Who Should Control Technology Transfer for Trade and Economic Growth?:
Global Economic Integration and Industrial Policy in Emerging Asia

The impact of Thailand Industry 4.0 policy on Technology Transfer

ASSOC. PROF. DR. CHAWALIT JEENANUNTA

SIRINDHORN INTERNATIONAL INSTITUTE OF TECHNOLOGY
THAMMASAT UNIVERSITY
AGENDA

1. Overview of Thai Economy
2. Overview of Thai Automotive Industry
3. Results of the policy
THAILAND

50th Largest country in the world in

LAND AREA

513,115 (KM²)

Capital: BANGKOK

POPULATION

66 Million

32.4 Million

33.7 Million

2018 GDP

3.73% GDP Growth Rate

MOBILE PHONE PENTRATION RATE

82% of POPULATION

9hrs - internet

3hrs - Social Media

INDUSTRY: Agriculture & Manufacture

RELIGION: Buddhism

LANGUAGE: THAI

GOVERNMENT: DEMOCRACY

CURRENCY: Baht (THB)
Evolution of Thai Economies

Thailand GDP

Thailand 1.0  Thailand 2.0  Thailand 3.0

1960  1987

Agriculture  Light Industries  Heavy Industries

Thailand 4.0

Value-based Economy

R&D expenditure as a percent of GDP = 0.78%
In 2018

In 2018

R&D Personal/1000 = 1.7

2017 - Now
Industry Movement to Industry 4.0 Plan

Robotics
- Center of Excellence (CoE) (Industrial Prototype/ Technology Transfers/ Certified Technology/ HRD).
- Promote System Integrators (SI).
- Corporate Tax and Expenses Reduction for 5 years.
- Tax exemption for prototype import and R&D related activities.
- Promote the investment in robotics and automation in the industry.

The Next-Generation Automotive
- Establish electric vehicles (EVs) production hub by collaborating with OEMs.
- Promote the investment in EV production in Thailand.
- Surface Integration Design & Prototyping.
- Catalytic Manufacturing.
- Transmission System Parts.
- Build 100 charging stations.
- Center of Tire and Auto Parts Testing
- Automotive Human Development

Source: New engine of growth, 1 Feb 2017, Office of Industrial Economics
**Master Plan 2017-2021**

**Thailand Automotive Industry Development Master Plan 2017-2021 and Vision 2027**

"Thailand is a Global Green Automotive R&D base which create high value added base economy"

<table>
<thead>
<tr>
<th>Technology R&amp;D Innovation</th>
<th>ICE (Gasoline, Diesel)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Global Standard</td>
</tr>
<tr>
<td></td>
<td>• Light weight</td>
</tr>
<tr>
<td></td>
<td>• Emission Reduction (CO2)</td>
</tr>
<tr>
<td></td>
<td>• Engine Efficiency</td>
</tr>
<tr>
<td></td>
<td>• Productivity</td>
</tr>
<tr>
<td>Next Generation Vehicles</td>
<td>• Engine &amp; Motor Efficiency</td>
</tr>
<tr>
<td></td>
<td>• New/Advance Technology</td>
</tr>
<tr>
<td></td>
<td>• Waste &amp; Green</td>
</tr>
<tr>
<td></td>
<td>• Software Application</td>
</tr>
<tr>
<td></td>
<td>• Battery Pack, Charging Station</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HRD 4.0</th>
<th>High skill enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Knowledge Creation and Diffusion Society</td>
</tr>
<tr>
<td></td>
<td>R&amp;D, Innovation Capability</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic</th>
<th>Education for new and advance technology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Education for new management system for Industry 4.0</td>
</tr>
<tr>
<td></td>
<td>Academic Alliance</td>
</tr>
</tbody>
</table>

**Institution for Policy and Development Driven Systematic**

- Global Linkage Management System with Digital System
- Global Business Service Solution

**Government Policy & Support**

- Technology Transformation
- R&D, Design Capability
- Automation
- SMEs Start up/ Spring up

**Global Partnership & Linkage**

- IT intelligence
- Big data management
- Financial

**Market**

<table>
<thead>
<tr>
<th>Suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics/Management Center</td>
</tr>
</tbody>
</table>

**Source:** Rachanida Nitipathanapirak, Automotive Industry Situation and Master Plan, Thailand Automotive Institute
Self-Assessment Survey of Thai Manufacturing

Source: F.T.I. self-assessment obtained from 145 entrepreneurs 2017
## BOI Policy Incentive for Technology Transfer

### Merit-Based Incentives - Competitiveness Enhancement Measures (Optional)

<table>
<thead>
<tr>
<th>Types of eligible investments/expenditures</th>
<th>Additional Cap (% investment capital/expenditure incurred)</th>
<th>% of qualified investments/expenditures to combined revenue for the first three years</th>
<th>Additional CIT exemption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. R&amp;D: In-house, outsourced in Thailand or joint R&amp;D with overseas institutes</td>
<td>New 300%</td>
<td>1% or ≥ 200 MB.</td>
<td>1 year</td>
</tr>
<tr>
<td>2. Donations to technology and human resource development funds, educational institutes, specialized training centers, R&amp;D institutes or governmental agencies in the S&amp;T field</td>
<td>100%</td>
<td>2% or ≥ 400 MB.</td>
<td>2 years</td>
</tr>
<tr>
<td>3. IP acquisition/licensing fees for commercializing technology developed in Thailand</td>
<td>200%</td>
<td>3% or ≥ 600 MB.</td>
<td>3 years</td>
</tr>
<tr>
<td>4. Advanced technology training, including digital training such as IoT</td>
<td>200%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Development of local suppliers with at least 51% Thai shareholding in advanced technology training and technical assistance</td>
<td>200%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Product &amp; packaging design: In-house or outsourced in Thailand</td>
<td>200%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Investment Promotion of Advanced Technology and Automatic Control System

Supply Side

1. Design
   Solution Conceptual Design, Engineering Design & System Integration Design

2. Control System Design

3. Procurement / Making Part

4. Assembly

5. Installation & Commissioning

Exemption of Corporate Income Tax
- 8 years (No cap)
- 8 years
- 5 years

Machine Manufacture/ Automation System with Engineering Design
(Automation system Integration Design and Control System Design)

Engineering Design Service
Exemption of Corporate Income Tax
- 8 years (No cap)

Machine Manufacture/ Automation System with Engineering Design (Control System Design)

Robot Assembly or Automation System or Robot Parts
AGENDA

1. Overview of Thai Economy
2. Overview of Thai Automotive Industry
3. Result of the policy
Overview of Thai Automotive Industry

1.19 Million Units were exports value of 189.9 million USD.

24 Automotive Producers
- 17 Vehicle Producers
- 7 Motorcycle Producers
- 2,000 Automotive parts Producers

12th largest commercial vehicle producer in the world in 2017

3 Million Units per year
- To manufacture 3,500,000 units in 2020

2% Contribute to country’s GDP

Source: Thailand Automotive Institute 2017
Market Share in Thailand – 2017

- **Toyota**: 27.50% (239,551 units)
- **Mitsubishi**: 8.00% (69,737 units)
- **Isuzu**: 6.90% (59,709 units)
- **Honda**: 18.40% (160,550 units)
- **Nissan**: 24.60% (214,329 units)
- **Others**: 14.70% (127,768 units)

Source: Toyota Motor Thailand Co., Ltd. (TMT)
Sectoral Innovation System in Automotive Industry

**Government Organization**

**Private-Sector Industrial Association & Technology Promotion Agency**

**Supplier**
- Raw materials
- Tools
- Parts
- Etc.

**Automotive Manufacturers**
- Automotive Parts Makers
- Training / Knowledge Experience by Automotive Manufacturers
- Funding / High qualified researchers / Advanced knowledge

**Market**
- Domestic
- Export
- OEM

**Universities**

**Research Institute**

Source: Adopted from Intarakumnerd and Gerdsri (2014).
AGENDA

1. Overview of Thai Economy
2. Overview of Thai Automotive Industry
3. Result of the policy
## Future of Thai Automotive Industry

### Key Highlight

**EV HUB**

30.9M (USD)

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>UN R117</td>
</tr>
<tr>
<td>2019</td>
<td>EV Battery Testing</td>
</tr>
<tr>
<td>2020-2024</td>
<td>Proving Ground</td>
</tr>
<tr>
<td>2036</td>
<td>EV HUB</td>
</tr>
</tbody>
</table>

**EV HUB**

Chachoengsao Province

1,976,000 m²

**Road Map**

Next Generation Automotive Research Center

Source: THANSETTAKIJ.com
Current Investment in Electric Vehicle

World 10M units
- 0.9M units in ASEAN
- 0.6M units in Thailand

Electric Vehicle

| 25 Million | 1.2 Million |
| EV cars in the world in 2035 | EV Cars in Thailand in 2036 |
| 30% Market Share | 7% Market Share |

Source: BOI

2018
- 12M USD
- 70K units
- Capacities

2019
- 61M USD
- 70K units
- Capacities

2018-2019
- 115M USD
- BEV: Battery Electric Vehicle

2018-2020
- Capacities

BEV
PHEV: Plug-in Hybrid Electric Vehicles

Source: BOI
R&D and Technology Transfer

BWM Group Thailand collaborate with Center for Low Carbon Vehicles, KMUTT for researching in EV car sharing behavior.

14 December 2017

http://aeitfthai.org/pr-news/2857.html
R&D and Technology Transfer

BWM Group Thailand donated BMW 330e M Sport (plug-in hybrid) to Smart Mobility Research Center, Chulalongkorn University.

19 April 2018

https://www.thairath.co.th/content/1257991
Engineering Design Training

Lean Automation System Integrators (LASIs)
DENSO + Department of Industrial Promotion (DIP) + METI + JETRO
5 Japanese firms + 6 Thai University + System Integrators
Some observations

• Thai manufacturers are more passive on industry 4.0 due to the engineering capability

• Thai government uses the policy to encourage specific knowledge for Technology Transfer