UNITED STATES

Hot STI issues

- Creating a 21st century workforce and research infrastructure.
- Catalysing breakthroughs for national priorities through market-based and sustainable innovation.
- Improving innovation governance and co-ordination in a highly decentralised system.

General features of the STI system: The United States has long been at the forefront of cutting-edge innovation. It has excellent higher education institutions, a large and integrated marketplace, and efficient capital and equity markets. It leads the OECD in shares of GERD (41%), triadic patent families (29%) and scientific publications (31%). It hosts nearly a third of the world's largest corporate R&D investors (Panel 1[(e)]). Its research system relies primarily on an R&D-intensive business sector (2.04% of GDP) which accounts for 70% of total GERD (1[(d)]). Large domestic firms are the key actors; SMEs account for 17% of BERD and foreign affiliates for 15% (Panel 2). Most private R&D performers are in high-technology manufacturing (50%), followed by knowledge-intensive services (27%). Triadic patents per GDP are above the OECD median (1[(f)]). Researchers' international linkages are below the OECD median on account of the variety of opportunities offered by domestic linkages: 30% of scientific articles and 12% of PCT patent applications involve international collaboration (1[(q)(r)]). Universities and PRIs are actively filing patents (1[(p)]), especially in bio- and nano-technologies (35%) (Panel 3). While its RTA has slipped in recent years, the United States is strong in these technologies, as well as in ICT; it is relatively weak in environmental technologies (Panel 3). It has a good skills foundation; 41% of the adult population is tertiary-qualified and 35% of those employed are in S&T occupations (1[(s)(v)]). Inflows of new skills are modest. Only 9% of 15-year-olds perform well in science on the PISA test, there is a relative decline in doctoral graduates and low participation in science and engineering (1[(t)(u)]). ICT infrastructure is good, with fair coverage in fixed broadband (1[(k)]) and wide coverage in wireless broadband (1[(l)]). The e-government readiness index is high (1[(n)]).

Recent changes in STI expenditures: GERD was USD 402 billion and 2.90% of GDP in 2009. It grew by a strong 2.9% in real terms during 2005-09, in spite of a sharp USD 5.8 billion decrease in 2009 driven by a contraction in private spending. In response to the economic crisis, the *American Recovery and Reinvestment Act* (ARRA) of 2009 approved R&D funding of USD 18 billion for new discoveries in energy, climate and future technologies.

Overall STI strategy: The 2009 Strategy for American Innovation: Driving towards Sustainable Growth and Quality Jobs was updated in 2011 and is the basis of the government's push to further an innovation-based economy. It has three goals: a world-class workforce with 21st century skills; competitive markets that spur productive entrepreneurship; and breakthroughs in national priorities.

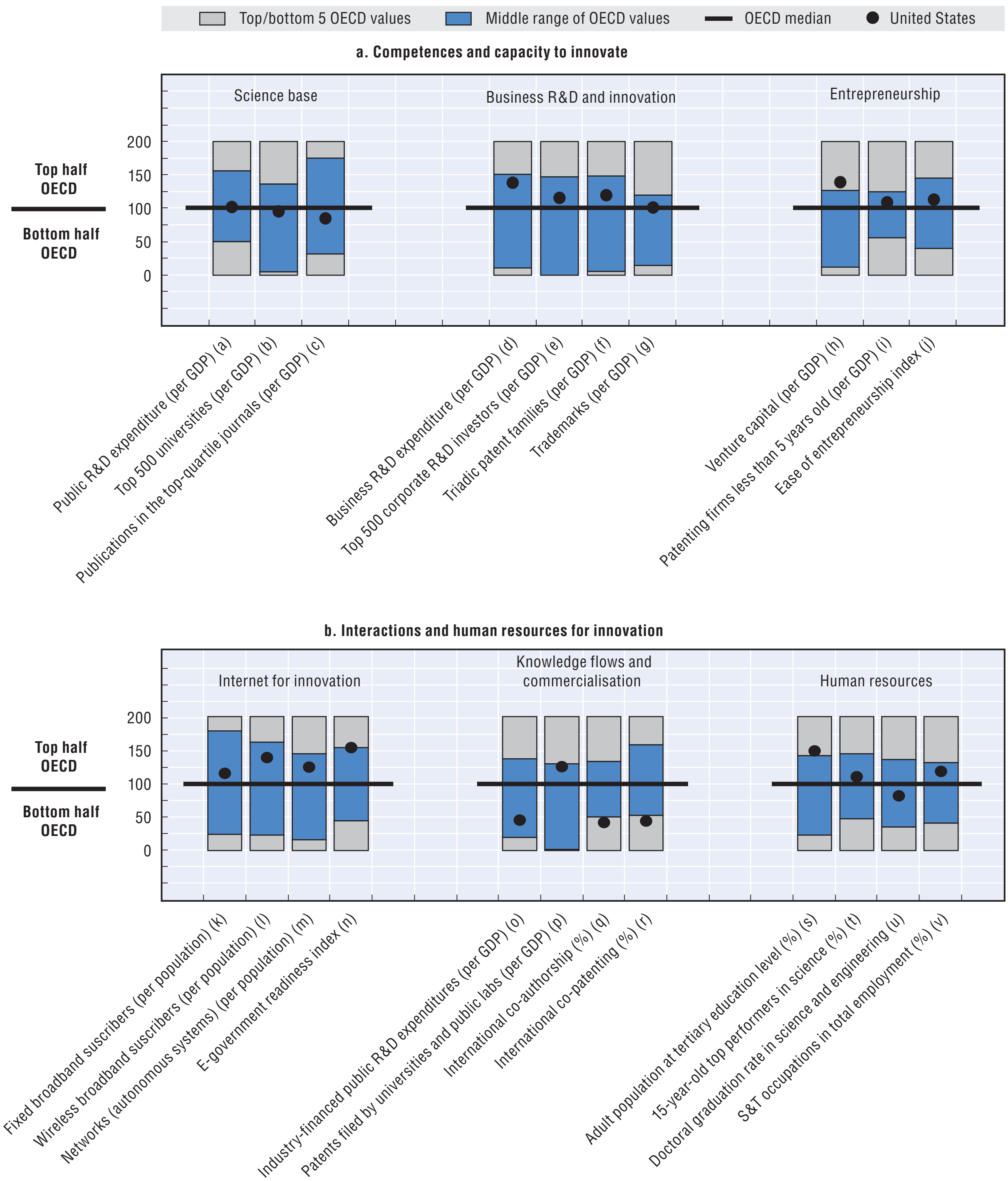
STI policy governance: There is no central administration exclusively in charge of innovation. The Office of Science and Technology Policy gives policy advice and co-ordinates STI policies. Key agencies in the Commerce Department are the National Institute of Standards and Technology and the US Patent and Trademark Office. The Commerce

Key figures

Labour productivity, GDP per hour worked in USD, 2010	**59.0**	**GERD, as % of GDP, 2009**	**2.90**
(annual growth rate, 2005-10)	(+1.6)	(annual growth rate, 2005-09)	(+2.9)
Environmental productivity, GDP per unit of CO_2 emitted in USD, 2009	**2.67**	**GERD publicly financed, as % of GDP, 2009**	**1.01**
(annual growth rate, 2005-09)	(+3.1)	(annual growth rate, 2005-09)	(+4.2)

Figure 10.43. **Science and innovation in the United States**

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).

Department established an Office of Innovation and Entrepreneurship and a National Advisory Council on Innovation and Entrepreneurship. In January 2012, a COMPETES progress report provided findings on basic research, education, research infrastructure, and support for manufacturing. The National Science Foundation's (NSF) Science of Science and Innovation Policy (SciSIP) and Science of Science Policy (SOSP) are building a knowledge base to improve policy evaluation.

Science base: The United States has a strong science base, but at the aggregate level, selected performance indicators are around the OECD median (1(a)(b)(c)). Public R&D expenditures are slightly above the median, and many other OECD countries have caught up with the performance of US universities and researchers.

Business R&D and innovation: To boost business R&D, the Research and Experimentation (R&E) Tax Credit is to be simplified, expanded and extended. The 2013 budget increases non-defence R&D by 5% to USD 64.9 billion. The budgets of three key science agencies – NSF, the Department of Energy Office of Science, and the National Institute of Standards and Technology laboratories – are on a long-term doubling trajectory.

Entrepreneurship: Formal entrepreneurial education programmes have been set up in recent years, and the Kauffman Foundation has allocated USD 20 million for university funding of entrepreneurship research. The Small Business Innovation Research programme offers SMEs government R&D funding opportunities. The proposed changes to the R&E tax credit will extend support for loans and tax credits to SMEs. The Startup America Initiative also encourages entrepreneurship.

ICT and scientific infrastructures: As part of building a 21st century infrastructure, the Wireless Innovation (WIN) Fund will allocate USD 300 million to advance R&D in cutting-edge wireless technologies. This should expand access to high-speed Internet, modernise the electric grid and enhance the wireless spectrum.

Clusters and regional policies: The Economic Development Administration (EDA) promotes incubators and regional cluster development. The Small Business Administration and the EDA encourage regional innovation clusters. The Department of Defense has technology clusters for robotics, energy and cyber-security. A new proof-of-concept centre at the University City Science Center in Philadelphia and the Office of Innovation and Entrepreneurship (OIE) are key recent developments. The OIE also manages the i6 Challenge, a competitive grants programme.

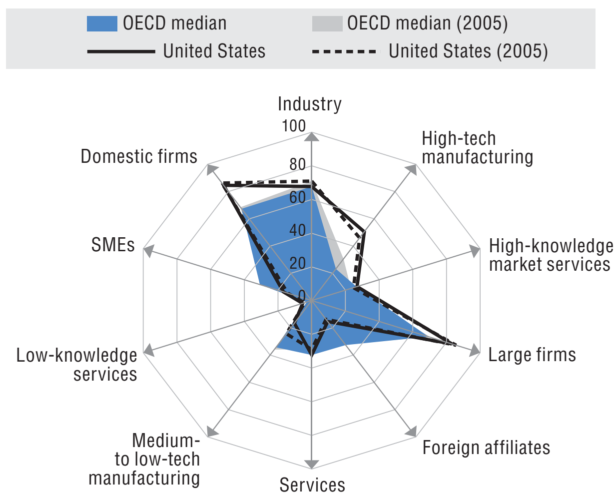
Knowledge flows and commercialisation: The *America Invents Act 2011* is a major policy reform to improve IPR protection and licensing. It aims to reduce patent backlogs, limit litigation, improve patent quality and increase inventors' ability to protect intellectual property abroad. The NSF's Office of Experimental Programs to Stimulate Competitive Research (EPSCoR) aims to strengthen research and education in science and engineering and to prevent undue concentration of research activities.

Human resources: The improvement of STEM education is a national priority, along with the goal to lead in tertiary attainment. The 2013 budget proposes a 2.6% increase to improve post-secondary STEM education as well as the quality of primary and secondary teachers. The five-year strategic plan for STEM education aims to improve co-ordination of STEM-related agencies. Other human capital programmes include Race to the Top (Phase 3), the Early Learning Challenge Fund and the Head Start Program.

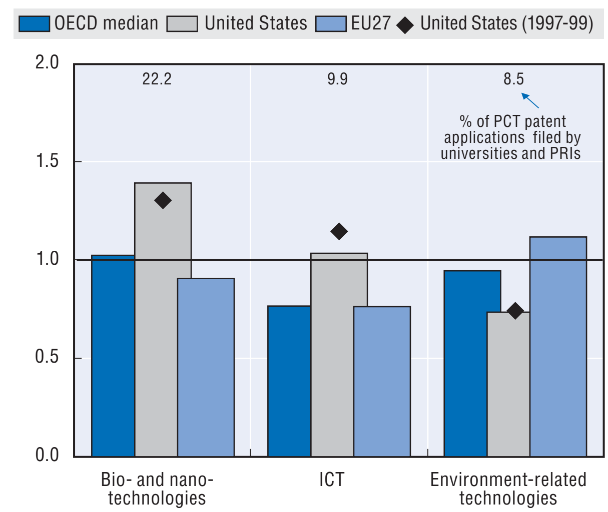
Emerging technologies: The 2013 budget provides USD 2.2 billion for R&D in advanced manufacturing, industrial materials and robotics to create high-quality manufacturing jobs. It also proposes USD 30.7 billion for the National Institutes of Health for biomedical research. Funding for the National Center for Advancing Translational Sciences aims to expedite the development of new diagnostics and treatments; the National Nanotechnology Initiative receives ongoing R&D funding.

Green innovation: The United States intends to lead the world in R&D on clean energy technology. The Clean Energy Standard aims to create a market for clean technologies through tax incentives and the Production Tax Credit. Other R&D funding has been allocated to the Advanced Research Projects Agency-Energy and the Energy Efficiency and Renewable Energy Office for advanced technology vehicles.

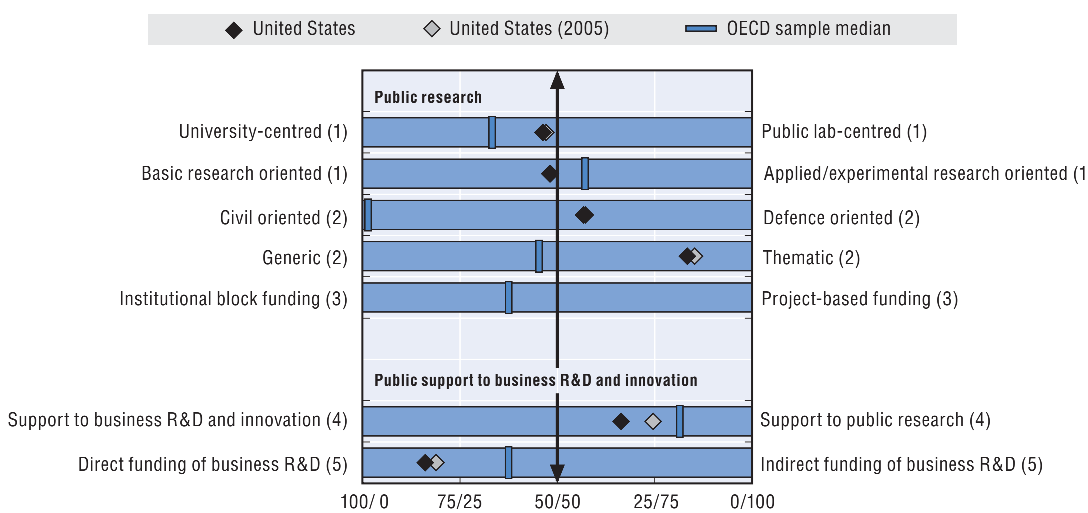
Panel 2. Structural composition of BERD, 2009
As a % of total BERD



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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