

COLOMBIA

Hot STI issues

- Strengthening governance of STI.
- Doubling expenditure on R&D to 0.5% of GDP by 2014 by channelling revenue from primary resources.
- Promoting human capital.
- Expanding innovation to new regional areas.

General features of the STI system: Colombia is a middle-income country with large oil supplies. The economy has grown consistently over the past decade and withstood the global recession relatively well. It has a high level of FDI, notably in the oil sector; this provides potential leverage for international collaboration. Its research sector is small and it faces major societal challenges: low educational standards, low tertiary attainment, inadequate infrastructure, a high level of inequality, and suboptimal ICT and scientific infrastructures. These shortcomings have to be addressed if Colombia is to realise its ambitious STI objectives and become a knowledge-intensive economy. But the country has capitalised on its integration in international networks. In 2008-10, 50% of scientific articles were produced jointly with researchers abroad (Panel 1^(a)). Human resource indicators are relatively weak: only 10% of persons employed are in S&T occupations (1^(v)) and PISA science scores of 15-year-olds are well below the OECD median (1^(b)). With 6 fixed broadband and 5 wireless subscribers per 100 inhabitants, there is room for improvement in ICT infrastructures (1^(k) (l)). The e-government readiness index is relatively high compared to other Latin American countries and similar to levels in the Czech Republic (1⁽ⁿ⁾).

Recent changes in STI expenditures: Colombia has very low R&D intensity, with GERD at around 0.16% of GDP for the last five years to 2011. In 2009, the private sector funded 19% of GERD, the public sector 77% and 4% was financed from abroad. Colombia aims to increase GERD to 0.5% of GDP by 2014.

Overall STI strategy: In 2010, the government identified innovation as one of the five drivers of future economic growth and social development. The Departamento Nacional de Planeación (DNP), together with the innovation agency, Colciencias, have formulated an ambitious STI strategy, presented in the Sectoral Strategic Plan for Science, Technology and Innovation, within the framework of the National Development Plan 2010-14: Prosperity for All. A national innovation strategy is currently being developed.

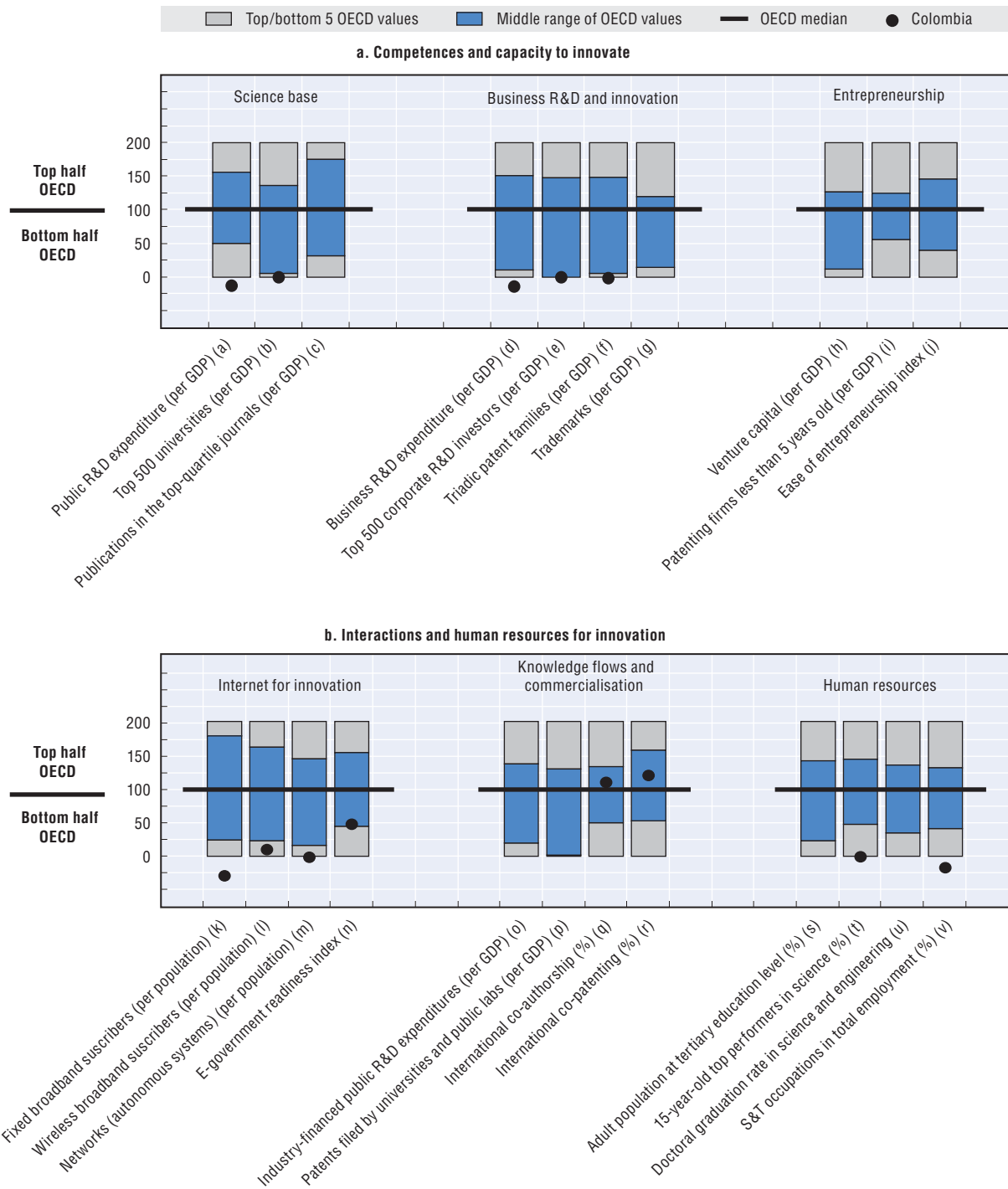
STI policy governance: DNP and Colciencias are the leading agencies of the National System for Science, Technology and Innovation (NSSTI). The World Bank (WB) and the Inter-American Development Bank (IDB) have provided a loan of USD 50 million for strengthening Colombia's STI governance structure.

Key figures

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| Labour productivity, GDP per hour worked in USD, 2010 (annual growth rate, 2005-10) | n.a. | GERD, as % of GDP, 2009 (annual growth rate, 2005-09) | 0.16 (+4.8) |
| Environmental productivity, GDP per unit of CO₂ emitted in USD, 2009 (annual growth rate, 2005-09) | 6.85 (+3.4) | GERD publicly financed, as % of GDP, 2009 (annual growth rate, 2005-09) | n.a. n.a. |

Figure 10.9. **Science and innovation in Colombia**

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).

StatLink <http://dx.doi.org/10.1787/888932690301>

Science base: In 2010 Colciencias' budget for the creation and strengthening of research centres was about USD 14 million; it was increased to USD 22 million in 2011.

Business R&D and innovation: A mix of direct and indirect funding is used to fund business R&D and innovation. Colciencias, the Ministry of Agriculture and Bancóldex, the state-owned Colombian entrepreneurial development bank, subsidise and co-finance R&D and STI projects. The *Legislative Act 5* of July 2009 modified the Constitution to create the General Royalties System (SGR) which invests 10% of total receipts from the exploitation of non-renewable natural resources in a fund to finance STI projects. The tax deduction for STI R&D and technological development projects was increased from 125% to 175% in 2011.

Entrepreneurship: The Modernisation and Innovation Fund for Micro, Small and Medium Enterprises (MSMEs) allocates co-financing for innovation programmes; these are managed through the newly created Development and Innovation Unit at Bancóldex, which also provides coaching and mentoring to high-technology entrepreneurs. Moreover, Colombia has programmes to provide equity financing and venture capital investments (USD 53 million in 2011), such as the *Emprender Fund* which provides access to seed capital for innovative entrepreneurs and *Fontic-Colciencias* which promotes and funds STI programmes in the ICT sector.

Clusters and regional policies: A 2011 Colciencias Consultancy Report identified a lack of implementation and decentralisation capabilities in most regions. *Law 1286* of 2009 strengthens and consolidates regional STI policies. Moreover, various projects have been implemented to strengthen regional clusters, such as the *Technology District* in Bolívar (the petrochemical and naval sectors) and the innovation nodes

network in Risaralda (automation, robotics and biotechnology).

Globalisation: In order to tap into global knowledge Colciencias and the Ministry of Foreign Affairs actively support Colombian researchers and innovators engaged in international projects. A number of scientific and technical co-operation agreements with other countries are also in place. Bancóldex, Proexport and Colciencias provide subsidies to promote foreign STI investment. This has already attracted two international cutting-edge technology R&D centres.

Human resources: Colciencias has designed a strategy to support STI skills from early childhood to doctoral study. Government initiatives include increasing the number of highly qualified human resources in priority areas, achieving a higher percentage of full-time teachers in universities and strengthening regional scientific and technological capabilities. The development of regional capabilities particularly concerns higher education institutions, which have received over USD 4 million in recent years from the Ministry of National Education in order to strengthen their master's and doctoral programmes. Also, the *Virginia Gutiérrez de Pineda*, *Francisco José de Caldas* and *Bicentennial Generation Programmes* provide scholarships for doctoral and overseas study. Programmes such as *Pequeños científicos* ("little scientists") promote critical thinking and scientific skills at an early age.

Emerging technologies: To develop emerging technologies, the national STI policy (CONPES 3582, 2009) proposed developing strategic sectors to produce high-value goods and services with high scientific and technological content. These sectors include energy and natural resources, biotechnology, materials and electronics, ICT, logistics and design. A genome sequencing centre and bioinformatics and computational biology centre are also being developed.

Green innovation: Green innovation is addressed in the CONPES 3700 document. Colciencias is designing strategic plans for green-related sectors, including water and forest resources, biodiversity, alternative energy, and biofuels.