationales-buero.de
Bilateral programme for joint R&D projects for SMEs	▪ First German-Korean call for joint R&D projects for SMEs in July 2014 ▪ 5th call: March 2018 ▪ 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 Trade, Industry and Energy (MOTIE) ▪ Agencies: Aif Project GmbH, Korean Institute for the Advancement of Technology (KIAT) ▪ www.zim-bmwi.de, www.kiat.or.kr

List of Planned Programmes or Activities with RoK in 2019

Programme Title	Contents
Science Circle	▪ 4 times per year ▪ Science talks with German and Korean speakers

PART 12 GREECE

GREECE

GREECE

Country Outline

- GDP: 184,714 mil. euros (Eurostat 2018)
- GDP per Capita: 17,200 euros (Eurostat 2018)
- Areas of Marked S&T Specialisations: Agrofood, Life Sciences & Health – Medicine, Information and Communication Technologies, Energy, Environment and Sustainable Development, Transport and logistics, Materials - Construction, Culture - Tourism - Cultural & Creative Industries.

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1. Policies and Strategies in Science, Technology and Innovation

The 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, a National Road Map for research infrastructures is at stake for the same time frame.

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 and to 1,13% in 2017 (provisional), while the relevant EU-28 indicator increased during the same period from 1.85% to 2.07% (2017). This increase is mainly due to private sector's impressive investments on R&D from 488,7 in 2013 to 990,8 in 2017.

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 expenditure in R&D compared to the EU average, 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 risk 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 1.25% 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.

GREECE

2. National STI Programmes and Initiatives

Programme Title	Contents
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 their budgets were relatively small and participants were mainly academics, lately calls of significant larger budget (around 5 M€) have been launched with the participation of enterprises (cases of China, Israel, Greece). The following specific agreements have been launched since 2015: • Bilateral Cooperation with Germany (2016) • Bilateral Cooperation with Russia (2017), next by the end of 2019 • Bilateral Cooperation with Israel (2017 & 2019) • Bilateral Cooperation with China (2018) **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. The beneficiaries of agreements are enterprises, universities, technological institutes, research and technological organizations and public organizations. **Target population**: Enterprises, Universities, PRIs **Budget / Cost estimate**: EUR 50 millions
EUROPEAN R&D COOPERATION (P2P cooperation)	**About** The Government supports the Greek participants to the Joint Initiative ERA-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 25 million Euro through the new operational programme 2014-2020 The currently supported ERANETS by the Greek side are: 1. ACT ERANET COFUND 2. E-RARE 3 3. EJPRARE-D 4. TRANSCAN 5. ERANET-RUS-PLUS 6. EURONANOMED 7. CHISTERA 8. QUANTERA 9. FLAGERA 10. COFUND ON BLUE-BIOECONOMY 11. SOLARERANETCOFUND 12. CSP 13. ERAMIN 14. ICT-Agri 15. HERA JRP PS 16. PERMED 17. NEURON 18. AQUATIC POLLUTANTS 19. PRIMA In addition Greece participates in JU-EXSEL without national funding. Furthermore Greek participation in others JTIs and JPIs is under consideration.

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. Science, Technology and Innovation Cooperation Partners

In order to promote cooperation between Korea and Greece in various areas including S&T, a draft-Agreement was proposed by Greece to the Korean colleagues.

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

HUNGARY

HUNGARY

Country Outline

- GDP: 131,935 mil. euros (Eurostat 2018)
- GDP per Capita: 13,500 euros (Eurostat 2018)
- Areas of marked S&T specialisations: health research, automotive industry, biotechnology, advanced materials, laser science, ICT, energy technologies, brain research, material sciences, natural sciences

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Hungary was the first country from the Eastern Bloc that established diplomatic relations with the Republic of Korea, and shortly afterwards the two governments signed a bilateral Science and Technology cooperation agreement.

In 2014 the National Assembly adopted the Act LXXVI of 2014 on scientific research, development and innovation (RDI Act) that created the National Research, Development and Innovation Office (NRDI Office). The NRDI Office develops Hungary's national strategy for scientific research, development and innovation and manages the National Research, Development and Innovation Fund as the research funding agency of Hungary.

The main focuses of science and technology in Hungary are digitalization, ICT, industry 4.0, electric and autonomous vehicles, smart cities, start-ups, laser research, water research, biotechnology, life sciences and agricultural sciences.

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 STI Programmes and Initiatives

International Cooperation Programmes/Initiatives

Programme Title	Contents
ELI-ALPS https://www.eli-alps.hu/	Extreme Light Infrastructure (ELI) project is an integral part of the European plan to build the next generation of large research facilities identified and selected by the European Strategy Forum on Research Infrastructures. The main objective of ELI Attosecond Light Pulse Source (ELI-ALPS) is the establishment of a unique attosecond facility which provides ultrashort light pulses between THz (1012 Hz) and X-ray (1018-1019 Hz) frequency range with high repetition rate for developers and end-users.
Stipendium Hungaricum scholarship http://studyinhungary.hu/study-in-hungary/menu/stipendium-hungaricum-scholarship-programme	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.
National Smart Specialisation Strategy (S3) https://nkfih.gov.hu/english-2017/strategic-documents/national-smart	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).

3. Joint Activities with Korea

Activities with the RoK in 2019-2020

Programme Title	Contents
KSP (Knowledge Sharing Program) 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. http://www.ksp.go.kr/english/pageView/info-eng?nationCd=HU

KSP (Knowledge Sharing Program) 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 program aims to make the economies of the participating countries more innovative by exchanging scientific and technological experience. http://www.ksp.go.kr/english/pageView/info-eng?nationCd=G2
Call for research and development projects in Hungarian – Korean cooperation	Joint call of the National Research, Development and Innovation Office and the National Research Foundation of Korea aiming to support research development projects in Hungarian–Korean cooperation which result in new or further developed, market-oriented products and services. https://nkfih.gov.hu/english-2017/nrdi-fund/hungarian-korean-cooperation-2018/2018-2117-tet-kr
Joint research Lab Program	Based on a MoU signed by the Hungarian Academy of Sciences (MTA) and the National Research Council of Science and Technology (NST). The purpose is to expand scientific and technological research cooperation between MTA and NST in all fields of sciences and encourage direct contacts and cooperation between research teams and individual scientific researchers.

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
National Research, Development and Innovation Office (NKFIH) https://nkfih.gov.hu/about-the-office	▪ Organisation type: Research funding organisation ▪ Major research product: It funds research projects in all branches. ▪ Current cooperation status with Korea: joint call with NRF ▪ Contact point: nkfihivatal@nkfih.gov.hu
Hungarian Academy of Sciences (MTA) https://mta.hu/english	▪ Organisation type: Academy of sciences ▪ Major research areas: research in all branches. ▪ Current cooperation status with Korea: MoU with NST ▪ Contact point: info@titkarsag.mta.hu
ELI-ALPS Research Institute https://www.eli-alps.hu	▪ Organisation type: Laser research facility ▪ Major research: Valence and core electron science, 4D attosecond imagining, THz radiation based research, biological and medical application, nanomaterials ▪ Contact point: info@eli-alps.hu
Institute for Computer Science and Control (SZTAKI) https://www.sztaki.hu/en	▪ Organisation type: Research Organisation ▪ Major research areas: Computer science, engineering, information technology, intelligent systems, process control, vehicles and transportation systems, production informatics and logistics, energy and sustainable development, security and surveillance, networks, networking systems and services, distributed computing ▪ Contact point: contact@sztaki.mta.hu
Institute of Experimental Medicine (KOKI) http://koki.hu/english	▪ Organisation type: Research Organisation ▪ Major research areas: Molecular pharmacology, neuropharmacology, neurobiology, neuroendocrinology, molecular cell metabolism, cerebral cortex research, thalamus research, neurophysiology ▪ Contact point: info@koki.mta.hu
Wigner Research Centre for Physics https://wigner.mta.hu/en	▪ Organisation type: Research Organisation ▪ Major research areas: Particle and nuclear physics, solid state physics, optics ▪ Contact point: titkarsag@wigner.mta.hu
Research Centre for Natural Sciences (MTA TTK) http://www.ttk.mta.hu/en	▪ Organisation type: Research Organisation ▪ Major research areas: Materials and environmental chemistry, enzymology, cognitive neuroscience and psychology, organic chemistry ▪ Current cooperation status with Korea: Joint research Lab Program ▪ Contact point: ttk@ttk.mta.hu
Centre for Energy Research (MTA EK) https://www.energia.mta.hu/en	▪ Organisation type: Research Organisation ▪ Major research areas: Atomic energy research, energy security and environmental safety, materials science ▪ Current cooperation status with Korea: Joint research Lab Program ▪ Contact point: info@energia.mta.hu
Universities in Hungary	▪ Semmelweis University http://semmelweis.hu/english/ ▪ Budapest University of Technology and Economics https://www.bme.hu/?language=en ▪ Eötvös Loránd University https://www.elte.hu/en/ ▪ Corvinus University of Budapest http://portal.uni-corvinus.hu ▪ University of Szeged http://www.u-szeged.hu/english ▪ University of Debrecen https://unideb.hu/en ▪ University of Pécs https://international.pte.hu/ ▪ Óbuda University http://uni-obuda.hu/en

PART 14

IRELAND

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

IRELAND

IRELAND

Country Outline

- GDP: 324,038 mil. euros (Eurostat 2018)
- GDP per Capita: 66,700 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Immunology, Animal and Dairy, Nanoscience, Computer science and Material science

Contact Information

- Organistion: Embassy of Ireland
- Name / Position: Ms Ciara Leacy / Deputy Head of Mission
- Phone no. / e-mail: (+82) 02 721 7212 / ciara.leacy@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 2017]
- 10th in the Global Innovation Index 2017 (out of 127 countries) [Source: Cornell University, INSEAD and WIPO 2017]
- 13th in the world for university-industry collaboration on R&D [Source: Global Competitiveness Report 2016-2017]

Ireland is ranked 11th 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 Immunology
- 2nd in Nanotechnology
- 2nd in Animal and Dairy
- 4th in Agricultural Sciences
- 5th in Materials Sciences
- 6th in Chemistry

[Source: Thomson Reuters Essential Science Indicators 2017]

Ireland is ranked first in the EU according to the most recent review of the "Performance of Innovators" *[Source: European Innovation Scoreboard 2017]*, 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 seventeen world leading SFI Research Centres. The initial 12 national Centres of excellence each targeted 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. The latest four SFI Research Centres were 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. A fifth new centre will be launched in 2018 focusing on precision (smart) agriculture research for dairy.

(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 STI 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.

Programme Title	Contents
SFI Industry Fellowships www.sfi.ie/funding/industry-collaboration	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 ▪ Email: industry.fellowship@sfi.ie
SFI Partnerships www.sfi.ie/funding/funding-calls/sfi-strategic-partnership	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 ▪ Email: partnerships@sfi.ie

Programme Title	Contents
SFI Research Centres www.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 17 Research Centres in areas of strategic importance. ▪ 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: €1-5m 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 17 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 www.sfi.ie/funding/funding-calls/sfi-president-of-ireland	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 €1m in direct costs. ▪ Research Fields: Science and Engineering ▪ Email: FRL@sfi.ie.
SFI Academic Led Programmes www.sfi.ie/funding/funding-calls	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.

3. Joint Activities with Korea

Medical Technology Research

Biomedical Manufacturing Technology Centre (BMTC) at the Korea Institute of Industrial Technology (KITECH) and CURAM, the Science Foundation Ireland Centre for Research in Medical Devices, have established a programme of research collaboration allowing for joint conferences, workshops, and researcher exchange.

Artificial Intelligence Research

Samsung Electronics and Insight Centre for Data Analytics at University College Dublin (UCD) are collaborating on a major research project involving a team of more than 25 researchers from Korea and Ireland. The Samsung/Insight project aims to leverage Insight's data science and AI expertise to develop smarter products using machine learning, user modelling and recommender systems.

4. Science, Technology and Innovation Cooperation Partners

Knowledge Transfer Ireland (KTI)

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.

Organisation Name	Detailed information
National Directory of Research Centres	▪ Organisation type: National Intellectual 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 ▪ Contact Information: http://www.knowledgetransferireland.com

PART 15

ITALY

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

ITALY

ITALY

Country Outline

- GDP: 1,756,982 mil. euros (Eurostat 2018)
- GDP per Capita: 29,100 euros (Eurostat 2018)
- 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) -2-7500240 / seoul.science@esteri.it

The public research system, with HERD (High Education Research and Development) of 0.35% and GOVERD (Government Expenditure on R&D) of 1.30% of GDP in 2016, 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.

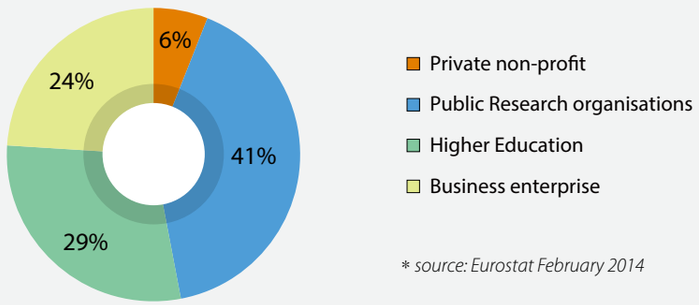
Various initiatives aim at bridging the gap between academia and industry. Technological districts and high technology poles as well as public-private laboratories are established in different parts of the country. The National Innovation Fund (FNI) was created in 2012 by MiSE to facilitate the financing 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.

1. Policies and Strategies in Science, Technology and Innovation

Government funding for R&D by sector of performance



* source: Eurostat February 2014

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 0.35% and GOVERD of 1.30% of GDP in 2016, 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 STI 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 2017 GERD (Gross Expenditure on R&D) was just 1.40% 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 0.70% of GDP in 2016, 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).

Recent changes in STI spending: Italy's domestic R & D spending has grown at an annual average growth rate of about 2.7% over the past five years. In 2009, 44% of domestic R & D spending was invested by private companies, 42% by the government, and 9% abroad. The $ 2.5 billion (2010-2011) FAR-Fund for Promotion of Research has had a major impact on the increase in public funding for business and university public research institutions.

3. Joint Activities with Korea

Activities with the RoK in 2019-2020

Programme Title	Contents
Bilateral workshop on Human Microbiome	▪ Date/venue: May/COEX ▪ 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 Current issues on HIV prevention and therapy	▪ Date/venue: June/KNIH ▪ Major topic or agenda: HIV disease, therapies, vaccine, prevention ▪ Target Participants: Private and public research bodies, scientists, students, National research agencies, governmental institutions
Bilateral workshop on Occupational Medicine	▪ Date/venue: September/Inje University ▪ Major topic or agenda: Advanced policies in occupational medicine, practical experiences, scientific issues regarding occupational medicine
Bilateral symposium on Underground Physics: neutrinos and dark matter	▪ Date/venue: October/IBS-Daejeon ▪ Major topic or agenda: Underground research on particle physics and neutrinos ▪ Target Participants: Private and public research bodies, scientists, students, National research agencies, governmental institutions
Bilateral symposium on Medical Robotics	▪ Date/venue: November/KAIST ▪ Major topic or agenda: Biorobotics, medical applications, technology transfer ▪ Target Participants: Private and public research bodies, scientists, students, National research agencies, governmental institutions
VI Bilateral S&T Forum "IoT and the 4.0 Industrial Revolution"	▪ Date/venue: November/Polytechnic of Turin ▪ Major topic or agenda: HealthCare, Energy and Environment, Smart cars, smart manufacturing ▪ 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
- ISCR/KNUCH – Restoration and preservation of mural paintings

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. Science, Technology and Innovation Cooperation Partners

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
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 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
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
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 2019-2021

RESEARCH AREA	TITLE	ITALIAN COORDINATOR	KOREAN COORDINATOR
Biomedicine	Governing neuronal signalling: Graphene-based interfaces to foster neuronal regeneration and restore network excitability in neurodegenerative disorders	BENFENATI Fabio (Fondazione Istituto Italiano di Tecnologia)	LEE Gwan-Hyoung (Yonsei University)
Agri-Food and Biotechnology	Molecular and physiological bases of leaf senescence as determinant of plant productivity and resilience to climate change and environmental stresses	LORETO Francesco (CNR-DiSBA)	LIM Pyung Ok (DGIST)
ICT	Memristor Spiking Neural Networks with Oscillatory Neurons and Event-Driven Synaptic Crossbars for Neuromorphic Vision Recognition	CORINTO Fernando (Politecnico di Torino)	MIN Kyeong-Sik (Kookmin University)
Nanosciences and Advanced Materials	Development of a cost-effective wearable metal nanowire-based chip sensor for optical monitoring of metabolites in sweat	MATTEINI Paolo (CNR-IFAC)	HWANG Byungil (Chung-Ang University)
Energy and Environment	Construction of Task-specific Molecular Channels for Analysis and Purification of Contaminated Water	DI SERIO Martino (Università degli Studi di Napoli Federico II)	JUNG Ok-Sang (Pusan National University)
Marine Sciences	Late Quaternary evolution of the ocean-ice sheet interactions: the record from the Ross Sea continental margin	COLIZZA Ester (Università di Trieste)	KHIM Boo-Keun (Pusan National University)
Convergence Science	Research of conservation environment and eco-friendly damage control of cultural heritage Korea and Italy	CANEVA Giulia (Università Roma Tre)	CHUNG Yong-Jae (Korea Natl Univ of Cultural Heritage)
Basic Sciences	Development of the Multigap resistive plate chamber using Ecological Gases	DE GRUTTOLA Daniele (Centro Studi e Ricerche Enrico Fermi)	KIM Do-Won (Gagneung-Wonju Natl University)

PART 16

LATVIA

LATVIA

LATVIA

Country Outline

- GDP: 29,524 mil. euros (Eurostat 2018)
- GDP per Capita: 15,300 euros (Eurostat 2018)
- 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

- Organisation: Higher Education, Science and Innovation Department, Ministry of Education and Science of the Republic of Latvia
- Name / Position: Mr. Janis Paiders / Manager of Smart Specialization Analysis Unit
- Phone no. / e-mail: (+371) 67047936 / janis.paiders@izm.gov.lv

Latvia is a country with strong scientific traditions with a high share of the population having completed tertiary education. The overall business conditions are good and that provides an opportunity for innovation-driven growth. The main goals for research in Latvia as defined in the Smart Specialization Strategy is to specialize in five priority areas that will transform the national economy towards the production of the goods and services with greater added value.

In order to achieve this goal, major reforms in the research and development sector were implemented that allowed to modernize the existing research infrastructure and consolidate research potential in 20 internationally competitive research institutes that are integrated with higher education and industry.

As a result, the share of high technology products in Latvia's exports and the overall productivity of the economy are gradually increasing and our research system is becoming more open and internationally competitive what can be seen in our high activity in Horizon 2020. The overall goal is to increase the total R&D investment to 1.5% of GDP. These investments should also include an increase in private R&D funding from 21% in 2016 to 48% in 2020.

1. Policies and Strategies in Science, Technology and Innovation

Latvian National Innovation Strategy (RIS3) is defined in the Guidelines for Science, Technology Development, and Innovation 2014-2020. It 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; bio-medicine, medical technologies, bio-pharmacy and bio technology; smart materials, technology and engineering, smart energy; ICT)

7) Polycentric development

Research environment	
22 state funded research institutions, including 15 internationally competitive scientific institutes or their separately evaluated departments	7500 researchers (3 482 in FTE), 16% work in the industry
Finance	
In 2017, 137.9 million EUR was invested in R&D, which is 0.51% of GDP (the target goal is 1.5%)	25% of companies are active in innovations
Human resources	
Amongst the population aged 25–34 about 1% are PhD holders	56% of PhD graduates are women, Proportion of women researchers in 2013–52% (the highest rate in the EU, average in the EU–33%)
Priorities	
More than 20 000 students in 2017/18 academic year are studying in STEM fields (Natural Sciences and Engineering) and almost 90% of them are studying in state owned HEI's	In the 2017/18 academic year, foreign students constitute 11% of all students in Latvia (constant increase over previous years)
Ongoing projects	
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 not only stipulates the exchange of scholarships, but also encourages direct cooperation between universities, and research and educational institutions of their respective countries.

International Cooperation Programmes/Initiatives

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: All
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: All

3. Joint Activities with Korea

A number of agreements on the extension of cooperation with Latvia were signed in South Korea as part of the State President's visit: a memorandum of understanding on the promotion of mutual economic relations and strengthening of international trade between the South Korean Import Association KOIMA and the Latvian Investment and Development Agency (LIAA), a memorandum of understanding between the LIAA and the Government

of the Gyeonggi Province on the possibility of cooperation in technology transfer and start-up ecosystem development, as well as a memorandum of understanding between the LIAA and the South Korean Pallet and Container Association.

4. Science, Technology and Innovation Cooperation Partners

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 (UL) with its 15,000 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. ▪ Major Activities with Korea: UL has concluded bilateral cooperation agreements with the following universities in South Korea: Kyungpook National University, University of Incheon, Pukyong National University. ▪ In the 2017/2018 academic year, 13 students from South Korea study at the UL. For local students the UL offers 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, E-mail: 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: RTU has bilateral cooperation agreements with the following universities in South Korea: Kyungpook National University, Pukyong National University, Kongju National University, Handong Global University. ▪ RTU has been working with exchange students from Korea since 2007. In the 2017/2018 academic year, there are 9 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
The Institute of Solid State Physics, University of Latvia http://www.cfi.lu.lv/eng	▪ Organization type: Research institute ▪ Major Research Area/Product: The Institute of Solid State Physics, University of Latvia (ISSP UL) 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. ISSP UL is a national coordinator and leader in several research projects. It has an active International Supervisory Board consisting of internationally recognized experts. The mission of ISSP UL is to carry out high-level scientific activity, and to use its knowledge in the fields of education and innovation. The 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

Organisation Name	Detailed information
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 IOS resulted in a high number of patents, which are held 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 Address: Aizkraukles 21, LV-1006, Riga, Latvia Tel: (+371) 67 014 801, Fax: (+371) 67 550 338, Email: sinta@osi.lv

PART 17

LITHUANIA

LITHUANIA

Country Outline

- GDP: 45,114 mil. euros (Eurostat 2018)
- GDP per Capita: 16,100 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Health Technologies and Biotechnology, Novel Production Processes, Materials and Technologies, Agro-Innovation and Food Technologies

Contact Information

- Organisation:
- Name / Position: Ms Kristina Babelytė-Labanauskė / Head, Technology and Innovation Division, Ministry of Education and Science of the Republic of Lithuania
- Phone no.: (+370) 5 2191220

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 funding (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.

Table 1. 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 STI Programmes and Initiatives

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

List of Programmes of Activities with RoK in 2018

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 Tel. (+370) 5 2714543 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 Tel. (+370) 37 300 702 e-mail: leonas.balasevicius@ktu.lt

Programme Title	Contents
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 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. Science, Technology and Innovation Cooperation Partners

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
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 email: 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 : +370 (85) 272 93 25 email : 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 5) 264 9211, 266 1640/1643 Fax: (+370 5) 260 2317 e-mail office@ftmc.lt

PART 18

LUXEMBOURG

LUXEMBOURG

LUXEMBOURG

Country Outline

- GDP: 58,869 mil. euros (Eurostat 2018)
- GDP per Capita: 96,700 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Environment

1. Policies and Strategies in Science, Technology and Innovation

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 STI Programmes and Initiatives

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

Not Applicable

4. Science, Technology and Innovation Cooperation Partners

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, email info@list.lu

PART 19

MALTA

MALTA

MALTA

Country Outline

- GDP: 12,328 mil. euros (Eurostat 2018)
- GDP per Capita: 25,600 euros (Eurostat 2018)

Contact Information

- Organisation: The Malta Council for Science and Technology
- Name / Position: Ms Ramona Saliba Scerri / Deputy Director, Strategy, Policy & Internationalisation Unit
- Phone no. / e-mail: (+356) 23602121 / ramona.saliba-scerri@gov.mt

Malta has a population of 436,947 (2016) living in an area of 316 square kilometres, making the country one of the smallest and most densely populated countries in the world. Whilst having a very open economy, the country has a narrow export base and this makes Malta highly susceptible to external economic fluctuations. Therefore, when looking at Malta's Research and Innovation system, the international context cannot be ignored. At a macro level, Malta has a stable political, economic and financial system, and a number of high value-added economic sectors stimulated by foreign direct investment. On the other hand, Malta's R&I system is very young and small, resulting in a relatively fragmented system and sub-optimal critical mass. Brain drain is an ongoing threat and the lack of public research institutes and large-scale research infrastructures can provide a challenge when attracting local and foreign researchers. However, Malta's National R&I Strategy 2020 attempts to address the gaps of the system and provide measures to build a stronger and enabling R&I framework, whilst making the most of the opportunities at hand, such as Malta's geographical location, its membership to the European Union, its international linkages thanks to the diasporas of Maltese researchers and innovators, and marketing Malta as a test-bed for new technologies due to its small size.

1. Policies and Strategies in Science, Technology and Innovation

Malta's STI Policy is governed by the National Research and Innovation Strategy, 2014 - 2020. The ultimate goal of this strategy is 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 that of providing an enabling framework for achieving this vision, building on achievements as well as lessons learnt. This in turn depends on establishing the necessary 'building blocks' including a comprehensive R&I support ecosystem, a stronger knowledge base and smart, flexible specialisation. Malta's approach to R&I is strongly business oriented and focused on close to market research and transition to innovation. Supporting the route from ideas to market in a holistic manner is a prime goal of Malta's new R&I Strategy. Within this context, industry-academia collaboration, support to private sector investment and effective transfer of knowledge are of crucial importance in making sure that good ideas and research efforts

yield the desired results. The document may be downloaded from the following link http://mcst.gov.mt/policy-strategy/national-research-innovation-strategy/. Following the finalisation of the National R&I Strategy, Malta also prepared an R&I Action Plan in order to map out the operationalisation of the R&I Strategy.

As stated, one of the Strategy's pillars is Smart Specialisation, a new strategic approach conceived within the reformed Cohesion policy of the European Commission and hence tied with funding of research and innovation under the respective priority axis. Smart Specialisation is a place-based approach characterised by the identification of strategic areas for intervention based both on the analysis of the strengths and potential of the economy and on an Entrepreneurial Discovery Process (EDP) with wide stakeholder involvement. It is outward looking and embraces a broad view of innovation including technology-driven approaches. Malta's areas of specialisation were identified through a bottom-up process and work is ongoing to continue developing our competitive areas through focus groups, workshops and dedicated seminars, the monitoring system and technical and political committees. The current areas are high value-added manufacturing, health with a focus on e-health and healthy living and active ageing, aviation and aerospace, aquaculture, maritime services, resource efficient buildings, tourism product development and ICT.

One of the main indicators for monitoring the implementation of the Strategy is investment of R&D expenditure as a percentage of GDP. Over the years, R&D expenditure as a percentage of GDP and also in real terms, show that Malta's investment has been increasing over time, and in the past few years has remained more or less stable, reaching an investment of 0.61% in 2016 (latest available data). Most of R&D investment comes from the business sector, yet over the years the higher education sector showed the largest increase in expenditure, and investment from government remaining mostly stable. Another indicator used to measure progress is the number of researchers expressed as full-time equivalents, which since 2011 has shown a steady increase towards the targets set in the Strategy (746 in 2011 compared to 829 in 2016). The number of PhD holders as a percentage of the active population increased substantially since 2009 and over the past few years has remained stable (0.19% in 2009 compared to 0.40% in 2016).

2. National STI Programmes and Initiatives

Programme Title	Contents
FUSION	▪ Programme definition: FUSION is a national funding programme that supports Research and Innovation as well as providing the necessary support for researchers and technologists to turn their innovative ideas into a market-ready reality. FUSION is composed of two main programmes, the Commercialisation Voucher Programme (CVP) and the Technology Development Programme (TDP). These two programmes are designed in a way to offer the necessary mentoring and financial support for researchers and technologists to take their ideas to the market. The CVP is aimed at improving the development and commercialisation potential of innovative research ideas whereas the TDP supports the actual development of innovative projects proposed by public entities and industry players. ▪ Cooperation Type: Joint Research ▪ Funding Organisation: FUSION is supported through the Malta Government funds, and managed by the Malta Council for Science and Technology (MCST). ▪ Call Opening/Closing Date: CVP: 2 calls per year – Jan and May TDP: 2 calls per year – March and October ▪ Participation Qualification: Eligible entities: Maltese Public and Industrial Entities. Foreign entities can apply as part of the TDP Consortium but will have to self-fund their part of the research. ▪ Project Duration: Between 1 to 3 years ▪ Funding Scale and Funding Scheme: FUSION operates under De Minimis Aid -a single undertaking cannot receive more than €200,000 in aid over any 3-year period. ▪ Research Fields: - ICT-based Innovation / Enabler - Health (focus on e-health, active and healthy ageing) - Resource-efficient buildings - High value-added manufacturing (focus on process and design) - Aquaculture - Tourism product development - Maritime Services - Aviation and aerospace

PART 20

NETHERLANDS

NETHERLANDS

NETHERLANDS

Country Outline

- GDP: 774,039 mil. euros (Eurostat 2018)
- GDP per Capita: 44,900 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Agro-food & Nutrition, Chemical, Creative industry, Energy, High-tech System & Materials, Horticulture, Life science & Health, Logistics and Water

Contact Information

- Organisation: Embassy of the Kingdom of the Netherlands
- Name / Position: (Mr.) Peter Wijlhuizen / Senior Officer for Innovation, Technology and Science
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Through their interactive approach to finding innovative solutions to the big challenges facing the world today, the Dutch way of thinking and working has been shaped by centuries of living in the low-lying delta of the Netherlands. Through the ages, the Dutch have joined forces to find ingenious ways to tackle challenges related to water, urbanization, energy, food, health and security. By being inventive, pragmatic and open to new challenges, the Dutch have created a flourishing and resilient country. The Netherlands is a constantly evolving ecosystem of cities, industry, agriculture and nature, all integrated through smart infrastructure. It is a source of knowledge and experience that the Dutch are keen to share with others. Learning from the past to create a better future. Together, seeking sustainable solutions for the most livable world. The Netherlands is one of the most competitive and innovative countries worldwide as it has ranked the no. 2 from the Global Innovation Index in 2018. The Netherlands is the world's second-largest agricultural exporter, the port of Rotterdam is one of the world's largest harbours and it is a gateway to Europe. Dutch university researchers are among the most productive in the world, and the Netherlands is one of the most wired countries in the world.

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 channelled 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 Horizon2020.

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 2016, Dutch companies and research institutes spent over 14.3 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 2016 amounted to 2.03 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 a have preliminary meeting with the Dutch ministry of Economic Affairs. In 2017, the preparation meeting for the first Joint Innovation Committee meeting was held in Korea along. The official first Joint Innovation Committee meeting will take place in second half of 2018 in the Netherlands.

For more detailed information, please visit:

- https://www.government.nl/topics/enterprise-and-innovation/encouraging-innovation
- https://www.government.nl/topics/science/documents/policy-notes/2019/01/28/curious-and-committed---the-value-of-science
- https://vsnu.nl/files/documenten/Domeinen/Onderzoek/DigitaleSamenleving/VSNU%20Digital%20Society%20Research%20Agenda.pdf
- https://www.rathenau.nl/en/science-figures

2. National STI Programmes and Initiatives

International Cooperation Programmes/Initiatives

Programme Title	Contents
Horizon2020	▪ http://ec.europa.eu/programmes/horizon2020/
JTI / Eureka clusters	▪ http://www.eurekanetwork.org/clusters
Eurostars	▪ 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

Activities with the RoK in 2019-2020

Programme Title	Contents
Smart City Mission to South Korea	▪ Title: KR-NL joint collaboration on Smart Cities ▪ Date and Venue: September 4-6, 2019, KINTEX ▪ Objective: Finding R&D and or business opportunities to join the National smart city pilot projects in Sejong and Busan. ▪ Target Participants: Dutch companies in clean technology, water treatment, mobility and urban regeneration sector ▪ Detailed Information: The Dutch delegation will visit Korea during the Smart City Expo in September to find opportunities to join smart city projects and potential partners and agents in Korea. There will be a Holland Pavilion, seminars, 1:1 matchmaking and some site visits opportunities
Holland High Tech Career Roadshow	▪ Title: Working in the Netherlands ▪ Date: November, 2019 ▪ Objective: The Dutch high-tech industries are booming and there is a high demand for engineers and scientists from outside of the country. As Korea has a high percentage of well-educated talents in the engineering sector, this event will bring opportunities for Koreans to find a job in the Netherlands. ▪ Target participants: Job seekers who have backgrounds in engineering or science. ▪ Detailed information: Dutch recruiters from high-tech industries will visit Korea. The recruiters will be touring the nation (Seoul, Daejeon and so on) to meet Korean talents. The program will include a half day seminar about the Dutch companies, and working environment and so on, and in the second half of day will be a 1:1 interview with prearranged schedule.
Swiss-Dutch Semicon week	▪ Title: Swiss-Dutch Semicon week ▪ Date: January, 2020 ▪ Objective: Showcase the latest development of semicon technologies by inviting renowned Dutch and Swiss universities and spin-offs which are considering entering Korean market or finding Korean investors. ▪ Target participants: Semiconductor manufacturing firms, investors, universities and research institutes ▪ Detailed information: This event is co-organized by the Swiss Embassy and with the help of Korean investors. The Dutch and Swiss researchers and spin-offs visit Korea to present about their latest developments of semicon technologies. The event is an opportunity to introduce the advancement of Dutch and Swiss technology and find potential partners and investors.

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
Netherlands Enterprise Agency (RVO), https://english.rvo.nl	Netherlands Enterprise Agency (RVO.nl) encourages entrepreneurs in sustainable, agrarian, innovative and international business. It helps with grants (a.o Eurostars and H2020), finding business partners, know-how and compliance with laws and regulations. The aim is to improve opportunities for Dutch entrepreneurs and strengthen their position. Netherlands Enterprise Agency is part of the Ministry of Economic Affairs and Climate Policy and works at the instigation of ministries and the European Union.
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 and energy saving and efficiency.
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.
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) have signed a MoU to increase cooperation between vegetation patchiness and river hydraulics.

Organisation Name	Detailed information
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.
Delft University of Technology (TU Delft), https://www.tudelft.nl	TU Delft is the largest and oldest Dutch public tech university located in Delft. It is one of the best engineering and technology universities which rank within 20th in the world. TU Delft researchers have developed many new technologies used today. They are very active in research cooperation with knowledge institutes and industries, and also active in startup and technology transfer.
Eindhoven University of Technology (TU/e), https://www.tue.nl/en	TU/e is a research university specializing in engineering science and technology. Their research and knowledge valorisation contribute to solving the major societal issues and boosting prosperity and welfare by focusing on the strategic areas of energy, health and smart mobility; to the development of technological innovation in cooperation with industry; and to progress in engineering sciences through excellence in key research cores and innovation in education. Because of its geographical location, the university closely work with high tech companies like Philips, ASML and DAF. TU/e is one of the most prestigious universities in the world, together with TU Delft.
University of Twente (UT), www.utwente.nl/en	UT is a public research university located in Enschede. Entrepreneurial spirit is one of the core values of the institution and it is committed to make economic and social contributions to the Netherlands. It is one of the top 200 universities in the world which has high competency in nanotechnology, biomedical technology and so on.

PART 21

POLAND

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

POLAND

POLAND

Country Outline

- GDP: 496,462 mil. euros (Eurostat 2018)
- GDP per Capita: 12,900 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Maths, Physics, IT, Astronomy, Quantum Electronics, Life Sciences, Biotechnology, Food, Agriculture and fisheries, Energy, Environment, Security, ICT, Materials

Contact Information

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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 2018 classified Poland as a moderate innovator – 25th place out of 28.

In 2016, the total budget for research accounted for 0.97 % GDP. The aim is to reach 2% 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 bn available in 2014-2020.

According to the most recent (March 2019) data provided by Poland's Central Statistical Office, the country's GERD in 2017 amounted to USD 5,37 bn, which means a 14% increase compared to 2016. In the last five years an increase of 42,7% of the expenditures has been recorded.

In 2017 R&D intensity (that is the share of gross domestic expenditures on R&D in relation to GDP) amounted to 1,03% and was lower by 1.04 pp in comparison with R&D intensity for the whole European Union. R&D intensity in Business enterprise sector (BERD/PKB) amounted to 0.67%, in Higher education sector (HERD/PKB) – 0.34%, whereas in the Government and the Private non-profit sectors jointly ((GOVERD & PNPRD)/PKB) – 0.03%.

As the results of the Global Innovation Index 2017 show, in the period 2008-2015 Poland occupied the first place in terms of growth of private sector R&D expenses (BERD). In the same period, Poland was third only to China and Slovakia in terms of GERD growth.

The year 2016 saw a record increase in the private sector's R&D spending. Businesses allocated almost USD 2,77 bn on R&D, an 26% increase compared to 2014. The private sector's expenses now account for 53,1% of Poland's total R&D expenditure, compared with 46.6 in 2014 and 43.6% in 2013.

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, quantum electronics and electromobility. 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

Source: Warsaw Business Journal

In February 2016, Poland's government issued 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, Prime 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 the challenges, 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 0.97% 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 elements of the plan was the establishment of the Polish Development Fund which operates within the new architecture of Polish development institutions and implements programmes enhancing the long-term investment and economic potential and supporting equal opportunities and environmental protection 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

- https://www.oecd.org/sti/oecd-science-technology-and-industry-scoreboard-20725345.htm
- https://stat.gov.pl/en/topics/science-and-technology/science-and-technology/science-and-technology-in-2017,1,13.html
- 2019 Bloomberg's Global Innovation Index: Poland – 22nd place

2. National STI Programmes and Initiatives

International Cooperation Programmes/Initiatives

Programme Title	Contents
Smart Growth (EU international programme) www.ncbr.gov.pl/en	▪ 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 ▪ Matching fund from Korean government: N
POWER (EU international programme) www.ncbr.gov.pl/en	▪ 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 ▪ Matching fund from Korean government: N

Programme Title	Contents
GameINN (for less developed Polish regions only) www.ncbr.gov.pl/en	▪ Cooperation Type: Joint Research Consortium with a Polish company/university /research unit ▪ Funding Organisation: National Centre for Research and Development ▪ Call Opening/Closing Date: Q1/Q2 2019 ▪ Participation Qualification: Please contact gameinn@ncbr.gov.pl ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: Approx. USD 26 million ▪ Research Fields: Video & computer games ▪ Matching fund from Korean government: N
INNOSTAL (for less developed Polish regions only) www.ncbr.gov.pl/en	▪ Cooperation Type: Joint Research Consortium with a Polish company/university /research unit ▪ Funding Organisation: National Centre for Research and Development ▪ Call Opening/Closing Date: Q1/Q3 2019 ▪ Participation Qualification: Please contact innostal@ncbr.gov.pl ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: Approx.USD 50 million ▪ 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 ▪ Matching fund from Korean government: N
INNOSHIP (for less developed Polish regions only) www.ncbr.gov.pl/en	▪ Cooperation Type: Joint Research Consortium with a Polish company/university /research unit ▪ Funding Organisation: National Centre for Research and Development ▪ Call Opening/Closing Date: Q2/Q3 2019 ▪ Participation Qualification: Please contact innoship@ncbr.gov.pl ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: Approx. USD 52 million ▪ Research Fields: Pilot and demo lines, prototypes – new products, services and technologies, schemes, discoveries and IT systems, new and improved products and their production technologies, innovative solutions to modernise and support technological processes in ship industry ▪ Matching fund from Korean government: N
Fast track for micro and large enterprises as well as SMEs www.ncbr.gov.pl/en	▪ 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: Q1/Q3-Q4 2019 – micro- and SMEs as well as large enterprises ▪ Participation Qualification: Please contact konkurs1.1.1@ncbr.gov.pl ▪ Project Duration: TBC ▪ Funding Scale and Funding Scheme: Approx. USD 587 million for micro and SMEs as well as large enterprises ▪ Research Fields: Random ▪ Matching fund from Korean government: N

3. Joint Activities with Korea

Activities with the RoK in 2019-2020

Programme Title	Contents
V4 - Korea Research Programme	V4-Korea Joint Research Program - V4-Poland, Czech Republic, Hungary and Slovakia and RoK was established. It envisages joint V4-RoK research projects with the first call dedicated to advanced materials technologies and materials engineering. It was launched in November 2016 and closed on 22 February 2017. 5 projects were recommended for funding and will be carried out until 2020-2021.

4. Science, Technology and Innovation Cooperation Partners

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 e-mail: 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 e-mail: office.rd@samsung.com
University of Wrocław	▪ Organisation type: University ▪ Major Research Area: Various ▪ Major Activities with Korea: Bilateral agreement on student exchanges with Yeungnam University, Pusan National University and Hankuk University of Foreign Studies ▪ Future Plans: N/A ▪ Contact Information: Ms. Joanna Skotnicka e-mail: joanna.skotnicka@uwr.edu.pl Tel. +48 71 375 27 03

Organisation Name	Detailed information
Jagiellonian University, Cracow	▪ Organisation type: University ▪ Major Research Area: Various ▪ Major Activities with Korea: Bilateral agreement on student exchanges with Keimyung University ▪ Future Plans: N/A ▪ Contact Information: Ms. Adriana Hołub-Palonka e-mail: adriana.holub-palonka@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, Coordinator for European/African Region Exchange Program, Office of International Affairs, Chonnam National University e-mail: Chacha1052@jnu.ac.kr

PART 22

PORTUGAL

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

PORTUGAL

PORTUGAL

Country Outline

- GDP: 201,613 mil. euros (Eurostat 2018)
- GDP per Capita: 19,600 euros (Eurostat 2018)
- 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

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The National Research and Innovation System is increasing its development, over the last decade, reducing its gap to the 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 has underpin research and innovation policy and funding instruments for 2014-2020 period. The ENEI Vision for 2020 is: 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 are:

- **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;
- **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;
- **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.

More recently, a series of policies and strategies in Research and Innovation were launched:
- **Decree Law 57/2016:** Scientific Employment Stimulus is an incentive to hire new researchers and for the development of scientific employment plans and scientific careers by public or private institutions. These funding schemes strengthen the national scientific and technological system and promote employment opportunities for PhD holders, facilitating the formalisation of scientific employment and contributing to the greater national attractiveness for highly qualified young people. They also contribute to the rejuvenation of scientific institutions, attracting more and better scientists, and to facilitate a framework that stimulates the mobility of researchers.

In the spirit of the Resolution of the Council of Ministers no. 32/2016, dated June 3, 2016, and more specifically of the principles set forth in the attachment entitled "Commitment to Knowledge and Science: the Commitment to the Future", FCT started in 2017 the preparation of fifteen Thematic R&I Agendas. Research and Innovation Thematic Agendas aim in particular to mobilize experts from R&D institutions and companies to identify challenges and opportunities in the Portuguese scientific and technological system, particularly in the medium- and long-term. These agendas are also expected to contribute to the development of research and innovation activities, contributing to finding answers to the problems or needs of different sectors of society. The inclusive and dynamic process of preparing these agendas - involving experts from academia, research centers, companies, public organizations and civil society, within a framework of dialogue between different national actors - makes it possible to specify emerging and promising areas for Portuguese Research and Innovation, in a medium- and long-term perspective, until 2030. Building the thematic agendas is a process in which each agenda presents a specific trajectory, with contrasting development stages, as each agenda was launched at different moments over the last months. The thematic agendas will be subject to regular updates, as part of an ongoing debate to be carried out in the future.

In the present year, the new **"Law of Science"** was published in the Diary of Republic (Diário da República) at May 16. The Decree-Law no. 63/2019 reviews the legal regime of institutions dedicated to research and development and other stakeholders in the National System of Science and Technology. It defines the general principles of its evaluation and financing, and regulates the valuation, access and dissemination of knowledge.

2. National STI 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.

National STI Programmes/Initiatives (all funded by FCT)

Programme Title	Contents
Scientific Employment Stimulus https://www.fct.pt/apoios/contratacaodoutorados/empregocientifico	Scientific Employment Stimulus Programme is an incentive for hiring new researchers and development scientific employment plans and scientific careers by public or private institutions. It has the following instruments: ▪ Call for Proposals on Individual Scientific Employment - direct support to the contracting of doctoral researchers in all scientific areas, through annual competitions promoted by FCT, in order to facilitate the continuous and systematic integration of new doctorates in the institutions. ▪ Call for Proposals on Institutional Scientific Employment - a support to the development of R&D activities stimulating contracting doctoral researchers by the scientific institutions, through calls addressed to the institutions. ▪ Support for scientific employment plans in the scope of the evaluation process of R & D Units 2017-2018.
Fellowships, PhD Studentships, PhD Studentships in Industry http://www.fct.pt/apoios/bolsas/concursos/individuais2018.phtml.en	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 ▪ Call Opening/Closing Date: Annual call ▪ Participation Qualification: PhD Studentships – Master Degree; Post-Doctoral Fellowships - PhD ▪ Project Duration: Variable ▪ Funding Scale and Funding Scheme: **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; **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.

Programme Title	Contents
R&D Institutions https://www.fct.pt/apoios/unidades	Most scientific research in Portugal takes place in R&D institutions financed and evaluated by FCT. Research in these R&D Units encompasses all scientific fields, from life and health sciences to social sciences and humanities, from engineering and exact sciences to natural and environmental sciences. Provided with the capability to perform high quality research, R&D institutions have a central role in both advancing research and national development, while establishing themselves as international centres of excellence that address issues of national and global relevance. R&D institutions are regularly evaluated by FCT. In June 2019, FCT completed a new cycle of evaluation of 348 R&D institutions that will be funded for the period 2020-2023. Total funding amounts to 420 M€ for this period. These R&D Units were also awarded 1.600 new PhD fellowships corresponding to an investment of 106 M€.
Collaborative Laboratories https://www.fct.pt/apoios/CoLAB/	Applications for the recognition and attribution of the title of Collaborative Laboratory are permanently open. This title will allow institutions to apply for specific funding. Collaborative Laboratories should be established as non-profit private associations or as companies. Their main goal is to create skilled and scientific jobs in Portugal, both directly and indirectly, by implementing research and innovation agendas geared at creating economic and social value. CoLABs must meet the challenge of enhancing the density of knowledge-based activities in the country by fostering the consolidation of collaborative practices between scientific, technological or higher education institutions and the social and economic fabric, namely businesses, the hospital and health care system, cultural institutions, and social organizations.

3. Joint Activities with Korea

Activities with the RoK in 2019-2020 (Ongoing Activities)

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.

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
Universidade do Minho http://www.uminho.pt/en/home_en	Signature of three Memoranda 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
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 (Univ. Lisboa)	The Instituto Superior Técnico signed a Protocol of Cooperation with the University of Seoul (July, 2014). Contact Information: https://tecnico.ulisboa.pt/en

A - Under the PROPOLAR 2017-18 Leg, 3 projects were implemented with support from the Korean Polar Research Institute (KOPRI):

- CIRCLAR2 - Cartography and monitoring of ordered stone circles with ultra-high resolution images in the Antarctic Maritime, Part 2, Coordinator: Pedro Pina (Center for Natural Resources and Environment / Instituto Superior Técnico-CERENA / IST, University of Lisbon).
- ETeA II - Ensuring the effectiveness of teamwork in Antarctica II, Coordinator: Pedro Quinteiro Fernandes da Silva (William James Center for Research-WJCR, University Institute-ISPA).

- HYDROTOMO - Geoelectric study of permafrost and the active layer and its possible influence on the evolution of ecosystems near the Korean Antarctic Base and the Peruvian Antarctic Base, King George Island, Antárctida Marítima, Coordinator: António Correia (Institute of Earth Sciences-ICT, University of Évora).

B - A joint drilling for the Global Terrestrial Network for Permafrost is planned to be carried out near the Korean King Sejong base in the upcoming PROPOLAR 2018-2019 Leg.

PART 23

ROMANIA

ROMANIA

ROMANIA

Country Outline

- GDP: 202,884 mil. euros (Eurostat 2018)
- GDP per Capita: 10,400 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Energy, Environment and Climate change, Advanced materials

Contact Information

- Organisation: Embassy of Romania
- Name / Position: Ms. Nichita Alexandra / Third Secretary
- Phone no. / e-mail: (+82) 7974924 / alexandranichita@romania.ollehoffice.com

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 STI Programmes and Initiatives

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 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

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. Science, Technology and Innovation Cooperation Partners

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 STI Programmes and Initiatives
3. Joint Activities with Korea
4. Science, Technology and Innovation Cooperation Partners

SLOVAKIA

SLOVAKIA

Country Outline

- GDP: 90,202 mil. euros (Eurostat 2018)
- GDP per Capita: 16,600 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Materials and nanotechnology, Biomedicine and Biotechnology, Environment and agriculture, Sustainable energy.

Contact Information

- Organisation: Embassy of the Slovak Republic
- Name / Position: Mr Ondrej Sykora, Head of Economic and Commercial Affairs
- Phone no. / e-mail: (+82)-2-794-3981 / emb.seoul@mzv.sk

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 4th export destination in 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. 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 has created 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 MoUs 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. In 2018 another two MoUs were signed: (i) Slovak Academy of Science and National Research Foundation of Korean; (ii) Slovak Innovation and Energy Agency and Korea Institute of Energy Technology Evaluation and Planning; to foster the cooperation. The 2019 is expected to be a year the second round of the Joint Committee will take place.

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 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 13 November 2013 and respectively in its Implementation plan. 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

The main joint activity between RoK and SR for 2019 is the second round of the Joint Committee for S&T cooperation. Apart from joint research projects mentioned below, other activities include mainly individual scholarships/mobility initiatives/exchange programmes.

Activities with the RoK in 2019-2020:

Programme Title	Contents
Intergovernmental Joint committee meeting	▪ Activity: Joint Committee meeting (2nd round) based on a bilateral Agreement on Scientific and Technological Cooperation between the Government of Republic of Korea and the Slovak Republic; ▪ Major topic or agenda: Joint call for mobility projects; ▪ 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.

4. Science, Technology and Innovation Cooperation Partners

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

PART 25 SLOVENIA

SLOVENIA

SLOVENIA

Country Outline

- GDP: 45,948 mil. euros (Eurostat 2018)
- GDP per Capita: 22,200 euros (Eurostat 2018)

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 STI 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 of Korea (NRF). Last decision document was approved in July 2013 where both sides agreed to jointly fund the five research projects. Slovenia is interested to launch a common call for the coming period. The subjects of the call are all scientific fields.

PART 26 SPAIN

SPAIN

SPAIN

Country Outline

- GDP: 1,208,248 mil. euros (Eurostat 2018)
- GDP per Capita: 25,900 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Bio including Health, Green technology including Energy, Smart city and Transportation, Information and Communication Technologies, Nanotechnology, Materials, New Production technologies, Aerospace

Contact Information

- Organisation: the Embassy of the Spain to the Republic of Korea
- Name / Position: Dr. Jordi Espluga Bach, Science & Technology Head
- Phone no. / e-mail: +82 (0)2 3703 6615 / jordi.espluga@cdti.es

1. Policies and Strategies in Science, Technology and Innovation

The activities in Spain in the scope of Research & Development (R&D) follow the direction of 2017-2020 Master Plan, which sets the priorities for the coming years, with the objectives of improving resource efficiency while maximizing outcome and visibility, including the following,

- Bring talent in research
- Enhance industrial leadership, and capacity building
- Increase private investment, and the technology capabilities of the industry
- Answer to societal challenges
- Promote an open R&D model, and more inclusive into society
- Coordination of the R&D policies, at international, national and regional scope

The main funding agencies in charge of the management and funding of the Master Plan are the "Agencia Estatal de Investigación" (AEI) and the "Centro para el Desarrollo Tecnológico Industrial" (CDTI), both under the Ministry of Science, Innovation and Universities. The main actions of the Ministry are found these four pillars;

1. Personnel, talent promotion and employment: Human resources, Mobility, Incorporate talent in research
2. Enhance the research and technology system: Knowledge, Infrastructures and equipment, Encourage participation of research institutes
3. Industrial Leadership: Foster Industrial research & Experimental development, Promotion of horizontal technologies, Industry 4.0

4. Promote research and development targeting Societal challenges including Health technologies, Promote a Digital society and inclusiveness

Among the fourth pillars, in connection with Korea the main actions are focused on industrial leadership and societal challenges, fostered mainly through multilateral programs like the H2020 and EUREKA, as well as of Bilateral scope subject to joint calls for proposals, like the KSEI and NUCLIS. There are also initiatives in view of Mobility co-funded under the Marie Sklodowska Curie Actions (MSCA), to name the TecnioSpring INDUSTRY currently managed by the regional Government of Catalonia.

In view of Industrial leadership, the implementation falls under the responsibility of CDTI through the establishment of cooperation programs in order to promote, evaluate and finance joint research projects. It also targets to enhance public-private partnerships while bridging networks among enterprises, research institutes and universities. It fosters the incorporation of technologies to enhance the competitiveness of the industry, while supporting globalization of the enterprises. CDTI focuses its activities through international programs at both multilateral and bilateral level, to name the H2020 and Eureka. Another cooperation activities are offer support industry procurement to scientific projects and installations, exploring funding modalities for young technology based companies, and fostering the Industry 4.0 initiatives.

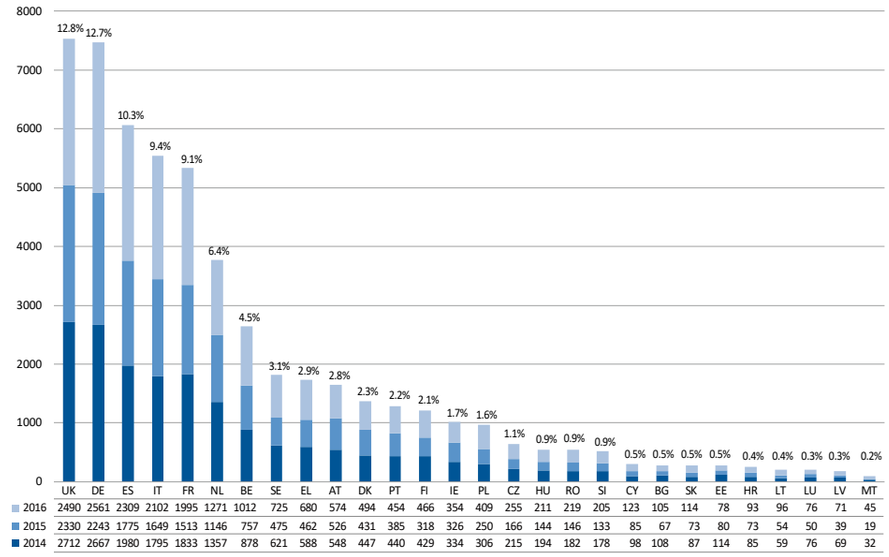
Concerning the pillar of science, the AEI takes charge of the most part, to name, increase impact and return to society of research results from research institutes and universities, promotion of Spanish entities in international large scale projects and H2020, coordination of funds, research awareness spread into society, more participation of the private sector in research, among others. In this scope the following areas are targeted, Health and Well-being; Clean Energy, Smart Transportation, Climate Change and Resources, Humanities and Social Sciences, Economy and Digital Society, Security and Defence, Biology, Food, and Marine research.

The former Master Plan 2013-2016 had a budget of total €10.8 billion, corresponding to €1,4 billion to Talent promotion and employment, €1 billion to scientific excellence, €2,3 billion to industrial leadership, and €6,1 billion to societal challenges. In total the expenditure on R&D in 2016 reached 1.3% of GDP with the target set to achieve 2% by year 2020. In view of international objectives, it pursues to consolidate a 10% participation of Spanish entities to the H2020, increase to 54.5% the number of scientific publications with international partners, and to 13.5% of high impact.

At international scope, it is remarkable the performance of Spain in the H2020 over the program´s average and with a sustained positive growth. Spain shows also good scores in international scientific co-publications.

In regard with H2020, according to the database Cordis, Spain was third in terms of number of participations to H2020 in signed of grant agreements across member states, with a 10.3% for the years 2014, 2015 and 2016. This trend is being maintained, with the efforts put to consolidate and even increase it in some particular modalities of the H2020, like the SME instrument.

Figure 1: Number of participations to Horizon 2020 per Member State, 2014-2016, and share of total Horizon 2020 participations



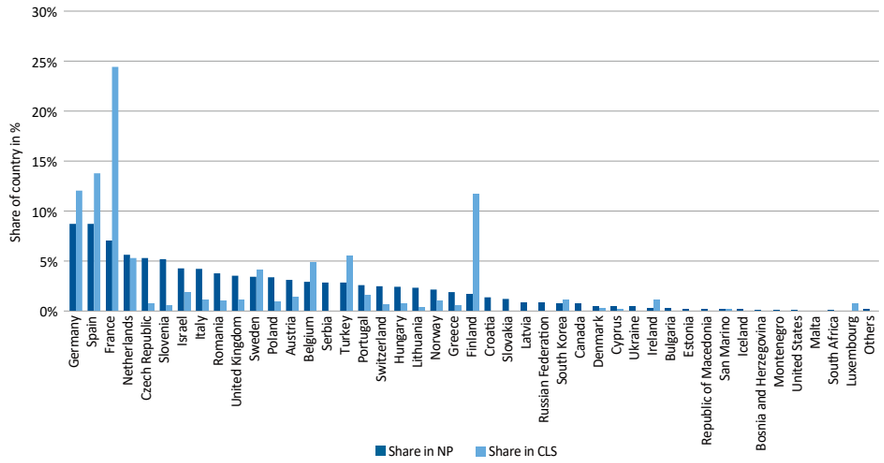
Source: Corda call in 2014, 2015 and 2016. Signed grants cut-off date by 1/9/2017

Based on the FP7 thematic priorities, the areas where Spain shows scientific and technological specialization are: Aeronautics and Space, Transport, Food & Agriculture & Fisheries, Construction; to a less degree: Automobiles, Energy, Environment, Materials, Bio and Health.

A study of the specialization index by the most-cited publications shows that the largest number of scientific articles is produced by order of importance in the fields of Health, Information and Communications technologies, and Food, agriculture and fisheries.

It is also remarkable the achievements of the Spanish participation in applied research under the Eureka initiative.

Figure 2: Distribution of firms in Eureka Network and Cluster projects based on the country of origin (project duration within the period between 2001 and 2019)



Source: Prognos/Joanneum Research/ULB (2017), based on data provided by the Eureka Secretariat

During the Spanish chairmanship, the number of projects in all modalities experienced a sharp increase, which would reposition Spain even higher in this ranking among countries. Noteworthy, during the Spanish chairmanship it was included in the Regulatory corpus of Eureka the new status of Korea as Partner Country, encompassing an increase of Korean projects in general, with special mention to projects carried out jointly with Spanish entities, ranking the first country for Korea in bilateral projects under Eureka.

2. National STI Programmes and Initiatives

The State Secretariat for Research, Development and Innovation under the Ministry of Science, Innovation and Universities is responsible for the policies of scientific and technology research, development and innovation, including the management of international relations. The funding programs are largely managed by the funding agencies of CDTI and AEI, in charge of management of the programs which are open to world, at multilateral and bilateral level, to name Eureka, Iberoeka, H2020, Mobility including MSCA, ERA-Net, and bilaterally vis-à-vis with countries worldwide under mutual agreements for collaboration. The scope of the funding is limited to the activities carried out within the territory of Spain.

3. Joint Activities with Korea

In this line the joint activities are scheduled under the agreements with the Korean Ministries MSIT and MOTIE, covering various forms of joint collaboration. The following table shows the programs for joint collaboration between Spain and Korea,

Activities with the RoK in 2019-2020

Programme Title	Contents
H2020 https://bit.ly/2CvGT9q	▪ Cooperation Type: Joint Research ▪ Funding Organization: H2020 ▪ Call Opening/Closing Date: No coordinated calls are currently open; targeting the calls flagging Korea for collaboration ▪ Participation Qualification: Registered R&D activities carried in Spain, and within an international consortium ▪ Project Duration: Not fixed ▪ Funding Scale and Funding Scheme: Depends on the programme ▪ Research Fields: Depends on the thematic field of the call ▪ Matching fund from Korean government: Yes, subject to local evaluation
EUREKA NETWORK & CLUSTER http://www.eurekanetwork.org/ EUROSTARS https://www.eurostars-eureka.eu/	▪ Cooperation Type: Joint applied research ▪ Funding Organization: CDTI and KIAT ▪ Call Closing Date: - EUREKA Bilateral Call March 29 (1st Call), August 30 (2nd) 2019 - Clusters - Eurostars ▪ 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: - Loan (IDI) combined with a non-reimbursable part, up to 75% of eligible costs in the form of loan at 0% with a relative non-reimbursable grant of up to 33%; - Grant (EUROSTARS) of up to 55% (Small), 45% (medium), and 35% (Large) of eligible costs ▪ Research Fields: Horizontal (Network & Eurostars), Thematic (Cluster) ▪ Matching fund from Korean government: yes

Programme Title	Contents
KSEI https://bit.ly/2ULn0mU	▪ Cooperation Type: Joint Research ▪ Funding Organization: CDTI ▪ Call Closing Date: KSEI Call June 7 2019 ▪ 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 scheme: Loan (IDI) of up to 75% of eligible cost, combined with a non-reimbursable part of up to 33%. ▪ Research Fields: Energy efficiency, Smart Grid, New and renewable energy ▪ Matching fund from Korean government: yes
NUCLIS https://bit.ly/2qRuwQR	▪ Cooperation Type: Joint Research ▪ Funding Organization: Catalonia Trade & Investment / co-financed with European Regional Development Fund (ERDF) funds ▪ Call Opening/Closing Date: Jun 2019 / Oct 2019 ▪ Participation Qualification: Financial support to companies located in Catalonia with international technological cooperation R&D projects. Oriented to obtaining new products and processes that reach prototype and / or demonstrators phase (TRL 3-7) ▪ Project Duration: From 12 to 30 months ▪ Funding Scale and scheme: Grant of up to 200,000 Euros / project with aid intensity of up to 45% depending on the company´s size and the nature of its R&D activities. ▪ Research Fields: Information and Communication Technologies, Biotechnology, Photonics, Nanotechnology, Advanced materials and Advanced manufacturing ▪ Matching fund from Korean government: yes (for GRIs through NST / MSIT)
Tecniospring Industry https://bit.ly/2SIxhEa	▪ Cooperation Type: Mobility / Fellowship programme ▪ Funding Organization: ACCIO Catalonia Trade & Investment Agency, co-financed by the H2020 Marie Sklodowska-Curie actions of the European Union ▪ Call Opening/Closing Date: Jul 2019 / Sep 2019 ▪ Participation Qualification: Experienced researchers of any nationality with a PhD and two additional years of full-time research experience, or at least 6 years of full-time equivalent research experience. Researchers must not have resided or carried out their main activity in the country of their host organization for more than 12 months in 3 years immediately prior to the deadline for the submission of applications. ▪ Project Duration: The duration of the fellowship is 2 years ▪ Funding Scale and scheme: Financial support to cover up to 100% of 2-year employment contracts and develop research activity: salary, including social security: 58,500€ per year. Research costs: 18,240€. Mobility costs: 1,920 €. ▪ Research Fields: Applied research projects with a clear market focus. Projects must be aimed at developing a new technology and bring it to the market in the fields of: Life sciences; Chemical, Energy and Environment; Mobility; Food; Industrial systems; Design and cultural industries. ▪ Matching fund from Korean government: Not needed. This program provides 100% funding.

PART 27

SWEDEN

SWEDEN

SWEDEN

Country Outline

- GDP: 466,925 mil. euros (Eurostat 2018)
- GDP per Capita: 45,900 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Life Science, Sustainable Urban Management, Aerospace, Energy and ICT, Mining, Minerals and Steel, Forest Products and Biomass

Contact Information

- Organisation: Embassy of Sweden
- Name / Position: Mr Anders HEKTOR, PhD / Science and Innovation Counsellor
- Phone no. / e-mail: (+82) 2 3703 3731 / anders.hektor@gov.se

Sweden is an innovation leader. The country has consistently ranked No 1 in the European Innovation Scoreboard since measures started in 2010, and No 2 and 3 in the Global Innovation Index since 2013. 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, promotes cross-sectoral collaboration and is open to international influences.

1. Policies and Strategies in Science, Technology and Innovation

Innovative Country

Sweden, the country of the Nobel Prize, has ranked the top in the European Innovation Scoreboard every year since the measures started in 2010. And in the Global Innovation Index Sweden has ranked number 2 or 3 every year since 2013. The country has also ranked at the top end of the scale in various innovation dimensions (OECD) and took the second position in Forbes Best Countries for Business Index 2019. 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 3.25%, recorded the top among the EU Member States at least since 2015.

Innovation Policy

The country has put consistent effort to expand its innovative capacity and create a better climate for innovation to meet societal challenges and 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 under the Prime Minister, to prepare for the future and further strengthen its competitiveness. The Council works to tackle societal challenges and has selected four innovation partnership programmes (IPPs); The Digital Structural Transformation of Industry; Health and Life Science; Climate Transition in Industry; Skills provision and lifelong learning. The Council emphasizes the importance of partnerships among public, business and academia. The Prime Minister chairs the Council and the Council consists of four ministers and eleven 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 a significant amount of investment in research infrastructure. For example, MAX IV Laboratory and the European Spallation Source (ESS) are launched and the government expect they will form a key hub in Europe's joint research.

To expand Sweden's innovative capacity further, Sweden 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) in late 2016.

Also, the government has developed the initiative, Strategic Innovation Areas (SIO), to make Sweden more attractive and unique to investors. The SIO will create a shared platform for strategic cooperation among different sets of actors. 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 society. The Challenge Driven Innovation (CDI) program is launched to tackle societal challenges, such as aging population and climate change. The government is changing 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 as % of GDP was 3.25% (Eurostat 2018) and 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 main research funding agencies in Sweden. The Swedish Research Council (VR) is the largest civil recipient of the R&D fund in Sweden and provides around SEK 6.4 billion (760 million USD) in funding for basic research in all areas of research each year. 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 distributes about 1.3 billion SEK (154 million USD) annually. 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 distributes 550million SEK (65 million USD) each year. The Swedish Innovation Agency (Vinnova) contributes to sustainable growth by improving conditions for innovation by funding innovation projects and research needed to develop new solutions. Vinnova distributes 3 billion SEK (356 million USD) annually.

RISE (Research Institutes of Sweden Holding AB), is a single holding entity and a group of public research institutes that receives government funding. The overall objective of the RISE is to support sustainable development of Sweden and help the country to gain more international competitiveness. 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.

Four research funding foundations were established by the government in the mid-1990s. These 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 foundations. Support from other public research foundations is also important contributions to research. For example, the Bank of Sweden Tercentenary Foundation (RJ), foundation is a public fund and supports research in Humanities and Social Sciences.

Private financiers are also important and provide significant contributions to research in Sweden. Notably, the Wallenberg Foundations distributes 190 million USD worth of grants every year and made special announcements in 2018 to commit 270 million USD for research on AI and Quantum computing the coming decade. Sweden's second biggest research oriented foundation based on assets is Torsten Söderbergs Stiftelse that provide grants of up to 14 million USD each year. The third largest private research foundation is Jan Wallanders and Tom Hedelius Stiftelse that provided 179 grants, totalled 25 million USD in 2017.

2. National STI Programmes and Initiatives

Programme Title	Contents
Korea-Sweden STI Joint Research Programme www.vr.se/inenglish	▪ The Swedish Research Council (SRC) has an ongoing bilateral collaboration with the National Research Foundation of Korea, NRF. A typical project lasts two years with up to 50,000 USD per year provided by each side. ▪ The 2018 call focused on exchange for use of national research infrastructure. Eight Swedish projects were granted to utilize South Korean research facilities and five South Korean projects were funded for travel to visit Swedish facilities. Research topics addressed were within life-, medical-, natural- and engineering sciences. The projects were evaluated by their respective national funding agency and should be completed before the end of 2020. ▪ The next joint launch between VR, NRF and other national research funding organizations will take place in early 2020 with funding from 2021 and onwards. - Contact person: magnus.friberg@vr.se
Korea-Sweden Research Cooperation (STINT) www.stint.se/en/scholarships_and_grants/korea-sweden	▪ 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 78 000) and NRF invests a corresponding amount to the Korean side. Since 2008 STINT has supported 66 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 are open to all fields of science. Calls usually open approximately in June/July and close in September/October for the next year program. In 2019 STINT and NRF have granted support to four new projects. Calls for the 2020 program will open in June 2019 - Contact person: mattias.lowhagen@stint.se
Grants for Korean-Swedish Research Collaboration (SSF) www.strategiska.se/en	▪ 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. Initially 9 projects had been funded for three years (2014-2017). Through the midterm evaluation in 2017, 6 out of 9 projects were selected for additional three years' funding at the same level from September 2017. - Contact person: Joakim.Amorim@stratresearch.se
EUREKA and Eurostars Korea-Sweden Collaboration (Vinnova) www.vinnova.se/en	▪ A Memorandum of Understanding was signed between the Korea Institute for Advancement of Technology (KIAT) and the Swedish Governmental Agency for Innovation Systems (VINNOVA) during EUREKA Innovation Week 2018. ▪ Both countries will focus on areas of mutual interest and consider utilizing existing channels, such as EUREKA meetings to identify, discuss, plan, implement and monitor collaborative activities. These include but are not limited to partner search, matchmaking, identifying joint R&D projects, drafting of promotional calls, etc. ▪ Eurostars Promotional Call on Smart Mobility, Smart Industry, Circular Economy, Smart Health and Smart Energy, closes in June 2019. - Contact person: ciro.vasquez@vinnova.se

3. Joint Activities with Korea

For information on upcoming events and activities please visit the website of the Embassy of Sweden: https://www.swedenabroad.se/ko/embassies/Seoul

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
RISE www.ri.se/en	Research Institutes of Sweden AB (RISE) is owned by the Swedish government and works in collaboration with and on behalf of the private and public sectors and academia. RISE develops services, products, technologies, processes and materials that contribute to a sustainable future and a competitive Swedish business community. RISE mobilises resources and creates improved conditions to increase the pace of innovation by gathering a number of research institutes and over a hundred test beds and demonstration environments under the umbrella of a single innovation partner.
Chalmers University of Technology www.chalmers.se/en	Chalmers University of Technology is a full-scale technological university with scientific depth and interdisciplinary breadth situated in Gothenburg, Sweden. At Chalmers, both curiosity-driven fundamental research and applied research to solve concrete societal challenges are natural. Founded in 1829, Chalmers is consistently ranked World top 100 for Engineering. Recently, nine researchers from Sweden (two Chalmers) and nine from South Korea received a total of 7.3 million USD for research collaboration of the highest international standards.
Royal Institute of Technology 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. 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 www.liu.se/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 www.lunduniversity.lu.se	Lund University (LU) was established in 1666, and is consistently ranked as one of the top 100 universities in the world. LU provides education and research in engineering, science, law, social sciences, economics and management, medicine, humanities, theology, fine art, music and drama. LU has research collaboration with many Korean counterparts in fields such as Biomedical Engineering, Automatic Control and Nanoscience.
Karolinska Institutet www.ki.se/en/startpage	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 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

UNITED KINGDOM

UNITED KINGDOM

Country Outline

- GDP: 2,393,693 mil. euros (Eurostat 2018)
- GDP per Capita: 36,000 euros (Eurostat 2018)

Contact Information

- Organisation: British Embassy Seoul
- Name / Position: Mr. Gareth Davies / Head of Science, Innovation and Energy
- Phone no. / e-mail: (+82) 2- 3210-5628 / sinkorea@fco.gov.uk

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 10.7% of all citations and 15.2% of the world's most cited papers. The UK was ranked fourth overall in the 2018 WIPO Global Innovation Index and fifth in the WEF Global Competitiveness Report 2018 for quality of scientific research institutions. Four of the world's top ten universities are in the UK (QS World University Rankings 2019).

1. Policies and Strategies in Science, Technology and Innovation

Published in November 2017, the UK Industrial Strategy sets out how we are building a Britain fit for the future – how we will help businesses create better, higher-paying jobs in every part of the United Kingdom with investment in the skills, industries and infrastructure of the future. It ensures that our country and its citizens can embrace and benefit from the opportunity of technological change.

The Industrial Strategy's vision is based on Five Foundations of Productivity:

- Ideas – being the world's most innovative economy
- People – creating good jobs and greater earning for all
- Infrastructure – delivering a major upgrade to the UK's physical and digital infrastructure
- Business Environment – making the UK the best place to start and grow a business
- Places – enabling prosperous communities across the UK

Through an open and consultative process the UK has identified Grand Challenges that have been set for the UK government and wider economy. These are in response to global forces that will shape our rapidly changing future, and which the UK must embrace to ensure we harness all the opportunities they present. The Grand Challenges commit to: putting the UK at the forefront of the artificial intelligence and data revolution; maximising

the advantages for UK industry of the global shift to clean growth; becoming a world leader in shaping the future of mobility; and harnessing the power of innovation to meet the needs of an ageing society.

To support these actions the UK has committed to raise total R&D investment to 2.4% of GDP by 2027, and to invest GBP 725 million in a new Industrial Strategy Challenge Fund to capture the value of innovation. In addition, new Sector Deals, partnerships between government and industry have been launched to unlock additional resource to respond to industry led recommendations to increase sector productivity. The first five Sector Deals are in the life sciences, construction, the creative industries, artificial intelligence and the automotive sector.

For further information on the UK Industrial Strategy; the Grand Challenges, Industrial Strategy Challenge Fund and Sector Deals please visit:

The UK Industrial Strategy – Building a Britain Fit for the Future
www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

2. National STI Programmes and Initiatives

In April 2018, the UK launch of UK Research and Innovation (UKRI) was announced. UKRI brings together the UK's seven Research Councils (see below for details), InnovateUK and Research England to form a single, strategic organisation for the support of all UK publically funded science and research activity with a combined annual budget of over GBP 6 billion annually. While the Research Councils and InnovateUK 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.

An important development within the UK's STI environment has been the creation of the UK's innovation support agency, InnovateUK, now part of UKRI. With a budget of over GBP 550 million per year, InnovateUK provides a range of services and funding programmes to support the commercialisation of the best of UK research. Under the oversight of InnovateUK, 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. Available to any organisation that has established a presence in the UK, nine Catapults are now in operation.

- Cell and Gene Therapy Catapult
- Compound Semiconductor Catapult
- Connected Places Catapult (formerly the Future Cities and Transport Systems Catapults)
- Digital Catapult
- Energy Systems Catapult
- High Value Manufacturing Catapult
- Medicines Discovery Catapult
- Offshore Renewable Energy Catapult
- Satellite Applications Catapult

For further information please visit:

UK Research and Innovation www.ukri.org
InnovateUK www.gov.uk/government/organisations/innovate-uk
Catapult Centres www.catapult.org.uk

3. Joint Activities with Korea

Activities with the RoK in 2018

Programme Title	Contents
Medical Research Council – Korea Health Industry Development Institute Partnering Awards: Third Call	▪ Cooperation Type: Networking and Knowledge Exchange ▪ Funding Organisation: Medical Research Council (MRC). ▪ Call Opening/Closing Date: Opening November 2017; closing January 2018 ▪ Participation Qualification: UK and Korean researchers interested in exploring 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 and Korea participants. Up to 10 proposals will be funded each year. Funding used to support travel, visits and access to facilities, workshops, 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

Programme Title	Contents
UK – Korea Promotional Joint Call for Eurostars2 Projects	▪ Cooperation Type: Promotional Call for Joint Submissions ▪ Funding Organisation: InnovateUK ▪ Call Opening/Closing Date: Opening 20 September 2017; closing 01 March 2018 ▪ Participation Qualification: In the UK - SMEs only, in Korea - public and private research organisations, but led by a company ▪ Project Duration: Two to three years ▪ Funding Scale and Funding Scheme: Projects subject to funding criteria available to UK and Korean research organisations via the Eurostars2 funding programme; please check funding scale and availability with the National Eurostars Contact in your country. ▪ Research Fields: ICT - Internet of Things; AI & Robotics; Augmented & Virtual Reality; Cyber Security; Advanced Materials - Graphene Applications, Materials for Demanding Environments ▪ Matching fund from Korean government: Korean funding supported by the Ministry of Trade, Industry and Energy
UK – Korea Bilateral Collaboration on Smart Energy Innovation	▪ Cooperation type: Coordinated Funding Call ▪ Funding Organisation: Department for Business, Energy and Industrial Strategy ▪ Call Opening/Closing Date: Registration of interest – 26 April 2018; Competition submission – 03 May 2018 ▪ Participation Qualification: UK and Korean companies and research performing organisations seeking collaborations for the development and deployment of flexible energy systems ▪ Project Duration: Two years ▪ Funding Scale and Funding Scheme: Up to GBP 6 million in total (GBP 3 million per country) to support between three to six projects ▪ Research Fields: Development and demonstration of smart energy technologies, such as energy storage and demand-side response; vehicle-to-grid; flexibility markets; and system integration ▪ Matching fund from Korean government: Ministry of Trade, Industry and Energy
UK – Korea Civil Nuclear Research Programme Phase 2	▪ Cooperation type: Coordinated Funding Call ▪ Funding Organisation: Engineering and Physical Sciences Research Council (EPSRC) ▪ Call Opening/Closing Date: Opening 05 October 2018; closing 20 November 2018. Korean closing date 27 November 2018 ▪ Participation Qualification: UK and Korean academic and research performing organisations ▪ Project Duration: Up to three years ▪ Funding Scale and Funding Scheme: Up to GBP 3 million in total (GBP 1.5 million per country) to support up to four projects ▪ Research Fields: Waste Management, decontamination and environmental assessment, and robotics ▪ Matching fund from Korean government: Ministry of Trade, Industry and Energy, via the National Research Foundation of Korea

Activities with the RoK in 2019

Programme Title	Contents
UK – Korea Focal Point Programme	▪ Cooperation Type: Networking and Knowledge Exchange ▪ Funding Organisation: UK Department for Business, Energy and Industrial Strategy ▪ Matching fund from Korean government: Korean funding supported by the Ministry of Science and ICT ▪ Call Opening/Closing Date: Call for projects expected in late 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
Medical Research Council – Korea Health Industry Development Institute Partnering Awards (Fourth Call)	▪ Cooperation Type: Networking and Knowledge Exchange ▪ Funding Organisation: Medical Research Council (MRC) ▪ Matching fund from Korean government: Korean funding supported by the Ministry of Health and Welfare ▪ Call Opening/Closing Date: Please check MRC website ▪ Participation Qualification: UK and Korean researchers interested in exploring 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 and Korea participants. Up to 10 proposals will be funded each year. Funding used to support travel, visits and access to facilities, workshops, networking, researcher exchange, and other similar collaborative activities ▪ Research Fields: All fields within the basic sciences in line with bilateral strategic interests
Medical Research Council – Korea Health Industry Development Institute Dementia Call	▪ Cooperation Type: Coordinated Joint Funding Call ▪ Funding Organisation: Medical Research Council (MRC) ▪ Matching fund from Korean government: Korean funding supported by the Ministry of Health and Welfare ▪ Call Opening/Closing Date: Opening December 2018; closing February 2019 ▪ Participation Qualification: UK and Korea based researchers working in the area of dementia ▪ Project Duration: Three years ▪ Funding Scale and Funding Scheme: Up to GBP 600,000 for UK participants, with an equal amount of matched funding provided to Korean participants. Two proposals will be funded. ▪ Research Fields: Neurosciences and mental health

Programme Title	Contents
UK – Korea Multi-omics Based Research for Precision Medicine Research Initiative 2019	▪ Cooperation Type: Coordinated Joint Funding Call ▪ Funding Organisation: Medical Research Council (MRC) ▪ Matching fund from Korean government: Korean funding supported by the Ministry of Science and ICT ▪ Call Opening/Closing Date: Opening March 2019, closing in April 2019 ▪ Participation Qualification: UK and Korea based researchers working in the area of multi-omics based precision medicine ▪ Project Duration: Three years ▪ Funding Scale and Funding Scheme: Up to GBP 2 million available to cover the UK component of the one research project selected for funding under this call. A MSIT/NRF contribution of GBP 7 million will be made available to fund the Korean collaborators ▪ Research Fields: Multi-omics precision medical technology ▪ Further information can be found via the MRC website
UK – Korea EUREKA Joint Funding Call	▪ Cooperation Type: Coordinated Joint Funding Call ▪ Funding Organisation: InnovateUK ▪ Matching fund from Korean government: Korean funding supported by the Ministry of Trade, Industry and Energy ▪ Call Opening/Closing Date: Opening 18 March 2019; closing 05 June 2019 ▪ Participation Qualification: In the UK - SMEs only, in Korea - public and private research organisations, but led by a company ▪ Project Duration: Two years ▪ Funding Scale and Funding Scheme: Up to GBP 2 million in total (GBP 1 million per country); please check funding scale and availability with InnovateUK or the Korea Institute for Advancement of Technology ▪ Research Fields: advanced materials for transport (air, land and maritime) with a focus on materials development; Internet of Things, with an industry or vertical sector application
UK – Korea 5G Infotainment Services for Transport Environments Call	▪ Cooperation type: Grant Funding ▪ Funding Organisation: Department for Digital, Culture, Media and Sport ▪ Matching fund from Korean government: Ministry of Science and ICT ▪ Call Opening/Closing Date: Opening 25 April 2019; closing 01 June 2019 ▪ Participation Qualification: UK lead must be a business of any size; UK collaborators must be a UK based business, academic organisation, charity or public sector organisation; Korean lead organisation and collaborators must be a Korean based business, research or academic organisation ▪ Project Duration: for UK applicants the project must finish by 31 March 2021; for Korean applicants the project must finish by 31 December 2020 ▪ Funding Scale and Funding Scheme: Up to GBP 2.4 million in total (GBP 1.2 million per country) to support one consortium in each country ▪ Research Fields: 5G Infotainment Services for Transport Environments technologies demonstrated on existing testbed environments

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
UK Research and Innovation (UKRI)	▪ Organisation type: Research Support Organisation ▪ Contact Information : www.ukri.org
InnovateUK	▪ Organisation type: Innovation Funding Agency ▪ Contact Information: www.gov.uk/government/organisations/innovate-uk
Arts and Humanities Research Council (AHRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.ahrc.ukri.org
Biotechnology and Biological Sciences Research Council (BBSRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.bbsrc.ukri.org
Economic and Social Sciences Research Council (ESRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.esrc.ukri.org
Engineering and Physical Sciences Research Council (EPSRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.epsrc.ukri.org
Medical Research Council (MRC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.mrc.ukri.org
Natural Environment Research Council (NERC)	▪ Organisation type: Research Funding Agency ▪ Contact Information: www.nerc.ukri.org
Science and Technology Facilities Council (STFC)	▪ Organisation type: Research Funding and Infrastructure Support Agency ▪ Contact Information: www.stfc.ukri.org

Other European Countries

Delegation of the European Union to the Republic of Korea

Other European Countries

NORWAY

NORWAY

NORWAY

Country Outline

- GDP: 368,389 mil. euros (Eurostat 2018)
- GDP per Capita: 69,300 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Arctic Research, Climate Change, Public Health, Marine and Maritime Activities, Petroleum Technology, and Renewable Energy

Contact Information

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Following a remarkable transformation in the past century in research and innovation, in particular through the development of new technologies and processes in sectors such as oil and gas, shipbuilding and also fisheries and aquaculture, Norway today occupies a strong position internationally in terms of new technology, skills and knowledge.

Norway is among the OECD countries with the highest share of government-financed gross domestic expenditure on research and development. The country can offer unique competence and research opportunities, largely related to its geography, economic specialisation patterns and institutional characteristics. It has internationally leading competence in a number of areas, both in universities, in the research institutes and in industry. There is a strong focus on international cooperation.

1. Policies and Strategies in Science, Technology and Innovation

The Norwegian Government has high ambitions for the Norwegian knowledge society and has committed itself to investing heavily in quality of research and higher education. In its long-term plan for research and higher education, the Ministry of Education and Research has underlined the importance of strengthening competitiveness and innovation capacity, solving major challenges to society and developing high-quality research groups in the years to come.

There is a special focus on areas where Norway enjoys strategic advantages such as natural resources, strong industry clusters or top-notch expert communities. The long-term plan for research and higher education therefore identifies six specific long-term R&D priority areas:

- The oceans;
- Climate change, the environment and environment-friendly energy;
- Public sector renewal and higher quality, more efficient welfare, health and care services;

- Enabling technologies;
- An innovative, adaptable private sector;
- World-class research groups.

As a major energy nation, Norway has key competences in developing knowledge and technology for efficient and sustainable energy systems. With strong traditions within marine and maritime and energy research, Norway is among the world's leading nations in petroleum and hydropower competence. There is key expertise in oil-related fields of science and technology, such as seismography, fluid flow dynamics and fixed and floating offshore structures.

Although petroleum is important to the Norwegian economy, the Government has a very strong focus on research on renewable energy and environment-related technologies. Since 2008 the expenditures on research, development and demonstration on renewable energy sources and energy efficiency have increased significantly. Norway has vigorous internationally recognised research communities working on the climate system, climate trends and the impacts of climate change on ecosystems.

In addition, Norway has a leading position in technological climate related research, especially on carbon capture and storage. Norway also has high-quality research groups working in fields such as environmentally hazardous substances and biodiversity.

The Norwegian government has a strong commitment to industry-oriented research and has the goal that Norway should be one of the most innovative countries in Europe. Norway has established strategic large-scale research programmes in emerging technology areas such as ICT, biotechnology and genomics, material science and nanotechnology. The IT sector is one of the most knowledge- and education-intensive branches in Norway today that innovates in a highly competitive environment.

In terms of important actors, the Ministry of Education and Research is the main policy-making body responsible for research and innovation in Norway. At the operational level, the Research Council of Norway (RCN) serves as the key advisory body on research policy issues to the Government. The Research Council identifies strategic research areas, allocates research funds and evaluates research within all fields and disciplines. It acts as a meeting-place and network builder for Norwegian research and works actively to encourage international research cooperation.

2. National STI Programmes and Initiatives

Norway has internationally leading competence in a number of areas, both in universities, in the research institutes and in industry. Most of the R&D-performing universities in Norway are public institutions, which have considerable autonomy in managing and organising their activities. One of the defining features of the Norwegian research and innovation system is the strong research institute sector. Most of the R&D performed by the institutes can be categorised as applied research, with a focus on engineering, technology and natural sciences.

Norway has a solid institutional framework and generous public measures for supporting business/corporate R&D. Interaction between research and industry is promoted through various programmes, inter alia through a number of measures managed by the Research Council of Norway.

A large part of public R&D funding in Norway is channelled through the Research Council of Norway, which receives funding from all the ministries. The Research Council allocates research funds within all fields and disciplines. It covers the entire spectrum from basic research to innovation and administers a wide variety of funding schemes and research programmes. Most RCN programmes are open to, and indeed encourage, international partners in funded projects. Korean institutions can thus receive funding under almost all RCN schemes and programmes, provided that they apply for funding together with a partner affiliated with a Norwegian research institution.

List of National Programmes open to the world

Programme Title	Contents
Research Council of Norway Programmes	▪ Most RCN programmes are open to, and indeed encourage, international partners in funded projects. ▪ There are programmes in a great variety of thematic areas, including Advanced production processes, Biotechnology, Bioeconomy, Energy, Global development, Seas and oceans, Health, ICT, Public sector renewal and innovation, Climate, Culture, Food, The environment, Environmental technology, New materials/nanotechnology, Industry-oriented research, Transport and mobility, Education, Welfare and working life. More information can be found on the Research Council's website: https://www.forskningsradet.no/en

NORWAY

3. Joint Activities with Korea

Activities with the RoK

Programme Title	Contents
MoU RCN - NRF	▪ The Research Council of Norway and the National Research Foundation of Korea have signed an MoU and are exploring opportunities for cooperation.
Joint activities and agreements between Universities and Institutes	▪ Numerous Norwegian Universities and Research Institutes have signed collaboration agreements and are carrying out many joint activities with Korean institutions.

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
Research Council of Norway	▪ Organisation type: Research Funding Organisation ▪ Norwegian contact point for international research and innovation programmes and networks (including H2020, JPI, COST, Eureka, EEA funding schemes, Nordic cooperation and others) ▪ Major Activities with Republic of Korea: Grants, research and innovation programmes ▪ Contact Information: https://www.forskningsradet.no/en post@forskningsradet.no ▪ RCN has signed a MoU with National Research Foundation of Korea on joint research and exchange, as well as other cooperative programmes
Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education	▪ Organisation type: Public sector agency ▪ Promotes development and innovation in education, encourages international cooperation and digital learning methods ▪ Manages a number of national and international incentive schemes to promote quality in universities ▪ Contact Information: post@diku.no; https://diku.no/en
Universities in Norway	▪ Norwegian University of Science and Technology (NTNU): https://www.ntnu.edu/ ▪ University of Oslo : http://www.uio.no/english/ ▪ University of Bergen : http://www.uib.no/en ▪ University of Tromsø : https://en.uit.no/startsida ▪ University of Agder : https://www.uia.no/en ▪ Norwegian University of Life Sciences (NMBU).: https://www.nmbu.no/en ▪ OsloMet : http://www.hioa.no/eng/ ▪ University of Stavanger : http://www.uis.no/?lang=en_GB ▪ Nord University : https://www.nord.no/en/Pages/default.aspx
Research institutes that receive basic funding	▪ Institute for Energy Technology: https://ife.no/en/ ▪ NORCE Norwegian Research Centre AS: https://www.norceresearch.no/ ▪ Norwegian Geotechnical Institute (NGI): https://www.ngi.no/eng ▪ NORSAR – Norwegian Seismic Array: https://www.norsar.no/ ▪ Norwegian Computing Center: https://www.nr.no/en ▪ Norut Northern Research Institute: https://norut.no/en ▪ SINTEF AS: https://www.sintef.no/en/ ▪ SINTEF Energy Research AS: https://www.sintef.no/en/sintef-energy/ ▪ SINTEF Manufacturing AS: https://www.sintef.no/manufacturing/ ▪ SINTEF Ocean AS: https://www.sintef.no/ocean/ ▪ Chr. Michelsens Institute (CMI): https://www.cmi.no/ ▪ Fafo Research Foundation: https://www.fafo.no/index.php/en/ ▪ Fridtjof Nansen Institute (FNI): https://www.fni.no/ ▪ Peace Research Institute (PRIO): https://www.prio.org ▪ The Norwegian Institute for Social Research: http://www.samfunnsforskning.no/english/ ▪ Møreforsking AS: http://www.moreforsk.com/ ▪ NORCE Norwegian Research Centre AS: https://www.norceresearch.no/en/ ▪ NIFU Nordic Institute for Studies in Innovation, Research and Education: http://www.nifu.no ▪ NUPI Norwegian Institute of International Affairs: http://www.nupi.no/nupi_eng ▪ NTNU Social Research: http://www.samforsk.no ▪ Centre for Applied Research at NHH: http://www.snf.no ▪ SINTEF AS: http://www.sintef.no/en ▪ Stiftelsen Telemarksforsking: http://www.telemarksforskning.no ▪ Frisch Centre: http://www.frisch.uio.no/english ▪ Western Norway Research Institute: http://vestforsk.no/en ▪ Trøndelag R&D Institute: http://tfou.no ▪ Østfoldforskning AS: http://www.ostfoldforskning.no/en ▪ NIBIO – Norwegian Institute of Bioeconomy Research: http://www.nibio.no/en ▪ NOFIMA - Norwegian Institute of Food, Fisheries and Aquaculture Research: http://nofima.no/en ▪ RURALIS - Institute for Rural and Regional Research: https://ruralis.no/en ▪ SINTEF Ocean AS: https://www.sintef.no/en/ocean ▪ Norwegian Veterinary Institute: https://www.vetinst.no/en ▪ CICERO - Center for International Climate Research: https://cicero.oslo.no/en ▪ NERSC - Nansen Encvironmental and Remote Sensing Center: https://www.nersc.no ▪ NIKU - The Norwegian Institute for Cultural Heritage Research: https://www.niku.no/en ▪ NILU - Norwegian Institute for Air Research: https://www.nilu.no/en ▪ NINA – Norwegian Institute for Nature Research: https://www.nina.no/english/Home ▪ NIVA – Norwegian Institute for Water Research: https://www.niva.no/en ▪ NORCE Norwegian Research Centre AS: https://www.norceresearch.no ▪ Institute of Transport Economics: https://www.toi.no/english

Organisation Name	Detailed information
Innovation Norway	▪ Organisation type: Governmental agency ▪ Major Research Area/Product: Start-ups, growth companies and clusters, internationalisation, sustainability ▪ Major Activities with Republic of Korea: Country office in Seoul arranging several activities throughout the year ▪ Future Plans/Strategy: Ocean space and clean energy ▪ Contact Information: seoul@innovationnorway.no

Other European Countries

SWITZERLAND

SWITZERLAND

SWITZERLAND

Country Outline

- GDP: 597,314 mil. euros (Eurostat 2018)
- GDP per Capita: 70,000 euros (Eurostat 2018)
- Areas of marked S&T specialisations: Engineering & MEMS, Physics & Chemistry, Life Sciences & Medical Technology

Contact Information

- Organisation: Embassy of Switzerland
- Name / Position: Dr. Alessandra Apicella / Head of Science and Technology Office
- Phone no. / e-mail: (+82) 2 3704 4703 / seo.science@eda.admin.ch / www.stofficeseoul.ch

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)

- Innosuisse:
  Innosuisse as the Swiss Innovation Promotion Agency to promote science-based innovation in the interests of industry and society in Switzerland

- 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 STI Programmes and Initiatives

International Cooperation Programmes/Initiatives

Programme Title	Contents
Bilateral R&D Projects www.innosuisse.ch	▪ Programme name: Bilateral R&D Projects ▪ Cooperation Type: Joint research / researchers' mobility / joint lab …. ▪ Funding Organisation: Innosuisse ▪ Call Opening/Closing Date: Every month, depending on field. See website. ▪ Funding Scale and Funding Scheme: Application-oriented projects in any research-based innovative field. Only research institutions/universities get funding, not companies. ▪ Research Fields: All ▪ Matching fund from Korean government (if yes, what is funding process?)
EUREKA Network www.eurekanetwork.org	▪ Programme name: EUREKA Network ▪ Cooperation Type: Joint research ▪ Funding Organisation: Eureka (every country has a National Contact Point (NCP) ▪ Call Opening/Closing Date: Every month, depending on field. See website. ▪ Funding Scale and Funding Scheme: Market-driven innovative research and development projects. ▪ Research Fields: All ▪ Others: www.kti.admin.ch --> Funding opportunities --> For companies --> bilateral R&D projects
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.

Activities with the RoK in 2019-2020

Programme Title	Contents
Korean-Swiss Science and Technology Programme	▪ Major topic or agenda: Basic science research project funding with co-funding from Switzerland and Korea (collaboration NRF-SNSF) ▪ Date and Venue: Deadline March 14, 2019 ▪ Objective: 3 years Joint research projects (12 funded) ▪ Target Participants: Scientists ▪ Detailed Information: Website: www.snf.ch/en --> Funding --> Programmes --> Bilateral programmes –> South Korea
Switzerland – Korea Joint Call for R&D Innovation	▪ Major topic or agenda: Innovation projects including a Swiss consortium (company, Swiss research institution) and a Korean consortium (company, research institution ▪ Date and Venue: Yearly launched. Pre-proposal deadline May, proposal deadline September ▪ Objective: Joint research cooperation between academia and industry ▪ Target Participants: Companies and scientists ▪ Detailed Information: Website www.innosuisse.ch --> Go Global --> Bilateral
PhD exchange Program	▪ Major topic or agenda: Exchange program to enable mobility of young researchers, e.g. PhD students for research stays of up to 3 months (NRF-ETH-Z). ▪ Date and Venue: Yearly call opens in September and closes in November ▪ Objective: Cooperation exchanges ▪ Target Participants: Young researchers ▪ Detailed Information: www.ethz.ch/en --> The ETH Zurich --> Global --> Bilateral programs --> South Korea
Swiss-Korean Life Science Initiative	▪ Major topic or agenda: Collaboration platform for R&D collaboration in life sciences and medical technologies including medical doctors, engineers, companies and start-ups ▪ Date and Venue: Yearly symposium and startup workshop ▪ Target Participants: Scientists and companies active in medtech, precision medicine, digital health ▪ Detailed Information: www.stofficeseoul.ch --> Research and Innovation --> Bilateral --> Swiss-Korean Life Science Initiative
ARC-HEST	▪ Major topic or agenda: Collaboration in the field of sustainable architecture ▪ Date and Venue: Seoul, August 2019; Fribourg, February 2020 ▪ Objective: Summer and Winter schools aiming to bring Swiss and Korean students to work on challanges in the field of architecture and comfort ▪ Target Participants: Master students in architecture, engineering ▪ Detailed Information: www.stofficeseoul.ch --> Research and Innovation --> Bilateral --> ARC-HEST
Swiss-Korean Innovation Week	▪ Major topic or agenda: How smart technologies serve sustainable development goals – Smart Living ▪ Date and Venue: Seoul, May 20-24 2019. In 2020 topic and date tbd ▪ Objective: Enhance knowledge and cooperation in the above fields ▪ Target Participants: All depending on the activities ▪ Detailed Information: www.stofficeseoul.ch --> events--> Swiss-Korean Innovation Week

4. Science, Technology and Innovation Cooperation Partners

Organisation Name	Detailed information
Science & Technology Office, Embassy of Switzerland www.stofficeseoul.ch	▪ Organisation type: Science & Technology Office ▪ Current cooperation status with Korea: Connecting Swiss and Korean institutions/organizations and individuals for collaboration in research & innovation ▪ Contact point: Dr. Alessandra Apicella / Head of Science and Technology Office / alessandra.apicella@eda.admin.ch
Innosuisse (Commission for innovation) www.innosuisse.ch	▪ Major research areas/products: Cooperation academia-industry ▪ Current cooperation status with Korea: Collaborate actively with Korea (KIAT) in R&D funding and support Swiss start-ups expanding to Korea in all tech fields ▪ Contact point: Barbara Pfluger, Project Promotion and Knowledge & Technology Transfer (KTT) support / barbara.pfluger@kti.admin.ch
SNSF (Swiss National Science Foundation) www.snf.ch	▪ Organisation type: Funding organization ▪ Major research areas/products: Basic research ▪ Current cooperation status with Korea: Collaborate actively with Korea (NRF) in funding basic research collaboration ▪ Contact point: Jean-Luc Barras, Head of Division, Interdisciplinary and International Co-operation / jean-luc.barras@snf.ch
ETH Global (Korean webpage available) http://www.ethrat.ch/ko	▪ Organisation type: International Office ▪ Major research areas/products: Strategic management and supervisory body of the ETH domain. Have a webpage about ETH domain institutions in Korean ▪ Current cooperation status with Korea: Young researchers' exchange with NRF and unilateral calls for funding opportunities
ETH Zürich www.ethz.ch	▪ Organisation type: University ▪ Major research areas/products: Switzerland's highest-ranking university, leading house of Swiss science & technology collaboration Current cooperation status with Korea: Active research cooperation projects with Korean universities and industry, such as SNU, DGIST, POSTECH and SAIT ▪ Contact point: Elise Nardin, Programme Manager (for Korea) / elise.nardin@sl.ethz.ch
EPFL www.epfl.ch	▪ Organisation type: University ▪ Major research areas/products: Switzerland's brilliant young technical university, leading in basic science and working strongly with industry. ▪ Current cooperation status with Korea: Special relationship with KAIST and research projects with Samsung Electronics ▪ Contact point: Louisa Busca Grisoni, Head of Corporate Relations, Vice Presidency for Innovation / louisa.buscagrisoni@epfl.ch
PSI www.psi.ch	▪ Organisation type: Research centre ▪ Major research areas/products: Switzerland's largest research centre ▪ Current cooperation status with Korea: Close collaboration with Postech and Korean research institutes such as KIMM ▪ Contact point: Giorgio Travaglini, Head, Technology Transfer / giorgio.travaglini@psi.ch
WSL www.wsl.ch	▪ Organisation type: Swiss Federal Institute for Forest, Snow and Landscape Research ▪ Major research areas/products: Swiss Federal Institute for Forest, Snow and Terrain Studies ▪ Contact point: Konrad Steffen, Director / konrad.steffen@wsl.ch
Empa www.empa.ch	▪ Organisation type: Research institute ▪ Major research areas/products: Application and technology-focused research institute for materials and technology (materials & surfaces, civil engineering, biomaterials, energy). ▪ Contact point: Gabriele Dobenecker, Head Marketing, Knowledge and Technology Transfer / gabriele.dobenecker@empa.ch
Eawag www.eawag.ch	▪ Organisation type: Research Center ▪ Major research areas/products: Aquatic research center promoting the transfer of research to practice ▪ Contact point: Anne Dietzel, Knowledge Transfer & Continuing Educatio / anne.dietzel@eawag.ch
CSEM www.csem.ch	▪ Organisation type: Research centre ▪ Major research areas/products: Private research centre fostering innovation in microtechnology and ICT ▪ Contact point: Georges Kotrotsios, Vice-President, Marketing & Business Development / georges.kotrotsios@csem.ch
Universities of Applied Sciences	▪ Organisation type: University ▪ Major research areas/products: 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; ▪ ZHAW: Zurich Universities of Applied Sciences; www.zhaw.ch

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