SGI Sustainable Governance Indicators

2014 Research and Innovation Report

Research and Innovation Policy

Bertelsmann Stiftung

Indicator

Research and Innovation Policy

Question

To what extent does research and innovation policy support technological innovations that foster the creation and introduction of new products?

41 OECD and EU countries are sorted according to their performance on a scale from 10 (best) to 1 (lowest). This scale is tied to four qualitative evaluation levels.

10-9 = Research and innovation policy effectively supports innovations that foster the creation of new products and enhance productivity.
8-6 = Research and innovation policy largely supports innovations that foster the creation of new products and enhance productivity.
5-3 = Research and innovation policy partly supports innovations that foster the creation of new products and enhance productivity.
2-1 = Research and innovation policy has largely failed to support innovations that foster the creation of new products and enhance productivity.

Finland

Score 9

Finland has for some time been a forerunner in research and development (R&D) spending as well as in its number of researchers and patent applications; yet less so in terms of computer technology and Internet access. Finland's reputation as a high-tech country is well-earned. However, the focus of R&D has been on applied research to the disadvantage of basic research, and universities and other basic research institutes have not benefited. In the long run, the level of applied research of course being dependent on the level and achievements of basic research, this bias will have negative consequences for product development and productivity. Moreover, the technology transfer from universities to industry is subpar and academic entrepreneurship is not well-developed.

Israel

Score 9

In a research paper submitted to the Knesset in 2011, the Knesset's research institute analyzed Israel's R&D sector on the basis of three pillars, including scientific research performed primarily in academia, research conducted in government institutes, and research conducted by civil-industrial partnerships governed by the Ministry of Industry, Trade and Labor (since renamed as the Ministry of Economy). In various EU and OECD surveys, Israel has demonstrated high performance in the field of research and innovation. For example, in a recent publication, Israel was mentioned as having increased "its (European Patent Office) EPO patenting activity between 2000 and 2007, to reach the highest share of EPO patent applications per billion GDP." Israel was also singled out as one of the leading start-up and information exporters.

Israel's good rating is not a result of extraordinary government funding over the years. Its R&D is very much private-sector oriented. In 2000, government funds accounted for 24% of total spending on civil-industrial R&D development. In 2006, government funds accounted for only 15.9%, and in 2009 further reductions brought this figure down to 14.5%, below the European median of 37.3%. In 2006, however, private-sector investments were above the European median by more than 20%. Although government funding has declined over the years, reaching 0.67% of GDP in 2012 (Eurostat), total R&D investment as a percentage of GDP is high in comparison to many European countries because of the high levels of non-public R&D spending, which were at 3.83% in 2012 (Eurostat).

A large portion of Israeli R&D policy is directed toward international cooperation. Indeed, in 2011, Israel was engaged in 30 different international cooperative research ventures with a variety of European countries and organizations. These resulted in 250 grant applications and projects with a total budget of €250 million. As of 2005, the government office responsible for overseeing Israel's scientific relationships and capabilities had secured 14 binational agreements with various countries including Russia.

Internationalization has long been a priority of innovation-minded policymakers. The country is signatory to 29 bilateral R&D agreements and is involved in five EU programs, including Eureka, Eurostars, the Competitive and Innovation Program – Enterprise Europe Network (CIP-EEN), Galileo, and Sesar.

In terms of both policy and budgets, the most significant international involvement is in the Framework Programs, which are managed by the Israel-Europe R&D Directorate (ISERD).

A 2011 OECD report acknowledging these accomplishments also noted that Israeli bureaucracy in this field is still overly complex and burdensome. These issues are currently being re-evaluated, and are widely discussed in the public administration discourse.

Citation:
Goldshmit, Roi, "Information on scientific research and R&D in Israel," Knesset research institute, 3.2.2011. (Hebrew) http://www.knesset.gov.il/mmm/data/pdf/m02763.pdf
Levi, Anat & Roi Goldshmit, "Analyzing the budget of the office of the chief scientist in the ministry of the economy", Knesset research institute 26.5.2013.
http://www.knesset.gov.il/mmm/data/pdf/m02763.pdf
OECD, "OECD general economic review - Israel," 2011 (Hebrew)
http://www.mof.gov.il/Lists/List26/Attachments/314/OECD_Dec2011.pdf

European commission, "Innovation Union Competitiveness report 2011," 2011.
http://ec.europa.eu/research/innovation-union/index_en.cfm?section=competitiveness-report&year=2011
"World Economic Forum: The Global Competitiveness Report 2012-2013, Geneva 2012.
http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf

Sweden

Score 9

Sweden ranks among the top five advanced industrialized democracies in terms of research and development (R&D) spending per capita. This high level of investment in R&D has existed for considerable time. As an economy with high labor costs, Sweden's competitive edge lies not in large-scale manufacturing but in knowledge-intensive sectors. R&D spending thus directly sustains that competitive edge.

The current government's ministers rarely miss an opportunity to reinforce the argument that public spending on higher education, research institutions, and research and development in general is integral to future prosperity and wealth.

While R&D spending has a long history, converting research and development concepts into valuable products has been far more challenging for Sweden. The "Swedish paradox," as it is called, is precisely the inability to convert research findings into commercially viable products. However, as recent data show, Sweden now ranks first with regard to patent applications and license fees for intellectual property. This is a valid indicator that R&D is bearing fruit, as securing intellectual ownership of emerging products is a critical stage in the process from the research facility to the market. Public policy has targeted this very issue lately and the data suggest that R&D is now paying off.

Citation:
Edquist, C. and L. Hommen (eds) (2008), Small Country Innovation Systems (Cheltenham: Edward Elgar).

Switzerland

Score 9

Switzerland's achievement in terms of innovation is considerable, although it has no consistent innovation policy. Indeed, it is unclear to what extent public policy, as opposed to the country's strong overall competitiveness and medium level of private-sector corporate investment, has actively contributed to the formation of strong levels of innovation and entrepreneurship. But public policy obviously has not impeded innovation.

In the field of research policy, two peculiarities of the Swiss political system have had a strong impact: First, it is a liberal country with considerable reluctance to engage in economic- or social-policy interventions. Therefore, research funding is mainly provided by private actors. Second, as a federal and decentralized country, university research is performed by universities that are financed and regulated by cantons. However, this does not apply to the two federal schools of technology.

The output of the research system is impressive, as the following points demonstrate.

• Switzerland is at the top of the OECD in terms of per capita publications.
• Switzerland's share of global publications rose between 1981 and 2001.
• Swiss research is among the most-cited in the world.
• Switzerland is among the world's leading nations in terms of patent registration.
• The Federal Institute of Technology Zurich (Eidgenössische Technische Hochschule Zürich) is one of the best universities in the world; the universities of Basel, Bern, Geneva, and Zurich usually show up in the list of the 200 best universities worldwide.
• Swiss products enjoy strong demand in the foreign market, while a similar amount of foreign technology products are imported.
• Swiss companies allocate a significant portion of their assets to research.

However, there are several problems, including:

• a decrease in innovation in recent years (although Switzerland is still one of the most innovative countries in the world);
• the need to improve cooperation between universities and companies;
• weaknesses in social-science and humanities research relative to that conducted in the natural sciences or technological fields;
• a growing skepticism within the population as to the value of cutting-edge research;
• an unclear relationship between the recently created polytechnics and established universities;
• structural friction in coordinating Swiss research programs with EU research policy; and
• very low levels of public spending on research as compared to other countries. As a share of total research expenditure, public spending has declined from 28.4% in 1992 to 23.9% in 2004. This may not be a problem, however, as total research expenditure is probably a better indicator of sustainable growth overall.

Germany

Score 8

Germany's performance with respect to research and development is good. Germany ranks seventh worldwide in terms of patent applications per inhabitant (Global Competitiveness Report 2012 – 2013: 177). Indeed, according to the World Economic Forum, Germany's capacity for innovation is among the world's highest. In the area of technological development, product and process innovation, the country ranks third worldwide, just 0.1 point behind Japan (5.8 points) (Global Competitiveness Report 2012 – 2013: 177).

The German government has started to put a higher priority on research and development. Its spending is now above the European average. In 2012, the government increased the budget of the Ministry of Education and Research by 11%, reaching an all-time high of €12.9 billion (BMBF). In addition, the Ministry of Economics and Technologies spent €2.5 billion on technological research. To boost the business innovation budget, the ministry established a program for small and medium-sized enterprises in 2008. The government plans to increase spending on research and innovation to 3% of GDP by 2015. In contrast to numerous other European countries, Germany does not offer general R&D tax incentives, but rather concentrates on funding provided through targeted programs.

In recent years, medium-sized businesses in particular have contributed to the development of innovation, but cluster development is comparatively underdeveloped (Global Competitiveness Report 2011 – 2012: 506). Companies' expenditure on R&D is strong, but public-private partnerships and collaboration between universities and industry leave room for improvement. In the 2012 – 2013 Global Competitiveness Report, Germany was ranked 10th out of 144 countries with respect to the quality of its scientific-research institutions, with a score of 5.6. That was 0.7 points behind top-seated Israel, but slightly better than countries including Finland, France and Canada (cf. Competitiveness Report 2012 – 2013: 513). The government has continued to pursue its so-called excellence initiative within the tertiary education sector. The federal government and states have agreed to resume the Joint Initiative for Research and Innovation, and intend to increase the program's budget by 5% every year (2011 – 2015).

Iceland

Score 8

Public and private spending on research and development (R&D) in Iceland together totaled 3% of GDP in 2007, one of the highest levels in the OECD group. About 40% of this expenditure, or 1% of GDP, was provided by the government. This high level of R&D activity to some extent reflected the ongoing transformation of the Icelandic economy from a focus on agriculture and fisheries toward manufacturing and services, and has been associated with the creation of new private firms in biotechnology, pharmaceuticals, and high-tech manufacturing, among other new sectors. The government fosters research and innovation in the fields of geothermal energy, hydrogen power, genetics and information technology, and has in recent years sought to spur innovation. Innovation Center Iceland (Nýsköpunarmiðstöð Íslands), a government institute, was established in 2007 through the merger of the Technical Institute of Iceland (IceTec) and the Icelandic Building Research Institute (IBRI). It operates under the Ministry of Industries and Innovation and receives funding from both the public and private sectors. As a consequence of the collapse in 2008, public funding of research and development, which peaked in 2008 and 2009, was cut by about 10% in 2011. However, the drop in the value of the króna by a third in real (inflation-adjusted) terms since the crash of 2008 has made start-up and spin-off companies viable on a significant scale for the first time, while tourism has taken off on an unprecedented scale.

Citation:
Research and Development in Iceland 2011. RANNIS - The Icelandic Center for Research

Netherlands

Score 8

The Netherlands moved from 9th in 2009 to 5th in 2012 in the World Economic Forum's Global Competitiveness Report due to an improved innovation climate, better education and health, regulatory burden reduction for foreign business and more patents. The European Union's Innovation Union Scoreboard 2011 ranks the Netherlands as the third best "innovation follower" of a group of EU countries (Belgium, UK, Austria and France). The Netherlands scores above average in terms of open, excellent and attractive research systems (overall rank: 1st), and in scientific publication output, finances and support (overall rank: 5th), and intellectual aspects like number of patents (overall rank: 5th). Whether or not this national R&D performance is due to government policies (coordinated by the Ministry of Economic Affairs) is unclear. Dutch policies used to focus on the reduction of coordination costs in creating public/private partnerships. In addition, there were substantial amounts of money in innovation credits for start-up companies and R&D-intensive SMEs – four to five times as much as for larger companies. Since 2011, national R&D has focused on nine "top-level" sectors of the economy (water, agrofood, high tech, life sciences, chemistry, energy, logistics, the creative industry and greenhouse agriculture) and specific R&D support will be substituted by generic burden reduction for businesses, but there remains a special innovation fund for SMEs.

Citation:
Rathenau Instituut, Innovatiebeleid (www.rathenau.nl/web-specials)
European Commission, Innovation Union Scoreboard 2011 (ec.europa.eu/enterprise/policies/innovation/files/ius-2011_en.pdf)
World Economic Forum,The Global Competitiveness Report 2012-2013 (WEF_GlobalCompetitivenessReport_2012-2013.pdf)
D. Lanser en H. van der Wiel (2011), Innovatiebeleid in Nederland: de (on)mogelijkheden van effectmeting, CPB Achtergronddocument (www.cpb.nl/sites/default/files/publicaties/download/cpb-achtergronddocumenten)

South Korea

Score 8

The Korean government invests heavily in research and innovation, particularly in fields which can be directly commercialized. Public spending on research has substantially increased in recent years and accounts for 1% of GDP in 2011. The green growth policy is a good example of the government's willingness to support domestic industry's R&D of new products or production techniques. The government also uses protectionist measures that help Korean companies to develop indigenous technologies without facing competition. One example of this infant-stage technology protection is the requirement that all mobile phones sold in Korea must support a particular Korean internet platform. Such trade barriers have resulted in the complete dominance of Korean mobile-phone makers in the Korean market, because it is too expensive for foreign companies to design special models just for the country. The Korean government started investing in modern telecommunication infrastructure early, although it has seemed to lose its competitive edge as other countries catch up. The ever-increasing dominance of large business conglomerates ("chaebol") impedes the rise of small- and medium-sized enterprises, as well as the start-ups that are often the source of new innovations (as opposed to incremental ones). Other weaknesses include a lack of high-quality fundamental research that cannot easily be commercialized. To alleviate this, the government is funding new Institutes of Basic Science in 2012.

Citation:
OECD, OECD Review of Innovation Policies Korea 2009
Institute of Basic Science, http://www.ibs.re.kr

United Kingdom

Score 8

The United Kingdom's tradition of being active player in research and innovation dates back to the Industrial Revolution. The country's clusters of pre-eminent universities have for a long time played an important role in linking cutting-edge academic research with industries such as biotechnology or IT. Performance has been weaker in terms of overall R&D spending, and in converting innovation into products and sustainable, larger-scale production that is profitable in the long run. However, it is important to emphasize that the UK economy does not have the industrial base to support a large-scale R&D effort, so it is necessary to look at other indicators such as information and communication technology (ICT) spending (which matters more for service industries), to capture a truer picture of innovation effort.

Over the decades, attempts have been made by various governments to improve that situation, linking it to weaknesses in technical education on various levels. Recent government initiatives have focused on extending tax credits for R&D, setting up regional Technology and Innovation Centres (TICs), and investing in digital infrastructure and new university research facilities. There is also a current debate about the degree to which the United Kingdom should seek to attract highly skilled immigrants, which has been muddied by a broader attempt to curb immigration that is having some effect on the willingness of foreign students to come to the United Kingdom.

While the optimism expressed in the "Innovation and Research Strategy" and the sums involved are considerable, a long-term perspective advises some caution, for similar spurts have been undertaken from time to time, dating back to the Wilson government of the 1960s. Opinions vary as to why past efforts failed. Only in the medium term will the success of this new initiative be discernible.

United States

Score 8

The United States has traditionally invested heavily in research and development, but the recent recession and the country's problematic budget politics seem to be changing that. U.S. innovative capacity is a product of funding from a mix of private and public institutions. Certain public institutions stand out, particularly the National Science Foundation, the various federal laboratories, the National Institute of Health, and various research institutions attached to federal agencies. In addition, there is a vast array of federally supported military research, which often has spillover benefits. In recent years, total U.S. R&D stood at roughly $400 billion, or 2.75% of GDP, of which about one-third (.3 billion) was direct federal R&D funding. President Obama put forward the goal of raising total R&D spending to 3% of GDP. Unfortunately, these ambitious plans have fallen by the wayside. The recent demands for spending cuts and the across-the-board sequester cuts, if not reversed, will result in stagnating federal R&D spending. Spending on innovations in health, energy, agriculture, and defense, among other areas, will be affected. Instead of Obama's proposed growth, federal research and development will fall back to 2007 levels and then increase only slowly – declining sharply as a percentage of GDP.

Canada

Score 7

Generous fiscal-incentive programs for business R&D (BERD) are available in Canada both at the national and provincial level, and there is significant government financial support for higher-education-based R&D. Canada's low business expenditure on R&D (BERD) intensity and poor productivity performance are believed to represent a failure on the part of the business sector rather than inadequate public policy. Nevertheless, there are a number of issues in the innovation-policy area which may be a cause for concern and merit further study, including the effectiveness of the federal government's Scientific Research & Experimental Development (SR&ED) tax program in increasing business-sector R&D (the program has never been formally evaluated); the impact of cuts to government lab R&D budgets; the inadequacy of government programs in facilitating technology transfer or persuading small and medium-sized businesses to adopt best-practices techniques; and the relationship, or lack thereof, between increased rates of higher education participation and business sector R&D and productivity.

Many of these issues were addressed in the 2011 Jenkins report, which was commissioned by the federal government to review the federal support program for R&D. The report recommended a rebalancing of public support for R&D away from indirect support such as tax credits to direct support through funding of specific projects. The federal government responded favorably to this recommendation. The report also recommended that the federal government's main research organization, the National Research Council, focus more on applied research, and much less on basic research (seen as the role of the university sector), so as to promote the transfer of knowledge to the business sector. Again, the federal government has implemented this recommendation.

Public policy in Canada appears to have been effective in creating a strong research capacity. In September 2012, the Council of Canadian Academies released an assessment of science and technology in Canada that found Canada's scientific research enterprise to be ranked fourth-highest in the world, after that of the United States, the United Kingdom and Germany, in a survey of over 5,000 leading international scientists. With less than 0.5% of the world's population, Canada produces 4.1% of the world's research papers and nearly 5% of the world's most frequently cited papers. The six research fields in which Canada excels are clinical medicine, historical studies, information and communication technologies (ICT), physics and astronomy, psychology and cognitive sciences, and the visual and performing arts.

In May 2013, the federal government's Science, Technology and Innovation Council released its biennial review of the nation's science, technology and innovation (STI) performance, arguing that the country continues to tread water as a mid-level performer in STI, and that Canada must aspire to global leadership on key STI measures. The report found that between 2010 and 2012 Canada had lost ground on 23 STI indicators, improved on 16 indicators, and stayed the same on three indicators.

Citation:
Expert Panel for the Review of Federal Support to Research and Development (2011), Innovation Canada: A Call to Action (Jenkins Report), November, http://rd-review.ca/eic/site/033.nsf/eng/h_00287.html
Science, Technology and Innovation Council (2013) Canada's Science, Technology and Innovation System: Aspiring to Global Leadership, State of the Nation, 2012, May http://www.stic-csti.ca/eic/site/st ic-csti.nsf/eng/h_00058.html
Council of Canadian Academies (2012) Expert Panel Report on the State of Science and Technology in Canada, September, http://www.scienceadvice.ca/uploads /eng/assessments%20and%20publications%20and%20news%20releases/sandt_ii /stateofst2012_fullreporten.pdf

Denmark

Score 7

Denmark used to score quite well in international comparisons on competitiveness. Denmark ranked fifth in the World Economic Forum's Competitiveness Index for 2009, for example, down from third in 2008. But in the latest 2012–2013 report Denmark had fallen to 12th place. The latest report mentioned a weakening in the assessment of institutions and financial markets. The main factor behind the falling competitiveness was the serious deterioration of wage competitiveness and falling productivity. At the moment, however, wage competitiveness is improving in comparison with neighboring countries due to moderate growth in unit labor costs.

Despite this progress, Denmark has experienced a progressive decline in productivity growth, the causes of which are under debate. The government has appointed a "productivity commission" to analyze the issue and to provide specific policy proposals on how to strengthen productivity growth.

Public R&D spending relative to GDP puts Denmark in eighth position among OECD countries. If we look at total number of researchers in relation to population Denmark is number three among OECD countries (after Finland and Iceland). Finally, if we look at patent applications Denmark comes in at a fifth place (after Sweden, Switzerland, Finland and Israel). These factors suggest that Denmark may improve its competitiveness in the future if it can deal with the current problems, including relatively high labor unit costs.

The target for R&D investments is 3% of GDP. This figure was actually reached in 2009, with 1.02% public and 2.1% private research investments.

Since Danish businesses are less innovative than foreign competitors, the government has taken various initiatives, including the creation of a Business Innovation Fund, as well as a Globalization Fund.

Citation:
World Economic Forum, The Global Competitiveness Report 2012-2013, http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf (accessed 18 April 2013).
The Danish Government, "Denmark's National Reform Programme," May 2011 (accessed 18 April 2013).
European Commission,European Economic Forecast. Spring 2013.
Produktivitetskommissionen: www.produktivitetskommissionen.dk

Estonia

Score 7

Research, development and innovation, or RDI, have been strong priorities for national development. The priority position is reflected in a relatively sophisticated set of policies and instruments, and an increase in RDI expenditure over the past several years, which is slowly approaching the EU average. RDI investment has paid off, as the University of Tartu is now ranked among the 200 best universities worldwide by QS World University rankings. "Knowledge-based Estonia," the Estonian Research, Development and Innovation Strategy 2007–2013 aims to foster an innovative knowledge-based society and economic system. Policymakers see knowledge-based high-tech industries as paramount to retaining the country's competitive advantage.

The development and performance of the Estonian innovation system has been remarkable over the past two decades. However, recent evaluations also point to some weaknesses. Policy measures have been much more successful in developing scientific research, as indicated by an increased number of international publications, patents, as well as researchers and engineers. Advances in the development of high-tech products and services are also noticeable but less prominent. One problem is RDI measures are focused on the top end of the economy and the innovation system is, in general, quite detached from a vast part of country's economy. As a result, RDI output does not contribute to the structural reforms of economy. The second major problem is that RDI is treated as an objective in itself and, therefore, remains only vaguely linked to the country's economic and social goals. Basically, as with its economic policy, Estonia faces the problem of overproduction of strategies, lack of coordination and difficulty in implementing all its sophisticated programs.

Citation:
Peer-Review of the Estonian Research and Innovation System:Steady Progress Towards Knowledge Society.2012
http://www.mkm.ee/public/ERAC_EE_ Peer-Review_Report_2012.pdf

France

Score 7

In research and development policy France performs well. According to the EU Innovation Policy Report, France is ranked eleventh (of 27 EU countries) with respect to innovation capacity; in the report's global innovation index, France performs above the EU average but is ranked in the group of "innovation followers," behind the group "innovation leaders." Overall spending on research and development represents 2.3% of GDP, below the OECD average and far from the EU target of 3%. Whereas public spending on research efforts in France is comparable to the best-performing countries, private spending is however low. France's main weaknesses are its relatively low private resource mobilization for research and development efforts, a less than innovative corporate environment, especially with small- and medium-sized businesses, and weak cooperation between the private and public sectors.

The government has recently taken several measures to facilitate and promote innovation. Fiscal rebates for companies and citizens have been introduced; major projects have been financed; private funds have been mobilized through the creation of foundations; a €30 billion public loan was offered to support "innovative" ventures; the creation of start-up companies has been facilitated through various legal and tax incentives and capital risk channeled toward these innovative sectors; regional clusters have been supported by local and state authorities and collaboration between universities and companies has been encouraged. Infrastructure investment has also been made.

However, there are still no tangible results from all these efforts. Some barriers to innovation still exist. Cooperation between academic institutions and businesses is still restricted by cultural traditions, such as a lack of investment by small- and medium-sized companies and the reluctance of researchers to invest in policy-relevant or applied research. Productivity and the status of public research in international rankings could also be improved. Other issues include the growth of start-up companies that regardless are unable to raise proper funds and are then forced to sell assets to bigger companies. In general, the mediocre profitability of French companies is an obstacle toward more research and development spending. Uncertainty over legal and fiscal rules is also a major problem, as shown by the company revolt in the wake of the proposal of the Socialist-led government under President Hollande to raise taxes on profits resulting from the sale of young companies.

Japan

Score 7

Japan has developed into one of the world's leading producers of research and development (R&D) during the postwar period. Even during the so-called lost decades, science, technology and innovation (STI) received considerable attention and government funding. Current policies are based on the Fourth Science and Technology Basic Plan (2011 – 2016). Compared to the Third Plan, the emphasis has shifted away from a supply-side orientation fostering specific technologies such as nanomaterials to a demand-pull approach cognizant of current economic and social challenges. The reconstruction of the northeast and the need to catalyze green technologies are among the major goals mentioned in this context. While this demand-focused philosophy reflected the overall policy conception of the previous DPJ-led government, the approach could indeed help to overcome the problem of trying to identify what technologies will be the most important in the future.

The need to internationalize Japanese R&D represents an important future challenge. While many attempts at this have already been made, a home bias is still evident. The Fourth Plan recognizes this problem, and makes the case for an East Asia Science and Innovation Area. However, it will be difficult to reconcile the country's various national strategic interests in the region.

In institutional terms, the basic policy has so far been overseen by the Council for Science and Technology Policy. This body is headed by the prime minister, signaling the high status of STI questions. However, the council lacks concrete powers and clout. While plans to change its existing organizational structure were scrapped in late 2012, incoming Prime Minister Abe indicated an intention in early 2013 to strengthen the council, for instance by giving it budgetary power. This prospect faces opposition, however, and it is unclear whether organizational challenges can be overcome in the near term.

Lithuania

Score 7

Lithuania's economy is characterized by a low level of innovation. As assessed by the EU Innovation Scorecard, the country performs below the EU average, falling into the country group called "moderate innovators." Lithuania was ranked 38th out of 141 countries assessed in the 2012 Global Innovation Index. The country has set an ambitious target of spending 1.9% of GDP on R&D by the 2020; however, this level has hovered around 0.8% of GDP in recent years. Moreover, the share of this sum spent by the business sector was very low, totaling just 0.23 % of GDP in 2010. Within the country's innovation system, research is oriented only weakly to the market, research products are not supported with sufficient marketing or commercialization efforts, investment is fragmented, funding levels are not competitive with other European states, and research centers and enterprises do not participate in international markets to any significant degree.

Lithuanian authorities have used EU structural funds to improve the country's R&D infrastructure. So-called science valleys have been developed, integrating higher-education institutions, research centers and businesses areas that work within specific scientific or technological areas. This was a high priority for European Regional Development Fund support in the 2007 – 2013 period. Moreover, the government has supported the sector through financial incentives (in particular, an R&D tax credit for enterprises) and regulatory measures. Demand-side measures encouraging innovation are less developed. Excessively bureaucratic procedures are cited by the science and business community as among the main obstacles to research and innovation in Lithuania. For instance, the government has been urged to remove obstacles to the growth of (new) innovative companies, and to provide this sector with direct support.

Citation:
The EU Innovation Scoreboard is available at http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/innovation-scoreboard/
COMMISSION STAFF WORKING DOCUMENT on the assessment of the 2012 national reform programme and convergence programme for LITHUANIA, http://ec.europa.eu/economy_finance/economic_governance/sgp/pdf/20_scps/2012/02_staff_working_document/lt_2012-05-30_swd_en.pdf.
See Global Innovation Index 2012 at http://knowledge.insead.edu/innovation/global-innovation-index-2012-481

New Zealand

Score 7

New Zealand policy regarding research and development (R&D), high-technology employment and patent indicators is clearly deficient, a situation criticized by the Organization for Economic Co-operation and Development (OECD). The OECD strongly recommends a coherent policy that makes more use of incentives for enterprises to invest in research and development and that steers and funds public infrastructure with regard to basic and applied research institutions. The problem does not seem to result from cumbersome bureaucratic procedures, but has mainly to do with New Zealand's size and geographical isolation of the country as well as the lack of large companies operating at an international level. In response, the National Party-led government introduced a new business R&D support scheme including targeted grants and vouchers, and it restructured key innovation agencies into a single Ministry of Science and Innovation. In 2012, the ministry was absorbed by the Ministry of Business, Innovation and Employment. Major initiatives in research and innovation policy include the development of sector investment plans outlining priorities for the contestable science investment round (a program which provides financial resources for science and innovation research projects); input into the recovery and rebuilding of Christchurch following the 2010 earthquakes; the Green Growth Agenda; and the establishment of a new institute in February 2013 called Callaghan Innovation, to help commercialize innovation in the high-tech manufacturing and services sectors. While the government has increased spending on tertiary training in the fields of engineering and science, domestic expenditures on research and development as a percentage of GDP (0.59%) places New Zealand well down the list of Organization for Economic Co-operation and Development (OECD) countries, including its closest economic partner, Australia.

Citation:
Annual Report 2011-2012 (Wellington: Ministry of Science and Innovation 2012).
Callaghan Innovation: http://www.callaghaninnovation.govt .nz/ (accessed My 13, 2013).

Belgium

Score 6

According to a report by consultancy KPMG, Belgium, since it introduced a national interest deduction and a patent income deduction, has “increased its attractiveness as a prime location for companies involved in research and development activities and in the exploitation of patents.” The country’s location, transportation facilities and infrastructure offer much for potential investors, KPMG said. Despite these improved fiscal incentives, however, Belgium remains technologically backwards when compared to Germany or France. While some indicators such as patent registration or monetary returns may be improving, the technological content of the country’s exports is progressively eroding, and universities are chronically underfunded (yet despite this, most universities still perform well in terms of creating spin-offs and R&D innovation). Overall research and development spending remains below 2% of GDP, and like many other European countries, innovations that emerge from these investments rarely translate into commercial successes that would identify Belgium as a technology leader. Yet, qualified personnel is available and fiscal incentives have attracted some research-intensive firms, such as in the chemical, pharmaceutical or, more recently, computer science (such as Google) sectors.

The picture may evolve more positively, given the pressure to generate economic growth that will not come either from population growth or from industrialization. At each institutional level, regional and federal governments are trying to stimulate innovation and turn innovation into production.

Luxembourg

Score 6

Luxembourg when compared to European levels still falls below the average for research and development investment, spending 1.63% of GDP in 2012 (EU-27 average: 2%). The country needs to improve research efforts. For decades already, Luxembourg's four public research centers (now three as two have merged) produced studies yet lagged far behind international academic standards. Public spending was low. Improvements over the past 20 years have included the launching of a national funding program (Fonds National de la Recherche) in 1999, the founding of the University of Luxembourg in 2003 and the creating of a general public scholarship scheme that replaced child benefits in 2010.

Government objectives are to raise public expenditure on research and innovation from between 2.3% and 2.6% of GDP, with 0.7% to 0.8% earmarked for public use and 1.5% to 1.9% earmarked for private research. The European goal is 3% of GDP.

Citation:
Luxembourg 2020, Programme national de réforme du Grand-Duché de Luxembourg dans le cadre du semestre européen 20:
http://www.odc.public.lu/publications/pnr/2013_PNR_Luxembourg_2020_avril_2013.pdf
CEDIES: http://www.cedies.public.lu/fr/aides-financieres/
Observatoire de la compétitivité: économie de la connaissance: http://www.odc.public.lu/indicateurs/tableau_de_bord/index.html

Poland

Score 6

The Polish system for research and development (R&D) since 2010 has been majorly restructured. Science reforms as well as higher education reforms in 2010 and 2011 have spurred significant changes, including a move toward more competitive funding, the creation of two R&D agencies for applied and basic research, and efforts to tackle fragmentation through the concentration of funding on the best-performing institutions. In July 2012, the first six national leading scientific centers (KNOW) were selected. Each of them will receive up to PLN 50 million in additional funding for strengthening their institute's research potential and investing in top talent. However, while Poland's R&D expenditure has grown in recent years, especially with the help of EU funds, it still is low from a comparative perspective. This especially applies to private investment. Low employment in knowledge-intensive industries, the small number of patent applications and the low level of public-private co-publications highlight the weak links and lack of cooperation between science and industry.

Citation:
European Commission 2013: Research and Innovation Performance in Poland. Country Profile. Brussels. (http://ec.europa.eu/research/innovation-union/pdf/state-of-the-union/2012/countries/poland_2013.pdf)

Australia

Score 5

Successive governments have sought to introduce policies at various times to encourage innovation and to increase investment in business and industry. The 2008 report, "Venturous Australia – Building Strength in Innovation," recommended measures to increase human capital, enhance intellectual property rights and increase innovation in government. It also advocated the introduction of more comprehensive tax incentives to encourage greater investment in innovation. The Australian government responded to the report in May 2009 with "Powering Ideas; an Innovation Agenda for the 21st Century," in which it committed itself to a 10-year plan to build a stronger national innovation system. This undertaking involved the setting of seven national priorities on improving skills and expanding research capacity. The National Innovation Priorities were to complement Australia's National Research Priorities, which were focused on public sector research. For six of the seven National Innovation Priorities, specific targets were set and progress against these targets has been reported in each year since 2010 in the "Australian Innovation System Review."

However, despite the appearance of considerable policy emphasis on supporting technological innovations, in practice changes to the policy environment have been minimal and public funding to foster innovation has not discernibly increased, and may in fact have declined.

Citation:
Australian Government, 'Powering Ideas: An Innovation Agenda for the 21st Century', 12 May 2009: http://www.innovation.gov.au/innova tion/policy/pages/PoweringIdeas.asp x
Australian Government Department of Industry, Innovation, Science, Research and Tertiary Education, 'Australian Innovation system Report 2012': http://www.innovation.gov.au/Innova tion/Policy/AustralianInnovationSys temReport/AISR2012/index.html

Austria

Score 5

Public research in Austria is mainly university centered. However, this is a challenging environment, as universities are overburdened by huge numbers of students, while researchers in some disciplines are overwhelmed by teaching obligations. The Austrian Academy of Sciences is in a critical situation, racked by internal disputes and plagued by insufficient funding. The Austria Science Fund (Fonds zur Förderung der wissenschaftlichen Forschung) is tasked with coordinating academic research, but has shown only partial success in this task. Research funded by private corporations has little tradition in Austria, and at least in the near future, offers little hope of improving this situation. The deficiencies in public-funded research cannot be counterbalanced by privately funded operations.

This does not prevent excellent research in some fields. Important and significant innovations in disciplines such as biological science and medical research are still possible in Austria. However, the long-term perspective in particular gives reason for a pessimistic outlook.

More broadly, links between industry and science are sound, and a high share of public research is funded by industry. In contrast to basic research, industry-sponsored research is mostly aimed at the applied sciences and does not necessarily affect universities. Integration within international networks is strong, and a high share of the labor force is occupied in science and technology-related occupations. Business R&D is particularly strong in niche markets, often performed by specialized small and medium-sized enterprises (SMEs). Other pillars of Austrian business research include large companies, affiliates of foreign corporations, and the medium - to low-tech manufacturing sector. However none of the world's top 500 corporate R&D investors is based in Austria, according to OECD data.

Czech Republic

Score 5

While the effects of the global economic crisis led to an effective decrease of public expenditure on education from 2009 to 2011 both in terms of the proportion of GDP and actual volume of funding, the public expenditure for research and innovation has remained fairly stable, at 0.67% of GDP (financed from the Czech state budget) rising to 0.98% of GDP when EU funding is included. Over the last several years the structure of state spending on R&D changed profoundly as now only limited funding goes to applied industrial experimental research and to primary research. Furthermore, funding was shifted from the Academy of Sciences to universities. This led to regular open protests by researchers and scientists warning the government that such a policy would lead to the closing of top research institutions and an effective brain drain, as young scientists would see no future in many Czech research institutions. In comparison to their Western counterparts, private companies in the Czech Republic have little involvement in R&D at Czech universities and research institutions – spending less than 2% of their budgets there. There is also weak support for innovative start-up companies. The main means of transferring scientific output into products and enhanced productivity is inward investment by multinational companies, bringing innovations developed elsewhere.

Ireland

Score 5

Support for research, development and innovation (RDI) continues to figure prominently in the rhetoric of Ireland's educational and industrial policies. The state industrial promotion agencies exploit the fact that state aid to industry is compatible with EU policy, provided that it fosters RDI.

In education, the Science Foundation Ireland (SFI) organization is responsible for the National Strategy for Science, Technology and Innovation 2006-2013. This strategy received a major boost under the National Development Plan (2007-2013). However, the amounts allocated for the next round of research awards have been scaled back as part of the general austerity program.

While policy is supportive of research and innovation in indigenous firms, the most striking success of Irish industrial policy has been in attracting foreign-owned firms in high-tech sectors to Ireland. There have been several recent announcements of significant investment in RDI activities by foreign-owned (especially U.S.) firms. The location of these activities in Ireland has created opportunities for innovative small Irish firms to develop technologies enabling them to supply inputs to the new foreign-owned firms. The adequacy of the throughput of graduates with the skills sought by new firms in biotechnology and IT remains an issue. Many of the new high-tech firms located in Ireland have to recruit employees from abroad to meet their skill needs.

Ireland's overall information and communication technology readiness appears to continue to lag. Data in the World Economic Forum's latest Global Information Technology Report (March 2012) show Ireland dropping down the rankings on most items. On the Networked Readiness Index, Ireland ranked behind most other northern and western European countries and also scored poorly on infrastructure, digital content and on government prioritization and usage of ICT.

Norway

Score 5

Despite its high GDP per capita, Norway spends comparatively little on research and development (R&D), even compared to its Nordic neighbors. Research policy is nonpluralistic, government-led, and is not strongly oriented toward enterprise or innovation. One notable exception is in innovative company-based research on the elimination of CO_2 emissions in gas exploitation, particularly with respect to carbon capture and storage. The country's strength lies in applied economic and social research rather than in basic and hard science research. Research funds are mainly public, distributed through a single research council, and are politically directed from above. Recent reforms have not been very successful, and the government is frequently criticized for insufficient investment in research. The country's private sector also engages in comparatively little research funding. This low aggregate investment level is reflected in the relatively low number of patents that are granted. It is also interesting to note that the share of degrees granted in science and technology is low, and that Norwegian children have fared especially poorly in scientific knowledge, at least in relative terms, in the OECD's Program for International Student Assessment (PISA) study. The country would certainly benefit from a higher absolute level of investment in R&D. However, the research council's centralized allocation of funds and state subsidies, with only limited participation by private donors, has also been criticized as a model. The council's selection of priorities has often been narrow. There is thus ample scope for increasing investment in academic and basic research, as well for promoting more involvement by private- and public-sector actors.

Chile

Score 4

R&D expenditure as a share of GDP is very low in Chile compared to other OECD countries, and most of this expenditure is undertaken by the government rather than the private sector. But Chile has shown that it is aware of shortcomings regarding the necessities of technological innovations, especially for its future economic and thus social development. Significant reforms have been put in place to raise R&D funding, including earmarked taxation (a royalty tax on mining), higher government expenditure, and the improvement of tax incentives for private R&D. Although results have to date been disappointing – in large part because of bureaucratic hurdles to the approval of private and public projects – Chilean institutions show good results in basic research at least. But this good basic research almost never completes the steps required to pursue applied research. Universities are often not prepared to support research that operates at the interface between basic research and industrial development. Access to the few existing public funds tends to be quite difficult due to high bureaucratic barriers.

Cyprus

Score 4

Cyprus did not have a tradition of research and development within state-owned non-academic institutes until the 1990s. The creation of the first university (1992) and subsequently of other tertiary-education institutions with accredited programs, often drawing on EU funds, marked the beginning of research projects. The share of R&D expenditure accounted for by higher education today (49.6%) remains larger than that of businesses- or state-owned research centers, in contrast to the higher business-funded share EU-wide.

With regard to output and innovation, a substantial share of Cypriot companies have introduced innovations, and proportionally more enterprises receive public funding for innovation-oriented activities than the EU average. However, the country's scores on indicators such as R&D spending, number of research personnel and quality of Internet access are among the EU's lowest. Generally, the weakness of the private sector and the small size of most companies provide little opportunity for R&D activities. With respect to government expenditure on R&D, Eurostat ranked Cyprus at 22nd among the 27 EU member states in 2011.

Project funding was negatively affected by the economic crisis in the period under review. The rate of patent registration is among the lowest in the European Union (9.40 per 1 million population). As a response to deficiencies, intellectual property legislation has been regularly amended. New provisions enacted in 2012, offering tax incentives for profits and royalties deriving from the exploitation of intellectual property rights, are considered among the most advanced in Europe.

Citation:
http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&languag e=en&pcode=tsc00007&plugin=1

Hungary

Score 4

Hungary's research and development (R&D) sector is fairly advanced but chronically underfinanced. Under the Fidesz government, the situation has further worsened. Public funding for universities and research has been cut. The Hungarian Academy of Sciences has been put under the control of a former Fidesz minister and has suffered from a radical and politically motivated reorganization. The European Institute of Technology and Innovation (EIT), which had been established by the European Union in Budapest in March 2008, has not had much effect on R&D in Hungary so far, largely because of missing resources on the Hungarian side.

Italy

Score 4

In recent years Italian governments' research and innovation policies have been weak, underfunded and not strategically coordinated. The governments of the period under examination (essentially the Monti government) have not been able to improve significantly this situation because of the difficult budgetary situation. Funds for R&D have not increased, but some new measures have been introduced to foster start-up companies. As a result society, media and also some parts of politics have become more aware of the strategic importance of R&D.

Malta

Score 4

Business research and innovation (R&D) have gained in importance in Malta in recent years, notably as a response to the decline in low value-added manufacturing. Yet the National Research and Innovation System, as well as the policies and structures for its development, are still in the early stages. The National Strategic Plan for Research and Innovation 2011 – 2020 highlights the importance of placing R&D activities at the center of national economic policies and endeavors. The 2020 Strategic Plan also highlights the challenges that hinder growth in this area. Significantly, Malta has a relatively low percentage of science and technology graduates and consequently a low percentage of qualified individuals in science and technology in the labor force, compared to other EU member states. This is corroborated by the latest Innovation Union Scoreboard, which identifies human resources as one of Malta’s relative weaknesses. One reason for this is that local small and medium-sized businesses are geared toward the local market, and do not consider international opportunities; what’s more, only 7% of local small businesses offer products that could be regarded as unique.

In 2010, total expenditure on R&D was €42 million, 0.68% of GDP. The business enterprise sector contributed 62.3%, while the higher education and government sectors contributed 34% and 3.7% respectively. The fields of engineering and technology and natural sciences recorded a substantial rise in R&D activity, contributing 53.9% and 33.6% respectively. In 2013, the government budget allocated €42 million toward R&D and innovation activities. Sectors to be supported through such funding include biotech, pharmaceuticals, health care, maritime, information technology and electronics.

Citation:
National Strategic Plan for Research and Innovation 2011-2020 (Draft for Public Consultation - 2011) p.9, p.12, p.13
Innovation Union Scoreboard 2013 p.44
Research and Development in Malta NSO August 2012
Private Sector Interaction in the Decision Making Processes of Public Research Policies Country Profile: Malta European Commission ec.europa.eu/invest-in-research/pdf /…en/psi_countryprofile_malta.pdf

Portugal

Score 4

Research and innovation policy partly supports innovations that foster the creation of new products and enhances productivity. There is a policy to support research and innovation – backed by the European Union and the Portuguese government – that functions in universities and in businesses, and in some research centers which are linked to businesses and universities. These include: Aveiro University, Faculty of Medicine at Coimbra University, Faculty of Engineering at Porto University, Advanced Technical Institute of Lisbon, New University of Lisbon at Costa da Caparica, University of the Algarve, University of Minho, etc. There is not, however, a formulated policy to create new products to increase productivity. Moreover, the austerity measures have also had an adverse impact on support for research and innovation, curtailing public funding – the main source of investment on R&D – substantially. The economic recession has also had an adverse impact on private investment in R&D. Indeed, the European Union's Innovation Union Scoreboard shows that Portugal's innovation index declined by 4.9% between 2010 and 2012, contrasting with the overall EU increase of 2.4%.

Citation:
(1) European Union,"Innovation Union Scoreboard 2013"

Slovakia

Score value_6

Slovakia has a weak and underdeveloped research and innovation policy. R&D intensity, public expenditure on R&D, the number of patent applications and employment in knowledge-intensive activities are below the EU average. As the European Commission's 2011 Innovation Union Competitiveness Report states bluntly (Part B, p. 211): "At present, the very low R&D investment, both in the public and private sectors, results in poor scientific and technological production that reinforces the international dependency of the system and hinders its ability to create, use and diffuse knowledge." For the European Commission, even the very transition to a knowledge-based economy is at stake. After years of neglect, Slovak governments have finally addressed the issue. The Radičová government set up targets for increasing R&D intensity until 2020. The manifesto of the Fico government included a separate chapter on the "knowledge-based society" and called for various measures, including the transformation of the Slovak Research and Development Agency into a public institution, the creation of a new agency for financing industrial research, experimental development and innovation in industrial companies, and a comprehensive evaluation of the existing research centers in the country.

Citation:
European Commission, Innovation Union Competitiveness Report 2011;
http://ec.europa.eu/research/innovation-union/index_en.cfm?section=competitive ness-report&year=2011
http://www.proinno-europe.eu/inno-grips-ii/newsroom/slova kia-innovation-policy-2011-2013

Slovenia

Score 4

Slovenia has suffered from a low quantity and quality of R&D activities for a long time. The Pahor government aimed to strengthen R&D in enterprises and research institutions and, despite the negative effects of the economic crisis, succeeded in slightly raising public R&D spending in 2011. The Janša government put less emphasis on R&D. Its 2012 Fiscal Balance Act cut the public R&D budget by 13%. Both the Pahor and the Janša government managed to increase the share of EU funds devoted to the support of research and innovation.

Turkey

Score 4

The government continued to strengthen the country’s research and innovation capacity during the review period. The Scientific and Technological Research Council of Turkey (TÜBITAK) was previously affiliated to the Ministry of Science, Industry and Technology, and is now to facilitate communications between science and industry. In 2011 and 2012, the government provided €153 million for private and industrial research and development (R&D) projects. In 2011, Turkey’s expenditure on R&D increased by 20.4% compared to 2010 levels, reaching TRY 11.1 billion, according to the Turkish Statistical Institute (TurkStat). R&D spending in relation to GDP increased in 2011 to 0.86% (2010: 0.84%), far from the goal of 2%.

The government has supported the establishment of Technology Development Zones (TDZ) (Law 5746), which aim to bring industry and research institutions together to develop new products and production methods. As of November 2012, 47 zones were founded; some 2,114 companies from the biotechnology, automotive, medical technology and informatics industries were participating, with some 17,828 employees. At the time of writing, the number of approved, zone-related national patents was 322. In general however Turkey’s global innovation capacity is weak. The European Patent Office (EPO) has granted only 95 (2011) and 134 (2012) patents from Turkey.

Citation:
Ministry for EU Affairs (2013)“2012 Progress Report prepared by Turkey”, Ankara.

Bulgaria

Score 3

Traditionally Bulgaria is among the lowest spenders on research, development and innovation in the European Union. Like its predecessors, the GERB government concentrated on other issues and largely relied on foreign direct investment and European Union funds to generate economic growth. Public outlays for research and development have decreased significantly in the wake of the global economic slump from a high of 0.31% of GDP in 2009 to 0.22% of GDP in 2011. Subsidies for innovative start-up enterprises are available almost exclusively through European Union structural funds. Technological innovations are also stifled by cumbersome patent and copyright protection procedures.

Croatia

Score 3

Croatia offers tax reliefs for R&D, but substantially less than other EU member states. Overall, total expenditure on R&D comprised 0.75% of GDP (expenditure by the business sector accounted for 0.34% of GDP, the government sector and the higher education sector 0.21% of GDP each). In 2012, according to the results of the Community Innovation Survey, 42.4% of enterprises in Croatia reported having engaged in an innovation activity, compared to 52.9% in the EU-27. In accordance with the Entrepreneurship Incentive Plan, the Ministry of Entrepreneurship and Crafts introduced new measures under the Entrepreneurial Impulse Program in 2013. The program eliminates barriers to the growth of innovative companies by increasing the availability of financial resources for fast-growing, knowledge-based, small and medium enterprises. The Business Innovation Center of Croatia (BICRO) has introduced several measures to support innovative companies including RAZUM (Development of knowledge-based companies), KONCRO (Competitiveness and technology process advancement) and TECHRO (to develop science–industry cooperation through technology parks and technology transfer centers). An evaluation study of these measures concluded that the effects are “fairly modest” due to the lack of an institutional and business environment to incentivize innovative activity (Svarc and Racic, 2013). The study further concluded that there is a lack of strategic, coherent and integrated policy framework, that companies have a low technology capability to support innovation and that technology transfer mechanisms were inadequate.

Citation:
Svarc, J. and Racic, D. (2013) ERAWATCH Country Reports 2011: Croatia,” Seville: European Commission Joint Research Center, Institute for Prospective Technological Studies

Greece

Score 3

OECD data show that in Greece public spending on R&D amounts only to 0.28% of its GDP. Most research is conducted in state universities and state research institutions in Athens, Thessaloniki and Heraklion. Traditional fields of research include biology, computer science, economics, various branches of engineering, archeology and history. Research in other fields is not as developed. Most funding for research in these fields comes from the state, which in 2011 – 2013 was undergoing a dire fiscal crisis. More importantly, research associated with industrial production or services is not developed, as there is very little corresponding demand from the private sector. Yet teams of Greek researchers regularly participate in EU-funded research projects and are even lead partners in relevant consortia. For instance, the National Technical University of Athens actively participates in international projects, as does the Heraklion-based Institute for Technology and Research.

In 2011 – 2013, owing to the fiscal crisis, the Greek state was only partially able to offer subsidies and incentives to private companies engaged in research and innovation. Few state institutions, such as those mentioned above, and very few companies were able to support innovations, foster new products or enhance productivity. Examples include new brands of olive oil-based products and pharmaceuticals (such as the products of the Korres cosmetics company). At the same time, the government initiated and the European Union funded programs to encourage collaboration between private companies and public research institutions (universities; centers) under the Synergasia program in order to foster R&D clusters and individual research projects (with some €65 million under the Aristeia program in 2011 alone). But the operational processes for these initiatives were wanting, given the accumulated dysfunctionalities of the state administration and the bailout budget pressures. Much reform of both spending and instruments has been urgent, but was left poorly tackled due to these general problems and to wider political pressures from "insiders" in the research community.

Overall, however, Greek research and innovation policy was definitely suboptimal.

Latvia

Score 3

Expenditure for scientific research in the business sector in 2010 was 0.22% of GDP, placing Latvia significantly below the average EU-27 rate of 1.23% of GDP. The amount of public funding provided for R&D was the lowest of any EU member states. The lack of public funding is identified by the Ministry of Education as a major factor slowing down scientific progress in the country.

Annual fluctuations in funding for research institutions produce uncertainty, inducing young scientists to look for opportunities abroad. There is a persistent lack of state funds for participation in international research and infrastructure projects.

The Union Innovation Scoreboard 2010 study ranks Latvia last in terms of innovation development among 27 surveyed EU countries. However, the percentage growth over the past five years for Latvia is 2.71%, higher than the EU-27 average of 0.85%.

National industrial-policy guidelines for the 2013 – 2020 period, adopted in 2012, provide the framework for future support of innovation. The Ministry of Economy and the Latvian Investment and Development Agency (Latvijas Investīciju un attīstības aģentūra, LIAA) initiated a range of innovation-support projects in 2013 to promote business activity with comparatively high added value, aiming to support new product design and technology development, as well as to promote cooperation between the research and business sectors.

Citation:
1. Ministry of Education and Science (2011), Development of Science and Technology in Latvia, p.14, Available at: http://izm.izm.gov.lv/upload_file/Zinatne/zinatnes-un-tehnologiju-attistiba-Latvija-2011.pdf, Last assessed: 17.05.2013

2. European Commision (2010), Union Innovation Score board 2010, Available at: http://ec.europa.eu/research/innovation-union/pdf/iu-scoreboard-2010_en.pdf, Last assessed: 17.05.2013.

3. Ministry of Economy, Guidelines on National Industrial Policy, Available at (in Latvian): http://www.em.gov.lv/em/2nd/?cat=30765, Last assessed: 21.05.2013

Mexico

Score 3

National spending on research and development (R&D) continues to be very low. According to World Bank estimates, in 2011 Mexico spent only 0.4% of its GDP on R&D, roughly the same percentage as in developing countries like Botswana and Uganda. One consequence of Mexico's economic oligopolization has been severe polarization, in which a very large number of "micro" firms have little or no institutionalized access to state R&D spending, while large and efficient firms undertake their own research and development spending. There is growing awareness of this problem within Mexico itself, but Mexico still ranks near the bottom of most OECD member countries on indices relating to R&D.

Romania

Score 3

Two decades of underfunding and chaotic restructuring have caused a crisis in Romania's research sector characterized by a chronic shortage of active researchers (Romania has 2.09 researchers per 1,000 employees compared to an EU average of 7.8). Resource scarcity has led to the massive migration of the most capable researchers to other sectors of the economy or other countries. At the same time, poor remuneration and uncertain prospects of professional advancement prevent the influx of young talent. Despite the promise that the 2013 budget would be development-oriented, there are no substantial policy improvements to promote R&D as less than 1% of GDP is being spent on R&D as of 2012. In addition, the National Council for Sciences and Technology Policy does not have the executive ability to plan, prioritize and coordinate R&D in Romania. Due to the fiscal restrictions since 2008, public expenditure for R&D has decreased gradually, and as a result Romania has experienced a growing innovation performance gap compared to most other EU countries. While in 2013 the Green Industry Innovation Program was launched in Romania based on Norwegian grants totaling €21.4 million, such outside funding is unlikely to compensate for the lack of domestic funding.

Spain

Score 3

Spain has never been a leading example of research and technology policy, as evidenced by the relatively poor ranking of its universities, the reduced number of patents registered and other indicators of public or private support to innovation, which are far below other advanced economies. Although it is true that there has been an increase in the public spending devoted to innovation since the turn of the century, the crisis has hit this strategic field and the draconian cuts implemented in the last three years have worsened the earlier situation – which was not brilliant, either. The last figures show a deep decrease in investment in R&D, reaching only 1.33% GDP while the European Union and OECD averages are above 2%. The Ministry of Science and Innovation actually disappeared in 2012 when it merged within the Ministry of Economy.

The government's pledge to promote a new model of economic growth based on brainpower rather than on construction after the bursting of the housing bubble has not been reflected in the budget. On the contrary, the national research council CSIC (the largest Spanish scientific institution with 6,000 scientists and more than a hundred institutes) signaled in 2013 that a "catastrophe" in its research centers may happen if no extra money was found. Its budget has fallen by 30% from 2008 levels, and it only offered 13 permanent positions in 2013, compared with 263 in 2008. At regional level, the promotion of research has also suffered a lot. Many promising young researchers are going abroad since it is difficult to be scientifically competitive in a climate of such uncertainty with scarce resources and excessive bureaucracy. The only positive side of this dangerous situation with its draconian constraints and dangerous brain drain, is that public awareness of the relevance of R&D policies has grown significantly.

Citation:
http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tsdec320&language=en
http://www.elmundo.es/elmundo/2013/05/14/ciencia/1368531982.html

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