NATIONAL STRATEGIES FOR SCIENCE, TECHNOLOGY AND INNOVATION

National strategies for science, technology and innovation (STI) serve several functions in government policy making. First, they articulate the government's vision regarding the contribution of STI to their country's social and economic development. Second, they set priorities for public investment in STI and identify the focus of government reforms (*e.g.* university research funding and evaluation systems). Third, the development of these strategies can engage stakeholders ranging from the research community, funding agencies, business, and civil society to regional and local governments in policy making and implementation. In some cases, national strategies outline the specific policy instruments to be used to meet a set of goals or objectives. In others, they serve as visionary guideposts for various stakeholders.

Today OECD countries are no longer alone in developing national strategies for science, technology and innovation. Brazil, the People's Republic of China and India have developed national innovation strategies as part of their longer-term economic development strategies. More recently, middle-income and developing countries such as Argentina, Colombia and Vietnam are developing strategies to diversify their economies and mobilise innovation to improve their competitiveness. Several policy trends emphasised since 2010 are discussed below.

Finding new sources of growth and competitiveness. France, Italy, Japan and the United States are mobilising STI to re-start economic growth, which slowed in the wake of the financial and economic crisis. The French Investments for the Future Programme (Programme des investissements d'avenir, PIA) seeks to restore industrial competitiveness through investment in innovative and industrial projects and financial support for institutional reform of the French national innovation system. Germany and Korea are fostering investment in new growth areas such as green innovation. Countries that are innovation followers still focus largely on improving the quality of the business environment and moving up the value chain to gain competitive advantage. An example is Chile's new National Innovation Strategy for Competitiveness.

New industrial policy and targeting of strategic technologies/sectors. Besides their support for general purpose technologies such as nanotechnology, biotechnology and information and communication technologies (ICTs), many OECD countries are emphasising support for innovation in strategic technologies or sectors, including traditional ones (*e.g.* agriculture) and services. A number of STI strategies include industrial policy in wider innovation policies. Among others, the new Dutch industrial policy, Top Sectors, Brazil's *Plano Brasil Major*, China's 12th Five-Year-Plan for S&T development and Turkey's Industrial Strategy Document and Action Plan define strategic sectors that can strengthen national and industrial competitiveness.

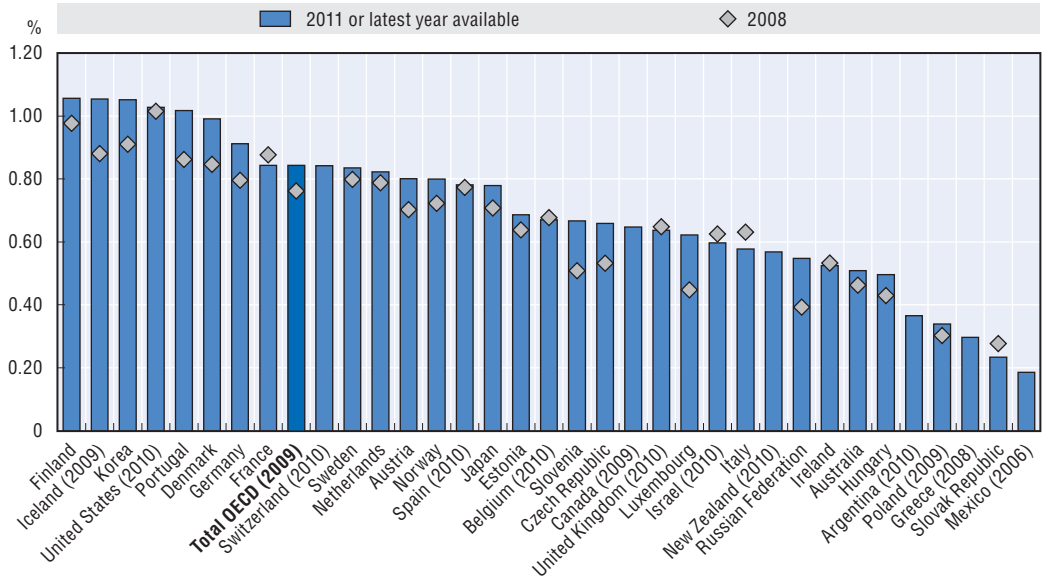
Grand challenges. Complementing the rise of a "new industrial policy", many OECD countries have used the so-called grand or global challenges (*e.g.* climate change, energy security, etc.) as a means of orienting public investments in STI. Denmark, Korea and Germany are "greening" their national research and innovation strategies, and most countries continue to place environmental issues, climate change and energy high on the agenda. Health and demographic changes also remain important challenges, in particular for Italy, Japan and Germany.

Stable R&D expenditures. In spite of the economic slowdown and fiscal austerity policies, data on government budget appropriations or outlays for R&D (GBAORD) (Figure 5.1) show that

government R&D budgets have remained stable in about half of OECD countries. As a share of GDP, total R&D budgets in the OECD area rose from 0.78% in 2005 to 0.82% in 2009.

Figure 5.1. **Government budget appropriations and outlays for R&D, 2008 and 2011**

As a % of GDP



Source: OECD, *Research and Development Statistics (RDS) Database*, March 2012.

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Emphasis on demand-side innovation policies. While supply-side innovation policies such as public R&D investments are necessary to preserve long-term innovation capacity, they are not enough. Some countries have broadened their STI strategies to include demand-side innovation and diffusion policies. For example, the Research and Innovation Policy Guidelines of the Finnish Research Council include specifications on demand-side approaches. However, aligning demand- and supply-side innovation polices remains a challenge, as does the evaluation of such measures.

Social cohesion. Income disparities and levels of inequality increased in several OECD and non-OECD countries in the past decades. National STI strategies are being used to enhance social cohesion while boosting economic growth. Poland's National Cohesion Strategy, Ireland's Strategy for Science, Technology and Innovation, and Portugal's National Strategic Reference Framework include policies that aim to create, sustain and rebuild social cohesion.

Public support for basic research. The science base has always been a cornerstone of national competitiveness and an essential source of knowledge for coping with grand challenges. Scientific leaders such as France, Switzerland and the United Kingdom preserve their lead in basic research. Countries that have lost ground or transition economies such as the Czech Republic and Poland continue to deepen the reform of their research systems by granting universities more autonomy to allocate their public funds. In the Netherlands, Japan, the United Kingdom and the United States there is a strong focus on improving the impact and output of public research through assessment and evaluation and improved priority setting. There is also a strong push to accelerate the transfer, exploitation and commercialisation of public research results, for example by improving

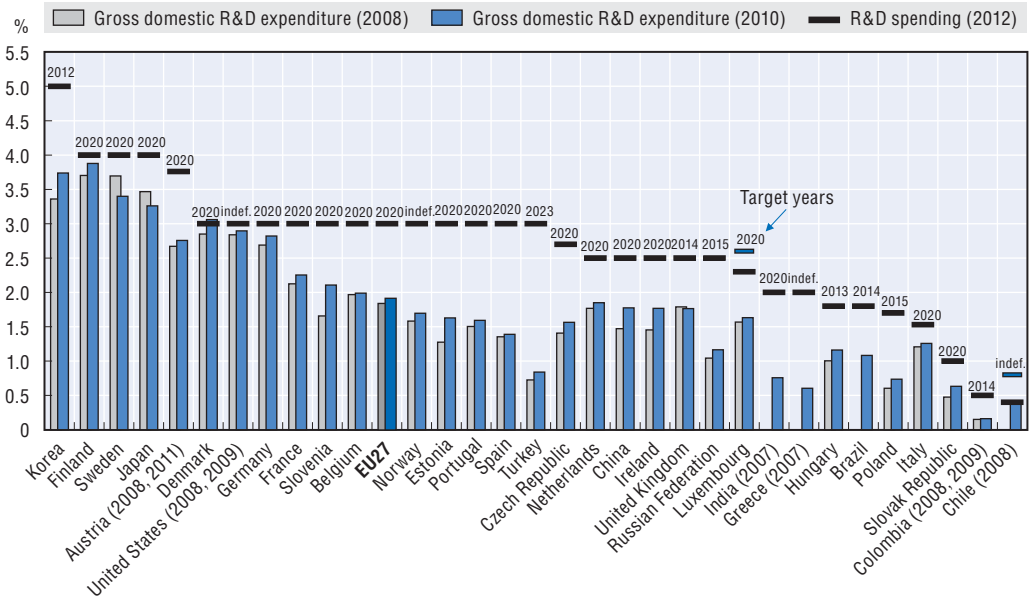
the management of intellectual property rights at universities and public research institutions and increasing access to publicly funded research data.

Human resources. Improvements in skills and in education in science, technology, engineering and mathematics play a role in innovation that is as large or larger than improvements in other tangible or intangible assets. Policies to improve human resources in science and technology, to encourage international mobility, to reduce gender gaps and to attract foreign talent remain high priorities in the national STI strategies of OECD countries.

Business support. Support to business innovation focuses on improving framework conditions, streamlining business innovation programmes, and expanding indirect funding instruments such as R&D tax credits. At the same time, given the critical role of the business sector in addressing challenges such as energy and the environment, much public support to business innovation is being directed towards public-private partnerships and towards improving links between public and private research through instruments such as innovation vouchers and via cluster policies. Improving conditions for entrepreneurship and the supply of risk capital, especially for small and medium-sized enterprises, remains an important focus of business innovation support policies. Finally, evaluation not only of public research but also of business support schemes is becoming more important in light of fiscal consolidation and the need to adapt policies to the rapidly changing nature of innovation.

Figure 5.2. **National R&D spending targets and gap with current levels of GERD intensity, 2012**

As a % of GDP



Note: Countries are ranked by descending order of national R&D spending targets and by descending order of GERD intensity in 2010 (or latest available year). For countries that adopted a range of target values, the minimum threshold is used in the ranking.

Source: Country responses to the *OECD Science, Technology and Industry Outlook* policy questionnaires 2010 and 2012; OECD, MSTI Database, June 2012; UNESCO Institute for Statistics, June 2012.

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