Science, Technology and Innovation Policies in Thailand: Achievements and Challenges

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Thailand Context

- An upper middle income economy
- ASEAN’s 2nd largest economy
- Total population of 67.2 million (2014)
- GDP per capita (nominal) US$ 5,771 (IMF, 2015 estimate)
- World’s largest natural rubber producer and exporter (WTO, 2013)
- World’s largest exporter of cassava products (FAO, 2013)
- World’s 2nd largest rice exporter (WTO, 2013)
- World’s 2nd largest sugar exporter (WTO, 2013)
- World’s 2nd largest hard-disk drive exporter
- Automotive manufacturing hub of Southeast Asia
Our STI Context

- Agriculture, Food, Healthcare and Life Sciences
- Competitive business sectors, Manufacturing bases
- Opportunities in ASEAN

Strengths & Opportunities

- Commercialization of research outputs
- Linkage of mega projects investment to STI & local industry development
- STI budgeting system
- Next generation knowledge workers
- Innovation for future competitiveness

Weaknesses & Challenges
The Values of STIP Review

• Critical evaluation of our STI system from external perspectives

• Learn from international best practices and failures

• Stimulate discussions and raise awareness on the role of STI in national economic and social development
Government Policy on STI
(12 September 2014)

1. **Reform STI administration system** to increase effectiveness of public-private linkage and partnership. **Increase R&D expenditures** to 1% of GDP with private/public sector ratio = 70:30*

2. Accelerate support for **STI manpower development** through STEM education, work-integrated learning, talent mobility, technological assistance to SMEs

3. **Reform incentive systems**, regulations and laws to enable commercialization of R&D and IP

4. Use public mega investment projects and government **procurement** to stimulate innovation in strategic areas, e.g., rail system and water management.

5. **Develop STI infrastructure & services** to effectively support technology and R&D commercialization

*70:30 by 2021; 60:40 by 2016*
Mapping of STIP Review Recommendations & Government Policy
<table>
<thead>
<tr>
<th>Thai Government Policy on STI</th>
<th>STIP Review Recommendations: 9 Strategic Thrusts for Change</th>
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</thead>
</table>
| 1. Reform STI administration system to increase effectiveness of public-private linkage and partnership. Increase R&D expenditures to 1% of GDP with private/public sector ratio = 70:30 | 1. Move leaders and institutions out of their comfort zone  
2. Mobilize for common goals and aspirations  
3. Balance social, environment and economic objectives  
4. Strengthen STI governance and management |
| 2. Accelerate support for STI manpower development through STEM education, work-integrated learning, talent mobility, technological assistance to SMEs | 6. Link innovation actors  
8. Expand international connection |
| 3. Reform incentive systems, regulations and laws to enable commercialization of R&D and IP | 6. Link innovation actors  
7. Support decentralization |
| 4. Use public mega investment projects and public procurement to stimulate innovation in strategic areas, e.g., rail system and water management. | 5. Improve resource management  
9. Take advantage of megaprojects |
| 5. Develop STI infrastructure and improve infrastructural services to effectively support technology and R&D commercialization | 5. Improve resource management  
7. Support decentralization |
1. Move leaders and institutions out of their comfort zone

<table>
<thead>
<tr>
<th>STIP Review Recommendations</th>
<th>Actions</th>
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<tbody>
<tr>
<td>Launch awareness campaign showcasing innovation initiative</td>
<td>- Grand Exhibition “Thai Innovation &amp; Technology for SMEs &amp; Farmers”</td>
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<tr>
<td>Build commitment for STI education and training reform</td>
<td>- Work-integrated learning program</td>
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<td>- Vocational Education Reform</td>
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<tr>
<td>Increase accountability through effective evaluation and conditional budget allocation</td>
<td>- Program-based budgeting system for strategic STI investment programs allowing for multi-year budget allocation (instead of annual allocation) with a new performance-based monitoring and evaluation scheme</td>
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Implemented | Underway | Planning
2. Mobilize for common goals and aspiration

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<th>STIP Review Recommendations</th>
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| Provide training for policymakers and stakeholders | - STI Policy & Management Program (PMP) for Policy Makers and STI Executives  
- Establishment of STI Policy Institute |
| Strengthen STI consultation process | - New STI Law |
| Agree on a common agenda for reform of STI education and training | - Vocational Education Reform  
- STI PMP for Policy Makers and STI Executives |
| Develop a long-term vision for agriculture | - Provincial Chief Science Officer and Chief Science Advisor  
- Strategic STI Initiatives, e.g. Organic Farming, Community-based Water Management Program, Tailor-made Fertilizers |
3. *Balance social, environmental and economic objectives*

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<td>Design STI incentives to benefit disadvantaged groups</td>
<td>- 300% Tax Incentives</td>
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<td>- Crowd funding</td>
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<td>- Industrial Technology Assistance Program for SMEs</td>
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<td>- Innovation Coupon</td>
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<td>- Loan guaranteed for SMEs</td>
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<td>- One-stop service MSTQ and Testing Labs</td>
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<td>- STI Facilitation Center</td>
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<td>- Regional Science Parks</td>
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<td>- Special Innovation Zone</td>
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<td>- Enjoy Science Program with Chevron</td>
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<td>Follow up on actions suggested in Thailand’s climate change TNA reports</td>
<td>- Technology Action Plans for Climate Change Adaptation and Mitigation</td>
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<td></td>
<td>- Set up of National Designated Entity</td>
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<tr>
<td>Develop a strategy for STI in agriculture that focuses on the poor</td>
<td>- Agriculture Strategic Research Program (Rice, Rubber, Cassava, Sugar Cane)</td>
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<td>- Regional Science Parks</td>
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<td>- Special Innovation Zones</td>
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- **Implemented**
- **Underway**
- **Planning**
4. Strengthen STI governance and Management

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<th>STIP Review Recommendations</th>
<th>Actions Taken /Underway/Planning</th>
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<td>Strengthen the role of the National STI Policy Committee</td>
<td>- New STI Law</td>
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</table>
| Separate policy advice from program implementation                                          | - Establish an STI Advisory Committee for the Prime Minister  
  - Move the National STI Policy Office from the Ministry of Science and Technology to the Prime Minister’s Office |
| Rationalize the structures of R&D institutions                                              | - Reliable third party evaluation (e.g., TDRI) |
| Enhance coordination between research, education and industry                              | - Special Innovation Zones  
  - Talent Mobility                                                                          |
| Review educational quality assurance and quality enhancement systems                      | - Education Super Board           |
## 5. Improve resource management

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<td><strong>Prioritize resources: Build a critical mass</strong></td>
<td>- R&amp;D Promotion Package for Electronics and Auto Industries</td>
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</table>
| **Update the mix of financing instruments for supporting innovation** | - 300% Tax Incentives  
- Crowd funding  
- Innovation Coupon  
- NIA Zero Interest Loan  
- Tech Commercialization Fund |
| **Use public procurement to develop technological capabilities of domestic firms** | - Government Procurement Program to Support Local Innovation |
| **Budget allocation processes to be transparent, based on performance** | - Program-based budgeting system for strategic STI investment programs |
| **Strengthen the impact of R&D programs on raising opportunities for and productivity of small-scale farmers** | - Smart Farming Program |

- [Implemented]  
- [Underway]  
- [Planning]
# 6. Link innovation actors

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<td>Expand schemes at the interface between the sources and the demand for knowledge</td>
<td>- Special Innovation Zones</td>
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<tr>
<td>Review incentives for mobility and collaboration</td>
<td>- New Office of Higher Education Commission Regulation</td>
</tr>
</tbody>
</table>
| Promote cooperative education | - PPP Scholarship Program  
- Talent Mobility  
- Work-integrated learning, Career Academy |
| Strengthen business incubation program and support research spin-offs and commercialization | - AIMS Program  
- Thai-BISPA |
| Strengthen formal participation of a wide range of stakeholders in program design, implementation and evaluation | - Regional Science Parks  
- MoU with Foreign countries |
| Strengthen linkages in agriculture | - Agriculture Research & Development Program  
- Thailand Agriculture Mobile Information System  
- Provincial Chief Science Officer and Chief Science Advisor |

[Implemented] [Underway] [Planning]
## 7. Support decentralization

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| Expand STI Infrastructure and networks in the region | - Regional Science Parks Network  
- Special Innovation Zones |
| Develop STI Policymaking capacities at the regional level | - STI Policy& Management Program (PMP) for Policy Makers and STI Executives |
| Expand school models that promote innovation and local development | - Work-integrated learning, Career Academy |
| Reinforce agriculture extension services | - Organic Farming Program |

- **Implemented**  
- **Underway**  
- **Planning**
8. Expand international connections

<table>
<thead>
<tr>
<th>UNCTAD Recommendations:</th>
<th>Actions</th>
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<tbody>
<tr>
<td>Build business linkages between TNCs and local firms</td>
<td>- R&amp;D Centers Promotion Program</td>
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</table>
| Engage international experts on STI policies and program design and evaluation | - Science Diplomacy – Thailand Global Partnership Program  
- International Research Network |
| Maximize international collaboration and mobility | - Science Diplomacy – Thailand Global Partnership Program  
- ASEAN Talent Mobility Program |

- Illustrated: Implemented  
- Underway  
- Planning
### 9. Take advantage of megaprojects

<table>
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<tr>
<th>UNCTAD Recommendations:</th>
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<tr>
<td>Ensure that HRD and the generation of technology spillovers are an integral part of the railway project</td>
<td>- Rail Academy</td>
</tr>
<tr>
<td>Make technology transfer an explicit objective of public procurement</td>
<td>- Government Procurement Program to Support Local Innovation</td>
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- [ ] Implemented
- [ ] Underway
- [ ] Planning
Highlight of Actions
New STI Law to Enhance STI Governance and Management

- Establish Science Cabinet
- Establish High-level STI Advisory Committee
- Move the National STI Policy Office from the Ministry of Science and Technology to the Prime Minister’s Office
- Set up a **Program-based Budgeting System** for strategic STI investment programs allowing for multi-year budget allocation (instead of annual allocation) with a new performance-based monitoring and evaluation scheme

Source: National Science Technology and Innovation Policy Office, Thailand
New IP Commercialization Law allowing transfer of IP ownership from funding agencies to grantees

Source: National Science Technology and Innovation Policy Office, Thailand
New Law allowing Government Agencies to set up Technology Commercialization Fund

This Law will allow government agencies to set up tech commercialization funds and invest in other funds.

Source: Satit Charnchaokul, 2014
300% Tax Exemption for R&D and Innovation Expenditures

- Enhancing Tax deduction for research, development and innovation expenditures from 200% to 300%
- Expanding the scope of expenditure, including Innovation expenditure

Source: National Science and Technology Development Agency (NSTDA), Thailand
Tax Exemption for Private Equity Fund and Crowdfunding

**Phase**
- Early stage
- Expansion stage
- Later stage

**Element**
- Seed
- Start-up
- Expansion
- Bridge
- MBO/MBI

**Sources of Financing**
- Angel Investor
- Venture Capital
- Crowdfunding (Donation & Reward)
- Equity Crowdfunding
- Equity/Debt Capital

**Profit Development**

Crowdfunding to close financing gap

Source: Dr. Vorapol Sokatiyanurak
Development of Special Innovation Zones (SIZ)

Special incentives for SIZ

- 10-Year CIT exemption without cap.
- Expert’s PIT waive for the first 5 years and after 5 years 10% flat rate

R&D Centers Promotion Program

National Innovation Package
Pre-R&D Lab Package
R&D Cluster Package
R&D Joint Lab Package

OBM
Tier 1
Tier 2,3

Financial Incentives
Technology
Human Resources (Expert, Researcher, Engineer, Technician)

Source: National Science Technology and Innovation Policy Office, Thailand
Scaling up of Industrial Technology Assistance Program for SMEs

- Investigate technological problem
- Matching supply of & demand for technology
- Technological consultancy service Joint R&D
- Funding subsidies 50:50

S&T Acquisition Program (Local & Overseas)  
Training/Workshop  
Attach local expert to overseas expert, help technology transfer to firms and universities

Number of projects

- 2,820 technology Development& innovation projects
- 10 regional nodes linking with local universities and science parks with 50 project managers
- Total investment 55.4 Million USD

Source: ITAP, NSTDA
Government Procurement Program to Support Local Innovation

Account of Government Purchasing Demand

Registration of Innovative Products
STI & Mega Projects

Rail System

Water Management

National Space Program
To facilitate the mobility of researchers in governmental agencies and higher education institutions to the industry.

**Talent Mobility Program**

Industry reimburses university*

* SMEs are exempt from reimbursement through MOST subsidy

**Industry**

**Government**

**University/Research Institution**

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**Talent Mobility Committee**

- Project certification
- Promotion/support

**STI Office coordinating roles:**

- Demand-Supply database keeping
- Pushing for enabling regulations
- Matching events

**Regulation reforms to encourage mobility**

- Continuing tenure
- Academic promotion

The Cabinet approved talent mobility to be a key performance indicator of universities and research institutions.
Education, Learning & Workforce

STEM Education and Workforce Development

Work-integrated Learning
- School in the Factory
- Apprenticeship
- Cooperative Education

Science-based Technology Schools

Science-Based Technology Schools focusing on different sectors

Suranaree Technical College, (Science Based Industrial Technology)

Singburi Vocational College, (Food Technology)

Phang-nga Technical College, (Innovation in Tourism)

Lamphun College of Agriculture and Technology, (Agricultural Biotechnology)

Science Based Technology Vocational College (Chonburi), (Science Based Industrial Technology)
STI Policy & Management Program (PMP) for Policy Makers and Executives

A Training Program for policy makers and executives to build a network of STI policy makers and innovation practitioners

Coverage: central administration, local administration, private sector, community leaders

Source: National Science Technology and Innovation Policy Office, Thailand
Astronomical Parks in 77 Provinces & Science Museums
Science Diplomacy: Thailand Science, Technology and Innovation Global Partnership (TGP) Program

HRD & Talent Mobility

Strategic R&D Collaboration

SME & Innovation Partnership

Thematic Tracks: Food & Agriculture, Health & Life Sciences, Energy, Climate Change, ICT & Digital Economy, Rail & Logistics
STI Facilitation Platform for Industry

- Talent mobility
- WiL
- Professional Training
- Product process development
  - MSTQ
- Consultation for
  - Tax 300%
  - BOI
- IP acquisition
- IP application / registration
- Talent mobility
- WiL
- Professional Training
- Product process development
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  - BOI
- IP acquisition
- IP application / registration

HRD Services

U-I-G Linkage Services

Incentive One-Stop Services

Technology Transfer & Acquisition

IP Management Services

Knowledge Exchange for SMEs

- Facilitate S&T related services to industry
- Services cover RDI value chain from Lab to Commercialization
- One-stop service for RDI developer
- 6 Platforms serve all industries needs
- Tailor made Service for each company
Thailand NDE acts as a Climate Technology Center and Network (CTCN) focal point and manages the submission of requests for technical assistance.

Source: National Science Technology and Innovation Policy Office, Thailand
The Network of Ban Limthong, Buri Ram Province

With Sustainable Water Management in Flood and Drought Areas

Before: (More than 40 years)
No water, No management, No agriculture, High debt, Villagers leaving town

H.M. the King’s Initiative
- Science and Technology (Maps, GPS receivers, etc.) for data collection, area measurement, systematic thinking
- Trap flashflood by canals
- Ponds network: link ponds by sub-canals
- Canal street
- New Theory Agriculture

Success 10 Years of Water Management System
- Enough water all year, Better living Standard
- 2.5 times higher income, Released debt
- Abundant agriculture
- Local people came back
- Expand working network from 1 village (3,700 Rai) to 35 villages, and conceptual network covered 3 sub-districts (71,566 Rai)

After:

Enough water year-long by creating small water retention units and sub-canals as water linkage throughout the area

Flashflood direction

Canals to trap rain and flashflood

Success 10 Years of Water Management System

Farm ponds

Vetiver grass

Ponds

Vetiver grass

Sub-canals
STI for Organic Rice Cultivation

- Aim to boost organic rice cultivation
- Introduce technologies that help farmers maintain their organic standards or meet the standards to acquire the certification.
- Promote soil improvement/organic matter amendment (fresh rice straw, green manure)
- Thailand Agriculture Mobile Information System (TAMIS) was introduced
- More than 4500 farmers have been trained so far
Blueprint for Thailand STI Reform

Transformation to an Innovation-driven Economy toward a high income country by 2026

- Pool of Talents/Innovators
- Innovation-driven Enterprises
- Mega Projects & Government Procurement
- Strategic industries for the future
- World Class STI Infrastructure

Key Mechanisms/Drivers

- Public-Private Partnership
- MOST, MOI, MOC, MOF, MOAC, MOE
- Financial & Tax Incentives
- Reform Laws & Regulation
- International Cooperation

Source: National Science Technology and Innovation Policy Office, Thailand
Thank you for your attention.

Ministry of Science and Technology, Thailand
http://www.most.go.th