

INDONESIA

Hot STI issues

- Accelerating the implementation of investment policy reforms.
- Increasing R&D capabilities (human resources, investments, infrastructures).

General features of the STI system: Indonesia is an emerging market economy and the largest economic player in Southeast Asia. After the dramatic collapse of its economy during the 1997-98 Asian crisis and years of political and social instability, Indonesia has started to grow. It was one of the rare countries with positive growth in 2008 and 2009. Reforms undertaken since the mid-2000s have helped to rebuild foreign investors' confidence and foster capital market development. Significant natural resources have supported the development of primary-resource-based and export-oriented manufacturing (refining, rubber and textile). The ICT sector has recently expanded rapidly (Panel 2). Few firms are part of the R&D system and BERD intensity was estimated at an insignificant 0.01% of GDP in 2008 (Panel 1^(d)). Research output (patents) and non-technological innovation (trademark counts) are almost nonexistent (1^{(f)(g)}). Indonesia has a complex regulatory environment in which government and state-owned companies continue to play a prominent role. Strict administrative procedures for establishing new firms, regulatory barriers to private investment, constraints on FDI (especially in telecommunications and transport), corruption, and restrictive labour regulations all hamper entrepreneurship and business development. The Indonesian archipelago encompasses thousands of islands and has serious and persistent problems in terms of basic infrastructures. Fixed broadband infrastructures are also undeveloped (1^(k)). The very small Indonesian research community is well integrated in global knowledge networks: 70% of

scientific articles and 50% of PCT patent applications are produced with international collaboration (1^{(q)(r)}). International students who pursue tertiary-level studies abroad, especially in Australia, Japan and the United States (Panel 3) help to develop and reinforce academic networks. The education system is inefficient. Only 4% of the adult population was tertiary-qualified in 2007 (1^(s)). Very few 15-year-olds have good PISA scores in science (1^(t)). Indonesia has few professionals and technicians (1^(v)) and very few researchers. The researcher population in fact decreased in relative terms from 0.46 to 0.19 per 1 000 employment between 2001 and 2009.

Recent changes in STI expenditures: Indonesia's GERD was only 0.08% of GDP in 2009 but has increased by a rapid 11.4% a year since the beginning of the 2000s. The policy emphasis on S&T for national economic development may encourage further R&D investments in the future.

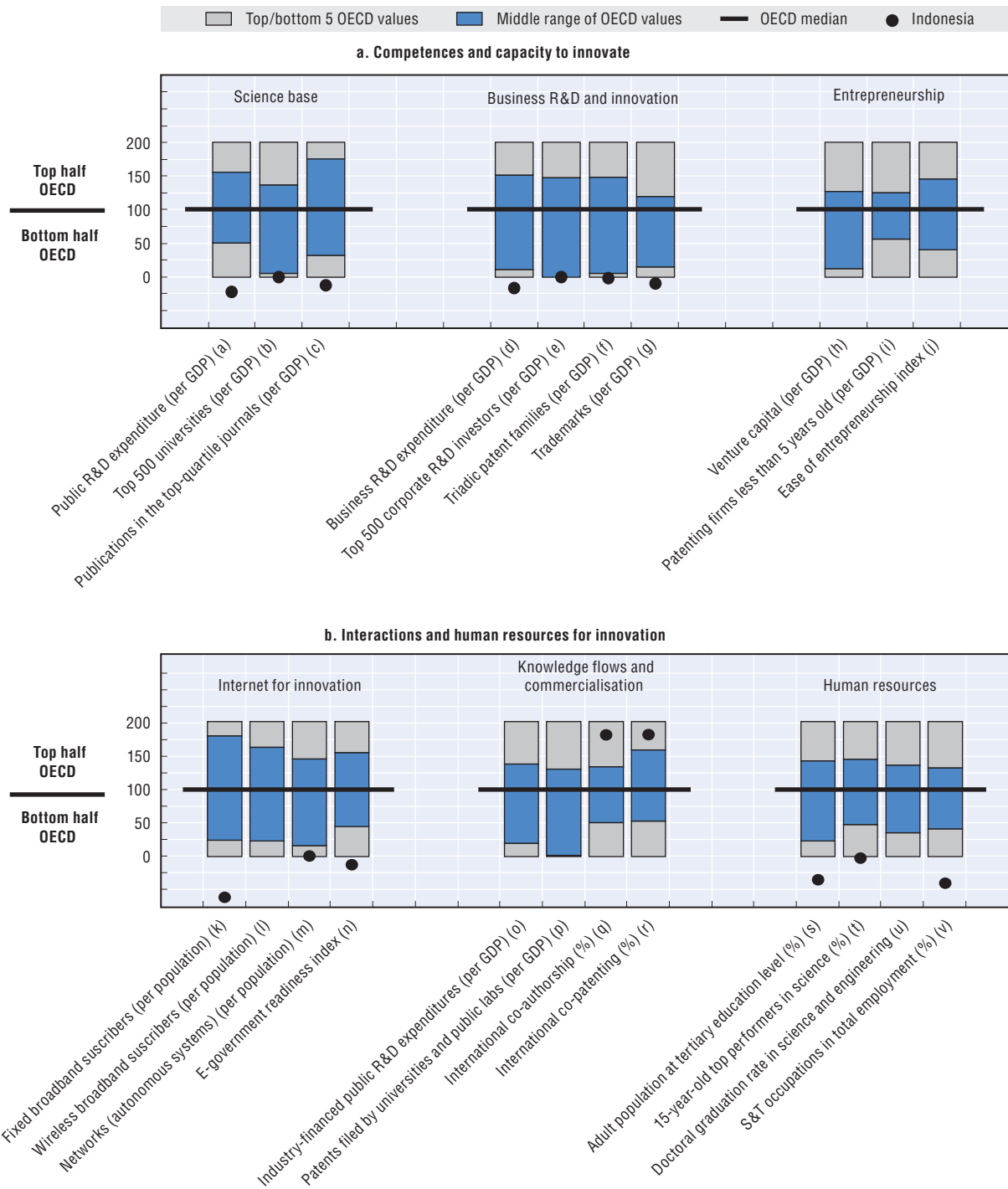
Overall STI strategy: Indonesia has a long-term development plan, Vision and Mission of Indonesian S&T Statement 2005-25, and has issued a series of five-year-plans to refine development priorities. The current plan (2010-14) focuses on quality of human resources, development of S&T through improved R&D capabilities (institutions, resources and domestic and international networks), and economic competitiveness. It also aims to improve the application and commercialisation of R&D results in order to address current national socioeconomic needs.

Key figures

Labour productivity, GDP per hour worked in USD, 2010 (annual growth rate, 2005-10)	n.a n.a	GERD, as % of GDP, 2009 (annual growth rate, 2000-09)	0.08 (+11.4)
Environmental productivity, GDP per unit of CO₂ emitted in USD, 2009 (annual growth rate, 2005-09)	2.56 (+3.0)	GERD publicly financed, as % of GDP (annual growth rate, 2000-09)	n.a n.a

Figure 10.21. **Science and innovation in Indonesia**

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).

Source: See reader's guide and methodological annex.

STI policy governance: Indonesia's STI governance is complex and involves many bodies. The independent National Innovation Committee (KIN) established in 2010 is in charge of oversight, steering and co-ordination of national innovation.

Science base: The public sector is the major performer of R&D, but the intensity of public investment in R&D is low (1^(a)) and the public sector performs relatively poorly. Indonesia has no world-class university able to attract foreign talent and has few publications in the best scholarly journals (1^{(b)(c)}).

Business R&D and innovation: R&D-performing companies are mostly concentrated in the manufacturing sector, which is largely composed of medium-low- and low-technology SMEs. The industrial structure and the lack of large firms and investment by multinationals seriously limit prospects for the development of business R&D.

Entrepreneurship: Indonesia has weak framework conditions for entrepreneurship. However, the *Investment Law 2007* led to a noticeable change in the entrepreneurial climate by clarifying various issues for investors and by revising the "negative list" of sectors in which domestic and foreign investments are prohibited or restricted. Indonesia has also actively reformed regulations and lowered costs to start up a business. An Innovation Centre for Micro, Small and Medium Enterprises was established to create synergies between the different support schemes to SMEs.

Knowledge flows and commercialisation: Links between R&D and innovation actors are historically weak. Major constraints on academia-industry collaboration are the rules concerning the research budget (return of all unspent allocations at the end of every fiscal year) and the accumulation of additional funds (transfer to the Ministry of Finance of incomes generated from industry projects). As regards commercialisation, Indonesia has made significant progress in the area of IPR protection. The application process has been streamlined, and

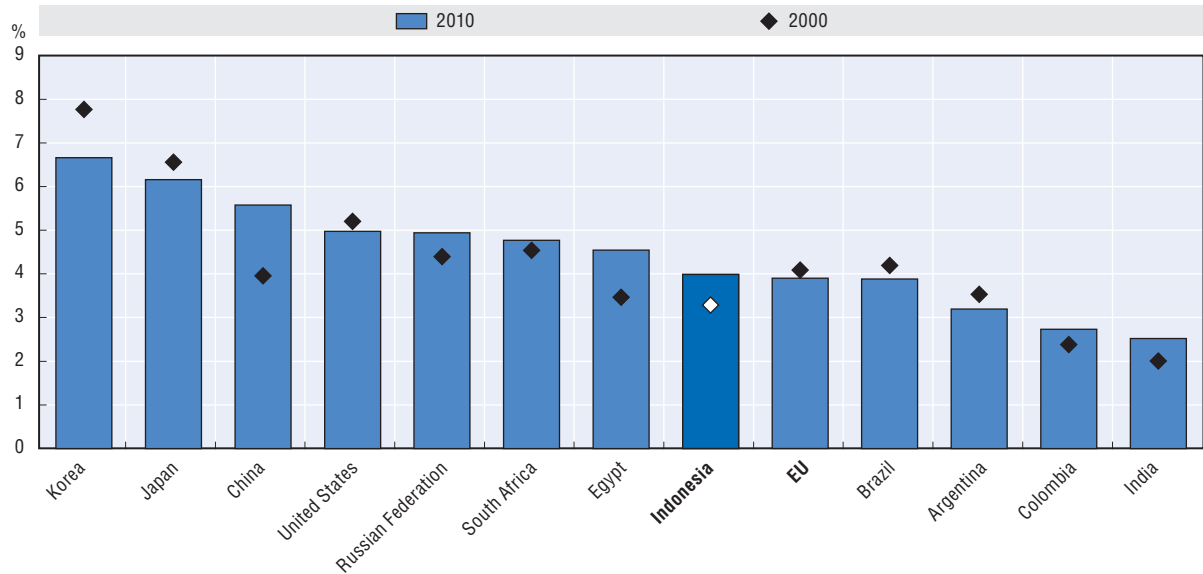
enforcement has been improved through the establishment, in March 2006, of a National Task Force for IPR Violation Prevention and the transfer of legal competence to handle civil cases on IPRs to commercial courts. Nevertheless, corruption, lack of transparency and structural constraints impede the implementation of the reforms.

Globalisation: Although investment policy reforms since the 1980s have helped to open Indonesia's economy to foreign interests, the level of FDI is below that in other Southeast Asian countries. The 2007 *Investment Law* established national treatment for foreign investors, and made restrictions on foreign equity more transparent.

Human resources: Human resources are a major weakness of Indonesia's STI system. However, expenditures on education have increased over the past two decades, and must amount to 20% of the government budget since a 2005 amendment to the Constitution. The expansion of technical and vocational education and training has become a priority, and a National Education Strategy was adopted to reduce disparities in access to education, to enhance teaching quality, and to improve the management and accountability of schools.

Green innovation: Indonesia faces serious energy and environmental challenges. While national oil and gas production is declining, domestic energy demand is rising fast under the combined effects of the world's fourth largest population growth, a rapid economic transition and poverty reduction. Electricity generation which is still mostly based on conventional sources, urbanisation, population concentration (Java-Madura-Bali), large-scale deforestation and over-exploitation of natural resources are sources of environmental degradation. The National Council on Climate Change aims to build capacities for reducing carbon emissions and the Indonesia Climate Change Trust Fund attracts investments to finance climate change adaptation and mitigation programmes.

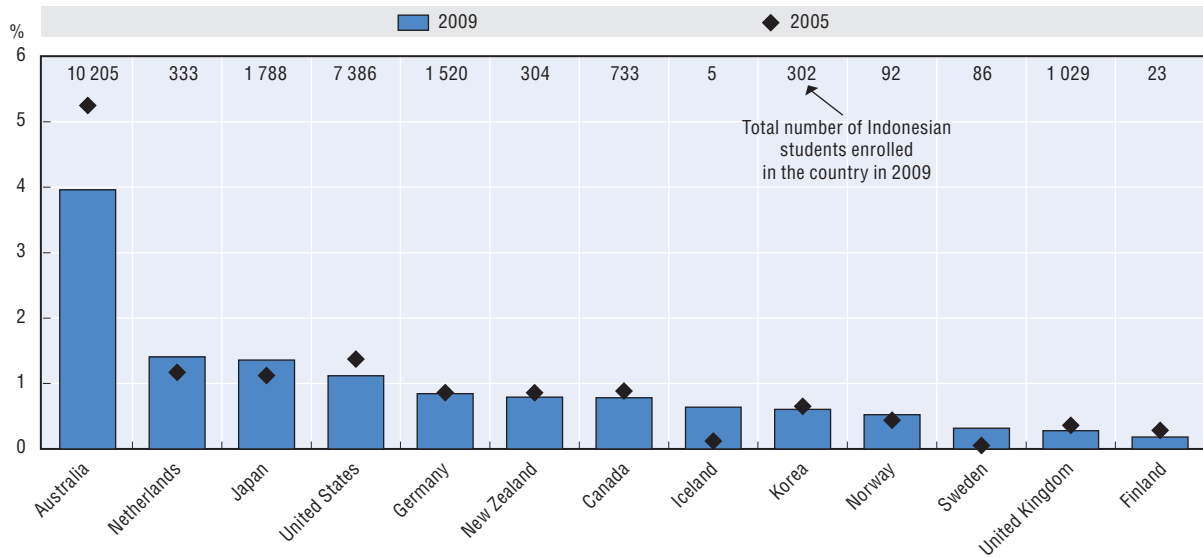
Panel 2. Value added in ICT industries, BRICS and selected countries, 2000 and 2010
As a % of GDP



Note: ICT industries include communications services, computer and related services, communications goods and semiconductors, and computers and office machinery.

Source: National Science Board (2012), *Science and Engineering Indicators 2012*, National Science Foundation (NSF), Arlington (US).

Panel 3. Indonesian students enrolled in tertiary studies abroad, 2005 and 2009
As a % of all international students enrolled at tertiary education level in the country



Source: OECD Education Database, 2012.

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