ICELAND

Hot STI issues

- Restoring and rebuilding capacity in STI and increasing industry R&D.
- Improving co-ordination of research funding among responsible ministries.
- Targeting green industries as the fastest-growing sector in the next decade.
- Continuing educational reforms and increasing the number of graduates in science and engineering.

General features of the STI system: Iceland's economy has diversified into high-knowledge services over the last decade to complement the traditionally strong fishing sector and aluminium production. Geothermal and hydropower industries have attracted investment from high-technology green firms. However, the global financial crisis severely affected Iceland and has put several investment projects on hold. Firms are moderately involved in the research system and most business R&D activities are concentrated in high-knowledge services and high-technology manufacturing (Panel 2). BERD as a percentage of GDP was 1.4% in 2008, down from 1.5% in 2000. BERD intensity and research output in terms of patents are close to the OECD median (Panel $1^{(d)(f)}$). Iceland's performance in terms of non-technological innovation is good, as reflected in trademark counts ($1^{(g)}$). The regulatory and administrative environment is not very conducive to entrepreneurship ($1^{(j)}$) owing to bureaucratic hurdles, foreign ownership restrictions in various sectors (electricity, fisheries) and entry barriers in network industries. In addition, universities and public labs do not actively patent the results of their research activities ($1^{(p)}$). Because of its small size and remote location, Iceland lacks world-class universities and large corporate investors ($1^{(b)(e)}$). Links between industry and science are strong, and industry funds 18% of public research ($1^{(o)}$). Iceland is strongly integrated in global networks: 72% of scientific articles and 42% of PCT patent applications are produced with international collaboration ($1^{(q)(r)}$). ICT infrastructures are well developed, with 34 fixed broadband and 54 wireless subscriptions per 100 inhabitants ($1^{(k)(l)}$). The government's e-readiness index is around the OECD median ($1^{(n)}$), similar to that of Austria, Ireland and Luxembourg. Human capital indicators vary: a third of the adult population has attained tertiary education ($1^{(s)}$) and 39% of the workforce is employed in S&T jobs ($1^{(v)}$). Iceland has a relatively high 17 researchers per thousand total employment, but PISA science scores of 15-year-olds are middling ($1^{(t)}$) and doctoral graduation rates in science and engineering are low.

Recent changes in STI expenditures: Iceland's GERD was 2.64% of GDP (USD 334 million) in 2008 and is targeted to reach 4% in 2020. It grew by 2.3% during 2005-08. Industry remains the main funder of GERD (50%) and government's contribution (39%) is relatively large, but decreasing compared to OECD countries. Overseas funding accounts for a notable 10% of total GERD.

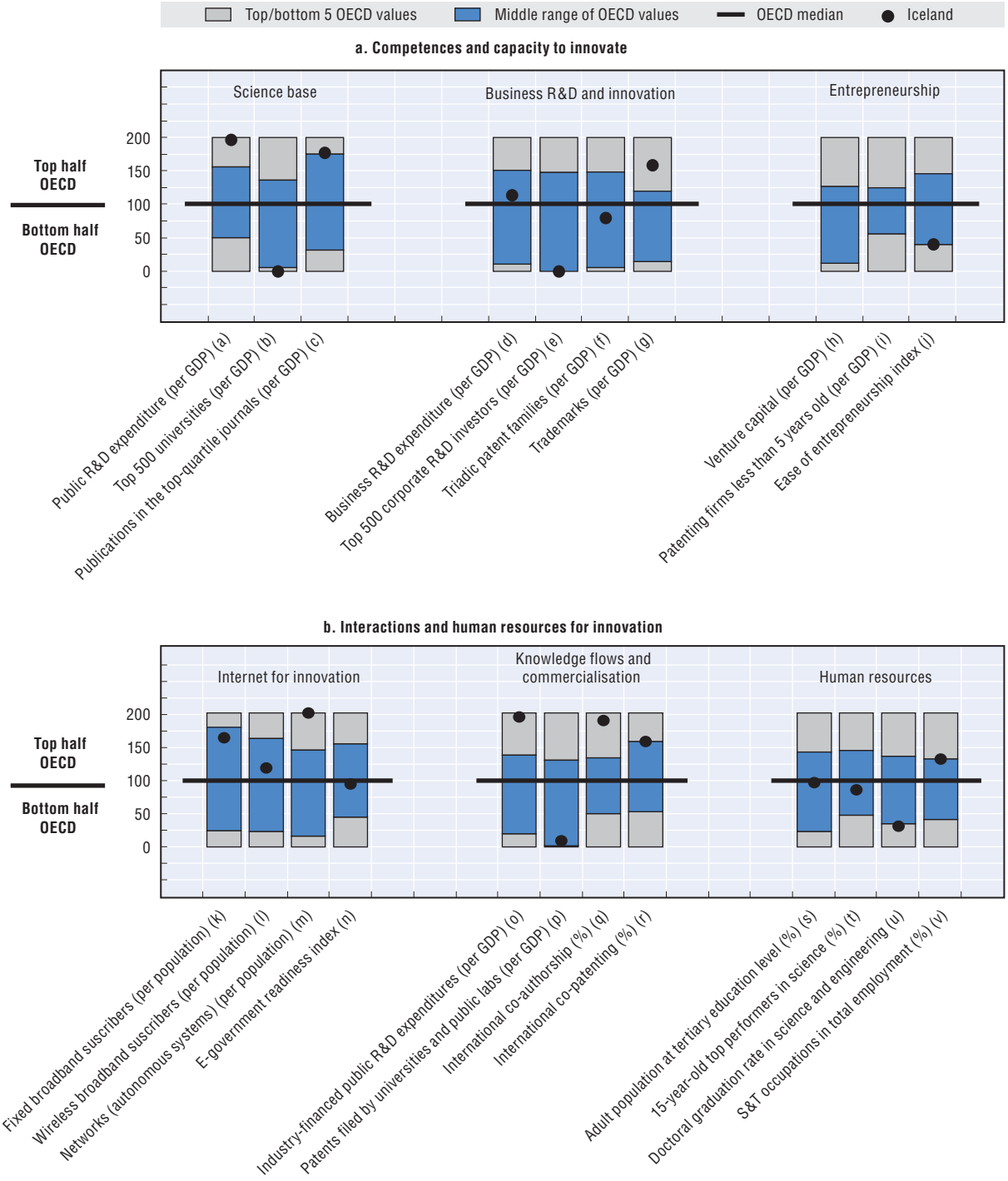
Overall STI strategy: Current government priorities focus on achieving macroeconomic stability. Since the global crisis the national STI strategy has been refocused. The New Science and Innovation Strategy 2010-20 has placed greater emphasis on competitive and performance-based funding, better quality assessment, and creative and design industries. To consolidate funding, the Icelandic Centre for Research (Rannís) has merged research

Key figures

Labour productivity, GDP per hour worked in USD, 2010	**40.1**	**GERD, as % of GDP, 2008**	**2.64**
(annual growth rate, 2005-10)	(+0.6)	(annual growth rate, 2005-08)	(+2.3)
Environmental productivity, GDP per unit of CO_2 emitted in USD, 2009	**5.86**	**GERD publicly financed, as % of GDP, 2008**	**1.03**
(annual growth rate, 2005-09)	(+3.7)	(annual growth rate, 2005-08)	(+0.9)

Figure 10.19. **Science and innovation in Iceland**

Panel 1. Comparative performance of national science and innovation systems, 2011



Note: Normalised index of performance relative to the median values in the OECD area (Index median = 100).

and technology funds. In 2011, a series of open forums were conducted to shape STI policy and provide a sharper focus.

STI policy governance: In 2009, the Minister of Science, Education and Culture (MSEC) established a national task force and a panel of international experts to review STI policy. Rannís and Innovation Centre Iceland (ICI) are two key funding agencies. The Science and Technology Council (STPC) is responsible for innovation policy and has reinforced Rannís's capacity for evaluation of research and innovation.

***Science base*:** Iceland has a strong science base and, along with Finland, the highest intensity of public R&D expenditures (at 1.14% of GDP) in the OECD area (1[(a)]) and a strong international publication record (1[(c)]). Although universities have gained in importance in the past five years, the public research system is traditionally centred in public labs. Public research is also very much oriented towards thematic issues and applied and experimental activities (Panel 3).

Business R&D and innovation: In 2009, Iceland introduced a tax reduction scheme for R&D to stimulate business R&D, with effect from 2011. Uptake has been good. All industries are eligible for tax deductions of up to 20% of research costs, with an annual maximum of USD 733 000 per company. The Technology Development Fund (TDF) received additional funding for 2011.

Entrepreneurship: Immediately after the crisis, grassroots initiatives were launched, such as creativity centres, idea generation houses, and entrepreneurship centres to boost entrepreneurship. The IMPRA unit at ICI helps entrepreneurs evaluate business ideas and provides counselling on start-up, growth and management. It also targets groups such as women, young entrepreneurs and managers. The Step Ahead initiative provides guidance to smaller firms. The Frumtak Investment Fund invests in start-up and innovation companies at home and abroad.

ICT and scientific infrastructures: In 2009, an STPC committee developed a research infrastructures roadmap to identify investment priorities. The MSEC has conducted an Information and Environment Research Programme on IT and eco-technology.

Clusters and regional policies: Through its centres of excellence and research clusters, STPC funds clusters in promising areas of comparative strength, such as geothermal activity. Grants of up to USD 22 000 are offered for the development of a service or product in an existing business or cluster in rural and regional areas. IMPRA also operates as an incubation centre.

Knowledge flows and commercialisation: The Off the Shelf project of the University of Iceland, in collaboration with the Patent Office and the Technology Court, provides students and researchers with incentives to exploit knowledge. The Iceland Living Lab (LL) at the ICI increases collaboration between users and producers and IMPRA promotes non-technological innovation. The Rannís Company and Institution (CI) grants also encourage collaboration.

Globalisation: The STPC, through Rannís, promotes international collaboration and networking as a top priority to compensate for a small domestic R&D market. The Nordic Innovation Council and the European Free Trade Agreement also facilitate Nordic co-operation. The TDF's support of companies seeking to globalise is highly rated.

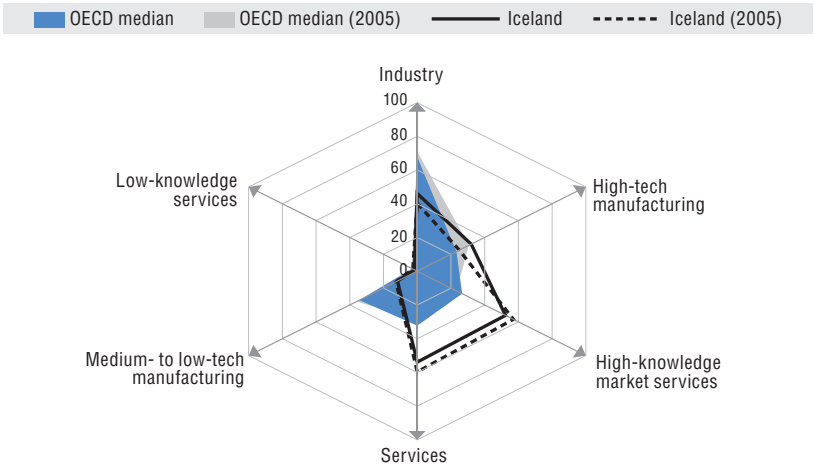
Human resources: Rannís participates in the EURAXESS service network which supports researchers. As part of its effort to prevent an outflow of researchers after the crisis, it offers grants to skilled overseas researchers. Secondary school education reforms passed in 2009 are expected to reduce drop-out rates and to increase formal education rates by 10% by 2020. The *New Act on Public Universities* in 2008 is an important higher education reform.

Emerging technologies: Iceland is home to DeCODE, a large genetics company that conducts extensive cutting-edge R&D. The TDF supports emerging technologies in geothermal research, genetics, artificial intelligence and eco-technologies. Recently, STPC launched a number of strategic research programmes at its centres of excellence, among others the Nano-science and Nanotechnology and Post-genomic Biomedicine Programmes, the Added Value for Seafood Programme, the Icelandic Institute for Intelligent Machines.

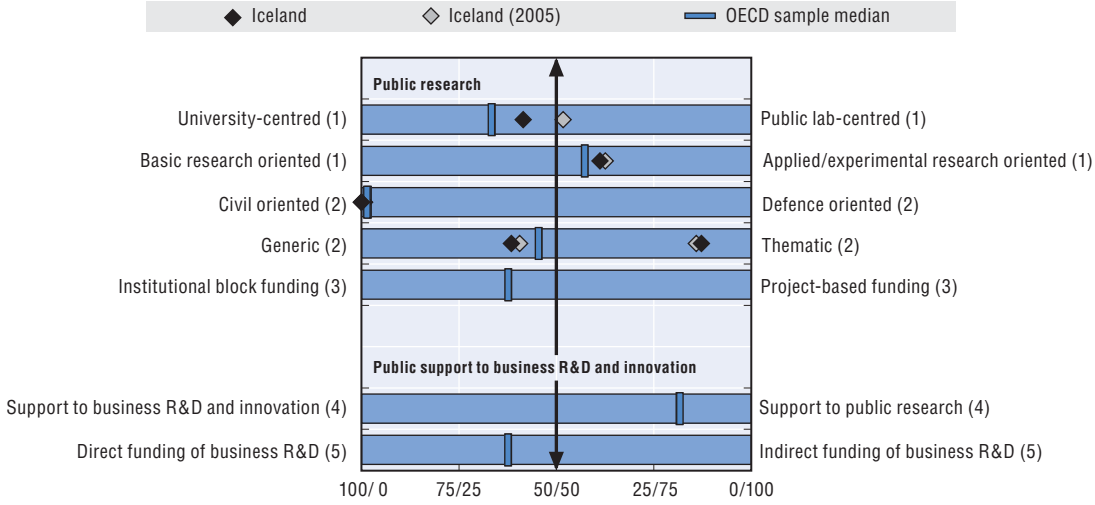
Green innovation: The Iceland 2020 strategy targets eco-innovation as the main growth sector in the next decade, and aims to double growth in turnover between 2011 and 2015. Green public procurement also enjoys high priority.

Panel 2. Structural composition of BERD, 2009

As a % of total BERD



Panel 3. Overview of national innovation policy mix, 2010



1. Balance as a percentage of the sum of HERD and GOVERD.
2. Balance as a percentage of total GBAORD.
3. Balance as a percentage of total funding to national performers.
4. Balance as a percentage of the sum of HERD and GOVERD funded by government and higher education and components of (5).
5. Balance as a percentage of the sum of indirect funding of business R&D and innovation through R&D tax incentives and direct funding of BERD through grants, contracts and loans.

Source: See reader's guide and methodological annex.

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