

THAILAND

Thailand was classified an upper-middle-income economy by the World Bank in 2016 and the second largest in South East Asia. In spite of recent political turmoil, the Thai economy gained pace in 2015 and growth is expected to grow at an average annual rate of 3.6% between 2017 and 2021.

While agricultural exports (mainly caoutchouc, manioc, sugar, and rice) have suffered from low commodity prices in 2014 and 2015, tourism re-emerged as one of the top drivers of growth. Simultaneously, Thailand has diversified its manufacturing sectors towards higher value added industries to escape the middle-income trap. It is the second largest hard-disk drive exporter and a regional hub for automotive manufacturing. Imports and exports were comprised notably of machinery and electrical products in 2016.

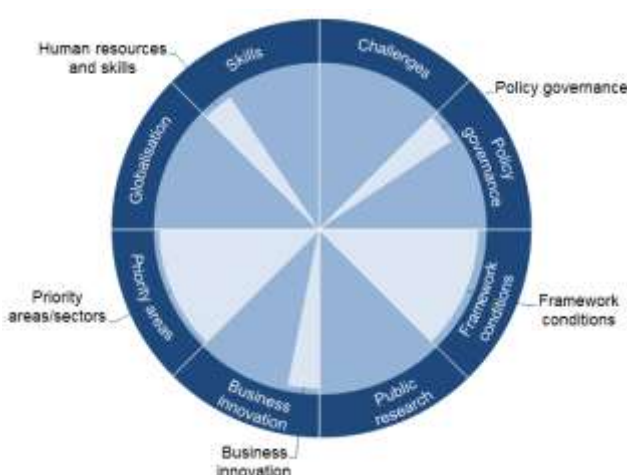
Thailand's 12th National Economic and Social Development Plan (NESD, 2017-21) was approved in 2016 in accordance with the 20-year National Strategy 2017-36. The latter intends to spur the competitiveness of Thailand's agricultural, manufacturing and service industries; promote green growth and research in energy security; enhance the potential of human capital; enhance the efficiency of public sector management; and reduce social disparities. GERD has ranged between 0.25% and 0.6% of GDP for the last two decades (increasing from 0.36% of GDP in 2011 to 0.63% in 2015) (Table 1).

In the new NESD Plan, the government has set ambitious R&D spending targets of 1% and 1.5% of GDP by 2018 and 2021, respectively. Major societal challenges include social inclusiveness and environmental sustainability.

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

| | THA | OECD |
|----------------------------------|---------|-----------|
| GERD | | |
| USD million PPP, 2015 | 6 948 | 1 247 981 |
| As a % of total OECD, 2015 | 0.6 | 100 |
| GERD intensity and growth | | |
| As a % of GDP, 2015 | 0.63 | 2.38 |
| (annual growth rate, 2011-15) | (+18.3) | (+2.4) |
| GERD publicly financed | | |
| As a % of GDP, 2015 | 0.16 | 0.62 |
| (annual growth rate, 2011-15) | +(3.8) | +(0.6) |

Figure 1. Major STI policy priorities, 2016





Hot issues

Improving the framework conditions for innovation

Thailand's innovation performance requires continued attention to framework conditions such as enhancing the supply and quality of human resources; conditions for innovation financing (especially of SMEs); entrepreneurship and investment in network infrastructure such as telecommunications, transport and electricity. Greater political stability and leadership are crucial to reduce uncertainty in the policy making process and to improve the ability of the government to implement longer term budget planning. In 2014, the Thailand Science Park (TSP) underwent an expansion (Incubation Cluster 2) and in 2016, the TSP was designated as the base of Food Innopolis, one of the super cluster initiatives formed by the government. Reducing the regional economic disparities in the country remains a challenge. The majority of the foreign direct investment (FDI) as well as public and private resources tend to be directed to export-oriented technology and science hubs in the Bangkok region, leading to a geographical concentration of financial and human capital and knowledge. Since 2014, Regional Science Parks were established as a supplement to the existing TSP. They build on the existing regional economic specialisation, i.e. in electronic industries in the north of the country, food and automotive industries in the centre, petrochemicals industries in the east, and rubber/ agricultural industries in the south of the country. The Eastern Economic Corridor of Innovation (EECi) is currently being developed under the auspices of the Ministry of Science and Technology and offers a complete eco-system for innovation. The project aims to develop key infrastructure to underpin the university-industry-government collaboration and will include a Living Lab, a Fabrication Laboratory and a Test-bed sandbox. Public participation will be promoted, expanding the concept of Triple Helix to Quadruple Helix. An End-to-End Intelligent Supply Chain management will be employed to connect and integrate the Thai industry to the world market, making EECi an investment hub of smart technologies.

Encouraging business innovation and innovative entrepreneurship

Business sector R&D investment has increased by 360% between 2008 and 2014 with a strong sectoral focus on manufacturing. Yet, BERD as a share of GDP still lags considerably behind in terms of OECD standards (4th). Tax incentives and innovation vouchers are the most important policy instruments for business R&D funding in Thailand (5). A recent tax reform increased the maximum deduction for R&D and innovation tax expenditures from 200% to 300%. Similarly, the Company R&D Facilitation Centre (CRDC-FC) intends to facilitate private company investment in R&D. It was set up in 2015 in co-operation with the National Science Technology and Innovation Policy Office (STI Office). Its main services include i) human resource development services; ii) technology transfer and acquisition; iii) IP management; iv) access to government support and incentives; v) and provision of space, tools and equipment for R&D to stimulate R&D investment from multinational companies. In 2016, a series of public events called "Start-up Thailand 2016" was launched to create inspiration for new entrepreneurs ranging from college and university students to farmers and corporate executives. The government has also implemented regulations for start-ups with incentives to attract global entrepreneurs and investors. The Government Procurement Programme to Support Local Innovation is another new initiative to boost innovation in the local business sector. Initiated in 2016, this programme gives fast-track treatment in the government procurement process to local innovation products. A system has been set up by the Ministry of Science and Technology to evaluate and qualify applications to commercialise locally manufactured products.

Improving the governance of the innovation system and policy

Until recently, the governance of science and innovation policies encompassed a multitude of overlapping administrative bodies and lacked a clear distinction of responsibilities (National Research Council (NRC), National Science, Technology and Innovation Policy Committee, Institute of Scientific and Technological Research (TISTR), National Science and Technology Development Agency (NSTDA), etc.). The government therefore implemented a STI Governance Reform in 2016 that consists of three major objectives: i) to revise the STI and R&D administration system; ii) to streamline STI and R&D into the national development plan; and iii) to introduce an agenda-based budgeting system. As a result, the National Research and Innovation





Policy Council was established in October 2016 as a single body to set the policy direction for research and innovation and its implementation. The STI Office and the National Research Council of Thailand jointly share the secretariat role of the Council.

Targeting priority areas/sectors

Under Thailand 4.0, ten “S-Curve” industries have been identified for the establishment of future industrial bases for a knowledge-based economy. As part of the prioritisation, new skill-intensive industries replace former labour-intensive ones, improving the country’s productivity and competitiveness potential. The “S-Curve” industry approach includes an upgrade of five existing industries, namely automotive, smart electronics, medical and tourism, agriculture and biotechnology, and the food processing industry. In addition, five new industries are being promoted to create the “New S-Curve” for Thailand: i) robotics, ii) aviation and logistics, iii) biofuels and biochemicals, iv) digital industries, and v) the medical sector. Investment promotion and human resource development measures have been formulated to boost these ten industries.

Improving overall human resources and skills

Although the government has reformed and improved the education system over the last two decades, the share of Thailand’s spending on higher education relative to GDP is still low by OECD standards (4^a). The low adult population with tertiary level education (4^b) and the low performance of 15-year olds in science (4^c) imply the need for a thorough re-examination of education to respond to the rising demand for a skilled STI labour force. Simultaneously, the demand for R&D staff in the private sector has increased by over 400% between 2008 and 2014. The government aims to improve overall human resources and skills through specific policies and programmes such as the STEM Education and Workforce Development Policy, the Dual Education Program, the Work-integrated Learning Program and the Skill Development Program. Managed by the STI Office, Talent Mobility is a national platform to co-ordinate and increase mobility of research personnel between public and private sectors. Since its inception in 2013, Talent Mobility has supported the mobility of 240 researchers and 157 students, working on 127 research projects and a total of 111 companies have joined the programme as of mid-2016. To ensure comprehensive coverage of enterprises throughout Thailand, the Talent Mobility Clearing Houses have been set up in four regions of Thailand. The National Innovation Agency (NIA) which was established by the Ministry of Science and Technology has promoted the national innovation culture and increased the awareness of the importance of innovation at all levels of Thai society. The NIA has developed the Innovation Management programmes, which aim to further develop the innovation system management in education, public and private sectors by working with educational institutions (e.g. Ramkhamhaeng and Chulalongkorn University). In addition, the STI Office has developed the Entrepreneurial University Programme to strengthen entrepreneurial skills of graduates with the goal to enhance Thailand’s entrepreneurial capacity and to ultimately raise the number and quality of start-ups. As of September 2016, thirty universities, such as Thammasat University and Suranaree University of Technology, had joined the programme.



Some key STI performance indicators

Figure 2. Environmental performance

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

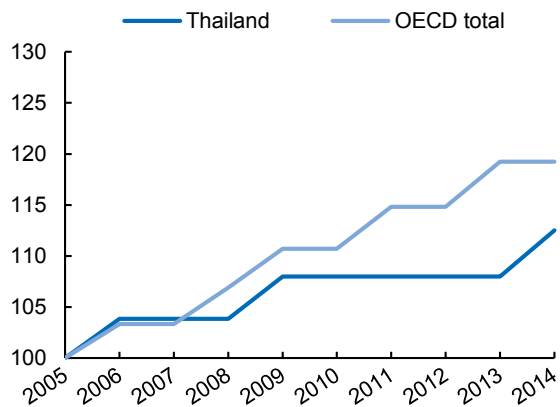
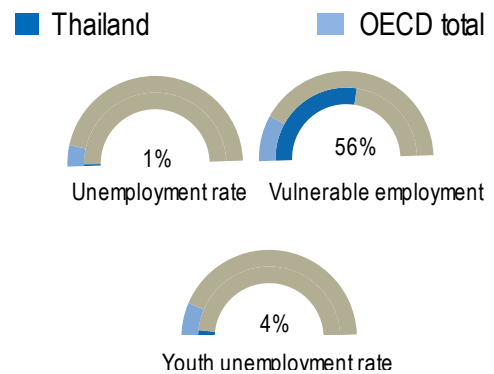


Figure 3. Unemployment

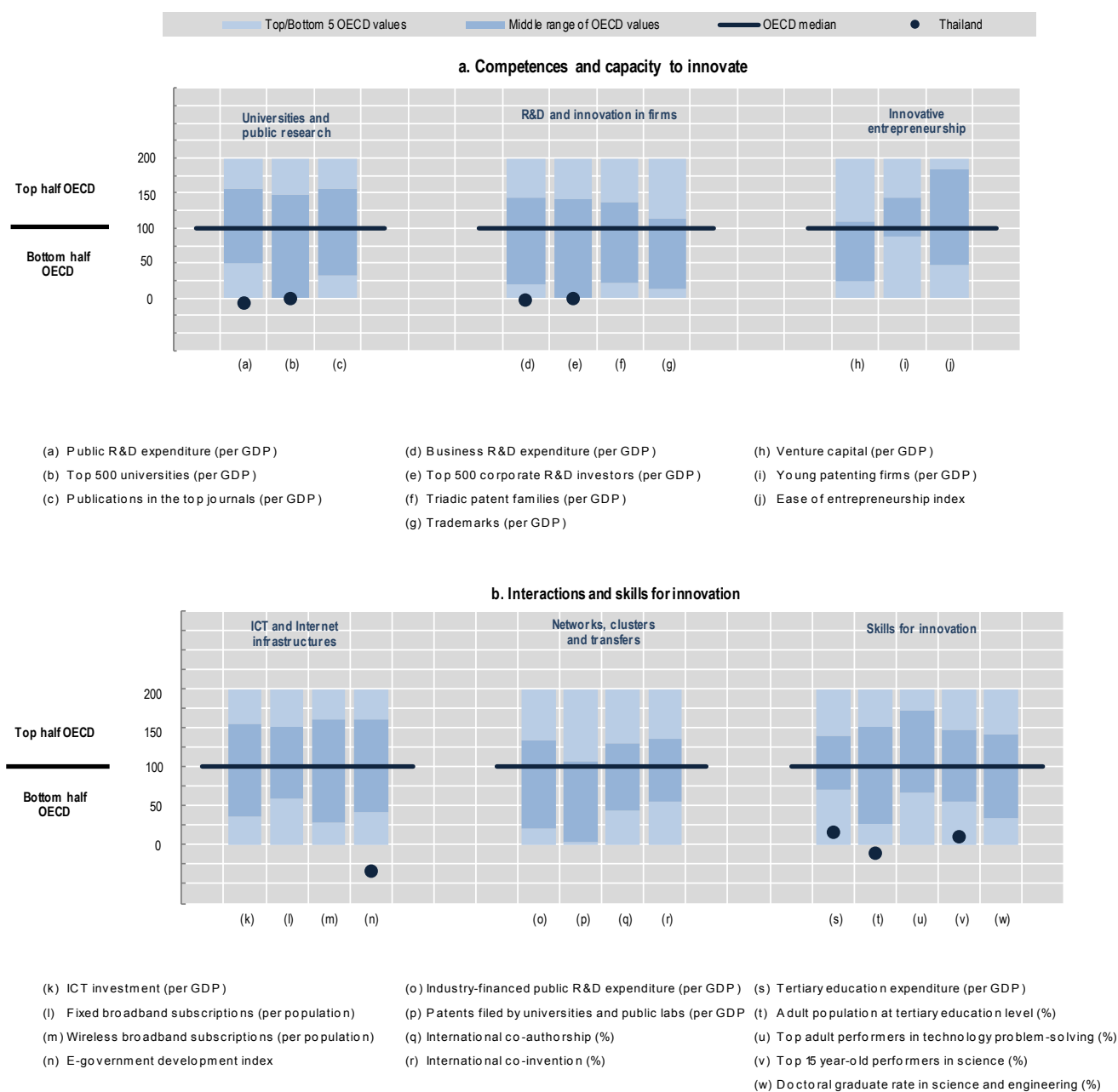
2014 or latest year available Percentage



Benchmarking national STI systems

Figure 4. Science and Innovation in Thailand

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 Thailand STI system

New challenges

Thailand's environmental performance, as measured by GDP per unit of CO₂, is below the OECD median and decreased between 2012 and 2013 (2). To reverse this trend, authorities recently introduced several policies related to climate change mitigation and the transition towards a low carbon society in three main sectors: i) energy (electricity generation and transportation), ii) waste management, and iii) industrial processes. The STI Office acts as the focal point for the Climate Technology Centre and Network (CTCN) under the United Nations Framework Convention on Climate Change (UNFCCC). It supports the articulation and prioritisation of requests and proposals and manages the submission of technical assistance requests to CTCN. It recently analysed and benchmarked the energy consumption and greenhouse gas emissions of iron and steel industries. In terms of energy efficiency, power consumption in production is intended to be reduced by 25% within the next two decades. The share of renewable energies is set to reach 20% of final energy consumption by 2036.

ICT and Internet infrastructures

An array of programmes has been established to promote ICT use in urban and rural areas, though barriers to further expansion remain to be addressed. These include inadequate ICT use, the lack of a proper regulatory framework for Internet infrastructure and services, using ICT to improve the efficiency of trade administration, private investment in the sector, computer literacy and advanced skills.

Technology transfer and commercialisation

While linkages between research and industry have developed as illustrated by the rise in the share of private R&D funding in PRIs and universities, Thailand continues to lack sufficient qualified human resources in technology transfer and commercialisation of research, both in terms of quality and quantity. Therefore, the Alliance for Innovation Managers (AIM) was launched in 2015 to strengthen the exchange between technology professionals from private and public sectors with a special focus on science park personnel and incubators. The Research and Innovation Exploitation Act, being proposed to the Cabinet, aims to encourage the commercialisation of public research by reforming patent and trademark laws. The Act allows an inventor whose research was publically funded to choose to pursue ownership of an invention in preference to the government, if technology transfer capabilities can be demonstrated.

Clusters and regional policies

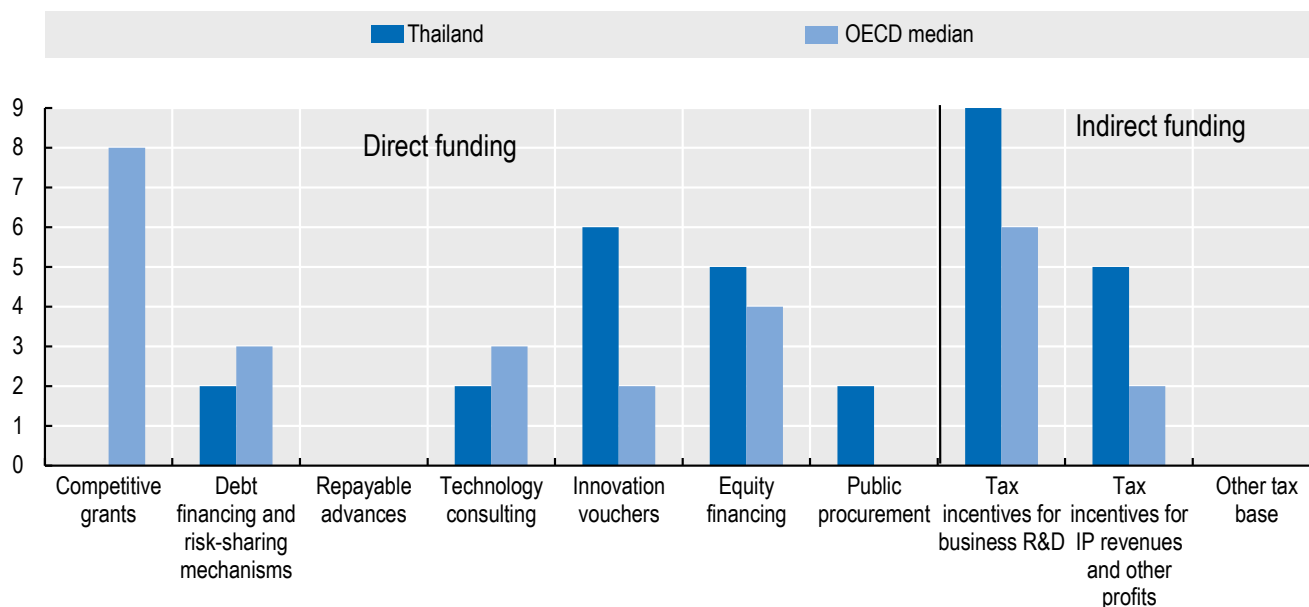
Clusters are crucial for linking manufacturers, suppliers, and supporting industries with academic institutions and public research institutions (PRIs). The government in conjunction with the Board of Investment inaugurated the Special Economic Development Zone Policy in 2015 to develop two types of clusters: Super Clusters include advanced technology and industry networks, such as automotive, electronics, telecommunication, petrochemicals, food and medical industries. Other targeted clusters englobe agro-processing, and textile sectors. This initiative is supported by government agencies in terms of human resource incentives, infrastructure development and logistic systems, tax incentives, financial support, and amendments of rules and regulations to facilitate investment.



National STI policy mix

Figure 5. Most relevant policy instruments of funding of business R&D, 2016

Country self-assessment, index (9 = high and increasing relevance, to 0 = not used)



Note: Note: Policy information comes from country responses to the EC/OECD STI Policy Survey 2016 and 2014. Thailand's responses are available in the EC/OECD STI Policy Database, edition 2016 at http://qdd.oecd.org/DATA/STIPSurvey/THA...STIO_2016.

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

StatLink <http://dx.doi.org/10.1787/888933434108>

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