OECD *Multilingual Summaries*

OECD Science, Technology and Industry Outlook 2014

Summary in English

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After the crisis

The impact of the recession and the moderate pace of recovery on innovation and innovation policies has been considerable. At 1.6%, gross expenditure on R&D in OECD countries over 2008-12 was half the rate for the years 2001-08.

The challenges facing OECD governments include sluggish economic growth, and pressing societal and environmental issues. However, fewer public resources can be harnessed in response - the impact of fiscal consolidation is already felt in green R&D budgets. Governments have therefore initiated a “new deal” for innovation that raises the status of innovation in the policy portfolio while adapting to this new context. Current prospects of slow GDP growth and tight government budgets point to a continuing strategy to harness innovation to achieve social goals over the coming years.

The evolving landscape

China is now a major driver of global R&D, doubling spending on R&D over 2008-12, despite a slowdown in growth compared to 2001-08. In a bid to escape a ‘middle-income trap,’ emerging countries like Brazil or India are making innovation a major engine of economic growth and must upgrade their capacity to innovate. European countries have increasingly diverged, with some moving towards their R&D-to-GDP targets while others fall further behind.

With greater globalisation and inter-dependence in the fields of science, technology and innovation, national innovation policies increasingly seek to improve domestic advantages in global value chains (GVCs) to attract the innovation-related segments (R&D, design, etc.) that contribute most to value and job creation. Because talent and other knowledge-based assets are particularly valuable and mobile, countries compete to attract and retain them, through national research “ecosystems” that encourage foreign direct investment, or by integrating new firms and SMEs into GVCs. Particular attention is paid to the attractiveness of national research systems, by strengthening universities’ capacity, research infrastructure and international openness, including job opportunities for foreign researchers, branding activities, mobility schemes, educational products and improved learning environments. There is also evidence that tax incentives lead to competition between countries to attract foreign R&D centres.

Recent technology developments have focused on global issues (climate change, ageing societies, food security) and on productivity growth (e.g. new manufacturing processes), and environmental and social concerns raise specific challenges and opportunities for STI policies.

The need to address them has made STI policies more mission-oriented. With increasing income inequality following the crisis, for example, innovation is mobilised to ensure that the benefits from “islands of excellence” (the best universities, firms or cities) reach less-favoured companies, universities or regions. A more systemic approach to innovation policy has been developed, in light of the variety of stakeholders and trade-offs and potential synergies between policy areas (regulation, tax, education etc.).

Meeting these challenges will require technological breakthroughs, rapid deployment of existing or new technological solutions and system-level changes (in policies, regulation, behaviours, etc.). Innovation for an ageing society for example can lead to new growth industries, but suffers from insufficient finance and policy coherence. A range of disciplines will need to be mobilised, in a way that can harness the changes to multidisciplinary research brought about by the Internet and IT.

Here, the convergence of IT, bio, nano and cognitive sciences has the potential to lead to "the next industrial revolution", and already, the increase in the service component of innovation, a part of this evolution, is influencing countries' competitiveness.

Business R&D

Business spending on R&D has regained its pre-crisis annual growth rate of 3% since 2011, but from a lower base than before the 2009-10 cuts. The prospects for growth here are better than for investment in physical assets because companies, anticipating weak demand, are improving products and processes, but are not expanding production capacity.

Substantial public support to business R&D helped cushion the impact of the crisis. It remains at significantly higher levels than a decade ago, mainly owing to more generous R&D tax relief. Together, direct funding and tax relief represent 10-20% of countries' business R&D expenditure, sometimes more. Indirect support is equal to or more than direct support in 13 out of the 32 countries that report data. However, as public debt soared, many governments reduced innovation-related expenditures, or undertook more systematic evaluation of existing policies, streamlining existing programmes and reducing overlapping policies.

Direct public funding of business R&D is increasingly awarded through competitive grants and contracts, while debt financing (loans, loan guarantees) and equity funding (venture capital, funds of funds) are becoming more popular. Many countries are channelling funding towards particular industries or categories of firms (notably SMEs) as part of their "new industrial policies".

In many countries, credit conditions have been severe for SMEs in particular (higher interest rates, shortened maturities, increased request for collateral). European venture capital investment is significantly lower than before the crisis, whereas it has fully recovered in the United States. This has led governments to increase their funding, and new sources of finance (crowdfunding, other forms of non-bank financing), while marginal, are spreading fast.

Public R&D

Public R&D plays a pivotal role in innovation systems. R&D expenditure by universities and public research institutions held up well during the crisis, owing to a sustained public commitment to R&D, with higher education representing 61% of public R&D in 2012 against 57% in 2000.

To increase excellence and relevance, public research has increasingly relied on project funding, often on a competitive basis, at the expense of institutional core funding, owing in part to difficult budgetary situations. Most countries have implemented research excellence initiatives that combine institutional and project funding mechanisms to encourage outstanding research and support challenge-led research.

Knowledge transfer, notably commercialisation, is now a central objective of public research. Policy initiatives have introduced a market perspective in upstream science (e.g. industry-science co-operation on R&D). Recently, more integrated and strategic policies have encouraged downstream support for the commercialisation of publicly funded research results, by up-scaling and professionalising technology transfer offices, and involving students in commercialisation.

As "open science" progresses, new policy approaches will be needed to determine how public research is funded, research is undertaken, research output is exploited, research results are accessed and protected, and to shape how science and society interact.

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