Automation and Robotics in Thailand
October 2019 UPDATE

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EASTERN ECONOMIC CORRIDOR
THE BEGINNING OF A GREAT LEAP TOWARDS THAILAND 4.0

THAILAND 4.0
SMART TECHNOLOGY
SMART PEOPLE
Match To The Real Demand
Leave No One Behind
TAking Thailand 4.0 into action

**THAILAND 4.0 POLICY**

New economic model aimed at developing & transforming Thailand into a first world country with improved security, prosperity & sustainability under National Strategy.

**EEC ACT**

Putting Thailand 4.0 into action via area-based development

**PILLARS OF EEC**

- Infrastructure
- Incentives
- Facilities

**INDUSTRIES IN TARGET**

- Integrated planning & management in infrastructure investment projects
- Special incentive promotion package
- Amending or suspending laws & regulations to facilitate foreign & domestic investment such as Ease of Doing Business & One-Stop Service

**INSTITUTIONS FOR EEC**

- EEC Policy Committee (chaired by PM)
  - Set policies & approve area development plans
  - Designate promotional zones & privileges
- EEC Office (headed by EEC Secretary General: 4 years term)
  - Propose plan & policy for area development
  - Provide OSS
  - Approve license to operate factory or business

**LOCATION OF EEC**

- Three provinces chosen to pilot the EEC: Rayong, Chonburi, & Chachoengsao.
- Special Economic Zones in EEC

*Source: Draft EEC Act, Ministry of Industry (MOI), TDRI, Krungsri Research*
EEC MASTER PLAN 2017-2021

- Infrastructure Projects & Aviation Industry
- New S-Curve Industry
- MICE / Medical Tourism
- Agricultural & Natural Resource
- Financial Center
- HRD / Education
- 3 New Cities
- Local Communities Communication
EASTERN ECONOMIC CORRIDOR: FOCUSED PROJECTS AND INVESTMENT PLAN IN 5 YEARS

**Infrastructure**
- Aerotropolis: U-tapao International Airport
- High Speed Train Linking 3 Airports
- Laem Chabang Port Phase 3
- Map ta Phut Port Phase 3
- Sattahip Commercial Port
- Dual Tracks Rail linking 3 Seaports
- Highways & Motorways

**Targeted Industries**
- Next Generation Automotives (EV/AV)
- Aviation/Robotics/Smart Electronics
- Advanced Petrochemical & Bioeconomy
- Medical Hub

**Tourism**

**Technology & Innovation**
- EEC of Innovation (EEC)
- Digital Park Thailand (EECd)
- Human Resource Development & Education

**New Cities**
- Chachoengsao
- Pattaya
- Rayong

**Others**
- Global Business Hub
- Free Trade Zone
- Public Utilities
MAJOR INFRASTRUCTURE PROJECTS

U-TAPHAO AIRPORT AND MRO [310,383 MB]
- Increase Cap. of Airport from 3 to 15,30,60 M. passengers/year
- MRO / Aviation Industry
- Eastern Airport city

MAPTAPHUT PORT PHASE 3 [10,154 MB]
- Increase capacity of Port
  +Liquid & Gas 20 MillionTon/Yr

HIGH SPEED TRAIN (HSR) [215,100 MB]
- Link 3 Airports
- Link Bangkok and EEC area

SATTAHIP COMMERCIAL PORT
- Ferry and Cruise Ports
- Container and military port
- Multimodal Transport

LEAMCHABANG PORT PHASE 3 [155,834 MB]
- + Container 7 MillionTEU/Yr
- + Car 1 MillionTEU/Yr
- Increase transporting container by Rail 7% to 30%

DOUBLE-TRACK RAIL [77,276MB]
- Link 3 Sea Ports
- Link with CLMV
- Seamless Operation
AEROTROPOLIS
U-TAPAO AIRPORT
## High Speed Train Linking 3 Airports

<table>
<thead>
<tr>
<th>Route</th>
<th>Distance</th>
<th>Speed</th>
<th>Time</th>
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<tr>
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<td></td>
<td>250 km/hr max</td>
<td>115 min</td>
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<tr>
<td>Don Mueang – U-Tapao</td>
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<td>Don Mueang – Rayong</td>
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<td>250 km/hr max</td>
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ENHANCE 5 EXISTING INDUSTRIES
ADD 5 NEW INDUSTRIES

FIRST S-CURVE

- AUTOMOBILE FOR THE FUTURE
- SMART ELECTRONICS
- AGRICULTURE & BIO TECHNOLOGY
- FOOD FOR THE FUTURE
- WORLD CLASS TOURISM

NEW S-CURVE

- ROBOTICS & AUTOMATIONS
- AVIATION & LOGISTICS
- BIO ENERGY & BIO CHEMICALS
- MEDICAL AND HEALTH INDUSTRY
- DIGITAL INDUSTRY
CONTACT INFORMATION

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http://www.eeco.or.th
“Industry 1.0 was the invention of mechanical help,

Industry 2.0 was mass production, pioneered by Henry Ford,

Industry 3.0 brought electronics and control systems to the shop floor

Industry 4.0 is peer-to-peer communication between products, systems and machines.” IoT, BigData and Cloud => Smart Manufacturing

Stefan Ferber, Director for business development of the IoT at Bosch Software Innovations
Aida (using Aida motor)
Small press 80T – 650T complete (Whole Panel provided by Rockwell)

Official article in “Metal Forming Magazine” highlighting at FabTech Nov, 2019 100% standardization on Rockwell

~ In addition to the press lines, other Aida servo technology on display included its exclusive Allen-Bradley based servo press control for machines in capacities from 315 to 3500 tons. At Aida’s booth, the control demonstrated several servo press stroke-motion profiles in real-time on a virtual press.

Aida-America: www.aida-global.com
SCALABLE ANALYTICS
VARYING DEGREES OF HUMAN INTERACTION.

DATA
SYSTEM
HUMAN INPUT
DESCRIPTIVE
What happened?
DIAGNOSTIC
Why did it happen?
PREDICTIVE
What will happen?
PRESCRIPTIVE
What should I do?

Source: Gartner + Rockwell Automation
Current Situation of Automation and Robotics

Global Expenses of Automation and Robotics

2014
500 Billions $US

2020
1.4 Trillions $US

15%
Per year

Asia
Relatively ranked at the Top: 40%

Thailand imports
200 Billions Baht/year

Big Players

Industrial Robots

ABB
Yaskawa
Fanuc
Kuka

Service/Medical Robots

Dyson
Robotnik
ไทยมี GAP กับประเทศไทยผู้นำมากที่สุด คือ ด้าน Future Prospect โดยเฉพาะด้านขวัญที่ได้มา จากผลการสำรวจ สำนักงานที่ไทยมี GAP กับประเทศผู้นำน้อยที่สุด คือ ด้าน Sustainability

ส่วน GAP ระหว่างไทยกับประเทศไทยผู้นำจะคำตอบที่สำคัญพบว่าไทยยังคงทำคะแนนได้น้อยกว่าไปทุก ๆ ด้าน โดยที่ด้านที่ไทยมี GAP กับคู่แข่งมากที่สุด คือ ด้าน Business Environment & Strategy สำนักงานที่ไทยมี GAP กับประเทศไทยผู้นำน้อยที่สุด คือ ด้าน Sustainability
Import and Export: Automatic Parts/Machines

**Import** 266,000 MB annually
Continuously increases

Import Value of industry overview

The three highest demand
1) Conveyor system
2) CNCs, Robots, ASRS
3) High Precision Machines

**Export** 134,000 MB annually
Slightly increases

Export Value of industry overview: Simple Packaging Machines

Thailand is 132,000 MB deficit has balance of trade. When combining with plans of increasing industrial productivity, the figure becomes **200,000 MB annually**.
Marginal usage of robotics and automation in manufacturing industry in Thailand. There is a high opportunity (85%) to transform

85% of industry have an opportunity to adopt robot & automation to improve process

(Group 1,2,3)

Source: from the survey on 94 entrepreneurs, Strategy for improving competency of Thai industry with manufacturing automation system (2015)
50% of industry in Thailand is ready to adapt their manufacturing process to use robotics/automation within 1-3 years.

- Majority of **Large** companies are ready to change in 1-3 years.
- Majority of **Medium** companies are ready to change in 3-5 years.
- Majority of **Small** companies are ready to change in later than 5 years.

Source: from the survey on 94 entrepreneurs, Strategy for improving competency of Thai industry with manufacturing automation system (2015)
Supply Chain in Automation and Robotics

Parts Manufacturers
- Robot Structure, metal and plastic parts
- Controller and actuators
- Sensors

Software Developers
- PLC
- Embedded Software
- Cognitive and monitoring modules

Integrators/Builders
Installing of robotics system and automation plant

Robots
- Service Robots
- Industrial Robots

Automation

30%-40%

Repairs and Maintenance

20%
1) Demand Driven (Incentive)
Create the demand of using robots and automation (50% DTD)

2) Enhance Competitiveness
- Reduce cost of local manufacturers
- Import tax restructuring: reduce import tax of spare parts to the same level as products (0%)

3) Technology Capability Enhancement Center of Excellence (CORE)
Technology transfer mechanism 1. Certify technology 2. HR Development 3. Consultant/Technology Transfer 4 Industrial prototypes

Outcome
- Industry in Thailand increase productivity
- Local robot manufacturers are able to be a technology owners and brand owners
- Local investment resulting in business expansion
Measure for Development of Robotics Cluster - Summary

A. Manufacturing Industry / Service Buisness

1. Need automation
   - Consultant

2. Design / Build / System Integrate
3. Design / Build / System Integrate
4. System installation

B. System Integrators (SI) in robotics & automation

- S1 Database SI / Suppliers / Innovation List / Invention / DOPA / TGI / NSTDA
- S2 Consultant and Knowledge TGI / FIBO / Academic institutes
- S3 Industrial Prototyping TGI / NSTDA / FIBO / Academic institutes

- I1 100% DTD if invested automation
- I2 Deduct expense 200% Training
- I3 Credit line for buying automation
- I4 Fund / Project supported by government
- I5 Matching Fund
- I6 Soft Loan
- I7 Reduce Tax for spare parts
- I8 Deduct 200% Training expense Tax for spare parts
- I9 8 years Tax exemption / 5 years Tax 50% reduction

C. Automation Machinery / Service

D. Componenet / Software Supplier

E. FDI / JV

E. FDI / JV
Mitsubishi – Burapa University in Industry 4.0
e-F@ctory promotion plan to government

**Smart Factory Learning Center**
- Improve Users
- Human Improvement

**Training Center**
- TTT Program
- Up/Reskilling <FA Skills PA>

**Customized Course**
- Thai-German Inst.
- MELFT + Alliances
- TARA/CORE <SI Warrior>

**Co-Working Space**
- R&D, Prototype
- Join

**Up/Reskilling <Related Skills>**
- Rayong Tech.
- E-Tech
- Entech
- RMTEK
- DSD – Chon-Rayong
- ARADA
- MARA
- Chonburi Tech.
- Kasetsart Sri.
- Thai German Inst.
- JTFC
- TPA

**1st VEC/U in EEC (All related)**
- Targeted 37,000 P. (5 years)
- FY 2019 2,400 p.

**National Standard Certification (Factory Automation)**

**STARTUP**
- DATA CENTER

**Confidential**
e-F@ctory promotion plan to specific industry

Smart Factory Training

EEC Learning Center

Model Line @ Site

Co-Working Location Solution Team

Up/Reskilling (Training) EEC & Networks

Standard Test/Certification

Confidential
Investment Promotion in Robot and Automation Industry

Support Supply Side

Robot & Automation

Encourage Demand Side

BOI promotes both robot & automation suppliers and users.

Group A
Types of business exempted from income tax

Group B
Types of business not exempted from income tax
## Investment Promotion in Robot and Automation Supply Side Side

### Supply Side

| Types of Promoted Business                                                                 | Exempted from income tax *
|-------------------------------------------------------------------------------------------|-------------------------------
| Engineering design                                                                        | 8 years (without financial limit) |
| Manufacture machinery/automation equipment with engineering design (with designing and controlling processes by computer) | 8 years                      |
| Manufacture machinery/automation equipment with engineering design (with Automation System Integration) + design the controlling system by computer) | 8 years (without financial limit) |
| Robot or Automation Equipment or Parts Assembling                                          | 5 years                       |

* In addition to the income tax, income, machinery and raw material import duty will be exempted for export, including rights and benefits not related to tax, such as possession of land, visa and work permit.
Manufacture machinery/automation equipment with engineering design (with Automation System Integration Design and Control System Design)

Exempted from income tax
8 year (without financial limit)

Assemble robots and automation equipment or parts

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

Exempted from income tax
8 years

5 years
Allies

9 Agencies
1. Thai-German Institute
2. Electrical and Electronics Institute
3. Institute of Field roBOtics (FIBO)
4. Chulalongkorn University
5. Mahidol University
6. King Mongkut's University of Technology North Bangkok
7. Khon Kaen University
8. Chiang Mai University
9. King Mongkut's Institute of Technology Ladkrabang

Contact Information

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E-mail: core@/cgi.mail.go.th
SI Development plan 2018-2021

2017
- SI Training
- Technology transfer
- Prototype development
- Increase number of SI
- Create SI network

2018
- Promote BOI privilege A1, A2
- Tax exemption According to degree
- Business matching
- SI Training
- Increase number of SI

2019
- Develop the capability to create new products
- Develop prototype And standards
- Set up SI database
- Incubate SI Start Up.
- Increase additional 570 SI.

2020
- Develop the capability to be technology developer
- Organize business matching with foreign SI
- Increase additional 400 SI

2021
- Develop the capability to export
- Create Start Up for product exporter
- Increase additional 400 SI
CoRE Network

1. Thai-German Institute (Network Chairman)
2. Electrical and Electronics Institute
3. Chulalongkorn University
4. Institute of Field Robotics (FIBO)
5. Khon Kaen University
6. King Mongkut's University of Technology North Bangkok
7. Chiang Mai University
8. Mahidol University
9. King Mongkut's Institute of Technology Ladkrabang
10. Rajamangala University of Technology Isan Khon Kaen Campus
11. Rajamangala University of Technology Lanna
12. Prince of Songkla University
13. Panyapiwat Institute of Management
14. Thai-Japan Promotion Association
15. National Metal and Materials Technology Center (MTEC)
Country policy
Thailand 4.0
Industry 4.0

Investment in the future industry and transform the manufacturing sector by utilizing robot and Automation system.

Activities/Output

• Center of Robotic Excellence / Network management system / us BOI Preilege / import tax exemption / data warehouse

Learning Center and Development network

Increase product value

• Develop 85 Robotic Prototype.
• Subsidize the rental of tools / equipment / software

Increased personnel skills

• Develop 165 SI Designers and 570 SI warrior.

Increase investment value

Incubate 35 SI Start up.

Increase productivity

• Conduct technology and knowledge transfer from abroad

GDP of industrial sector growth at 4-5% within 5 years.
Additional domestic investment 200,000 million within 5 years.
Reduce the import of robots and automation systems 30% (80,000 million baht) within 5 years.
Has the capability to exported by 2026
Increase number of up to 1,400 within 5 years.
Overall productivity of Thai industry increase 50% within 5 years.

Demand
Supply

User
SI
Supplier

Flagship Robot and automation industry development

Agenda 5
Big Data

Agenda 1
S-Cuve

Agenda 2
SME 4.0

Agenda 3
Factory 4.0

MOI’s Policy.

MOI’s Policy.
Investment: Sia San, UBTECH, Nachi, Yasukawa, ABB, KUKA
On 22 Nov 2017, the draft of EEC Human Development plan was approved by EEC Policy Committee.

Requirement of labors in 10 targeted industries:
- Many Positions..Specialist..High Income
- Genius
- Expert in Business

Professional

Engineering Specialist

Researcher Scientist

Expert in Business

Accountant/Lawyer/Project Manager

70% need specialist with non-degree

30% need genius

Workers were trained could work already

Adapt to be Short Course for working immediately
Long Course for skillful and match for the future

Invite specialists to be trainers

+ Ministry of Industry with Embassy of Japan: Distance Cooperation between Japanese Universities and Thai Investors (Flex Campus)
+ Thai – German Cooperation in Labor Development for 4.0 Industries / Develop Research and Innovation Policies for Targeted Industries
EEC and Demand Driven Education Development

Expected New Job
Creation in EEC in 5 years (2019-2023)

- Total 475,668 Positions
- Vocational 250,000 Positions
- Bachelor 210,000 Positions
- Master, Ph.D 10,000 Positions

Top 3 needed sectors
- 1. Digital
- 2. Logistics
- 3. Smart Electronics

Source: Ministry of Education, Ministry of Labour and EEC
Employment demand for EEC 2019 - 2023
Total: 475,667 jobs

1. Smart Electronics
   - 58,228 Jobs (12%)
     - Vocational: 25,500
     - Bachelor’s: 29,028
     - Master’s and Ph.D.: 5,700

2. Next-Generation Automotive
   - 53,738 Jobs (11%)
     - Vocational: 44,492
     - Bachelor’s: 9,155
     - Master’s and Ph.D.: 91

3. Affluent, Medical and Wellness Tourism
   - 16,920 Jobs (4%)
     - Vocational: 15,179
     - Bachelor’s: 1,741

4. Robotics
   - 37,526 Jobs (8%)
     - Vocational: 21,885
     - Bachelor’s: 14,277
     - Master’s and Ph.D.: 1,364

5. Aerospace
   - 32,836 Jobs (7%)
     - Vocational: 3,713
     - Bachelor’s: 29,123

6. Digital
   - 116,222 Jobs (24%)
     - Vocational: 49,156
     - Bachelor’s: 67,066

7. Medical Hub
   - 11,412 Jobs (2%)
     - Vocational: 5,080
     - Bachelor’s: 5,302
     - Master’s and Ph.D.: 1,030

8. Advance Agriculture
   - Vocational:
   - Bachelor’s:

9. Food for the Future
   - Vocational:
   - Bachelor’s:

10. Biofuels and Biochemical
    - Vocational:
    - Bachelor’s:
    - Master’s and Ph.D.:

11. Rail Transit System
    - 24,246 Jobs (5%)
      - Vocational: 20,569
      - Bachelor’s: 3,236
      - Master’s and Ph.D.: 427

12. Maritime
    - 14,630 Jobs (3%)
      - Vocational: 3,580
      - Bachelor’s: 11,050

13. Logistics
    - 109,910 Jobs (23%)
      - Vocational: 65,940
      - Vocational: 43,970

14. 10 S Curve Industries
    - Vocational:
    - Bachelor’s:
    - Master’s and Ph.D.:
Dr. Laowattana’s technological expertise is primarily in fundamental and applied areas of Robotics and Industry 4.0. His professional contribution also covers Artificial Intelligence and Investment Strategy for Digital Transformation. He was awarded an honor with his B.Eng. from King Mongkut’s University of Technology Thonburi (KMUTT). Under the Monbusho Program, he received a certificate in Precision Mechanics and Robotics at Kyoto University. He subsequently obtained his PhD. in 1994 from Carnegie Mellon University, USA under financial support from the Fulbright Fellowship Program and the AT&T Advanced Research Program. In 1996, he also received a certificate in Management of Technology from Massachusetts Institute of Technology (MIT) USA. He holds two US patents for robotic devices. He is the founding director of the Institute of Field Robotics Development (FIBO) where more than 150 robotics prototypes were built. He also founded and was the first President of Thai Robotics Society (TRS). He is now serving as Chairman of Strategy Committee and board member of TOT, the largest telecom public company. In addition, he is recently appointed by Prime Minister a member of the Digital Economy Board and a Working Committee for Supercluster of Robotics Industry. Other board responsibility were Government Saving Bank and KrungThai Computer Co., Ltd. He is a Technical Committee at the Thai Stock Exchange. He was director of Hard disk Cluster Program at National Science and Technology Development Agency (NSTDA). His responsibility was to strengthen hard disk industry in Thailand by formulating critical collaborative networks in the areas of R&D, HRD and Supply Chain Development among professionals from 30 national universities/laboratories and four multi-national companies, producing one of the highest annual turnover of 500 billions baht. He was acclaimed "Father of Thai Robotics" by representatives of both public and private sectors in Thailand.

Presently, his role and responsibility as Executive Advisor for EEC: Eastern Economic Corridor covers investment strategy and human resource development for the 10 new S-Curve industries.