CANADA

Hot STI issues

- Increasing the R&D intensity of firms via a mix of indirect and direct funding.
- Further developing labour force skills.
- Building on existing comparative advantages, including in resource-based sectors, and achieving higher productivity growth.

General features of the STI system: Canada's labour productivity grew slowly for most of the decade to 2010. Attention has therefore turned to the role of innovation in driving growth. With the economy's strong resource-based sectors, BERD stood at 0.91% of GDP in 2011, well below the OECD median. Much R&D activity is concentrated in the services sector (44%) and Canada's activity in non-technological innovation is reflected in the trademark data (Panel $1^{(g)}$). SMEs (38%) also play a key role. At the same time, industry funds a larger share of public research than in most OECD countries ($1^{(o)}$). Canadian researchers are reasonably well networked internationally, with 45% of scientific articles and 30% of PCT patent applications produced with international collaboration ($1^{(q)(r)}$). Canada's RTA is strong in the three technology areas covered; it has risen sharply in ICT in recent years, but declined somewhat in environment-related technologies (Panel 3). Canada's human capital is of high quality; 50% of the adult population is tertiary-qualified ($1^{(s)}$), and 30% of the labour force fills S&T jobs ($1^{(v)}$). PISA science scores for 15-year-olds are the seventh highest in the OECD area ($1^{(t)}$). ICT infrastructure is quite well developed, with 31 fixed broadband but only 32 wireless subscribers per 100 inhabitants ($1^{(k)(l)}$). In terms of e-government readiness, Canada is among the top ten OECD countries ($1^{(n)}$).

Recent changes in STI expenditures: GERD in constant prices has declined by 1.2% a year during the latter half of the past decade to USD 24 billion and 1.74% of GDP in 2011. It fell sharply in 2008 and again in 2010. In 2009 in the wake of the economic crisis, the Economic Action Plan allocated USD 50 billion to assist industries. Investments to boost broadband Internet, modernise laboratories, and fast-track clean energy capabilities were made.

Overall STI strategy: Canada's STI policy is based on Mobilizing Science and Technology to Canada's Advantage launched in 2007. The strategy seeks to foster Canada's competitiveness through investments and activities in three key areas: the role of the private sector in innovation, research excellence and strategic R&D, and knowledge-based workers. The technology priority areas are environmental science, natural resources and energy, health and life sciences, and ICT.

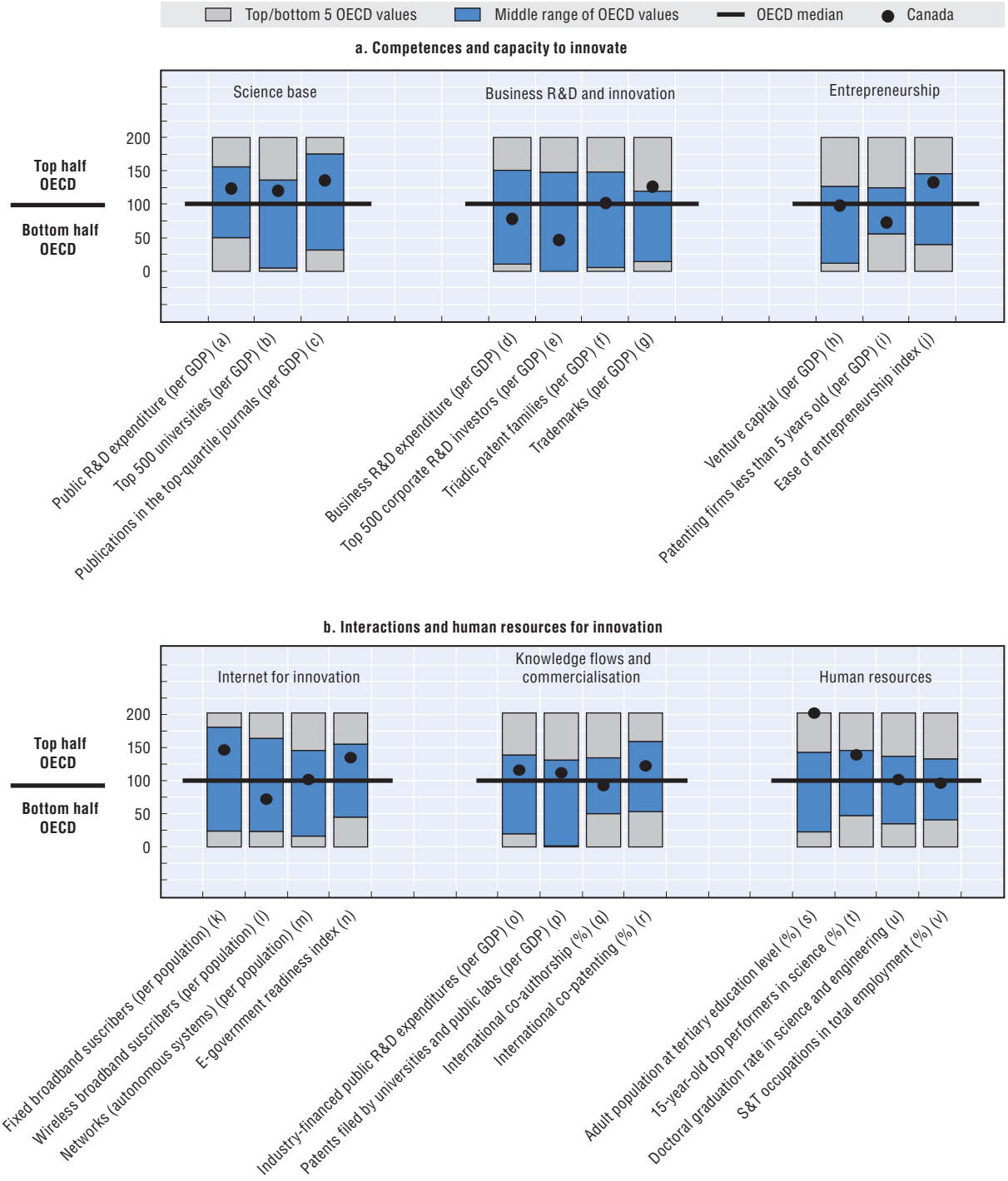
STI policy governance: Governance structures have remained largely unchanged. The Prime Minister and Cabinet formulate overall STI policy. Industry Canada and the Department of Finance implement policy with the science-based departments and agencies. The Natural Sciences and Engineering Research Council (NSERC), the Social Sciences and Humanities Research Council (SSHRC), the Canadian Institutes of Health Research and the Canada Foundation for Innovation fund research and science infrastructure at the federal level. Canadian provinces enjoy considerable autonomy; they develop and fund R&D policies for their

Key figures

Labour productivity, GDP per hour worked in USD, 2010	**45.2**	**GERD, as % of GDP, 2011**	**1.74**
(annual growth rate, 2005-10)	(+0.5)	(annual growth rate, 2005-11)	(–1.2)
Environmental productivity, GDP per unit of CO_2 emitted in USD, 2009	**2.45**	**GERD publicly financed, as % of GDP, 2009**	**0.83**
(annual growth rate, 2005-09)	(+2.4)	(annual growth rate, 2005-09)	(+1.6)

Figure 10.6. **Science and innovation in Canada**

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).

economies and fund education. The Science, Technology and Innovation Council advises the Minister of State for Science and Technology and produces regular reports on the state of Canada's innovation system. The Canadian Council of Academies is an independent non-profit corporation that informs public policy development via science-based assessments.

Science base: Although Canada's R&D intensity is relatively low, public-sector expenditure on R&D is well above the OECD median (1[(a)]). The public research system is university-oriented (Panel 4): HERD, at 0.65% of GDP, makes up almost 38% of GERD (2011). Canadian researchers perform well in terms of publications (1[(c)]).

Business R&D and innovation: Following the recent government commitment to address the private sector's need to foster business innovation more effectively, the 2012 federal budget plans USD 902 million over five years for direct support for R&D and USD 410 million for venture capital. The Scientific Research and Experimental Development tax incentive programme was also modified by removing capital from the expenditure base and streamlining it to be more cost-effective and predictable.

Entrepreneurship: To promote entrepreneurship, Canada has improved SME access to the SR&ED tax credit. BDC Venture Capital assists and finances firms (especially SMEs) from seed to expansion phases. Export Development Canada (EDC) provides private equity capital to assist firms to expand through export guarantee programmes.

ICT and scientific infrastructures: As part of its efforts to help develop a stronger digital economy, the government supports the adoption of key ICTs by SMEs through the Industrial Research Assistance Program (NRC-IRAP), and increased student enrolment in digital economy-related disciplines. The *Copyright Modernisation Act*, introduced in 2011, adapts laws to the digital economy. Investments were also made in post-secondary institutions (USD 4.3 billion) through the Knowledge Infrastructure Program (KIP), and in state-of-the art research facilities (USD 728 million) by the Canada Foundation for Innovation (CFI).

Knowledge flows and commercialisation: With its strong public research base, Canada could translate knowledge into commercial success more effectively. Relevant initiatives to do so include the Idea to Innovation Program, the Canadian Innovation Commercialization Program (CICP), the centres of excellence for commercialisation and research (CECR), and the Forest Industry Transformation Program. Other programmes to improve collaboration are the Business-Led Networks of Centres of Excellence and the Applied Research and Commercialisation Initiative.

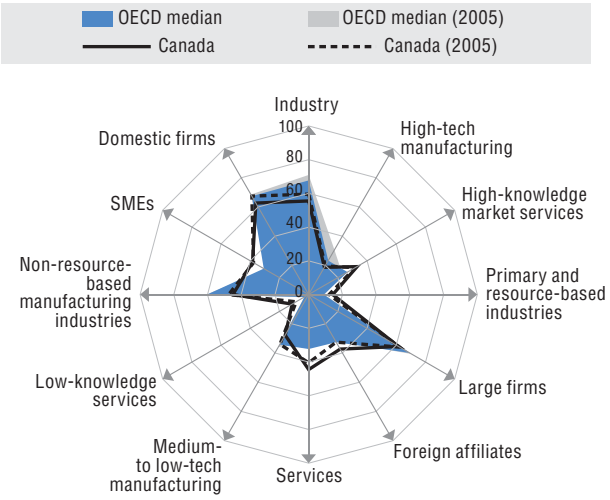
Human resources: Canada is among the leading OECD countries in terms of spending on higher education. The government has made strategic investments to strengthen Canada's knowledge advantage, including new Canada Excellence Research Chairs, enhanced eligibility for Canada Student Loans and Grants, expanded opportunities for adult basic education, tax relief and Registered Education Savings Plan assistance to post-secondary students who study abroad.

Emerging technologies: The federal government funds research for emerging technologies in areas ranging from health to nuclear research. Examples include funding to Genome Canada (USD 63 million), climate and atmospheric work through the NSERC (USD 34 million), the Canada Brain Research Fund (USD 97 million), the Perimeter Institute for Theoretical Physics (USD 49 million) and the National Optics Institute. The Strategic Aerospace and Defence Initiative (SADI) supports R&D in aerospace, defence, space and security technologies.

Green innovation: Canada has introduced a range of policies to encourage green growth. On the regulatory side are the Passenger Automobile and Light Truck Greenhouse Gas Emissions Regulations. The Canadian Intellectual Property Office (CIPO) expedites patent applications related to green technology. Funding initiatives – often coupled with forums for dialogue – include the Clean Energy Fund (USD 0.97 billion), the Clean Energy Dialogue, Sustainable Development Technology Canada (SDTC), the ecoENERGY Innovation Initiative, the Automotive Innovation Fund and Automotive Partnership Canada.

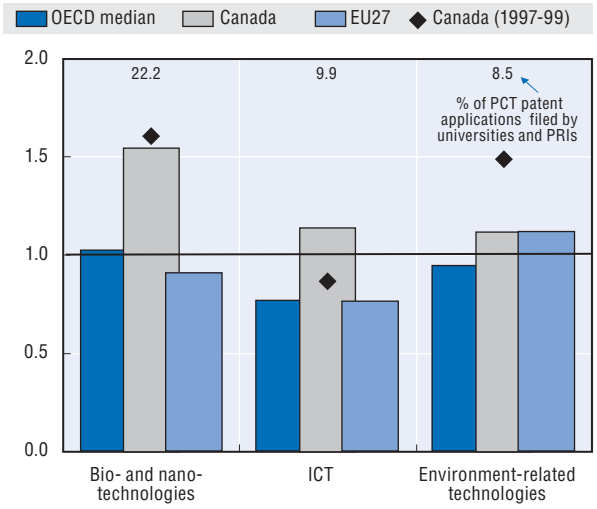
Panel 2. Structural composition of BERD, 2009

As a % of total BERD

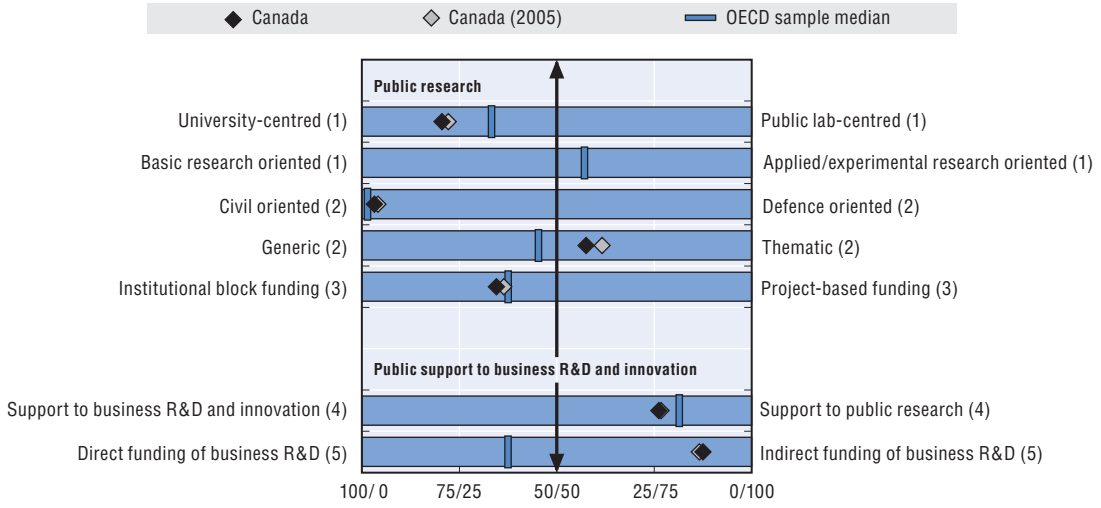


Panel 3. Revealed technology advantage in selected fields, 2007-09

Index based on PCT patent applications



Panel 4. 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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