



# Science and Technology Policy 2020–2022

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# Science and Technology Policy 2020–2022



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## Foreword by the Prime Minister

In 2020, we have all been tangibly reminded of the value of science in confronting public emergencies. The positive collaboration between the government and health scientists has been a key factor in combating the spread of COVID-19. It has not only made a major difference to have specialists with expert knowledge of the latest research in epidemiology and medical science participate in and direct the actions taken, the general public has also taken an active part in discussion of their premises. Using research in public policy and decision-making should never be based on blind faith in scientific advice. On the contrary, the utilisation of research has to support an open, democratic dialogue with broad participation in society.

Such a dialogue, however, is anything but a given. We need to consider how to lay the foundation for a culture where it is natural and instinctive to share scientific expertise on how to meet the greatest challenges of today, discuss the issues and resolve them together. Here the education system plays an important role, together with the government, the media and NGOs. During the current pandemic, we have seen the value of living in a society where we can have an informed conversation on complex issues of contention. We need to use the experience of the epidemic to reinforce the connections between science and society in our struggle with any threat – including most obviously the current climate crisis. By doing so we are better equipped to meet the future.

Businesses and workplaces throughout the country have been struggling in the wake of the pandemic and export earnings have fallen sharply. The major task ahead is to boost economic activity once more and create jobs. Our response emphasises innovation and knowledge generation, with a view to stimulating growth sectors based on knowledge and increasing knowledge-driven exports. Innovation, in both the private and public sector, can provide stronger support for the economy in the long run and increase our capacity to find solutions for the challenges of the coming years.

For innovation to thrive and prosper and deliver lasting benefit to the economy and society, the ecosystem for entrepreneurs and companies must encourage such innovation. Governments play a major role in laying the foundations of a strong ecosystem for innovation and research. We should aim to create conditions in Iceland where knowledge-based companies can thrive and grow and attract talented people from other countries to settle here to work on research and innovation.

A vibrant ecosystem of innovation and research cannot be created overnight. We need to ensure an education system where everyone can find suitable education; long-term financing needs to be available; healthy competition and co-operation needs to be encouraged; and an entrepreneurial culture fostered. Consideration needs to be given to the role of both the public and private sectors. Public investment in research and innovation in socially important endeavours can contribute to creating new opportunities in areas that are crucial and bring great benefits to society. Public investment for instance can accelerate green economic growth, and encourage advances in healthcare technology. Innovation in public service is required to make it more user-friendly and efficient, and digital solutions should be implemented to a greater extent. We must continue the process of integrating Icelandic into the digital world so that our language will be available in computer-controlled devices and artificial intelligence.

In tandem with investing in innovation, basic research needs to be reinforced. This increases our understanding of the cultural, social and natural world and gives young scholars the opportunity to develop disciplined scientific working procedures. The decreasing proportion of applications awarded grants by the Research Fund in recent years is unacceptable and a trend which we want to reverse. The large number of applications to the Fund is an indication of the fertile research community in Iceland. History tells us that basic research is not the opposite of applied research. Public investment in basic research in the past has resulted in many things that we take for granted today, such as smart phones, electric cars and biotech pharmaceuticals. Robust basic research strengthens our knowledge base, education and culture and delivers sustainable growth for the future.

In its actions, the government has shown its conviction that Icelandic society can grow out of this crisis. Which is why we are devoting greater investment to basic research, development and innovation than has ever been done before in the history of the Icelandic Republic. It is important to increase the number of pillars supporting the domestic economy, boost value creation and not least strengthen knowledge and research – to benefit all of us in the future.



A handwritten signature in blue ink that reads "Karin Jakobsdóttir". The signature is fluid and cursive.



# Vision of the Science and Technology Policy Council (STPC)

In 2030, Iceland will be a diverse society characterised by welfare, security and equal opportunities. Iceland will be among leading countries when comparing quality of life, happiness and democracy. Emphasis will be placed on the quality of education, everyone's access to it and an education system that is constantly evolving in step with the society and the future.

In 2030, Iceland will be a society where research, knowledge, creativity and initiative lead to reform, value creation and vibrant business and cultural life. The general attitude, financial resources, framework and human capital will support science and innovation as the basis for prosperity.

In 2030, Iceland will be a society that cultivates knowledge activities and basic research. This will be a society that uses research and innovation to address societal challenges, enhance quality of life and public health and protect ecosystems, both on land and at sea. It will be a model for other countries in terms of sustainable development.

In 2030, Iceland will be a country that uses its small size to its advantage and is an active participant in the international community of science, innovation and culture. A country with an attractive environment for creative and talented people. Funding for basic research and knowledge-driven innovation will reflect that of countries in the forefront, and research and innovation will be of national and international importance.

In 2030, Iceland will be a society where innovation is an integral aspect of its culture and economy. It will be an ideal place to establish and operate internationally competitive business ventures. In Iceland, technological innovations will strengthen the foundations of a society based on the fundamental values of democracy, equality and sustainability.

## Principal Objectives of the Science and Technology Policy Council (STPC)

.....

- Research and innovation in Iceland should have a framework that is internationally competitive.
- Icelandic institutions and enterprises should increase their participation in international research and innovation.
- Value creation based on knowledge should be strengthened and jobs in knowledge industries increase.
- Research and innovation should benefit society in tackling societal challenges.



## Funds that support the emphasis of the Science and Technology Policy Council

The **Research Fund** supports scientific research and research-related postgraduate studies based on a professional evaluation.

The **Infrastructure Fund** supports the development of research infrastructure with grants for the purchase of equipment, databases and other important facilities for research work.

The **Technology Development Fund** provides grants for R&D work in technical development aimed at innovation in industry.

The **Strategic Research and Development Programme** Programme for science and technology supports special emphases in the government's science and technology strategy.

Key figures	Budget 2020 mISK	Supplement due to COVID -19 mISK	Total for the year 2020 mISK
Icelandic Research Fund	2.475,6	775,0	3.250,6
Technology Development Fund	2.287,6	700,0	2.987,6
Strategic Research and Development Programme (SRDP) for science and technology	181,5	-	181,5
Infrastructure Fund	279,0	125,0	404,0
EU Framework Programmes in Education, Research and Technology	3.237,5	-	3.237,5
Grants for innovation in industry	3.934,5 *	-	Not yet known

\*budget estimate

∴ The role of the Science and Technology Policy Council is to promote scientific research, science education, technological development and innovation in Iceland, with the aim of strengthening the foundations of Icelandic society and culture and increasing the competitiveness of the economy.



# Overview of Actions under the Science and Technology Policy 2020–2022

## Successful research and innovation for the future

### Financing and the tax environment

Action 1: Strengthen competitive funds

Action 2: Assessment of the tax and grant system for research and innovation

### Human resources

Action 3: Increase the quality in higher education and strengthen universities' funding

Action 4: Streamline the application process for work permits for specialists from outside the EEA

Action 5: Boost skills in the labour market

Task 1: Skills forecast for the Icelandic labour market

Task 2: Competency strategy for the Icelandic labour market

Task 3: Promote education for new skills

### Open access to data

Action 6: Open access to data

Task 1: Open access to research data

Task 2: Increased use of data for innovation

Action 7: Innovation dashboard

## Societal challenges

Action 8: Increase the dissemination of science

### Environment, ecosystem and climate

Action 9: Boost research and innovation on environmental issues

Task 1: Boost research, monitoring and synergies

Task 2: Increase innovation in the field of climate change and the circular economy

### Health and well-being

Action 10: Boost scientific research and innovation in the field of health

Task 1: Boost scientific research in the field of health

Task 2: Boost innovation in healthcare services

### Life and work in a world of change

The policy as a whole is a response to the challenge.



**Successful research  
and innovation  
for the future**



# Successful research and innovation for the future

## A new advance

In 2020, the corona virus pandemic has strongly impacted the economy and future prospects in Iceland and elsewhere in the world. The Science and Technology Policy Council emphasises that science and innovation should play a key role in the post-epidemic response.

Strengthening activities based on research and knowledge can provide a stronger foundation for long-term welfare and value creation and contribute to an economy that is less dependent on finite natural resources. Investment in research and innovation creates well-paid, diversified and demanding jobs, both in public institutions and in private enterprises. That would diversify risk and better equip society to deal with uncertainty and challenges in the future.

A vibrant knowledge society cannot be created without basic research. Basic research provides the foundation for a society that fosters innovation, culture, welfare and democracy. The free search for knowledge, based on the interest, curiosity and creativity of scientists, is a key factor in the development of science, as well as being the basis for many major transformations in society. Basic research in physics is utilised, for example, in smart phones; development of medicines is based on basic research in the life sciences; the National Curriculum Guide for preschools and compulsory schools uses basic research in developmental psychology and education; campaigns for minority rights often refer to basic research in the social sciences and history; and so on and so forth.

It is important that the government at all times have access to good scientific advice to understand the nature of societal challenges and to respond to them effectively. This has become abundantly clear in the struggle with COVID-19, where effective dialogue between scientists and politicians has been crucial. Lessons can be learned from the pandemic in dealing with challenges such as climate change. Research and innovation will link the community and the future in responding to global challenges.

**: Research and innovation are  
: crucial for long-term prosperity,  
: high quality of life and sustainable  
: development.**

Innovation is a driving force in economic growth and one of the most powerful ways to improve living standards and quality of life in the long term. Innovation involves turning new ideas or research outcomes into value, for example, in the form of better services or new products. Innovation refers not only to technological progress and the development of new industries; it is also a prerequisite for the competitiveness of well-established industries and the quality and efficiency of public services. Innovation is a key factor in building industrial activity that is competitive and diverse. It promotes increased productivity and creates new sources of foreign exchange earnings. Innovation will play an important role in tackling the challenges of the future. It is the foundation for building a sustainable society utilising green technology.

Physical distancing resulting from the COVID-19 epidemic created a watershed moment in the use of digital technology in communication, work and study. Many people's eyes were opened to the potential offered by greater use of technological solutions in common devices such as smart phones. The pandemic is likely to accelerate greatly digital development and job automation. At the same time, the use of digital technology for personal surveillance in many parts of the world has raised serious questions about privacy and human rights.

## The state of science and innovation in Iceland

In Iceland, conditions for research and innovation are in many respects good. Compared to other countries, the Icelandic education system is well equipped to prepare students for a future shaped by the fourth industrial revolution.<sup>1</sup> The proportion of the Icelandic population working on research<sup>2</sup> and the proportion of women scientists is high compared to other European countries (Figures 1 and 2).<sup>3</sup>

Icelandic researchers are relatively more active in international collaboration than their colleagues in other countries<sup>4</sup> (Figure 3). Such collaboration increases the quality of research and brings new knowledge and skills into the country, which in turn creates a stronger basis for innovation. The proportion of start-ups and high-growth enterprises is high in European comparison and conditions are favourable for entrepreneurs (Table 1).<sup>5</sup> A high proportion of private-sector employees work in knowledge industries and public support for research and development by companies as a percentage of GDP is similar to that of other European countries (Figure 6).<sup>6</sup> A higher percentage of companies in Iceland are innovative than the average in EU states (Figure 5).

1 Huginn Freyr Þorsteinsson, Ásdís Jónsdóttir, Einar Birkir Einarsson, Henný Hinz, Hjálmar Gíslason, Lilja Dögg Jónsdóttir and Stefanía G. Halldórsdóttir. 2020. *Action Plan for the Fourth Industrial Revolution*. Reykjavík: Prime Minister's Office

2 Organisation for Economic Co-operation and Development (OECD), 2018. OECD Data, Researchers. Retrieved 8 May 2020: <https://data.oecd.org/rd/researchers.htm>

3 UNESCO. 2018. *Women in Science*. Fact Sheet No. 51. Paris: UNESCO Institute for Statistics.

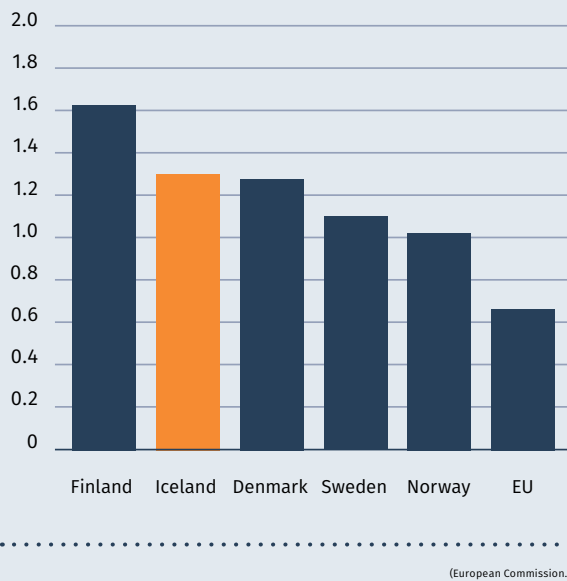
4 This can be seen in the number of international co-publications by Icelandic researchers, see: European Commission. 2018. *Science, Research and Innovation Performance of the EU 2018*. Strengthening the foundations for Europe's future. Brussels: European Union, p. 165.

5 European Commission. 2020. *Science, Research and Innovation Performance of the EU 2020. A fair, green and digital Europe*. Brussels: European Union, pp. 150, 155 and 177.

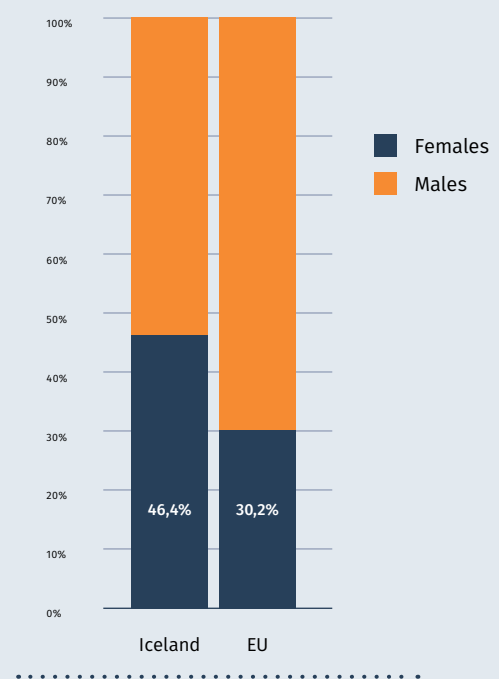
6 Ibid, pp. 277 and 442.

However, we can do considerably better. Iceland was ranked in 20th place in the Global Innovation Index in 2019. While this is not a poor performance, there is room for improvement – Iceland ranks last among Nordic countries.<sup>7</sup> The same applies to Iceland's position in 2019 on the *European Innovation Scoreboard*. There Iceland is among the countries considered strong in innovation but is still the weakest of Nordic countries. In particular, there are opportunities to increase the number of patent applications and boost exports of technology companies.<sup>8</sup> OECD has also pointed out that skills development needs to be strengthened for innovation, along with research collaboration between universities and private enterprises in Iceland.<sup>9</sup> R&D expenditure as a percentage of GDP is lowest in Iceland of the Nordic countries, as Figure 6 shows.

**Figure 1 – Researchers as a proportion of the total labour market (%) in 2018**



**Figure 2 – Proportion of women among scientists among scientists 2017**

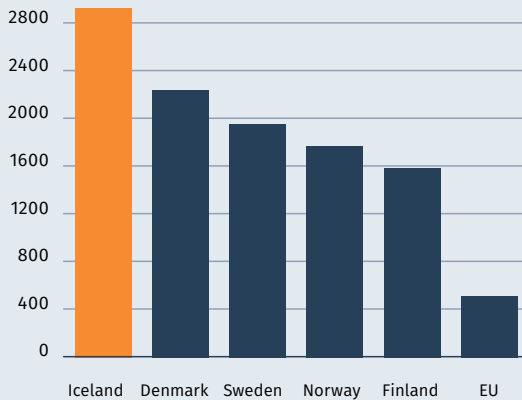


7 Dutta, Soumitra, Bruno Lanvin and Sacha Wunch-Vincent (eds.). 2019. *The Global Innovation Index 2019: Creating Healthy Lives - The Future of Medical Innovation*. Ithaca, Fontainebleau and Geneva: Cornell University, INSEAD and WIPO.

8 European Commission. 2020. *Science, Research and Innovation Performance of the EU 2020. A fair, green and digital Europe*. Brussels: European Union, pp. 420 and 440.

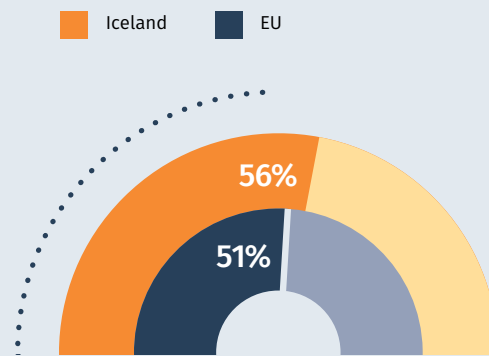
9 Organisation for Economic Co-operation and Development (OECD), 2018. *OECD Economic Surveys: Iceland 2019*. Paris. OECD Publishing.

**Figure 3 – International scientific co-publications per million inhabitants in 2016**



(European Commission.)

**Figure 5 – Proportion of innovative enterprises**



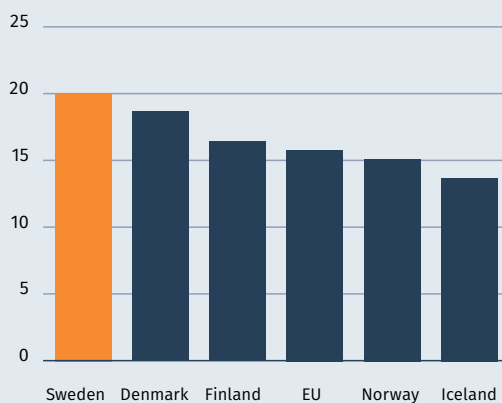
(Cis 2016, Statistics Iceland)

**Table 1 – Environment and conditions for entrepreneurs, Global Entrepreneurship Index. 10 top countries 2018.**

Sæti	Land	GEI stig
1	US	83,6
2	Switzerland	80,4
3	Canada	79,2
4	UK	77,8
5	Australia	75,5
6	Denmark	74,3
7	Iceland	74,2
8	Ireland	73,7
9	Sweden	73,1
10	France	68,5

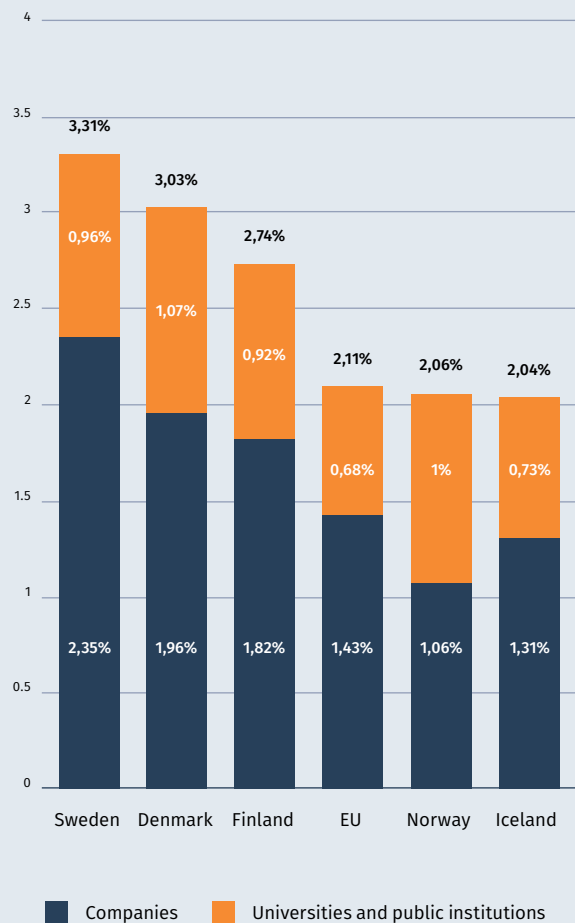
(Global Entrepreneurship Development Institute)

**Figure 4 % of private sector employees working in knowledge industries 2018.**



(Framkvæmdastjórn Evrópusambandsins)

**Figure 6 – R&D expenditure as a percentage of GDP 2018**



Statistics Iceland

## The Research and Innovation Ecosystem

To strengthen innovation and research in the longer term, a strong ecosystem of research and innovation needs to be created and maintained. The term "ecosystem" refers to the fact that research and innovation work only thrives under favourable conditions. Many things matter in this context: access to international research collaboration; access to good research infrastructure; knowledge of international markets and access to them; a culture that supports research, innovation and entrepreneurship; an efficient regulatory framework; appropriate education and lifelong learning; knowledge of business growth and development; access to funding for research and innovation; tax incentives; and so on (see Figure 7).

Major opportunities exist for strengthening connections and synergies within the ecosystem. In Iceland, extensive research is carried out in many fields and similarly many new enterprises are established here, but the connections between the two are not strong enough.

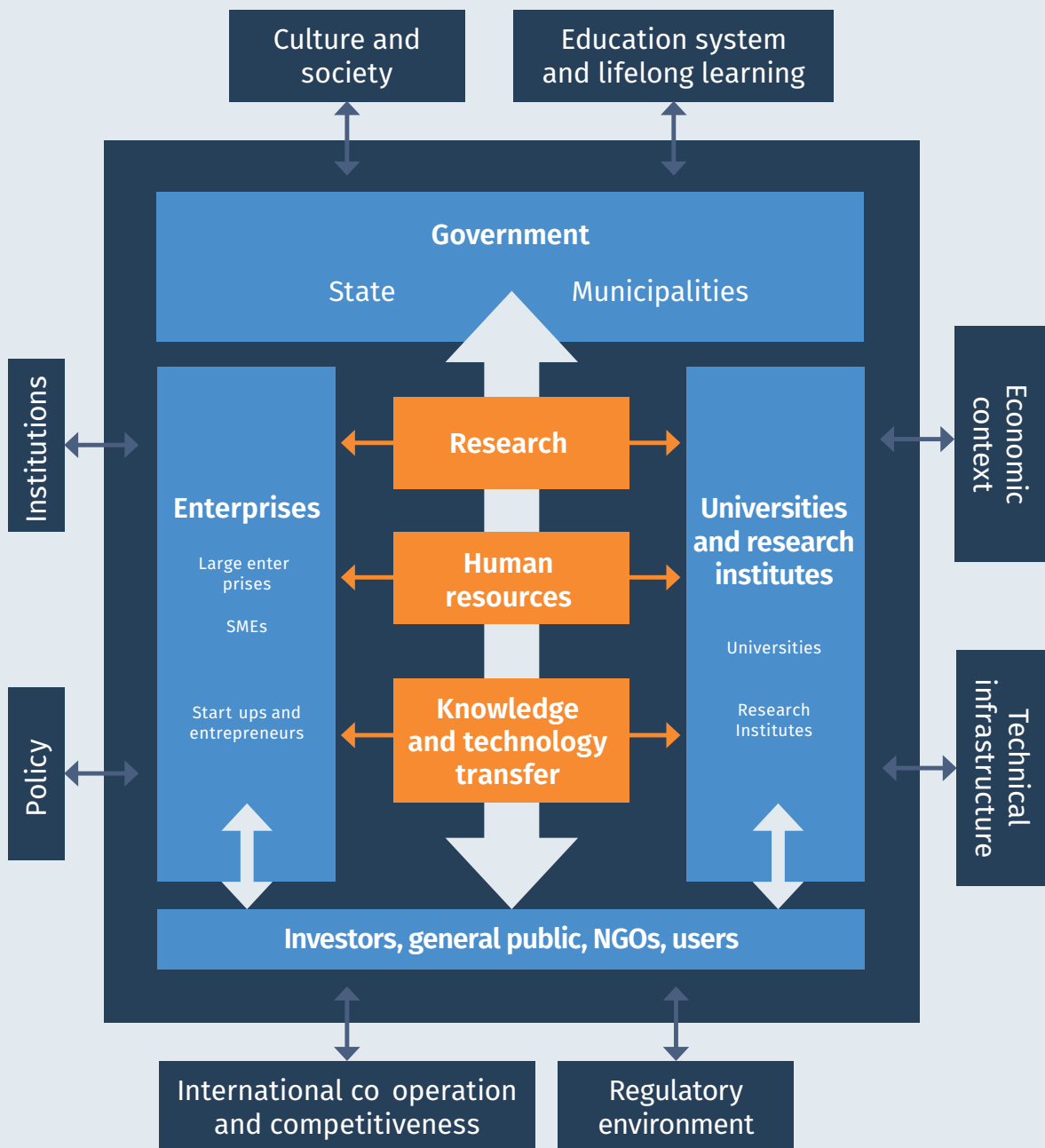
Reports on entrepreneurship and innovation in the Nordic countries have pointed out that the innovation ecosystem is generally too fragmented, and that co-operation needs to increase. Nordic states need to place more emphasis on creating entrepreneurial communities, building bridges between industries and increasing international co-operation.<sup>10</sup>

∴ **The strategy of the Science and  
∴ Technology Policy Council (STPC)  
∴ is to create a strong ecosystem in  
∴ Iceland for research and innovation  
∴ for the future.**

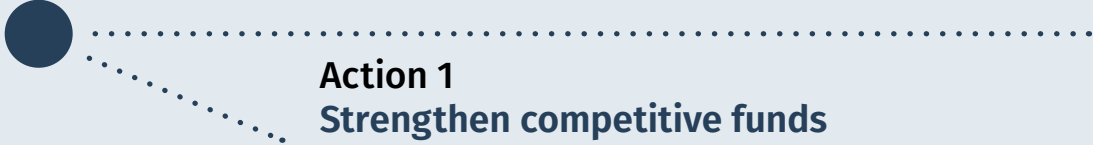
<sup>10</sup> Romanainen, Jari, Jelena Angelis, Derek Jan Fikkers, Reda Nausedaite, Emma Arenman, Karolina Henningsson, Katre Eljas-Taal, Johanna Vallistu, Frederic Maier and Kerli Muurisep. 2016. *Nordic Entrepreneurship Check 2016*. Final Report. Oslo: Nordic Innovation, and: Kreutzer, Idar. 2018. *An integrated and effective Nordic ecosystem for innovation and green growth*. Copenhagen: Nordic Council of Ministers.



**Figure 7- Research and innovation ecosystem**



# Funding and the tax environment



## Action 1 Strengthen competitive funds

Strong competitive funds are a prerequisite for success in research and innovation. They are a key factor in a flourishing research and innovation ecosystem.

Grants are awarded from competitive funds acting on the emphases of the STPC, based on objective and transparent processes. The funds set high quality requirements and in so doing promote increased competitiveness in research and innovation in Iceland.

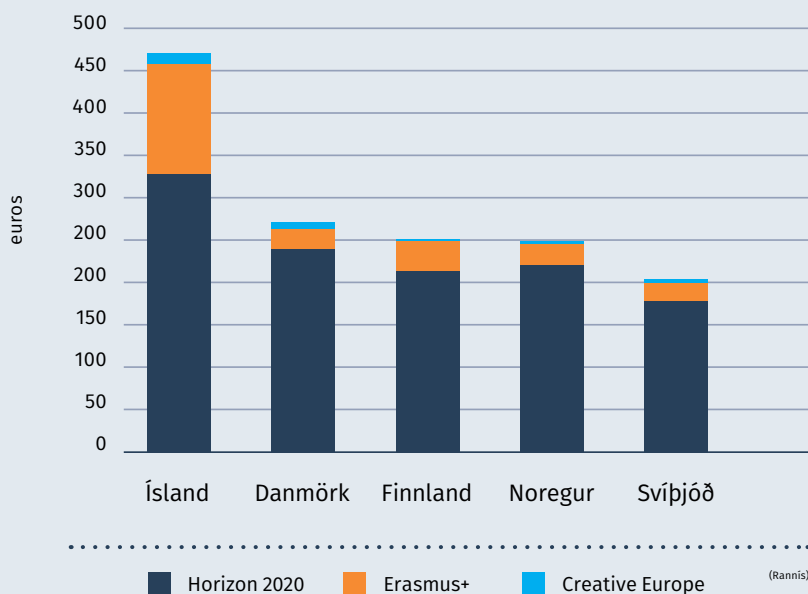
Robust domestic competitive funds are the basis for applications by scientists, entrepreneurs and enterprises in international funds. Domestic funds enable young scientists and entrepreneurs to acquire important skills and encourage innovation by start-ups at a critical growth stage. These domestic funds serve as a springboard to international co-operation, increasing the possibilities for scientists and enterprises in Iceland to be in the forefront internationally.

∴ **Participation in international co-operation is the lifeblood of vibrant research and innovation activities in Iceland. Such participation is founded on a strong knowledge base and robust domestic competitive funds.**

**Icelandic researchers have been** highly successful in Nordic and European research and scientific co-operation.<sup>11</sup> In terms of per capita grant funding, Iceland’s performance compared to other Nordic countries is remarkable, as the accompanying figure shows.

11 Icelandic Centre for Research (Rannís). 2018. *Iceland's participation in EU programmes in the field of research, education and culture*. Reykjavík: Rannís.

Figure 8 - Grants from EU Framework Programmes, euros per capita 2014–2017.



Success like this is anything but given. Strong domestic funds are a prerequisite for Iceland to continue its active involvement in international co-operation.

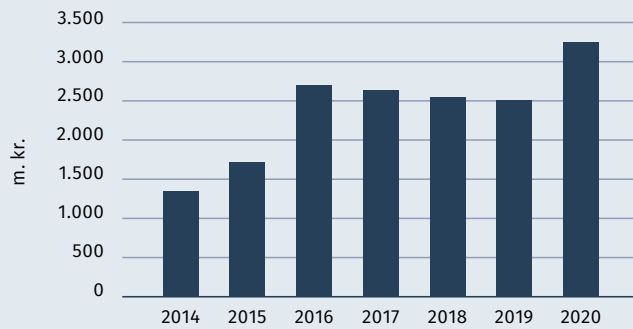
The government’s investment campaign in response to the COVID-19 pandemic provided a temporary additional contribution to the funds of ISK 1.6 billion. Of this, ISK 775 million went to the Research Fund, ISK 700 million to the Technology Development Fund and ISK 125 million to the Infrastructure Fund.

The action boosts the funds temporarily through a special three-year initiative. In 2021, funding for the competitive funds will be increased by approx. 50% compared to the 2020 national budget.

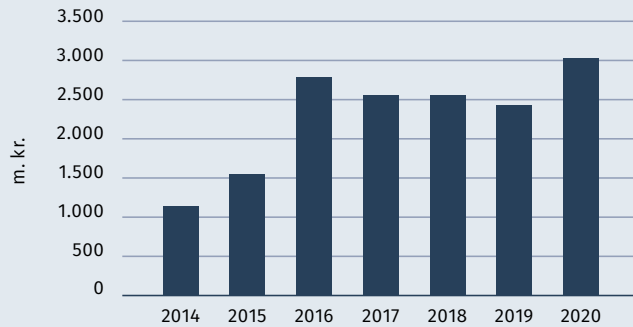
Furthermore, work will continue on reinforcing objective decision-making on SRDPs and the Infrastructure Fund

- Amendments will be made to the Act on Public Support for Scientific Research, No. 3/2003 with the aim of strengthening the SRDPs and making them more flexible. The objective is for SRDPs to be more useful for temporary emphases in research and innovation, to support targeted development in certain fields and to gather knowledge for policymaking on societal challenges. The changes will enable ministries to make better use of SRDPs to address specific societal challenges with the help of research and innovation.
- The Board of the Infrastructure Fund is working on a roadmap for research infrastructure in Iceland, under the Policy and Action Plan of the Science and Technology Policy Council 2017–2019. The goal of the roadmap is to create a strong research and innovation environment that increases the quality of research and innovation, strengthens Iceland’s competitiveness in the international scientific community and increases the country’s capacity to respond to societal challenges. In order to achieve these goals, special attention is directed at open access to research infrastructure and co-operation on the development and utilisation of the infrastructure.

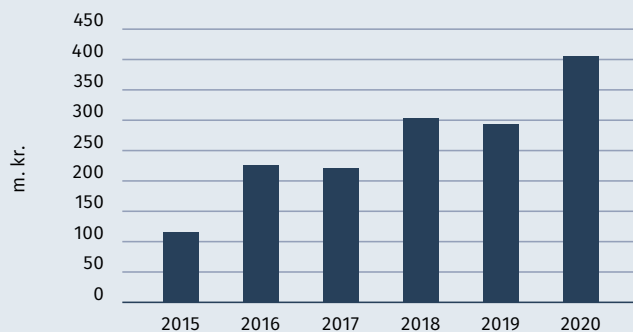
**Figure 9 –  
Icelandic Research Fund  
2014–2020**  
Fixed 2020 price level



**Figure 10 –  
Technology Development Fund  
2014–2020**  
Fixed 2020 price level



**Figure 11 -  
Infrastructure Fund  
2015–2020**  
Fixed 2020 price level




**Responsible party:**

Ministry of Education, Science and Culture and Ministry of Industries and Innovation. The Board of the Infrastructure Fund is working on a roadmap for research infrastructure.

**Schedule:**

A three-year initiative commencing in 2021.



## **Action 2: Examination of the tax and grant system for research and innovation**

The government places emphasis on an environment that encourages research and innovation. With this in mind, an examination will be made of the tax and grant system for research and innovation. The action involves a mapping of how the tax and grant system is structured as a whole, with the aim of providing a better overview that will facilitate assessing how the goals of supporting research and innovation can best be met.

Among other things, an examination will be made of the effects of tax incentives for research and development work. The aim is to obtain a professional and objective assessment of the use, utility and efficacy of laws on support for innovative enterprises. An assessment will be made of whether the objectives of legislation aimed at boosting R&D efforts and improving the competitive situation of innovative enterprises have been achieved during the ten-year period that support has been provided, and if so how. How the economy and society have benefited from these arrangements will also be examined.

An examination of the tax environment of research and universities will also be made, and this assessed with regard to taxation policy.

### **Responsible party:**

Ministry of Finance and Economic Affairs and Ministry of Industries and Innovation.

### **Schedule:**

The action is to be completed in 2023.

⋮ **Reimbursements to companies  
for R&D have increased rapidly in  
recent years and amounted to ISK  
3.6 billion in 2019.**

# Human resources

## Action 3: Increase the quality of higher education and strengthen universities' funding

Strong universities are the key source of knowledge activities in our society. They educate and train professionals for a variety of jobs, serve as a source of knowledge-driven innovation and foster culture and democratic debate. Furthermore, universities also bring new knowledge, technologies and methods to the country. Almost half of young people aged 25–34 years in Iceland have completed a university degree (47%), which is similar to other Nordic countries but higher than the OECD average (see Figure 12).

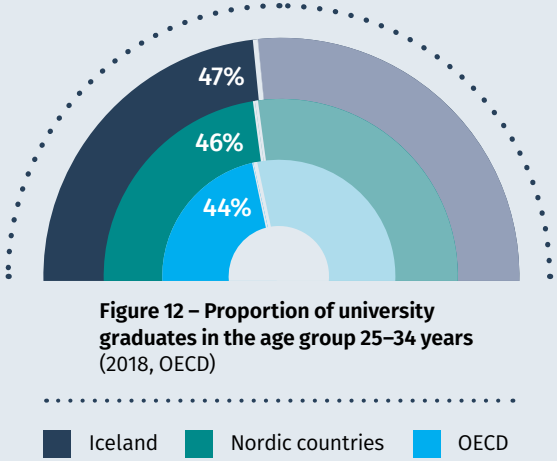


Figure 12 – Proportion of university graduates in the age group 25–34 years (2018, OECD)

The objective of the action is to make funding for universities comparable to that in other Nordic countries by 2025 and to increase the quality and efficiency of their work. The action is a continuation of Actions 4 and 5 in the last policy. This work led to university funding being comparable to the OECD average and to the publication of a Green Paper on University Funding,<sup>12</sup> which discusses methods for funding universities. The working group of the Ministry of Education, Science and Culture and the Science Committee of the STPC, which began work in 2020, will proceed on the basis of the Green Paper to develop indicators to measure the quality and efficiency of university work in consultation with the universities.

12 Ministry of Education, Science and Culture. 2020. *Green Paper on University Funding*. Reykjavik: Ministry of Education, Science and Culture.

Universities are the basis  
for knowledge-driven  
innovation and foster culture  
and democratic debate.

The action involves the following milestones:

In 2020: A working group is working to suggest improvements to the funding model to make it support the quality and efficiency of university work better. An analysis will be made of the funding of Nordic universities in a collaboration group including the universities, the Ministry of Education, Science and Culture and the Ministry of Finance and Economic Affairs. Work is underway on a strategy for quality and efficiency of university work and to develop indicators, including on the gender balance in university work, with a view to making the environment of Icelandic universities similar to that of comparable Nordic institutions.

In 2021: Consultation on changes to the funding model that emphasise quality and efficiency. The STPC and a diverse group of stakeholders will be included in the consultation. Work on a strategy for quality and efficiency in university work will continue, with a particular focus on the composition of the student population, the role of universities in knowledge creation and their role in the society. Consultations will be held on policy, indicators and the results of the analysis of university funding in Iceland, including methods of measuring what is comparable with other Nordic countries.

In 2022: Assessment will commence of funding in comparison with other Nordic countries and how the objective of the action should be achieved. Application of indicators to evaluate the efficiency and quality of university work will begin. A realistic plan will be implemented to achieve the objective by 2025.

In 2025: University funding will be comparable to funding elsewhere in the Nordic countries and based on similar criteria. Clear indicators are in place to assess the impact of public investment in the quality and efficiency of university education on Icelandic society.

**Responsible party:**

Ministry of Education, Science and Culture.

**Schedule:**

University funding will be comparable to that elsewhere in the Nordic region by 2025 and will be based on similar criteria. A status report on this work will be published in 2022.



#### **Action 4: Streamline the application process for work permits for specialists from outside the EEA**

Innovative companies and start-ups often need specialised expertise that is not available domestically. Lack of specialist expertise can be a major obstacle for enterprises and hinder their growth and development. They may even feel compelled to relocate valuable jobs abroad if they are unable to recruit staff with the necessary skills. The aim of this action is to make it easier for enterprises to hire experts from countries outside the European Economic Area, thus improving their access to important skills, expertise and international experience. An important first step was taken in 2016 when Regulation No. 1202, on deductions from the income of foreign experts, was introduced.

: **It is important to facilitate the  
: hiring of foreign experts by  
: enterprises and institutions to  
: strengthen their knowledge  
: base and build an international  
: network in innovation and the  
: knowledge industries.**

The action involves the establishment of a task force, led by the Ministry of Industries and Innovation, consisting of representatives from the Ministry of Social Affairs, the Ministry of Justice, Promote Iceland and stakeholders. The group's task will be to submit proposals for simplifying arrangements for processing and deciding on applications for work and residence permits for experts from outside the EEA.

The task force will look at the legislation, regulations and administrative processes for handling applications for work and residence permits for foreign experts and their families, with the aim of reducing unnecessary barriers and increasing flexibility.

#### **Responsible party:**

Ministry of Industries and Innovation in collaboration with the Ministry of Social Affairs, the Ministry of Justice and stakeholders.

#### **Schedule:**

Analytical work will begin in 2020 and improvement efforts commence in 2021, in line with the results of the analysis.





## Action 5: Boost skills in the labour market

Rapid social and technological changes are making the labour market much more fluid. Both enterprises and individuals will have to respond to demands for new skills, including in the field of innovation. Enterprises and industry in general need to develop rapidly to maintain their competitive edge. If innovation in Iceland is to be strengthened and the opportunities offered by the fourth industrial revolution fully utilised, it is crucial that the supply of education and lifelong learning keep up-to-date with changing times and take into account what key skills business, industry and society demand.

Good access to qualified staff boosts competitiveness and productivity. Formal education no longer tells the whole story; employers are increasingly looking at experience and skills in their recruitment. Here basic skills such as literacy and numeracy are important.

In the autumn of 2019, OECD published a report on economic affairs in Iceland, which deals specifically with education and skills.<sup>13</sup> Among other things, attention is drawn to the poor results of Icelandic students in PISA tests, especially to the weak performance of students with a mother tongue other than Icelandic. It also points to the growing disparity between the skills of people in the labour market and the skills that enterprises seek. Suggestions from the IMF mention similar aspects.<sup>14</sup> The education system needs to respond to these challenges.

∴ **Good access to qualified employees strengthens business competitiveness and boosts productivity.**

<sup>13</sup> Organisation for Economic Co-operation and Development (OECD), 2019. *OECD Economic Surveys: Iceland 2019*. Paris: OECD Publishing.

<sup>14</sup> International Monetary Fund. 2019. *Iceland. IMF Country Report No. 19/375*. Washington: International Monetary Fund.

### **Task 1: Skills forecast for the Icelandic labour market**

It is important to strengthen the capacity of public administration, institutions and individuals to make decisions about learning and skills development. Currently there is a lack of data on skills needs in the Icelandic labour market. It is extremely important to invest in the education and skills development that will be most useful. The action involves compiling a forecast of skills needs, the conclusions of which will be used to improve the administration's ability to take effective action in education and labour market policies.

#### **Responsible party:**

Ministry of Social Affairs in collaboration with the Prime Minister's Office, the Ministry of Education, Science and Culture and the Ministry of Industries and Innovation.

#### **Schedule:**

The first skills forecast should be available in 2021.

### **Task 2: Skills strategy for the Icelandic labour market**

A skills strategy will be formulated with a view of ensuring that education and skills are well aligned to the needs of the labour market and provide a strong basis for value creation and welfare. The skills strategy will comprise an integrated future vision of education, employment and the labour market. The aim of the strategy is to align education and skills training to societal needs.

In its report on the skills needed in the labour market, published in 2018, an expert group pointed out the importance of establishing a forum for discussion on the results of the skills forecast and to formulate a strategy and actions based on it to improve the interaction of the education system and the labour market.<sup>15</sup>

In this action the Ministry of Education, Science and Culture will lead work on a skills strategy in collaboration with the Ministry of Social Affairs, the Ministry of Industries and Innovation and stakeholders. It is important that representatives of the business community take an active part in formulating the strategy. In drafting a skills strategy for Iceland consideration will be given, for example, to the Norwegian government's skills policy for 2017–2021,<sup>16</sup> which was based on an OECD audit in 2014.<sup>17</sup>

#### **Responsible party:**

Ministry of Education, Science and Culture in collaboration with the Ministry of Social Affairs and the Ministry of Industries and Innovation.

#### **Schedule:**

A skills forecast should be available in 2022.

15 Anton Örn Karlsson, Karl Sigurðsson, Ólafur Garðar Halldórsson and Röbert Farestveit. 2018. *Færniþörf á vinnumarkaði (Skills Needs in the Labour Market). Tillögur sérfræðingahóps (Expert group recommendations)*. Reykjavík: Directorate of Labour.

16 Norwegian Ministry of Education and Science. 2017. *Norwegian Strategy for Skills Policy 2017-2021*. Oslo: Norwegian Ministry of Education and Science.

17 Organisation for Economic Co-operation and Development (OECD). 2014. *OECD Skills Strategy. Action Report*. Norway. Paris: OECD Publishing.

### **Task 3: Promote education for new skills**

The Organization for Economic Co-operation and Development (OECD) has estimated that about half of jobs will be considerably altered by automation resulting from increased use of artificial intelligence, and one of every seven will disappear. The report *Iceland and the Fourth Industrial Revolution*, published in 2019 by the Prime Minister's Office, anticipates that more than 50,000 individuals in Iceland perform work that will very likely be automated in the next few years.<sup>18</sup> In a society undergoing such rapid changes, it is crucial that people have the opportunity to educate themselves and improve their skills, in order to respond to new and changing demands in the labour market, regardless of age and social status.

Many people currently performing work that will become obsolete due to automation in coming years have little formal education. The OECD survey indicates that this is precisely the group least likely to take advantage of educational opportunities.<sup>19</sup> The Prime Minister's Task Force on the Fourth Industrial Revolution has highlighted the importance of taking action to ensure that technological change will reinforce the foundations of a society based on the fundamental values of equality and welfare. Consideration needs to be given to measures to see to it that people who lose their jobs due to technological advances have access to appropriate education and are able to change careers.<sup>20</sup> The supply of education and training needs to be increased and new knowledge in professional and theoretical disciplines made available to people in all sectors. Enterprises and institutions need to be encouraged to adopt policies to support the lifelong learning of employees.

The action involves an assessment of the state of continuing education in Iceland and a review of the Act on Continuing Education. It is important to clarify and simplify the system, so it reaches a wider group of adults than is currently the case.

#### **Responsible party:**

Ministry of Education, Science and Culture in collaboration with the Ministry of Social Affairs and the Ministry of Industries and Innovation.

#### **Schedule:**

The assessment of the continuing education system and review of legislation should be available in 2022.

18 Huginn F. Þorsteinsson, Guðmundur Jónsson, Ragnheiður H. Magnúsdóttir, Lilja D. Jónsdóttir and Kristinn R. Þórisson. 2019. *Ísland og fjórða iðnbyltingin (Iceland and the Fourth Industrial Revolution)*. Reykjavík: Prime Minister's Office

19 Organisation for Economic Co-operation and Development (OECD). 2019. *Getting Skills Right: Future-Ready Adult Learning Systems*. Paris: OECD Publishing.

20 Huginn F. Þorsteinsson, Ásdís Jónsdóttir, Einar Birkir Einarsson, Henný Hinz, Hjálmar Gíslason, Lilja D. Jónsdóttir and Stefania G. Halldórsdóttir. 2020. *Aðgerðaáætlun um fjórðu iðnbyltinguna. Tillögur verkefnisstjórnar (Action Plan for the Fourth Industrial Revolution. Task force recommendations)*. Reykjavík: Prime Minister's Office

## Open access to data



### **Action 6: Open access to data**

In neighbouring countries major emphasis has been placed on increasing the societal benefit from public investment in data by opening access to it. Among other things, there has been an increasing demand for open access to data generated through public competitive funds.

#### **Task 1: Open access to research data**

The action involves work to open access to public data from universities and research institutes and data generated through grants from public competitive funds in the field of research and innovation, provided this does not conflict with considerations of personal privacy or property rights. Consideration will be given to perspectives calling for research data not to be made public until after a certain period of time, in order to enable scientists to publish their results first. An analysis will be made of the obstacles to open access and cost involved in opening access and an action plan for implementation drafted.

##### **Responsible party:**

Ministry of Education, Science and Culture.

##### **Schedule:**

The recommendations should be available in 2021.

#### **Task 2: Increased use of data for innovation**

Data collected by public institutions has high potential value. Increased access to data can offer major opportunities, both for innovation and increased transparency and efficiency in public services. Increased use of public data for innovation and societal reform will be encouraged in collaborative efforts of ministries, institutions and enterprises. So-called datathons will be held, where representatives of institutions work with entrepreneurs to utilise data in new ways. The first datathon will take place in 2020 and focus on environmental issues. The project is intended to strengthen co-operation between institutions, enterprises and the general public, increase awareness of public data and encourage innovation. Additional similar actions will be held in 2020–2022.

##### **Responsible party:**

Ministry of Finance and Economic Affairs in collaboration with the Ministry of Industries and Innovation and other ministries as appropriate.

##### **Schedule:**

The first datathon will be held in the year 2020. Additional actions for increased use of data will follow.



## Action 7: Innovation dashboard

The government has an important role to play in creating conditions conducive to innovation in Iceland, from policymaking, education and infrastructure development to creating a favourable operating environment for enterprises. To achieve this requires strengthening and co-ordinating the innovation ecosystem through targeted actions. The ecosystem of innovation in Iceland, regulations and overall framework must be competitive with global best practice.

In order for the government's policy and actions to be properly directed and based on the right information, an innovation dashboard will be set up. The dashboard will be a sort of "control panel", graphically displaying information on the status, development and prospects of key elements in the innovation ecosystem in Iceland. Compiling and presenting this information regularly will enhance knowledge of those factors that influence development and success in innovation.

Among those indicators that can provide important information about the situation and contribution of enterprises to innovation and growth in Icelandic society are: globalisation; access to markets and international activities; the attitude towards innovation; tax incentives; investment in innovation; Iceland's position in international measures of competitiveness; social infrastructure; digital infrastructure; education and skills; support for business development and growth; ability to implement innovation and more.

The dashboard will enable users to compare the government's measurable targets in the field of innovation with the actual situation at any given time. The innovation dashboard will not only be an important tool for government policymaking, it can also be used to disseminate information on the status of innovation and entrepreneurship to the business community, institutions and the general public. It will be modelled on the tourism dashboard.

### **Responsible party:**

Ministry of Industries and Innovation.

### **Schedule:**

The first version of the dashboard should be available in 2021, and further improvements will follow regularly.

: Improved access to good data on  
: scientific and innovation work is  
: crucial for public policymaking.



# Societal challenges

# Societal challenges

## What can we learn from the COVID-19 pandemic?

Research and innovation are prerequisites for tackling societal challenges such as health emergencies, climate change, sustainable use of resources and fake news. The spread of the corona virus that causes COVID-19 has underscored the importance of governments working with scientists and utilising research to make decisions. The threat posed by such an epidemic imperils all nations without exception. International co-operation has been important to better understand the threat and seek solutions.

While the development of the pandemic has certainly been unusually rapid and its consequences more immediate than usual, it is similar to other major societal challenges in that understanding the nature and development of the problem is based on scientific conclusions and no solutions will be found without extensive collaboration on research, technology and innovation across sectors and borders. Willingness to share research results and open up databases increases transparency in decisions and accelerates the emergence of solutions.<sup>21</sup> The necessity of innovation, new solutions and a new approach has become abundantly clear in recent weeks, both in the fight against the virus and also in order to rebuild economies and societies in the wake of the global economic crisis that has resulted from COVID-19.

The global pandemic has also underlined that decisions in situations like these are subject to a variety of uncertainties. Even when there is easy access to good scientific expertise, the possibilities for predicting the future are always limited. Scientists and experts can also disagree on what comprises existing knowledge and how it should be used for decision-making. Such uncertainty is not a sign that science is unreliable or untrustworthy; on the contrary, both uncertainty and professional disagreement are a natural part of the scientific process.

**: Uncertainty and professional  
: disagreement are a natural part  
: of the scientific process, not  
: a sign of the unreliability of  
: research results.**

<sup>21</sup> This is discussed, for example, in an editorial in the journal *Nature*: "Coronavirus: three things all governments and their science advisers must do now". *Nature* (579): 319-320

## Disseminating research

When facing complex societal challenges, it can be a demanding task for experts to communicate research results to the general public and public authorities, while at the same time recognising that this knowledge will never be perfect or unquestionable. It is important that scientists can and wish to share their knowledge and discuss it outside the ranks of closed groups of experts. Increased public participation in such a dialogue can be the basis for strengthening democratic debate on various issues and formulating policies that are based on the best available knowledge and also take uncertainty into account.

## Increased investment for societal challenges

Many of the main challenges facing Icelandic society are global in nature and are therefore shared with other nations, but their manifestation in each location is shaped by the specific culture, history, society and environment.

It is important to build up knowledge in Iceland of how global challenges appear here and how we can deal with them. Doing so also equips Icelandic society better to create solutions and know-how that is not only useful domestically but also elsewhere. At the same time, international co-operation on research into societal challenges and how to meet them must increase, as these complex issues can only be addressed through strong cross-border co-operation. Investment in research, technological development and innovation needs to be increased on a permanent basis to enhance the capacity of Icelandic society to respond to challenges and adapt quickly.

**Investing in research and innovation is the key to tackling societal challenges. It is important to build up knowledge in Iceland of the local manifestations of global challenges.**



Today's challenges call for a reversal in attitudes and lifestyles and a far-reaching transformation of systems that are the cornerstones of society, such as energy and healthcare systems, transport, food production, water protection and communication systems.

The innovation involved has to include the entire society. Knowledge building and the dissemination of that knowledge need to be encouraged, to prevent polarisation into groups who can actively participate and others who are marginalised. Public ownership of new solutions needs to increase and users' involvement in innovation strengthen.

Societal challenges require increased collaboration across disciplines and sectors. Ways should be sought to create incentives for collaboration on innovation, research and technological development, and to remove obstacles to interdisciplinary collaboration.

**: In recent years, governments  
: in neighbouring countries have  
: increasingly looked at how to  
: strengthen innovation and research  
: to seek solutions to contemporary  
: challenges and to support  
: sustainability, equality and justice  
: in the spirit of the UN Sustainable  
: Development Goals (SDGs).**

Quality education at all school levels and good access for people of all ages to education is a prerequisite to ensure that Icelanders possess the knowledge and skills to seek out new routes and create new opportunities to meet the complex challenges and far-reaching societal changes ahead. In this context, strong universities play a key role.



## **Action 8: Increase the dissemination of science**

It is important for scientific efforts to be utilised in Icelandic society in policy-making and democratic decisions. Successfully dealing with societal challenges, such as public health issues and climate threats, will not be possible unless policy makers and the general public have easy access to reliable knowledge. The aim of this action is to create a framework that ensures the visibility of science, promotes increased knowledge of scientific methods, bolsters understanding and trust in and respect for the conclusions of science and expertise, provides access to evidence-based information and systematically counteracts the impact of fake news and misinformation in society.

The action aims to create a framework and plan for ways to ensure the public's access to evidence-based information and the dissemination of scientific methods and science in Iceland in the long term. Special efforts will be directed at spreading knowledge in the field of health and climate issues with a view to developing methods that can later be used in other fields. Here it is important to look at good practices in other countries and international organisations, such as the National Co-ordinating Centre for Public Engagement in the UK, OECD's guidelines for disseminating information for policy making and to the public, and EU grants for projects to disseminate research results to the public. Consideration should be given to how diverse methods and media, including technology and the fine arts, can be used to increase interest in and knowledge of science. The success of the different routes followed must be evaluated.

A task force will be appointed, firstly, for health matters and, secondly, for environmental issues, comprised of representatives from the working committees of the STPC, stakeholders and ministries. An employee acting on behalf of the Ministry of Health, the Ministry for the Environment and Natural Resources and the Ministry of Education, Science and Culture in a 50% position will work with the task force for three years. The work will seek ways to improve access to scientific information, improve understanding and respect for research results, and explore ways to increase the dialogue between scientists, the general public and representatives of institutions and politics in public policy-making.

It is necessary to map out which groups need to be reached most urgently, for example, persons with limited access to scientific knowledge, young people and people working on policymaking. It must be determined where access to knowledge most importantly needs to be improved and which institutions play a key role in doing so. Special attention will be paid to creating support and opportunities for teachers and other professionals to apply scientific methodology to improve the understanding of children and youths of the value of science.

### **Responsible party:**

Ministry of Education, Science and Culture in collaboration with the Ministry of Health and the Ministry for the Environment and Natural Resources.

### **Schedule:**

The action plan will be delivered to the STPC at the end of 2022.

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## UN Sustainable Development Goals (SDGs)

The 17 UN Sustainable Development Goals cover the period 2016–2030. The SDGs are an urgent summons for the nations of the world to work together to reduce poverty, increase equality, improve health, promote education and encourage the sustainable use of natural resources globally. Like other UN member states, Iceland is committed to working systematically to achieve these goals, both domestically and internationally.

The SDGs are a powerful tool for creating a common vision of global challenges, across countries and sectors. They require widespread participation in society and bring together governments and stakeholders. They call for a change in mindset and behaviour.

Science, technology and innovation play a key role in implementing the SDGs:

- Innovation and technological development are prerequisites for sustainable economic growth, sustainable development and solutions that can prevent further climate change.
- Research is a premise for raising awareness of societal challenges and possible ways to address, for example, the extent and nature of climate change, disease, pollution, inequality and conflict.
- Research is important for understanding the manifestations of global challenges in different regions and cultural areas and in different social groups. It plays a key role in identifying ways to address challenges rooted in local ecosystems, culture and history.
- Extensive dissemination of research and technological development is a prerequisite for as many people as possible to take part in discussing challenges and formulating solutions, regardless of education, social status, gender and age.
- Research supports the reversal in attitudes and behaviours necessary to change consumption patterns and modes of transport and to promote social equality, gender equality and responsible resource utilisation.
- Research lays the foundation for informed decision-making by the public, governments, institutions and enterprises.

Although science, technology and innovation are linked to all the 17 SDGs, two of them specifically concern research and development:

Goal 17, which deals with co-operation on all other goals, underlines the importance of international co-operation in science, technology and innovation. Particular emphasis is placed on environmentally friendly technological development and the transfer of knowledge to developing countries.

Goal 9 concerns innovation and development, including sustainable industrial development and increased support for technological development, research and innovation. Target 9.5 states in particular that investment in research and development needs to be enhanced.

## Emphases of the STPC 2019–2021

In 2018, the Science and Technology Policy Council defined the most pressing challenges facing Icelandic society in the coming decades. Extensive consultation was held with the public, representatives of political parties in the Icelandic parliament *Althingi*, the scientific community and business and industry. The aim of this work was to increase understanding of Icelandic society and its environment, seek new solutions and contribute to a diverse and innovation-oriented society in times of rapid change. These emphases provide the foundation for Strategic Research and Development Programmes (SRDPs) in science and technology in 2019–2021.

At its meeting on 23 November 2018, the STPC agreed to place special emphasis on three societal challenges in the period 2018–2021:

- environment, biosphere and climate;
- health and well-being;
- life and work in a changing world.

The Council had previously decided to focus on reinforcing the position of the Icelandic language in computers and technology.<sup>22</sup>

Applications were invited for grants from an SRDP for language and technology in the autumn of 2018 and from an SRDP on societal challenges in May 2020. In total, over ISK 1.6 billion will be spent on research and innovation projects through the SRDPs by 2023, of which ISK 1 billion will go to projects on societal challenges.

**: ISK 1 billion will be devoted to  
: research and innovation projects on  
: societal challenges in 2020–2023.**

<sup>22</sup> See: Science and Technology Policy Council. 2017. Science and Technology Policy Council Policy and Action Plan 2017-2019 Reykjavík: Ministry of Education, Science and Culture, Action 2, p. 12.

## Environment, ecosystem and climate

Environmental issues and the effects of climate change have been in strong focus in the last few years. Young people have taken the lead in spotlighting the consequences of global climate change, calling for greater action in nature conservation and environmental protection. Various changes have taken place in the country's ecosystem, interaction with nature, and public consumption and waste recycling.

The nature and extent of developments resulting from climate change and the decline of habitats and ecosystems demonstrate clearly the necessity of strengthening the research infrastructure in this field and increasing research on and monitoring of the country's biosphere. The effects of climate change and climate actions, such as the restoration of habitats and the sequestration of greenhouse gases in vegetation and soil, need to be assessed more effectively. As a signatory of the Rio Convention on Biological Diversity and Framework Convention on Climate Change, Iceland has committed itself to protecting and maintaining the country's biological diversity, practising sustainable exploitation and mitigating the impact of climate change on the biosphere and human environment.

∴ **Studies show that the polar regions are warming at least twice as fast as other parts of the world. The Icelandic government has drawn international attention to Arctic issues.**

A *Climate Action Plan for 2030*<sup>23</sup> has been adopted and a new policy and action plan for biological diversity is being drafted. Work is also underway on a food policy that deals with, among other things, sustainable food production, and an energy policy that aims at the sustainable utilisation of energy resources. There is plenty going on in innovation and development of green technology solutions. Additional programmes in this area, such as land reclamation and land utilisation programmes, are of major significance in this regard. The government has set a goal of achieving Iceland's carbon neutrality by 2040. It is clear that innovation and synergies play an important role when it comes to developing green solutions for positive climate action, the ecosystem, biodiversity and the sustainable use of resources.

23 Project Management for the Climate Action Plan. 2018. *Climate Action Plan 2018-2030*. Reykjavík: Ministry for the Environment and Natural Resources. <https://www.stjornarradid.is/lisalib/getfile.aspx?itemid=b1bda08c-b4f6-11e8-942c-005056bc4d74> and Project Management for the Climate Action Plan. 2020. *Climate Action Plan, 2nd edition*. Reykjavík: Ministry for the Environment and Natural Resources. <https://www.stjornarradid.is/library/02-Rit--skyrslur-og-skrar/Adgerdaaetlun%20i%20loftslagsmalum%20onnur%20utgafa.pdf>



## **Action 9: Increase research and innovation in environmental issues**

### **Task 1: Increase research, monitoring and synergies**

Scientific research and monitoring of the state of and changes in Iceland's natural environment will be strengthened, especially with regard to the impacts of climate change and other global environmental changes. Knowledge and understanding of the synergistic effects of actions in different environment areas will be increased.

Vigorous research and monitoring of the natural environment are key factors in actions to benefit the climate and restore the ecosystem, not least when it comes to adapting Icelandic society to climate change. It is urgent to increase knowledge of carbon sources, carbon emissions and sequestration from land and land use in Iceland through further basic research on which to build knowledge for applied actions in the future.

It is important that actions in different areas of the environment do not counteract each other. For this reason, the synergies need to be analysed, for example, of actions concerning climate change, ecosystem recovery, biodiversity and the cyclical economy. Synergies can make a major difference to the success of actions to fulfil international commitments to tackle global environmental challenges and also contribute to better utilisation of funding for environmental issues.

A plan will be drafted to strengthen research and monitoring of natural phenomena regarding the effects of climate change and potential climate actions. Furthermore, a plan will also be drawn up on how to ensure the synergies of Iceland's global environment actions to fulfil its international commitments, conventions and the UN Sustainable Development Goals (SDGs).

#### **Responsible party:**

Ministry for the Environment and Natural Resources.

#### **Schedule:**

Plans are to be ready in the autumn of 2021.

## **Task 2: Increase innovation in the field of climate change and the circular economy**

Innovation is the key to success in environment actions. Climate change challenges will largely be met through new technologies and innovation, as well as by reducing consumption and better utilisation of resources. The circular economy and its implementation in Iceland will create a wide variety of opportunities to better manage natural resources and create value from surplus and waste substances arising at various stages of the value chain.

Support will be provided for innovative projects in the field of climate change and the circular economy, among other things to boost research and development work in the implementation of new climate-friendly technological solutions and designs. The Climate Fund, for instance, will be used for this purpose.

### **Responsible party:**

Ministry for the Environment and Natural Resources in collaboration with the Ministry of Industries and Innovation.

### **Schedule:**

In 2020.

⋮ **It is important to apply scientific  
⋮ knowledge, technology and  
⋮ innovation to create a green society  
⋮ based on a circular economy and  
⋮ sustainable use of natural resources.**

## Health and well-being

The foundation of a welfare society is a strong healthcare system, which needs to address new challenges by using knowledge, research and innovation. In order to maintain health, diseases and their causal factors must be diagnosed and treated. It is no less important to monitor changes in public health and prevent illness. We need to investigate how people can live as well as possible as long as possible and utilise healthcare technology to raise the quality of life. By doing so we promote healthy aging and lifelong well-being.

The challenges our society faces include changing demography and the growing incidence of age-related diseases, such as dementia, as well as lifestyle-related diseases and obesity at all age levels. Mental disorders also increasingly affect the quality of life and labour market participation of Icelanders. Given the increase in people of foreign origin, it is important to consider multiculturalism and patterns of settlement in planning health services, for instance, to achieve equal access for different groups.

∴ **In Iceland, a variety of research focuses on healthcare and researchers at institutions in the country are in the forefront in many fields of health sciences.**

The Strategy for Icelandic Healthcare Services to 2030<sup>24</sup> published by the Minister of Health emphasises the quality of research and innovation. The quality of healthcare research relies on strong databases, research infrastructure and good collaboration between scientists in the field of basic and clinical research and public health science.

To meet healthcare challenges, we need innovation and new solutions to increase the efficiency, quality and safety of the services nationwide. One aspect of this is to increase collaboration between public institutions and start-ups, with a view to harnessing the creative energy of different actors in resolving problems.

24 Ministry of Health, 2019. *Heilbrigðisstefna. Stefna fyrir íslenska heilbrigðisþjónustu til ársins 2030 (Healthcare Policy. Strategy for Icelandic Healthcare Services to 2030)*. Reykjavík: Ministry of Health. See also Ministry of Health, 2019. *Stefna heilbrigðisráðherra í vísindarannsókn-um á heilbrigðisviði til 2030 (Policy of the Minister of Health for Scientific Research in Healthcare to 2030)*. Reykjavík: Ministry of Health.





## Action 10: Promote scientific research and innovation in healthcare

### Task 1: Promote scientific research in healthcare

Research and innovation in healthcare will be strengthened and public funding for this increased, based on an analysis of the funding situation in this field in Iceland in comparison with neighbouring countries. A special plan will be drafted to promote research in the health sciences. In *Healthcare Policy to 2030*,<sup>25</sup> emphasis is placed on increasing science, education and innovation in healthcare and the establishment of a Health Sciences Fund is proposed. The action involves analysing the funding situation in health sciences in Iceland and comparing this to the situation in neighbouring countries. A health sciences research fund will be established based on this analysis. Grants will be made from the fund using objective and transparent methods based on competition. Emphasis will be placed on promoting research in health sciences, from basic sciences to public health and clinical research, and interdisciplinary collaboration will be encouraged.

**Responsible party:**

Ministry of Health.

**Schedule:**

The analysis should be available in 2021.

### Task 2: Promote innovation in healthcare services

A special initiative for healthcare innovation was launched this spring as part of the government's actions in connection with COVID-19. The initiative, a joint project of the Ministers of Innovation, Health and Finance, aims at increasing dialogue and facilitating co-operation between public bodies in the health service and parties working on innovation and technological development in healthcare. The initiative includes a digital health congress,<sup>26</sup> where healthcare providers define challenges and collaborate with enterprises and entrepreneurs on solutions. Grants will also be provided for implementation and development of new healthcare solutions. The success of this initiative will be evaluated at year-end 2020 and a decision subsequently made on additional actions to encourage innovation in healthcare services.

**Responsible party:**

Ministry of Industries and Innovation in collaboration with the Ministry of Health and the Ministry for Finance and Economic Affairs.

**Schedule:**

The healthcare innovation initiative will continue to the end of 2020. A decision on further actions will be made based on the success of the project.

25 Ministry of Health. 2019. *Stefna fyrir íslenska heilbrigðisþjónustu til ársins 2030 (Strategy for Icelandic Healthcare Services to 2030)*. Reykjavík: Ministry of Health.

26 See for example: Ministry of Industry and Innovation, Ministry of Health, Ministry of Finance and Economy. 2020, 27 May. Stafrænt heilbrigðismót. Stefnumót heilbrigðisþjónustu og frumkvöðla. (Digital Health Congress: Healthcare Services Team Up with entrepreneurs). <https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2020/05/27/Stafrænt-heilbrigðismot-Stefnumot-heilbrigðisþjónustu-og-frumkvöðla/>

## Life and work in a world of change

The development of artificial intelligence (AI) and related technologies will have a major impact on business and industry in the near future. In May 2020, the Task Force for the Fourth Industrial Revolution submitted proposals for 27 priority actions to strengthen Iceland's ability to respond to the fourth industrial revolution and take advantage of the opportunities it offers.<sup>27</sup> Several of those priorities are included in this policy. Among other things, the task force pointed out that the fourth industrial revolution will probably affect most jobs in the labour market, and a large number of tasks will be automated with increased utilisation of AI and digital technology. This will mean that jobs will disappear. Responding to this requires a skills policy and increased lifelong learning, in line with Action 5.

Companies and institutions that implement innovation and renewal are more likely to take advantage of the opportunities inherent in the fourth industrial revolution to improve services and strengthen competitiveness. The innovation capacity of companies and institutions is based on the interplay of many factors. While the management and culture of the workplace are important for innovation, external factors such as access to qualified staff, capital and a network of partners are no less significant. The government plays an important role in removing barriers and creating incentives for a knowledge-driven economy, both in the private sector and in public institutions

The task force's proposals for an action plan for the fourth industrial revolution emphasises that technology is not a neutral factor but an active participant in shaping people's attitudes and values.

∴ **Conscious action must be taken so that technological development will support basic democratic values, human rights, gender and social equality and welfare.**

It is important to understand the impact of technology on society and culture and how to take optimal advantage of its inherent opportunities for the benefit of society. We need to build on the strengths of Icelandic society and nurture our core values and culture. By so doing, utilisation of AI can have great potential to increase welfare and strengthen competitiveness and value-creation based on knowledge.<sup>28</sup>

Overall, the *Science and Technology Policy 2020–2022* aims to make the Icelandic economy competitive in an international environment of rapid change and promote the utilisation of technological change for welfare and sustainability. Therefore, no specific actions are defined under this challenge.

<sup>27</sup> Huginn F. Þorsteinsson, Ásdís Jónsdóttir, Einar Birkir Einarsson, Henný Hinz, Hjálmar Gíslason, Lilja D. Jónsdóttir and Stefanía G. Halldórsdóttir. 2020. *Aðgerðaáætlun um fjórðu iðnbyltinguna. Tillögur verkefnisstjórnar (Action Plan for the Fourth Industrial Revolution. Task force recommendations)*, p. 5.

<sup>28</sup> *Ibid.*, pp. 5.



# Report of the Science and Technology Policy Council (STPC)



## Status of projects in the STPC's Policy and Action Plan 2017–2019

The Strategy and Action Plan 2017–2019 identified ten actions to be prioritised during the policy period and the responsible parties for each of them.

The STPC has closely monitored the progress of these actions and provided regular information on their status on the STPC website.

Major progress has been achieved since 2017. Six of ten actions were fully completed by the end of 2019. Four actions are still in progress and will conclude in 2020.

This section discusses what has been achieved since the last Policy and Action Plan, and what lies ahead in connection with each individual action. The status of actions is based on September 2020.

### Status of actions in September 2020

<b>ACTION 1</b>	<b>Societal challenges</b>	<b>ACTION COMPLETED</b>
<b>ACTION 2</b>	<b>SRDP on language and technology</b>	<b>ACTION COMPLETED</b>
<b>ACTION 3</b>	<b>Science dissemination plan</b>	<b>ACTION COMPLETED</b>
<b>ACTION 4</b>	<b>Quality, efficiency and funding of universities</b>	<b>ACTION WELL ADVANCED</b>
<b>ACTION 5</b>	<b>Revision of the university funding model</b>	<b>ACTION WELL ADVANCED</b>
<b>ACTION 6</b>	<b>Manpower and skills forecast</b>	<b>ACTION COMPLETED</b>
<b>ACTION 7</b>	<b>Examination of the tax environment for research and innovation</b>	<b>ACTION COMPLETED</b>
<b>ACTION 8</b>	<b>Assessment of the industry support system and institutional environment</b>	<b>ACTION COMPLETED</b>
<b>ACTION 9</b>	<b>Roadmap of research infrastructure</b>	<b>ACTION WELL ADVANCED</b>
<b>ACTION 10</b>	<b>Open Science Policy</b>	<b>ACTION IN PROGRESS</b>

## 1. Societal challenges

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**Action 1:** The major societal challenges facing Iceland will be defined, through broad consultation and at regular intervals, and directed actions take to respond to them.

**Responsible party:** Science and Technology Policy Council.

**Status:** Action completed

A meeting of the STPC in November 2018 approved the Council's professional emphases for 2018–2021. These emphases reflect the principal challenges facing Icelandic society in the coming years. Parties consulted included members of the general public, representatives of political parties in the *Althingi*, the scientific community and business and industry. A variety of routes were taken in gathering data, including open online surveys, questionnaires, discussion groups and open meetings.

The objective in defining areas for emphasis was to lay the foundation for targeted investment and interdisciplinary collaboration through SRDPs and the Infrastructure Fund. In addition, the definitions are used to streamline better international co-operation in the field of research and innovation at Nordic and European level.

Applications were invited under the SRDP for societal challenges in May 2020.

### What lies ahead?

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Social challenges will be defined on a regular basis, next for the years 2022–2024.

## 2. SRDP on language and technology

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**Action 2:** A three-year SRDP will be announced to strengthen the position of the Icelandic language in computers and technology.

**Responsible party:** STPC in collaboration with the Ministry of Education, Science and Culture.

**Status:** Action completed on the part of the STPC and the Ministry of Education, Science and Culture. Implementation is in the hands of the SRDP Board.

The SRDP includes strategic plans for temporary funding prioritisation. In the autumn of 2018, applications were invited for grants under the SRDP for language and technology.

### What lies ahead?

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Applications will again be invited for grants under the SRDP for Language and Technology in 2020.

### 3. Dissemination of science

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**Action 3:** A plan will be drafted for the dissemination of science and technology from universities and research institutes to the general public, all school levels and the government, and implemented.

**Responsible party:** STPC in collaboration with universities and ministries.

**Status:** Action completed

The implementation of the project was changed during the period of the action plan and it was entrusted to the Icelandic Academy of Science (*Vísindafélag Íslands*). The Prime Minister's Office and the Ministry of Education, Science and Culture provided the Academy of Science with a grant totalling ISK 8 million, to increase the visibility of science and strengthen its position in Icelandic society, promote general discussion on the connection between science and societal challenges of the future, and shed light on the contribution of science to Icelandic culture during the past century.

The Academy held six seminars in 2019 in a series of lectures on the involvement of science in societal challenges and issued a report about the project. The focus was on the status and importance of science for society. Among other things, there was discussion of future visions from different perspectives, of the situation of the Icelandic language in a technological world, young people, environmental issues, research, innovation in the education system and tourism in times of major changes. A varied group was involved in organising the seminars, which were well attended.

#### What lies ahead?

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Work will continue on dissemination of science and technology under the policy in the coming years, see Action 8 in the Science and Technology Policy 2020–2022.

## 4. University funding

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**Action 4:** The quality and efficiency of higher education will be increased, in part by boosting funding with the aim of reaching the OECD average by 2020 and the average in Nordic countries by 2025.

**Responsible party:** Ministry of Education, Science and Culture.

**Status:** Action well advanced.

One of the policies in the platform agreed by the coalition in 2017 was for Iceland to reach the OECD average in funding for tertiary education by 2020 and the average in Nordic countries by 2025. The same objective can be found in the latest policy of the STPC, and funding for universities has been increased in recent years in line with this goal.

As OECD figures are three years old when published, the most recent figures are from 2016. They show that expenditure per student year in Iceland was just over USD 14,500, or 94% of the average expenditure in OECD countries. According to a study by the European University Association (EUA) the increase in contributions to universities in Iceland between 2016 and 2018 was among the highest in 17 comparison countries in Europe. It can therefore be assumed that the government's goal of reaching the OECD average in university funding by 2020 has been achieved.

### What lies ahead?

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The action provided for the establishment of a group on quality and efficiency in higher education. The group began work in February 2020 and will complete its work at the end of 2020.

The aim is for university funding in Iceland to be comparable with that of other Nordic countries by 2025, see Action 3 in the Science and Technology Policy 2020–2022.

## 5. Revision of the university funding model

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**Action 5:** The funding model used to calculate university funding will be revised with a view to better encouraging quality in university work.

**Responsible party:** Ministry of Education, Science and Culture.

**Status:** Action well advanced.

The Ministry of Education, Science and Culture published a Green Paper on Funding to universities in the year 2020. The Green Paper describes the current budgeting system (including the university funding calculation model), which is based on Rules No. 646/1999, on funding for universities. It reviews options for the design of a new system, discusses the situation abroad and poses key questions. The Green Paper serves as the basis for consultation on a new budgeting arrangement.

### What lies ahead?

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The intention is to publish the review of the university funding model in 2020.

See Action 3 in the Science and Technology Policy 2020–2022.

## 6. Manpower and skills forecast

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**Action 6:** The STPC will assess the conclusions of an expert group on manpower and skills forecasts for the Icelandic labour market.

**Responsible party:** Science and Technology Policy Council.

**Status:** Action completed

The Report on Skills Needs in the Labour Market was published in May 2018; the STPC discussed the report at its meeting on 28 September 2018.

### What lies ahead?

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See Action 5 in the Science and Technology Policy 2020–2022.



## 7. Examination of the tax environment for R&D

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- Action 7:** An assessment will be made of the tax environment for research and innovation in Iceland, the impact of recent legislative changes assessed and proposals made on how the environment can be further developed in line with best practice in neighbouring countries.
- Responsible party:** Ministry of Finance and Economic Affairs.
- Status:** Action completed

The Ministry of Finance's assessment of the tax environment aimed at strengthening development and innovation was presented at a meeting of STPC in December 2019. The intention is to conclude the assessment report in 2020.

### What lies ahead?

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See Action 2 in the Science and Technology Policy 2020–2022.

## 8. Assessment of the industry support system and institutional environment

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- Action 8:** An assessment will be made of the support system and institutional environment of enterprises with the aim of examining how to increase the success and competitiveness of business and industry to a level comparable with the best known in neighbouring countries.
- Responsible party:** Ministry of Industries and Innovation.
- Status:** Action completed

An assessment of the support system and institutional environment of Icelandic business and industry was part of the Innovation Policy for Iceland published in the autumn of 2019. In its wake a variety of actions have been introduced which aim to improve support for innovation in Iceland. Mention could also be made of the bill of legislation on Kría, a start-up and innovation fund, submitted to the *Althingi* at the spring session 2020. An amendment was also adopted authorising pension funds to hold a stake of up to 35% in investment funds, provided certain conditions are met.

### What lies ahead?

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In February 2020, it was announced that the Icelandic Innovation Center (NMÍ) would be closed in its current form and the agency's projects transferred to a new organisation. The aim is to establish co-operation between key stakeholders on the operation of innovation parks for entrepreneurs and start-ups in the vicinity of the universities and find a suitable arrangement for building construction research based on this collaboration. Support for rural innovation will also be increased, in part through digital workshops. Emphasis will be placed on increasing integration with Regional Advancement Programmes, business and industry and educational institutions throughout the country. Work will continue according to the innovation policy proposals.

## 9. Roadmap of research infrastructure

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**Action 9:** A roadmap for research infrastructure will be developed and international participation in this infrastructure strengthened.

**Responsible party:** Ministry of Education, Science and Culture.

**Status:** Action well advanced.

Work has been underway in the Ministry of Education, Science and Culture on a roadmap for research infrastructure. A report on the process of the roadmap was compiled and research infrastructure in Iceland mapped. An amendment was made to the Act on Public Support for the Science and Technology Policy Council, No. 3/2003, providing for a special board to be appointed for the Infrastructure Fund, as prior to this it had the same board as the Research Fund. An act was also adopted on the European Research Infrastructure Consortium (ERIC), No. 66/2019. The ministry instructed the board of the Infrastructure Fund to continue working on a roadmap and the board advertised for ideas for roadmap projects in the spring of 2020. The board plans to invite applications for roadmap projects in the autumn of 2020, with the aim of publishing the roadmap in late 2020.

### What lies ahead?

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The board of the Infrastructure Fund is currently working on the roadmap. The intention is to publish the roadmap by the end of 2020. It will be updated regularly. See Action 1 in the Science and Technology Policy 2020–2022.

## 10. Open science

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**Action 10:** A policy on open access to data will be prepared.

**Responsible party:** Ministry of Education, Science and Culture.

**Status:** Action has commenced.

The task force of the Minister of Education, Science and Culture on open science was set up at the end of 2018. The group was comprised of representatives from the Ministry of Education, Science and Culture, National and University Library of Iceland, National and University Hospital, Icelandic Centre for Research and the University of Iceland. It was the group's assessment upon commencing its work that a policy was needed on open access to research results and its first step was to prepare a draft of such a policy. The draft policy was published in the government's consultation portal in March 2020.

### What lies ahead?

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The Ministry of Education, Science and Culture intends to publish a policy on open access to research results in 2020. Work will continue on formulating a policy on open access to research data, see Action 6 in the Science and Technology Policy 2020–2022.

# Other actions in the field of science, technology and innovation 2017–2020

## Policies

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### **Innovation strategy**

Ministry of Industries and Innovation

The Minister of Tourism, Industry and Innovation issued an innovation strategy for Iceland, *Iceland, the Land of Innovation*, in October 2019. Representatives from all political parties represented in the *Althingi*, representatives from the Science and Technology Policy Council, business and industry and the university community took part in the work.

The innovation strategy sets out a vision reaching to 2030. Since the strategy was published work has been in progress on actions under it. The principal actions undertaken so far are:

- Bill of legislation to establish Kría, a start-up and innovation fund, was presented at the spring session 2020. The fund's objective is to promote the growth and competitiveness of Icelandic business and industry through an active financing environment for start-ups and innovative companies. The fund will make contributions to venture capital funds investing in start-ups and innovative companies in their earliest stages. Financial appropriations to the fund in 2020 are expected to increase in connection with special economic measures due to COVID-19.
- A bill amending the Act on the Mandatory Guarantee of Pension Rights and Operation of Pension Funds, No. 129/1997, was adopted at the spring legislative session of 2020. The amendment expands the authorisation of pension funds to invest in funds for collective investment. The Minister's Innovation Think-tank on innovation issues was established at the beginning of 2020.
- Efforts are being made to increase the use of public institutions' data for innovative solutions, and provisions have been made for part of the funding for institutions in the fields of tourism, industry and innovation to be spent on innovation solutions.

In March 2020 the Minister, in collaboration with the Minister for Finance and Economic Affairs, presented an Action Plan for Public Innovation (see also the special website for public innovation). It includes twelve actions aimed at increasing public sector innovation to improve public services and make them more efficient.

## **Healthcare policy**

Ministry of Health

In June 2019 the Minister of Health issued a Strategy for Icelandic Healthcare Services to 2030. The strategy is based on consultation with representatives of healthcare institutions throughout Iceland, with professional bodies and trade unions of healthcare professionals, and other parties that provide health services. Among other things, it discusses science, education and innovation in healthcare. A vision is projected extending until 2030, including the following main aspects concerning research and innovation:

- Research activities, education and health services will be cost-analysed and financed in a transparent manner.
- Employees of public healthcare institutions will have the opportunity to work in scientific research for a certain period of time each year.
- Healthcare professionals working at the university hospital will conduct teaching and research in addition to clinical work.
- A Health Sciences Fund will have been established, providing grants for research in the field of health sciences.
- Databases and biobanks in the health system will be open and accessible to scientists who have acquired the required research accreditation.
- There will be formal co-operation with other Nordic countries on the evaluation of new technologies and new methods.

## **Policy regarding Scientific Research in Healthcare to 2030**

Ministry of Health

In September 2019 the Minister of Health's Policy on Scientific Research in Health Sciences to 2030 was published. The guiding principle of the policy is that scientific research should be the basis for advances in healthcare services and contribute to the improved health of Icelanders. The aim is to develop a research environment, build up facilities and strengthen the infrastructure for research that meets international standards in order to make it desirable for outstanding researchers to work on research in health sciences in Iceland.

## Legislation

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### **Committee on Good Practice in Science**

Prime Minister's Office, Ministry of Education, Science and Culture.

The Prime Minister's Office drafted a bill on good practice in science which was adopted by the *Althingi* in the spring of 2019 (Act No. 70/2019). The objective of the act is to help ensure that research in science is carried out in accordance with good scientific practice. The committee was transferred to the Ministry of Education, Science and Culture on 31 December 2019.

### **Review of the legal framework of the Science and Technology Policy Council**

Prime Minister's Office

In the autumn of 2018, the Prime Minister appointed a working group to review the STPC's legal framework. The review included three Acts: No. 2/2003 on the Science and Technology Policy Council; No. 3/2003, on Public Support for Scientific Research; and Act No. 75/2007, on Public Support for Technological Research, Innovation and Industrial Development. The group submitted its report in August 2020. A bill will be drafted to be submitted to the autumn session of the *Althingi* in 2020.

### **Review of Act No. 3/2003, on Public Support for Scientific Research**

Ministry of Education, Science and Culture

In May 2019, amendments were approved by the *Althingi* on Act No. 3/2003 on public support for scientific research. The amendment expanded the policy-making role of the Infrastructure Fund and adapted the rules of the Research Fund to the international environment.

### **Act on the European Research Infrastructure Consortium**

Ministry of Education, Science and Culture

In June 2019 *Althingi* adopted Act No. 66/2019, on the European Research Infrastructure Consortium (ERIC). The European Research Infrastructure Consortium is a co-operative forum for operation of large and expensive research infrastructure in Europe. The law will facilitate Iceland's participation in Europe's best research infrastructure. This infrastructure is of a scale that could not possibly be built up in Iceland. The objective of the Act was to increase the quality of research in Iceland and international participation.

## Reports

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### **Report and Action Plan for the Fourth Industrial Revolution**

Prime Minister's Office

In mid-2018, the Prime Minister appointed a committee for the fourth industrial revolution with the objective of reporting on discussion of the fourth industrial revolution internationally, its consequences for Icelandic society and Iceland's opportunities in the changes. The committee's report, *Iceland and the Fourth Industrial Revolution*, was presented in February 2019. Thereafter a task force was set up which compiled an action plan, which was published in May 2020.

### **Report of the future committee on challenges and opportunities arising from technological change**

Prime Minister's Office

In mid-2018, the Prime Minister appointed a future committee on challenges and opportunities arising from technological change. The committee's report, *Icelandic Society 2035–2040*, was published in November 2019. Among other things, the committee made the following proposals:

- to examine whether basic education and lifelong learning should be merged into one flexible education system to respond to changes in the labour market;
- to expand vocational, technical and practical training and to increase the number of graduates in science, technology, engineering, creative arts and mathematics (STEAM-subjects);
- to analyse manpower and skills needs on a regular basis and to increase co-operation on a long-term vision for the development of the education system;
- to set clearer goals for the development of employment in the capital area and in areas elsewhere;
- to define criteria for Iceland's competitiveness that consider developments abroad and goals in job creation;
- to work systematically against climate change, in part through energy conversion.

## Infrastructure

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### **Research information system**

Ministry of Education, Science and Culture

Establishing a current research information system (CRIS) was tendered in 2019 and a contract subsequently concluded with the publishing and analytical undertaking Elsevier for the purchase of the Pure system. The information system will be taken into service in all the universities and, in the longer term, also in research institutes. The system will facilitate universities, institutions and governments in maintaining an overview of research activities in Iceland, for example, applications for funding and success, staff specialization, international co-operation and more. The Ministry of Education, Science and Culture has entrusted the National and University Library of Iceland with the purchase and operation of the system.

### **Language Technology Plan**

Ministry of Education, Science and Culture

The project plan, *Language Technology for Icelandic 2018–2020* was issued under the auspices of the Ministry of Education, Science and Culture in 2017 and work on implementing it has been in progress since 2018. It involves the creation and development of the technical infrastructure necessary to ensure that Icelandic will be utilisable in a digital world, for electronic communication and information processing based on computer and electronic telecommunications. The SRDP on language and language technology intersects with part of the language technology plan.

## Funds

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### **Climate Fund**

The Ministry for the Environment and Natural Resources

The Climate Fund was established as part of the *Climate Action Plan 2018–2030* and is under the direction of the Minister for the Environment and Natural Resources. Its role is to support innovation projects in the field of climate change and projects related to informing and educating people on the effects of climate change. Among other things, the fund is intended to support research and development work in connection with the implementation of new climate-friendly technological solutions and design. The Minister has assigned management of the fund to the Icelandic Centre for Research and the first application deadline was 30 January 2020.

## **Government economic measures in connection with COVID-19 related to science and innovation**

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- allocations to the start-up and innovation fund Kría moved forward;
- co-investments in start-up companies under the name Stuðnings-Kría;
- Technology Development Fund boosted by ISK 700 million;
- Research Fund boosted by ISK 775 million;
- Infrastructure Fund boosted by ISK 125 million;
- allocation to innovation initiative in healthcare;
- authorisation for increased investment by pension funds in venture capital funds;
- a Food Production Fund will be established to support development and innovation in food production and processing;
- tax deductions for innovation companies for R&D expenditures expanded;
- measures related to enterprises' operating environment, such as deferral of taxes; payment of unemployment benefits to staff in reduced employment; simplification of rules on financial restructuring of companies; and state guarantees for corporate lending.



## Composition of the Science and Technology Policy Council 2019–2021

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### **Ministers**

Katrín Jakobsdóttir, Prime Minister; Chair of Science and Technology Policy Council;  
Bjarni Benediktsson, Minister of Finance and Economic Affairs;  
Guðmundur Ingi Guðbrandsson, Minister for the Environment and Natural Resources;  
Kristján Þór Júlíusson, Minister of Fisheries and Agriculture;  
Lilja Dögg Alfreðsdóttir, Minister of Education, Science and Culture;  
Svandís Svavarsdóttir, Minister of Health;  
Þórdís Kolbrún Gylfadóttir, Minister of Tourism, Industry and Innovation.

### **Chair of the Technical Committee**

Ragnheiður H. Magnúsdóttir, consultant in information technology, nominated by the Minister of Tourism, Industry and Trade.  
Alternate: Sigríður Valgeirsdóttir, expert in the Ministry of Industry and Innovation.

### **Chair of the Scientific Committee**

Ragnhildur Helgadóttir, professor and dean of the School of Social Science of Reykjavík University, nominated by the Minister of Education, Science and Culture.  
Alternate: Daði Már Kristófersson, dean of the School of Social Sciences, University of Iceland.

### **Other committee members**

Ásdís Jónsdóttir, expert in the Prime Minister's Office,  
nominated by the Minister of Education, Science and Culture.

Alternate: Stefán Baldursson, Office Director at the Ministry of Education, Science and Culture.

Erla Björk Örnólfsdóttir, Rector of Hólar University,  
nominated by the Higher Education Collaborative Committee.

Alternate: Eyjólfur Guðmundsson, Rector of the University of Akureyri.

Eyrún Valsdóttir, head of the education department of the Icelandic Confederation  
of Labour (ASÍ), nominated by ASÍ.

Alternate: Finnbjörn A. Hermannsson, chairman of Byggið.

Fríða Björk Ingvarsdóttir, Rector of the Iceland Academy of Fine Arts,  
nominated by the Higher Education Collaborative Committee.

Alternate: Vilhjálmur Egilsson, Rector of Bifröst University.

Halldór Björnsson, head of weather and climate at the Icelandic Meteorological Office,  
nominated by the Minister for the Environment and Natural Resources.

Alternate: Ester Rut Unnsteinsdóttir, mammalian ecologist  
at the Icelandic Institute of Natural History.

Hilmar Bragi Janusson, CEO of Genis hf., nominated by the Confederation of Icelandic Employers.

Alternate: Pétur Reimarsson, engineer at the Confederation of Icelandic Employers.

Jón Atli Benediktsson, Rector of the University of Iceland,  
nominated by the Higher Education Collaborative Committee.

Alternate: Guðbjörg Linda Rafnsdóttir, professor at the University of Iceland.

Jón Gunnar Bernburg, Professor of Sociology at the University of Iceland, without nomination.

Alternate: Eyjólfur Ingi Ásgeirsson, Associate Professor at the School of Technology  
and Engineering at Reykjavík University.

Margrét Helga Ögmundsdóttir, Adjunct Professor at the University of Iceland,  
nominated by the Minister of Health.

Alternate: Sigurður Yngvi Kristinsson, professor at the University of Iceland.

Róbert Farestveit, economist at ASÍ, nominated by ASÍ.

Alternate: Kristján Þórður Snæbjarnarson, chairman of the Electrical Industry  
Association of Iceland.

Steinunn Gestsdóttir, professor at the University of Iceland,  
nominated by the Higher Education Collaborative Committee.

Alternate: Þórarinn Guðjónsson, Associate Professor at the University of Iceland.

Svana Helen Björnsdóttir, managing director of Stiki hf.,  
nominated by the Confederation of Icelandic Employers.

Alternate: Sigríður Mogensen, director of the intellectual property department of the  
Confederation of Icelandic Industries.

Sæmundur Sveinsson, PhD in plant genetics at Matís ohf., nominated by the Minister of Fisheries and Agriculture.

Alternate: Helga Sigurrós Valgeirsdóttir, customer relations manager at Arion Bank hf.

Unnur Anna Valdimarsdóttir, Professor of Epidemiology at the University of Iceland, without nomination.

Alternate: Þóra Pétursdóttir, PhD in Archeology at the University of Tromsø in Norway.

The secretary of the STPC and the Science Committee is Elísabet Andrésdóttir.

The secretary of the Technical Committee is Berglind Hallgrímsdóttir.

The Liaison Group for the Science and Technology Policy Council is comprised of:

Ásdís Jónsdóttir, Prime Minister's Office, chair;

Ásthildur Knútsdóttir, Ministry of Health;

Berglind Hallgrímsdóttir, Iceland Innovation Center, secretary of the Technical Committee;

Elísabet Andrésdóttir, Icelandic Centre for Research, secretary of the STPC and the Science Committee;

Katrín Anna Guðmundsdóttir, Ministry of Finance and Economic Affairs;

Kjartan Hreinsson, Ministry of Industries and Innovation;

Ragnheiður H. Magnúsdóttir, chairman of the Technical Committee;

Ragnhildur Helgadóttir, chairman of the Science Committee;

Sigríður Valgeirsdóttir, Ministry of Industries and Innovation;

Sigurður Á. Þráinsson, Ministry for the Environment and Natural Resources; and

Una Strand Viðarsdóttir, Ministry of Education, Science and Culture.

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