

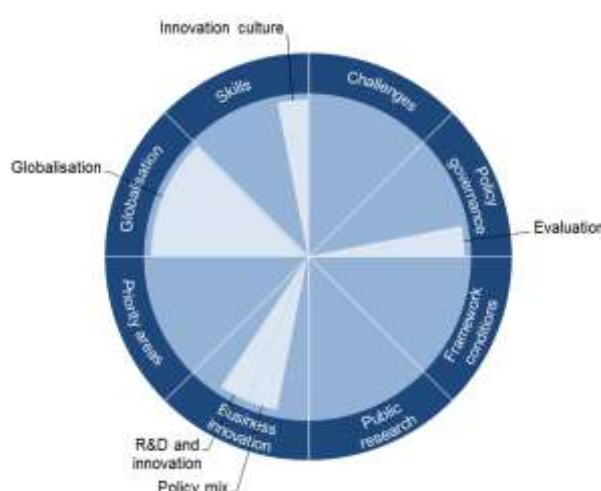
INDONESIA

Indonesia is the world's fourth most populous country, and 43% of its 250 million inhabitants are under the age of 25. The Indonesian economy relies mainly on the exploitation of the country's rich endowments of natural resources, and its expansion is therefore tied to developments on global commodities markets, as primary commodities account for more than half of its exports. Indonesia has enjoyed strong and stable growth over the past decade, with GDP growth rates above 5% annually until 2014, and the country has taken important steps toward further opening up its economy. Strong economic performance has led to a considerable reduction in poverty and improvements in living standards. However, there have recently been signs of a slowdown in economic growth and investment, due mostly to lower commodity prices, regulatory uncertainty and infrastructure bottlenecks (e.g. transport congestion). GDP growth is projected to gather pace to reach 5.5% in 2017. As an economy in catching up phase, Indonesia also faces severe environmental challenges in the form of air pollution, deforestation and the depletion of its natural resources. The Vision and Mission of Indonesia S&T Statement (2005-25) sets out a common vision for improving Indonesia's global competitiveness and fostering its transition toward a knowledge-based economy. The Third National Medium-Term Development Plan (RPJMN, 2015-19) is at the heart of the government's agenda to stimulate inclusive, sustainable growth and its plans to boost the further development of STI in 100 regions. Recent policy emphasis on the role of S&T for achieving national economic development aims to encourage greater R&D investment in the future.

Table 1. Gross domestic expenditure on R&D (GERD)

	IDN	OECD
GERD		
USD million PPP, 2013	2 132	1 181 495
As a % of total OECD, 2013	0.2	100
GERD intensity and growth		
As a % of GDP, 2012	0.08	2.38
(annual growth rate, 2008-12)	n.a.	(+2.3)
GERD publicly financed		
As a % of GDP, 2013	n.a.	0.61
(annual growth rate, 2008-13)	n.a.	(+2.5)

Figure 1. Major STI policy priorities, 2016





Hot issues

Supporting R&D and innovation in firms

Many Indonesian firms do not engage in innovation, as indicated by the low intensity of BERD and the very low numbers of patents filed and trademarks held (figure 4^{d,f,g}). R&D-performing companies are concentrated mostly in the manufacturing sector, which is dominated by SMEs characterised by medium-low and low technology. Indonesia's industrial structure combined with the lack of **multinationals'** investment in R&D (figure 4^e) seriously limits the prospects for the development of business R&D. In 2013, a Presidential Decree renewed a 2007 Government regulation that had introduced incentives to encourage private firms to conduct R&D and innovative activities and to diffuse technology. These incentives consist of both fiscal elements and technical support for R&D, including access to public laboratory equipment and instruments or personnel. The government plans to further increase public funding for R&D and innovation within the next five years, as the policy focus moves towards S&T-driven competitiveness. While the authorities continue to emphasise technology consulting and extension programmes in order to support business innovation (figure 5), new funding instruments are increasingly in use, including competitive grants under the RPJMN (2015-19), debt financing and risk-sharing mechanisms, as well as a number of tax incentives, including on corporate income tax, a VAT exemption on technology-based products and tax relief for local production that is based on at least 50% local resources. Recently, Indonesia has also consolidated its funding schemes for business innovation and revised its public procurement arrangements so as to make them more flexible and accessible. An Electronic Procurement Agency (LPSE) provides an electronic procurement system aimed at easing and supporting procurement procedures. Furthermore, the government foresees a more intensive use of demand-side instruments in the near future.

Revising the policy mix for business innovation

Recognising that an appropriate mix of policy instruments that can support needs of various industries can contribute to improving innovation performance, Indonesia's government foresees a shift in the composition of its innovation policy mix over the next five years. In addition to public procurement and demand-side instruments, greater use will be made of more targeted instruments. Indonesia has already deployed a series of sector-based and industry-targeted incentives to support technology diffusion and R&D in agrifood, shipbuilding, transport, machinery, health, textile, creative industry, etc. (see also below on clusters and regional policies). In order to ensure that these are efficient, better coordination, a systemic approach to governance is needed. A number of regulations relating to budgetary allocations to S&T programmes have been implemented with a view to strengthening the national innovation system. The Ministry of Research & Technology and Higher Education has also been reorganised by absorbing the functions and portfolio of instruments previously managed by the Ministry of Innovation.

Improving STI policy evaluation and impact assessment

Indonesia has put high priority on the Mental Revolution Programme that aims to reduce corruption and lay the foundations for "good governance" of the development agenda. The lack of harmonisation and conformity between national and sub-national laws and regulations is a major issue, as is corruption and the weak capacity of the civil service. As part of the Agenda of the Mental Revolution Movement, the government has planned an internal evaluation of civil servants and public services, including their "Technology Readiness Level". Likewise, the regular monitoring and evaluation of institutions is planned. The National Research Council involves the private sector in the definition of STI policy in order to increase its role in the implementation phase. In addition, in 2015 Indonesia reinitiated the Science Briefings to Parliament so as to bring STI issues and trends before high-level policy circles and improve STI policy coordination.





Building a broad innovation culture

Human resources are a major weakness of Indonesia's STI system. Although expenditures on education have increased steadily over the past two decades, the country still lacks skills to support knowledge-based growth (figure 4^{st.u}). Indonesia is aiming to build a stronger culture for innovation through education, awareness-raising and the design of more participatory policies. Education curricula have been revised in high schools and universities so as to raise scientific literacy and inspire students with an entrepreneurial spirit. The Science for All programme, for instance, aims to make teaching in high school science more attractive. The government has also implemented a new training programme on procurement and entrepreneurship, and entrepreneurship is being encouraged through awards and competitions organised jointly with private actors and international bodies.

Addressing the challenges of STI globalisation and increasing international cooperation

The fact that the few patents and scientific publications produced by Indonesia are actually produced through cooperation with international counterparts, signals not only a strong integration of the small Indonesian scientific community into international knowledge and innovation networks, but also a high degree of dependence (figure 4^q). However, most of the international collaborations involving Indonesian researchers are based on individual arrangements and bilateral programmes. There is no comprehensive strategy for international cooperation, and domestic researchers have to develop personal contacts and adapt to the specific conditions of each foreign institution in terms of research funding, foreign research permits and mobility. In the same vein, a new partnership has been concluded with the United States to provide individual research grants to Indonesian scientists to conduct development-related research. Since 2012, the Indonesian Endowment Fund for Education (LPDP) has provided financial support to Indonesian citizens undertaking postgraduate education abroad. In parallel, the government offers foreign academics a full exemption from personal income tax. Indonesia has also implemented several initiatives to facilitate the internationalisation of Indonesian industry. “Indonesia Day” is a marketing campaign aimed at promoting Indonesia’s culture and its craft products. Indonesia and Iran have concluded a bilateral agreement to develop applications in the aerospace and nuclear industries. The improvement of framework conditions for investments and the implementation of Globalisation and Free Trade Zones are intended to further attract foreign direct investment, including in R&D.



Some key STI performance indicators

Figure 2. Environmental performance

Green productivity, GDP per unit of CO₂ emitted, index 2005=100

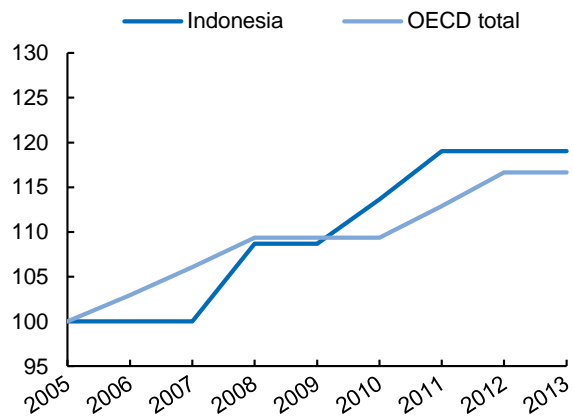
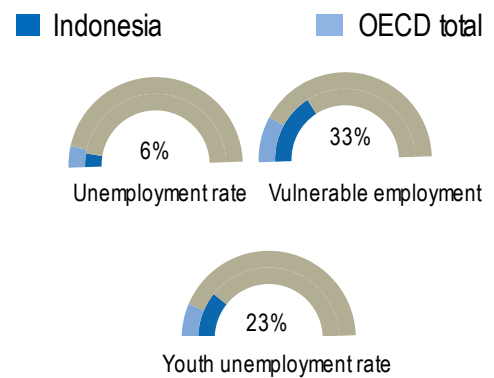


Figure 3. Unemployment

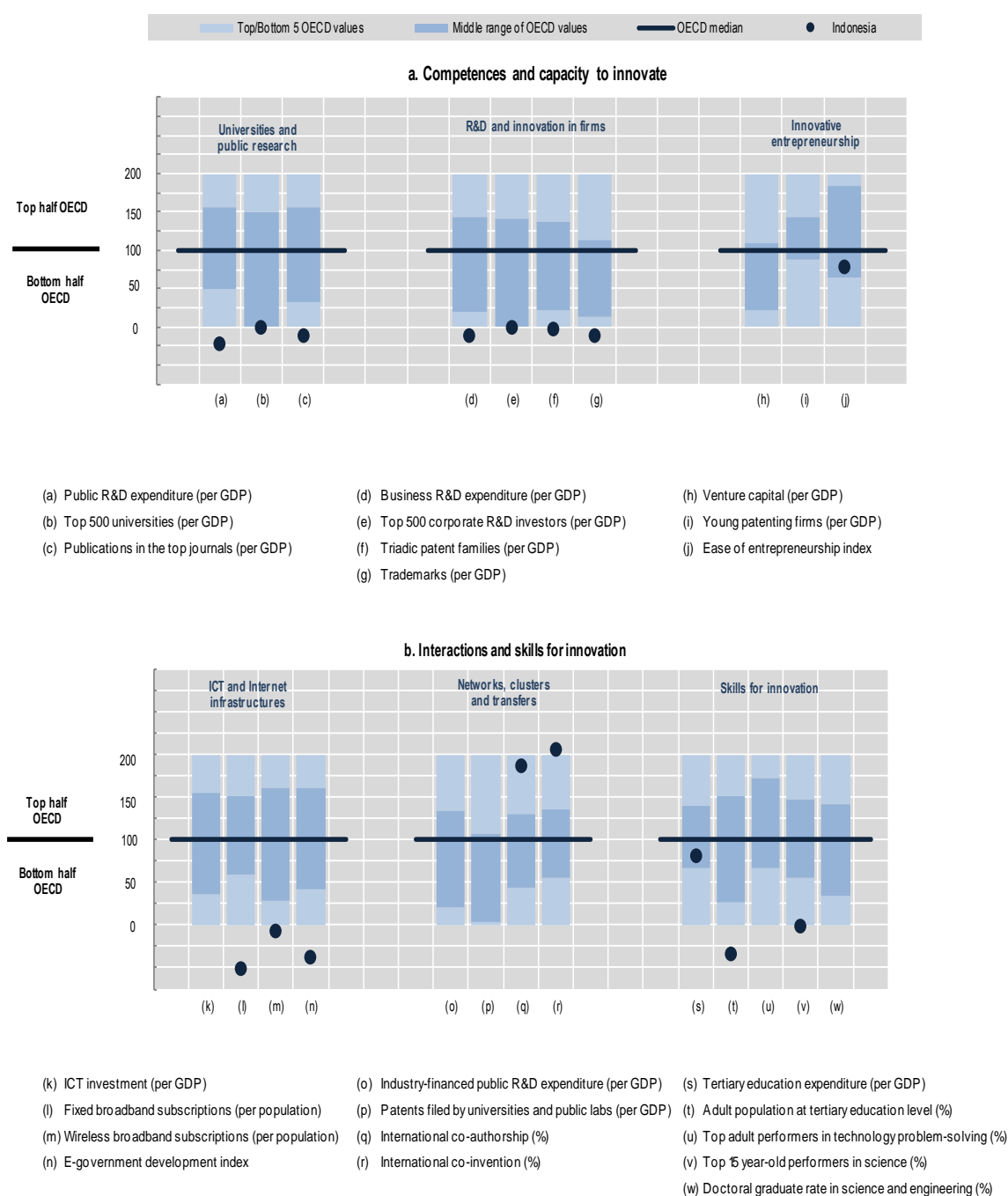
2013 or latest year available, percentages



Benchmarking national STI systems

Figure 4. Science and Innovation in Indonesia

Comparative performance of national science and innovation systems, 2016



Note: Normalised index of performance relative to the median values in the OECD area (Index median=100).



Highlights of the Indonesian STI system

New sources of growth

Indonesia has become a global player in many key farm and food markets (e.g. palm oil, rubber, fishery products). Boosting productivity growth in these sectors will, however, be crucial, as it will be increasingly difficult to expand agricultural land, given environmental concerns. In addition, there is still a gap to fill before achieving food self-sufficiency. The government is promoting research in synthetic biology for the generation of new crop and grass varieties. The Indonesian Institute of Sciences (LIPI) has stepped up its research activities on drought- and flood-tolerant rice varieties to mitigate the impacts of climate change. Recent achievements include the development of a transgenic drought-tolerant variety of sugarcane. A new programme, Agrifarm Training, provides seed capital and training for the development of a technology-based business in this sector as well. In January 2014, the government began enforcing a ban on the export of unprocessed mineral resources, first legislated in 2009, with a view to fostering processing industry in Indonesia and nurturing new growth engines. It is also promoting several fields of research, including electrical cars, biorefineries and the use of microbes to produce bioethanol.

New challenges

Fossil fuels are central to Indonesia's economy, both for domestic consumption and as an export commodity. Indonesia has become a net oil importer, as production declined at the same time that domestic demand increased. Fossil fuel consumption and deforestation are also major contributors to Indonesia's poor GHG emissions record. Several reforms have been implemented in the past to phase out inefficient fossil fuel subsidies, and to reduce the country's consumption and its dependency. As part of the RPJMN, the government put an emphasis on energy recovery and zero waste policies. The authorities established new incentives to encourage waste-to-energy solutions on industrial sites. A new Centre of Innovation has also been set up to develop energy generators that combine various sources of energy – water, wind and solar. Green growth, which is at the centre of the development agenda, also entails managing environmental and social risks in the agricultural sector. The mills in the palm oil and sugar industries have been equipped with waste-based electricity generators, and the 2015 Governing Oil Palm Landscapes for Sustainability (GOLS) programme provides support to manufacturers and traders in combatting deforestation.

Universities and public research

Indonesia's science system remains small, with no world-class university and few scientific publications in the best scholarly journals (figure 4^{b,c}). The government has adopted several initiatives with a view to increasing public research funding and improving funding efficiency. The Indonesian Science Fund, an autonomous body under the auspices of the Indonesian Academy of Sciences (AIPI), was established in March 2016 to supply funding to the Indonesian S&T research community. In addition, a government regulation was passed in 2015 to attract private funding. Since 2012, the government has been encouraging greater autonomy in universities, especially in the administration of research funding. New capacity for interdisciplinary research was built in 2013 with a new Centre for Interdisciplinary Research (ICIAR - LIPI).

Innovative entrepreneurship

The framework conditions for entrepreneurship in Indonesia are less supportive than the OECD average (figure 4ⁱ). Strict administrative procedures for establishing new firms, regulatory barriers to private investment, constraints on FDI (especially in telecommunications and transport sectors), corruption and restrictive labour regulations, as well as the dominance of state owned companies, all hamper entrepreneurship and business development. The Indonesian Board of Investment is currently developing an "Investment on One-Stop" online service, which aims to shorten the process of investing in Indonesia, which presently can take from three to 24 months. Indonesia has also set up several instruments to develop





Science and Technology Parks, Business Innovation Centres and business incubators in recent years. Since 2015, a Presidential decree has planned for coaching and counselling services to be provided in incubators. The government also offers soft loans to graduates in innovation management, with a view to supporting their start up activities.

ICT and Internet infrastructure

The Indonesian archipelago that encompasses thousands of islands has faced persistent problems in terms of basic infrastructure. Fixed broadband infrastructures are, for instance, highly undeveloped and fragmented (figure 4¹). Significant improvements in physical infrastructure and Internet infrastructure in particular will be required to meet the government's development targets. In October 2014, the government launched the Indonesia Broadband Plan, which aims to provide fixed broadband access to all government offices, hotels, hospitals, schools and public spaces by 2019, with a speed of at least 2 Mbit/s. In addition, investment in data centres and cloud computing technologies by local industries has gained momentum. The government is considering giving a boost to this trend by developing incentives for attracting FDI to the ICT sector.

Technology transfer and commercialisation

The National Research Agenda (2015-19) marks a new step in the Indonesian government's long-lasting efforts to foster industry-science cooperation on research and increase private investment in public research. The government is encouraging PRIs to expanding their priorities to collaborative research and to the diffusion of research and technology. More upstream, a 2015 regulation introduces the possibility of rewarding researchers with patent royalties. In addition, the National Library Portal allows broad access to a number of research-related databases.

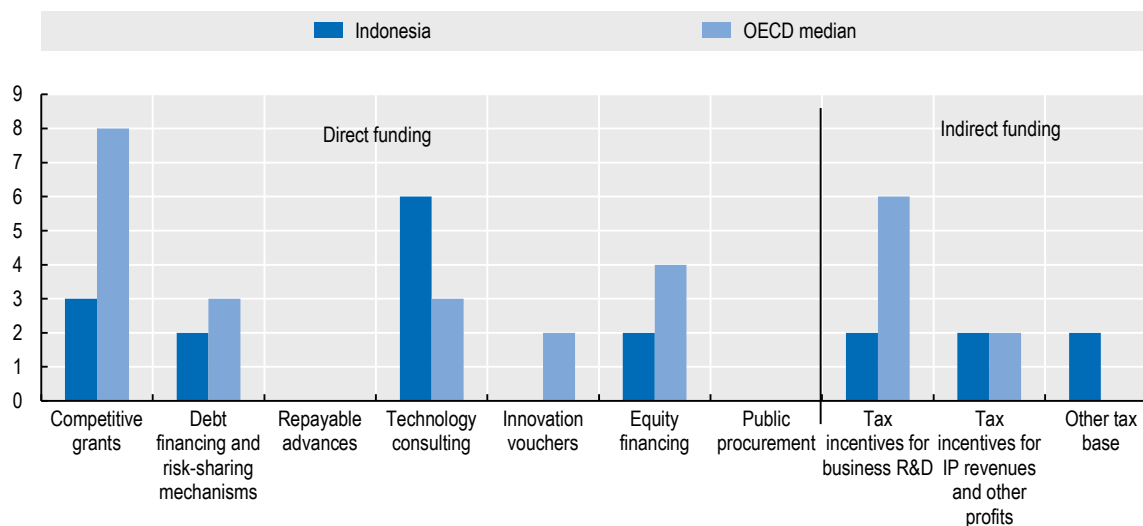
Clusters and regional policies

In line with past efforts to engage in a decentralisation process, in 2014 Indonesia released a Roadmap for a Regional Innovation System that aims to strengthen **regions'** competitiveness and their capability to address basic needs. It also provides a stimulus to regional universities and research departments. Furthermore, the Ministry of Planning has created an excellence scholarship programme to allocate scholarships in priority areas: energy, food and health.



National STI policy mix

Figure 5. Most relevant policy instruments of funding for business R&D, 2016
Country self-assessment, index (9 = high and increasing relevance to 0 = not used)



Note: Policy information comes from country responses to the EC/OECD International Survey on STI Policies 2016 and 2014. **Indonesia's** responses are available in the EC/OECD International Database on STI Policies, edition 2016 http://qdd.oecd.org/DATA/STIPSurvey/IDN...STIO_2016.


Source: See the reader's guide and methodological annex.

StatLink <http://dx.doi.org/10.1787/888933433868>

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From:

OECD Science, Technology and Innovation Outlook 2016

Access the complete publication at:

https://doi.org/10.1787/sti_in_outlook-2016-en

Please cite this chapter as:

OECD (2016), "Indonesia", in *OECD Science, Technology and Innovation Outlook 2016*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/sti_in_outlook-2016-66-en

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