

Automation and Robotics in Thailand

October 2019 UPDATE



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Executive Advisor



EASTERN ECONOMIC CORRIDOR

THE BEGINNING OF A GREAT LEAP TOWARDS THAILAND 4.0

THAILAND 4.0

SMART TECHNOLOGY
SMART PEOPLE

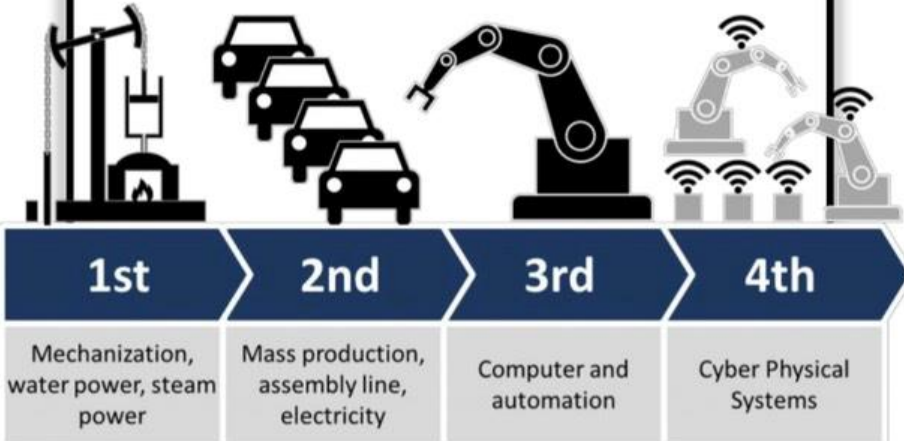
Match To The Real Demand
Leave No One Behind



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

- 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

LOCATION OF EEC

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

INDUSTRIES IN TARGET

First S-Curve



New S-Curve



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

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

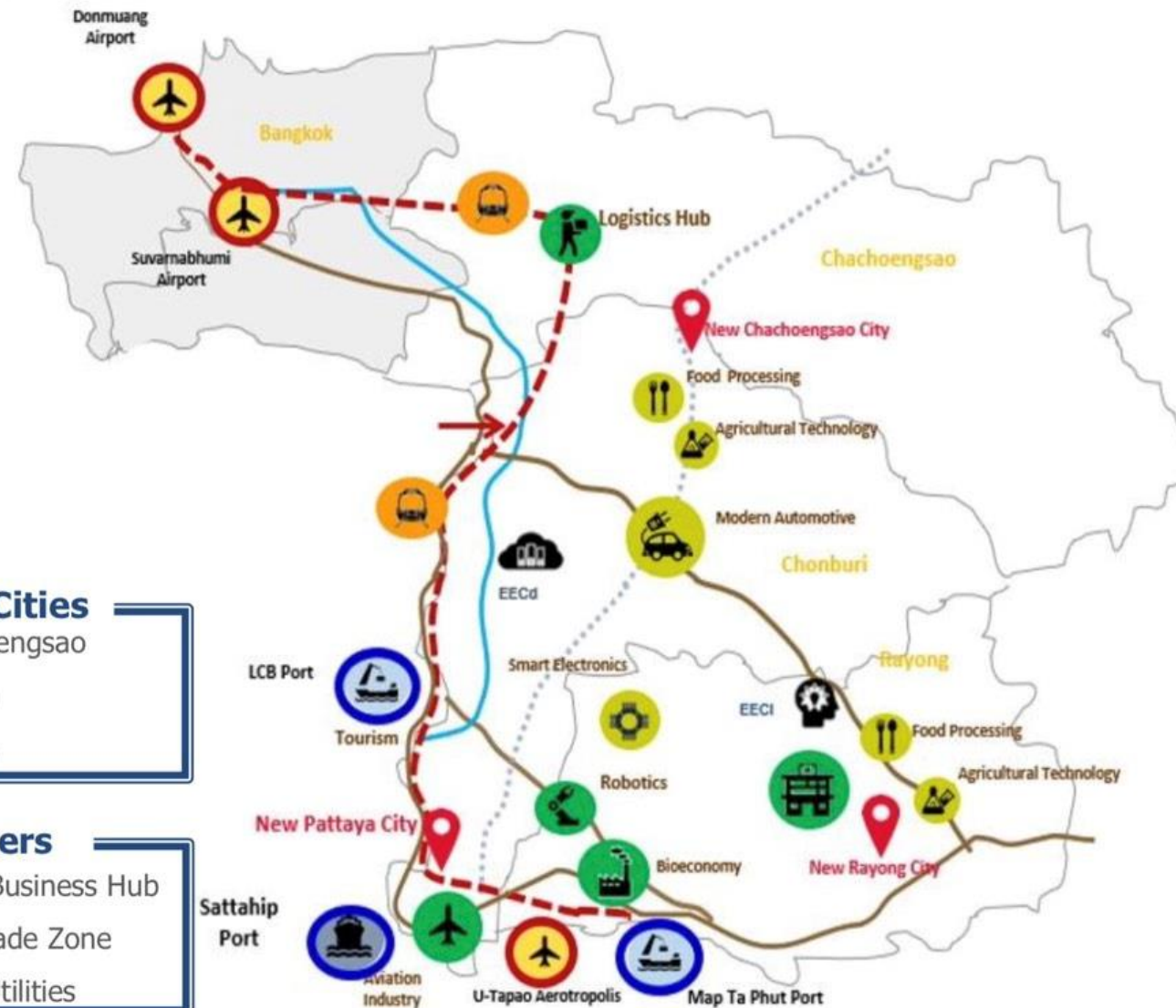
EEC of Innovation (EECi)
 Digital Park Thailand (EECd)
 Human Resource Development & Education

New Cities

Chachoengsao
 Pattaya
 Rayong

Others

Global Business Hub
 Free Trade Zone
 Public Utilities



MAJOR INFRASTRUCTURE PROJECTS



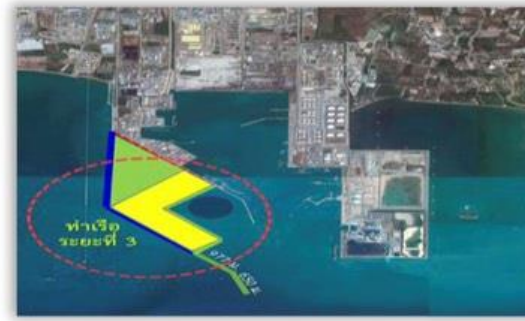
MAJOR INFRASTRUCTURE PROJECTS

U-TAPHAO AIRPORT AND MRO [310,383 MB]



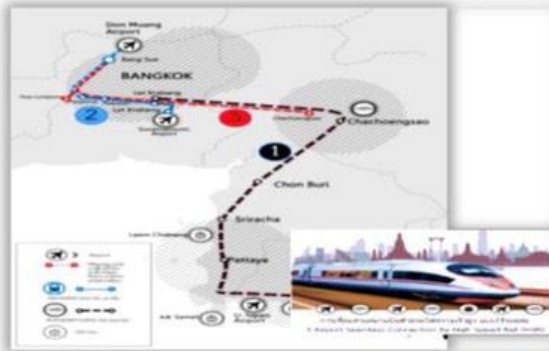
- Increase Cap. of Airport from 3 to 15,30,60 M. passengers/year
- MRO / Aviation Industry
- Eastern Airport city

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]



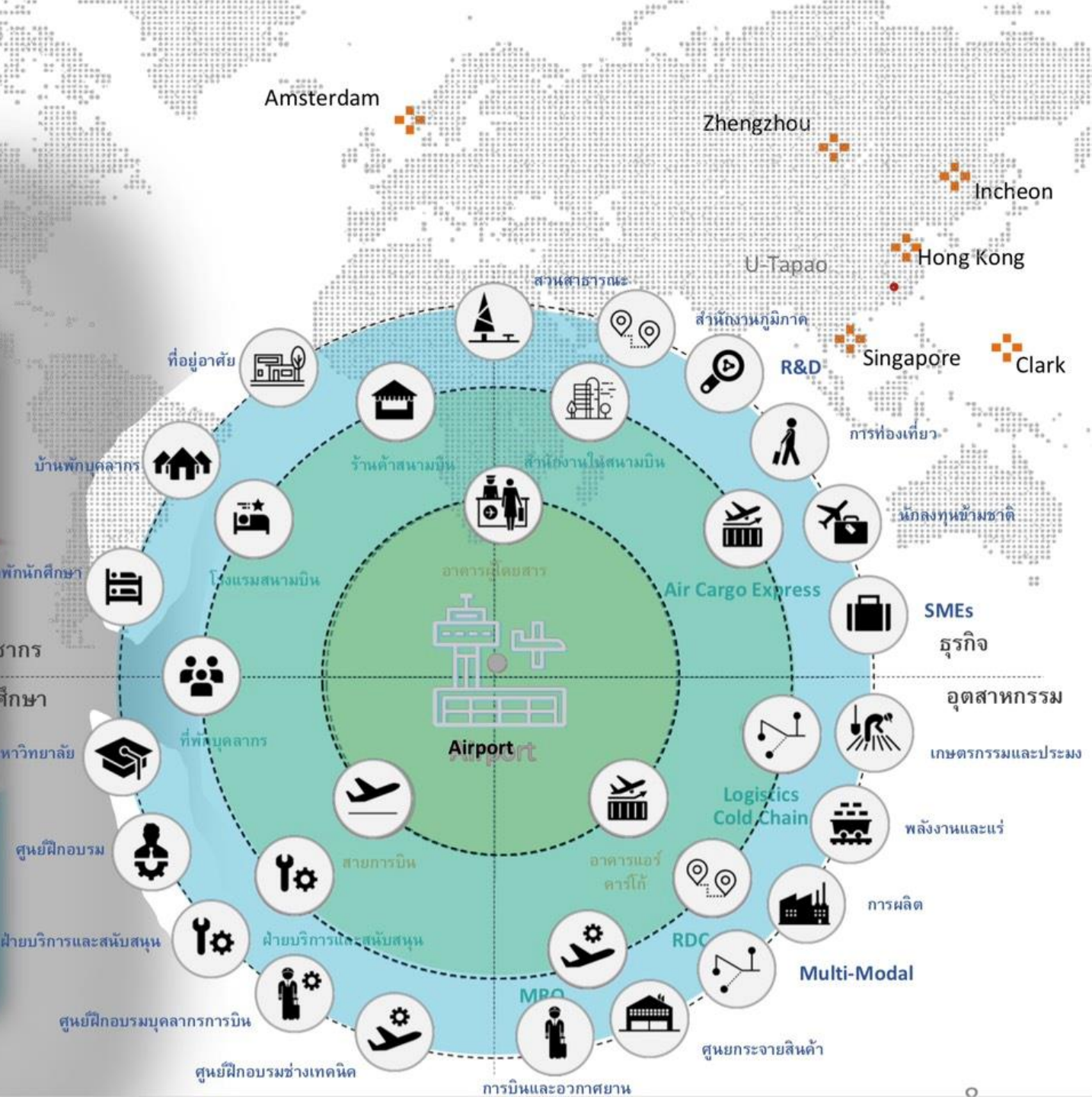
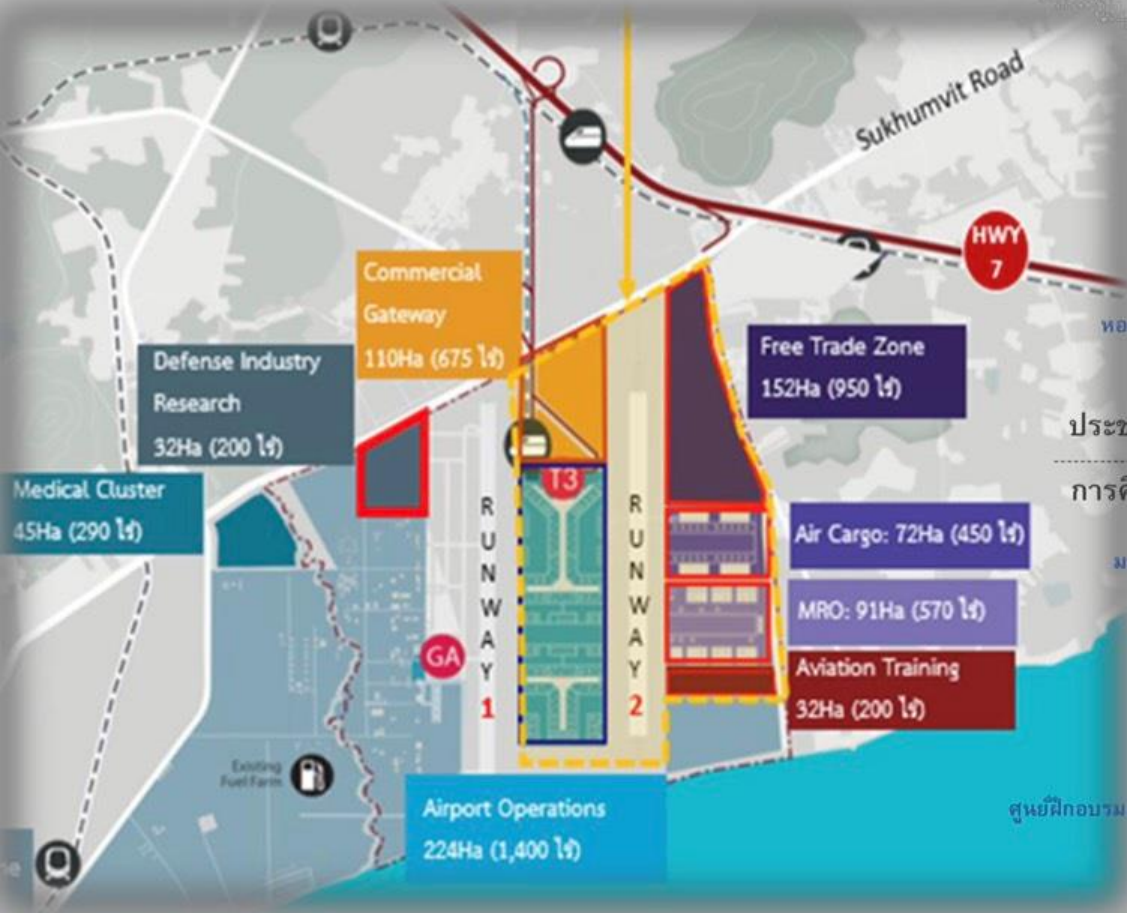
- + Container 7 MillionTEU/Yr
- + Car 1 MillionTEU/Yr
- Increase transporting container by Rail 7% to 30%

DOUBLE-TRACK RAIL [77,276MB]



- Link 3 Sea Ports
- Link with CLMV
- Seamless Operation

AEROTROPOLIS U-TAPAO AIRPORT



HIGH SPEED TRAIN LINKING 3 AIRPORTS



ALL STOP TRAIN จอดทุกสถานี

DON MUEANG - RAYONG	HSR	250 km/hr max	115 min
DON MUEANG - U-TAPAO	HSR	250 km/hr max	101 min
DON MUEANG - SI RACHA	HSR	250 km/hr max	70 min
DON MUEANG - SUVARNABHUMI	HSR	160 km/hr max	35 min
DON MUEANG - SUVARNABHUMI	CITY	160 km/hr max	35 min

EXPRESS TRAIN ไม่จอดระหว่างทาง

SUVARNABHUMI - U-TAPAO	HSR	250 km/hr max	45 min
MAKKASAN - U-TAPAO	HSR	250 km/hr max	56 min
DON MUEANG - U-TAPAO	HSR	250 km/hr max	85 min
DON MUEANG - RAYONG	HSR	250 km/hr max	82 min

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

SUSTAINABLE DEVELOPMENT





EEC

CONTACT INFORMATION

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**MONDAY-FRIDAY
08.30a.m.-4.30p.m.**

Industry 4.0

“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**

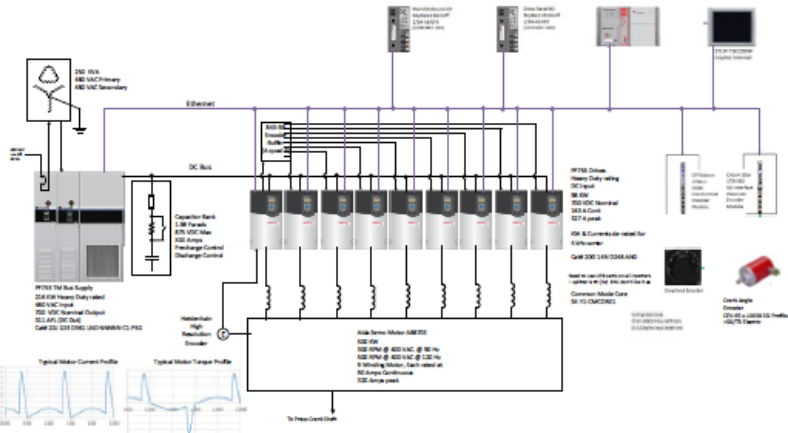
Aida (using Aida motor)

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

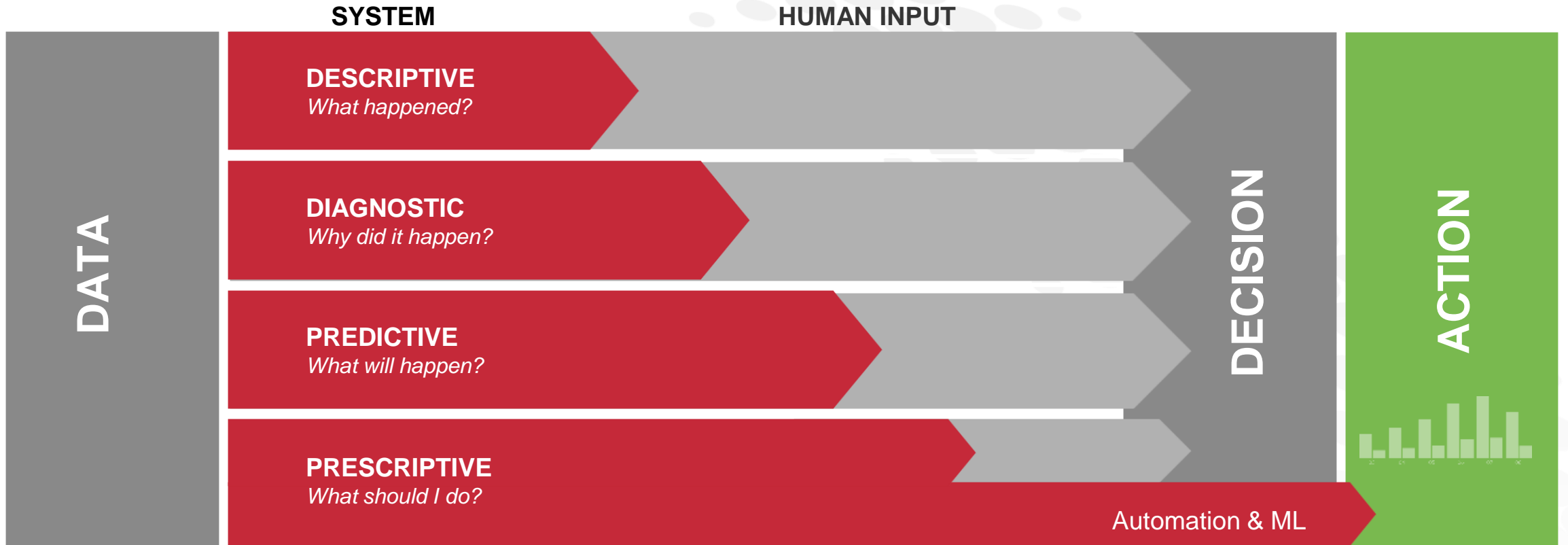
~ In addition to the press lines, other Aida servo technology on display included its **exclusive Allen-Bradley based servo press control** for machines in capacities from 315 to 3500 tons. At Aida’s booth, the control demonstrated several servo press stroke-motion profiles in real-time on a virtual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

Aida-America: www.aida-global.com



SCALABLE ANALYTICS

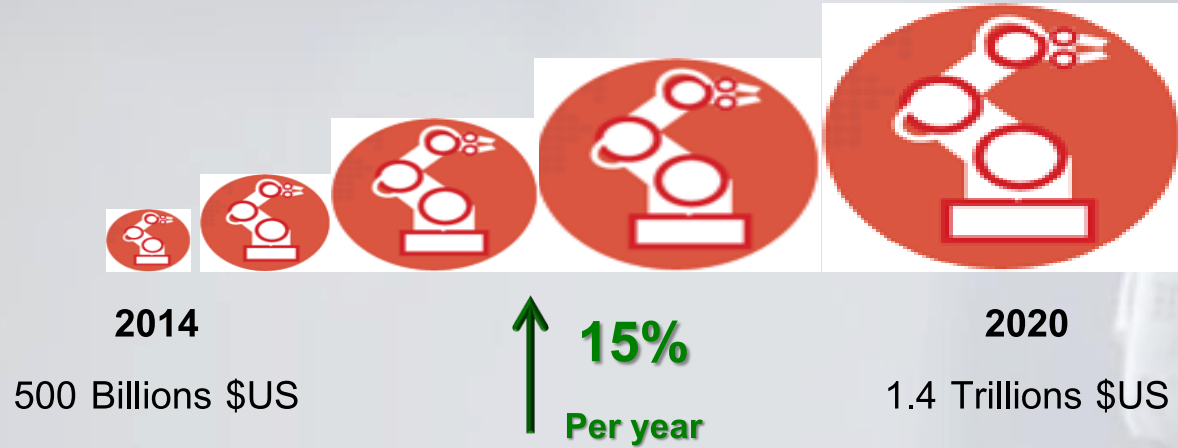
VARYING DEGREES OF HUMAN INTERACTION.



Source: Gartner + Rockwell Automation

Current Situation of Automation and Robotics

Global Expenses of Automation and Robotics



Asia

Relatively ranked at the Top: 40%

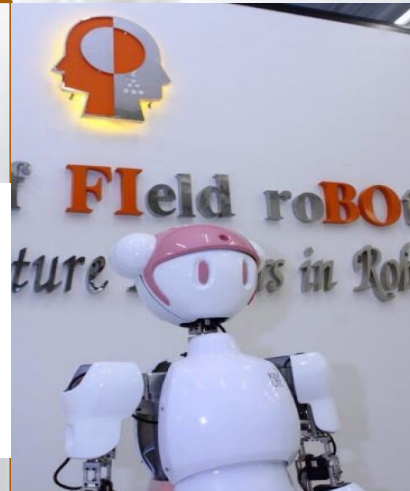


Big Players

Industrial Robots



Service/Medical Robots



วัดความสามารถในการแข่งขัน ปี 2019:อุตสาหกรรมระบบอัตโนมัติและหุ่นยนต์



- ไทยมี GAP กับประเทศผู้นำมากที่สุด คือ ด้าน **Future Prospect** โดยเฉพาะตัวชี้วัดที่ได้มาจากผลการสำรวจ ส่วนด้านที่ไทยมี GAP กับประเทศผู้นำน้อยที่สุด คือ ด้าน **Sustainability**
- ส่วน GAP ระหว่างไทยกับประเทศคู่แข่งที่สำคัญ พบว่า **ไทยยังคงทำคะแนนได้น้อยกว่าในทุก ๆ ด้าน** โดยที่ด้านที่ไทยมี GAP กับคู่แข่งมากที่สุด คือ ด้าน **Business Environment & Strategy** ส่วนด้านที่ไทยมี GAP กับประเทศคู่แข่งน้อยที่สุด คือ ด้าน **Sustainability**

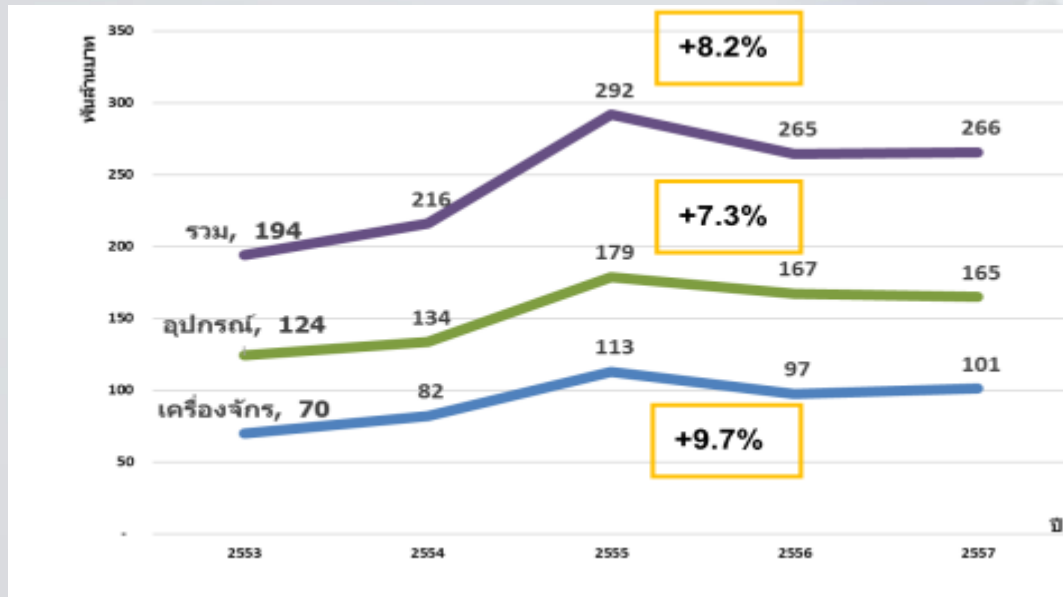


— ประเทศผู้นำ (จีน เยอรมัน ญี่ปุ่น สหรัฐอเมริกา)
 — ประเทศใกล้เคียงไทย (มาเลเซีย สิงคโปร์)
 — Thailand 2019

Import and Export : Automatic Parts/Machines

Import 266,000 MB annually
Continuously increases

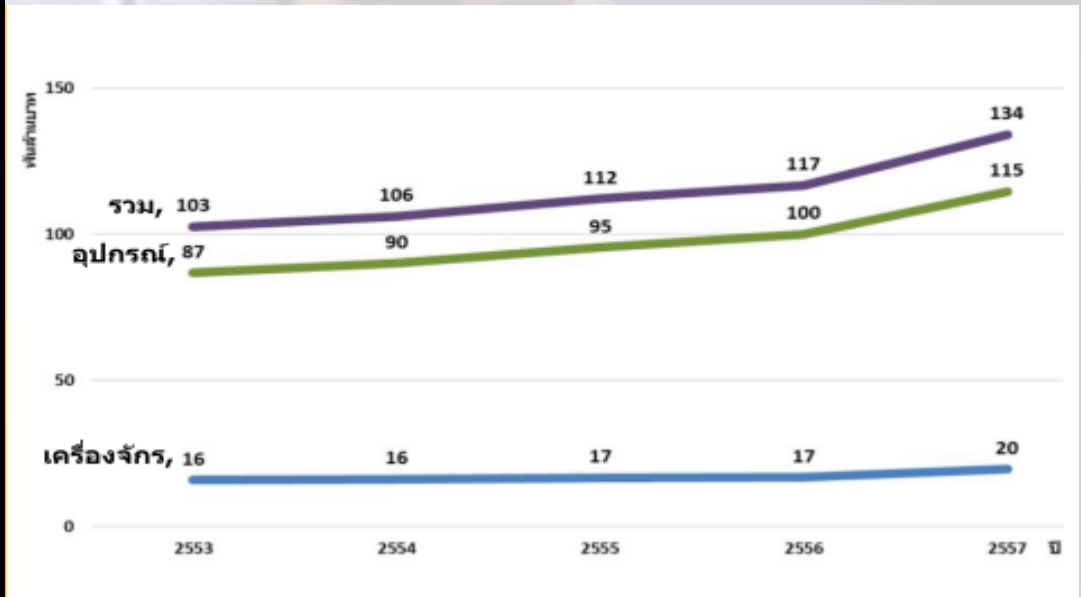
Import Value of industry overview



- 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

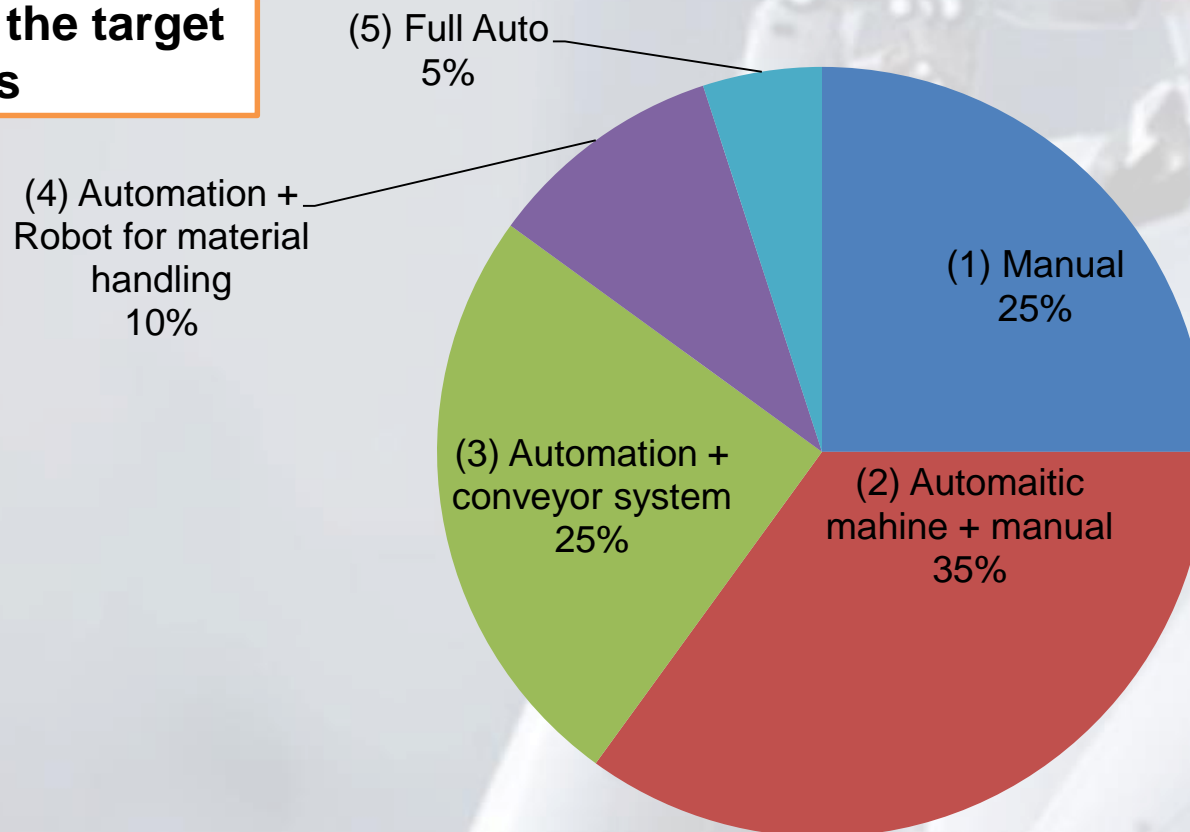


Thailand Is 132,000 MB deficit has balance of trade . When combining with plans of increasing industrial productivity, the figure becomes **200,000 MB** annually.

Status of manufacturing industries in Thailand

Marginal usage of robotics and automation in manufacturing industry in Thailand. There is a high opportunity (85%) to transform

Group 4,5 are the target levels



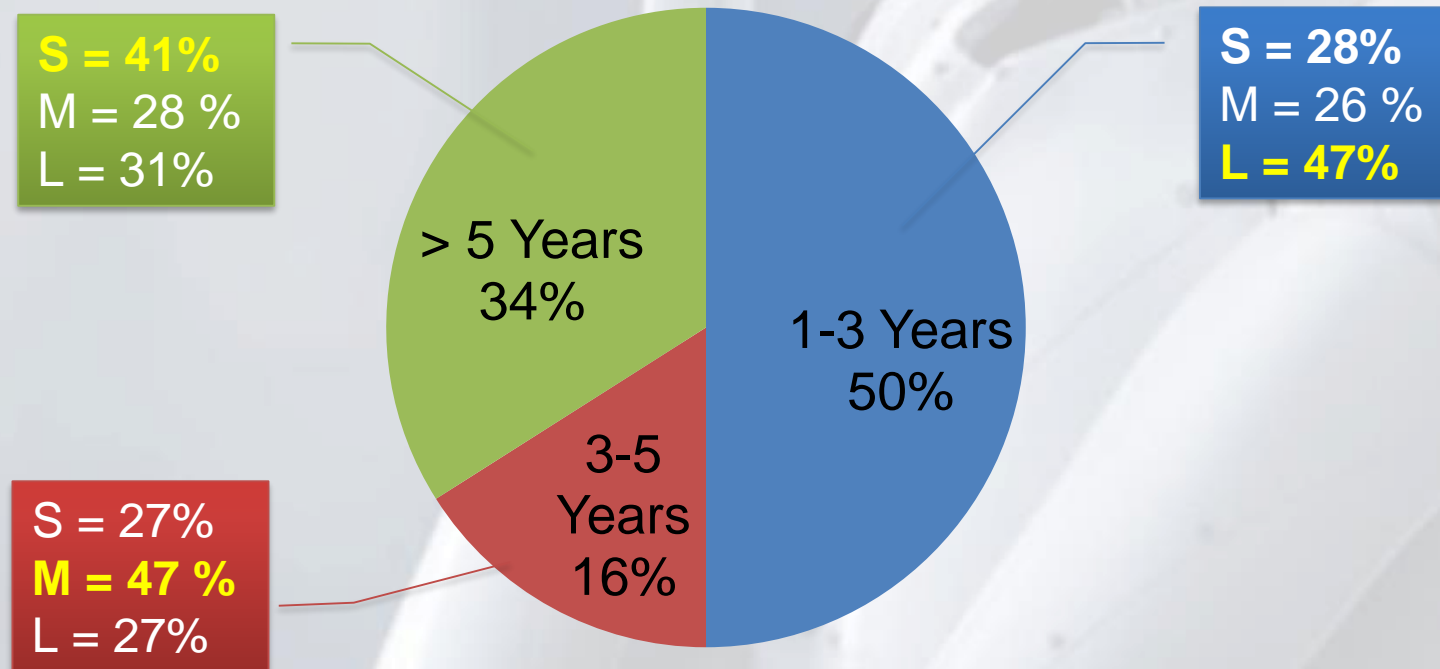
85% of industry have an opportunity to adopt robot & automation to improve process

(Group 1,2,3)

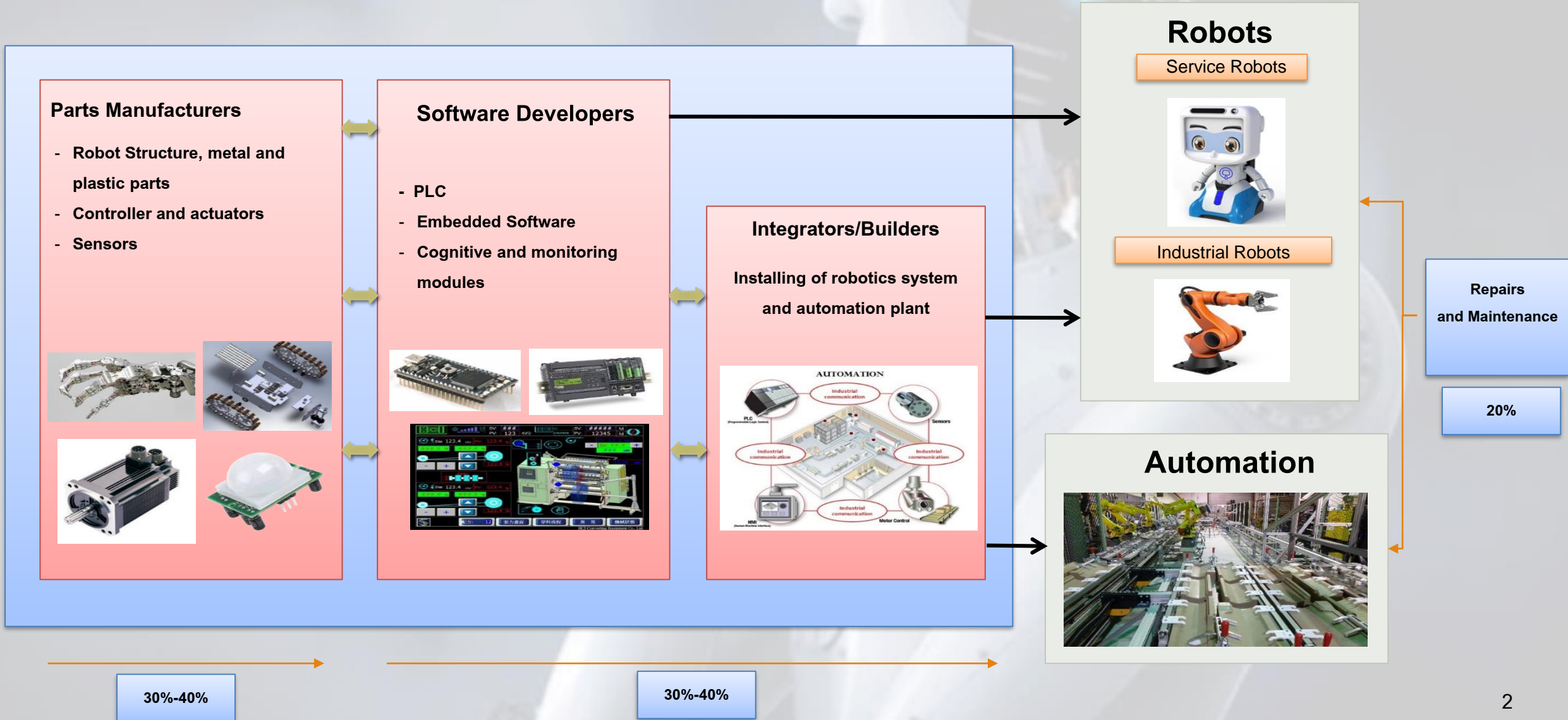
Status of manufacturing industries in Thailand

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.



Supply Chain in Automation and Robotics



Primary Mechanism for Development of Robotics Cluster

1) Demand Driven (Incentive)

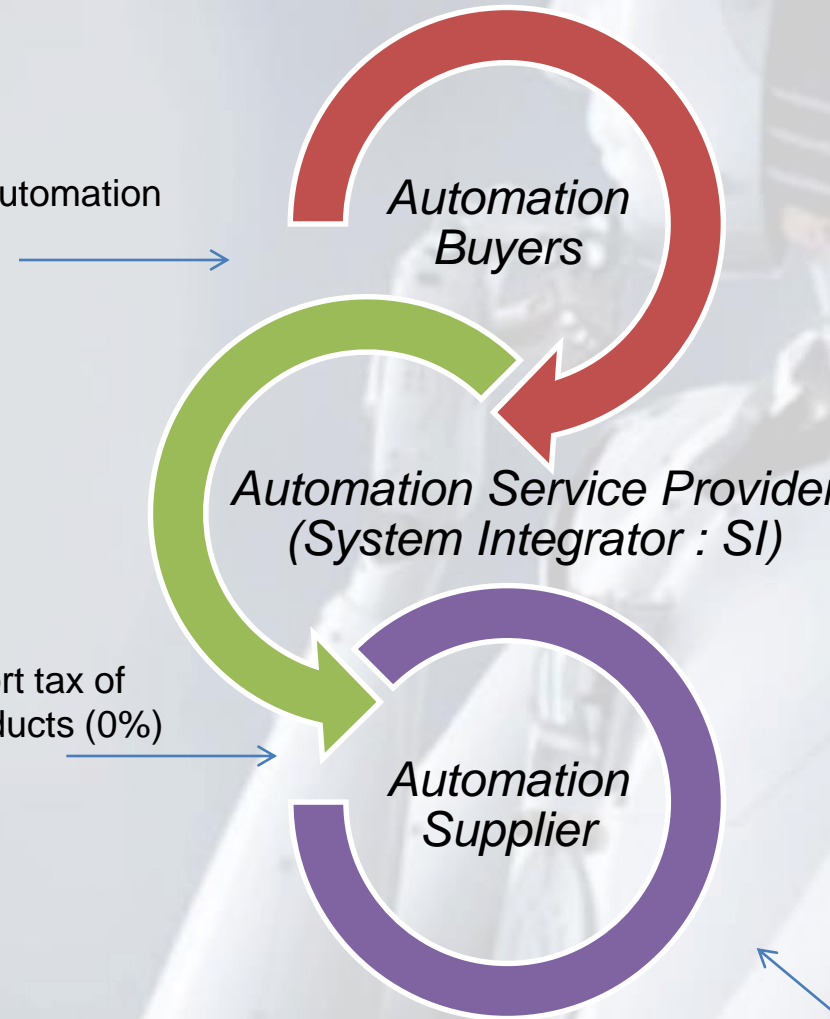
Create the demand of using robots and automation (50% DTD)

2) Enhance Competitiveness

- Reduce cost of local manufactureres
- 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



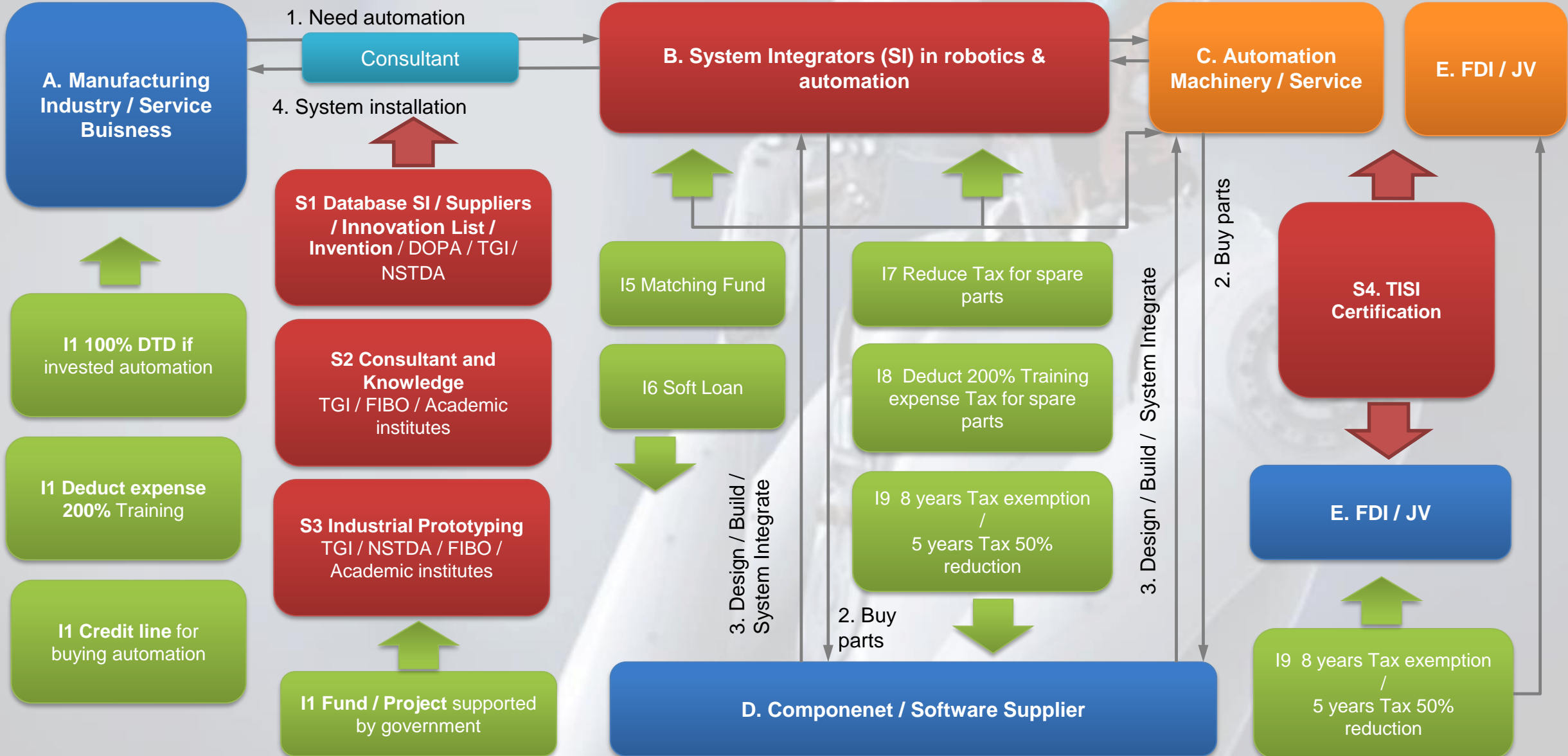
Outcome

- Industry in Thailand increase productivity
- Local robot manufactuters are able to be a technology owners and brand owners
- Local investment resulting in business expansion

Measure for Development of Robotics Cluster - Summary

Industry / Service

Robotics and Automation Manufacturing Industry



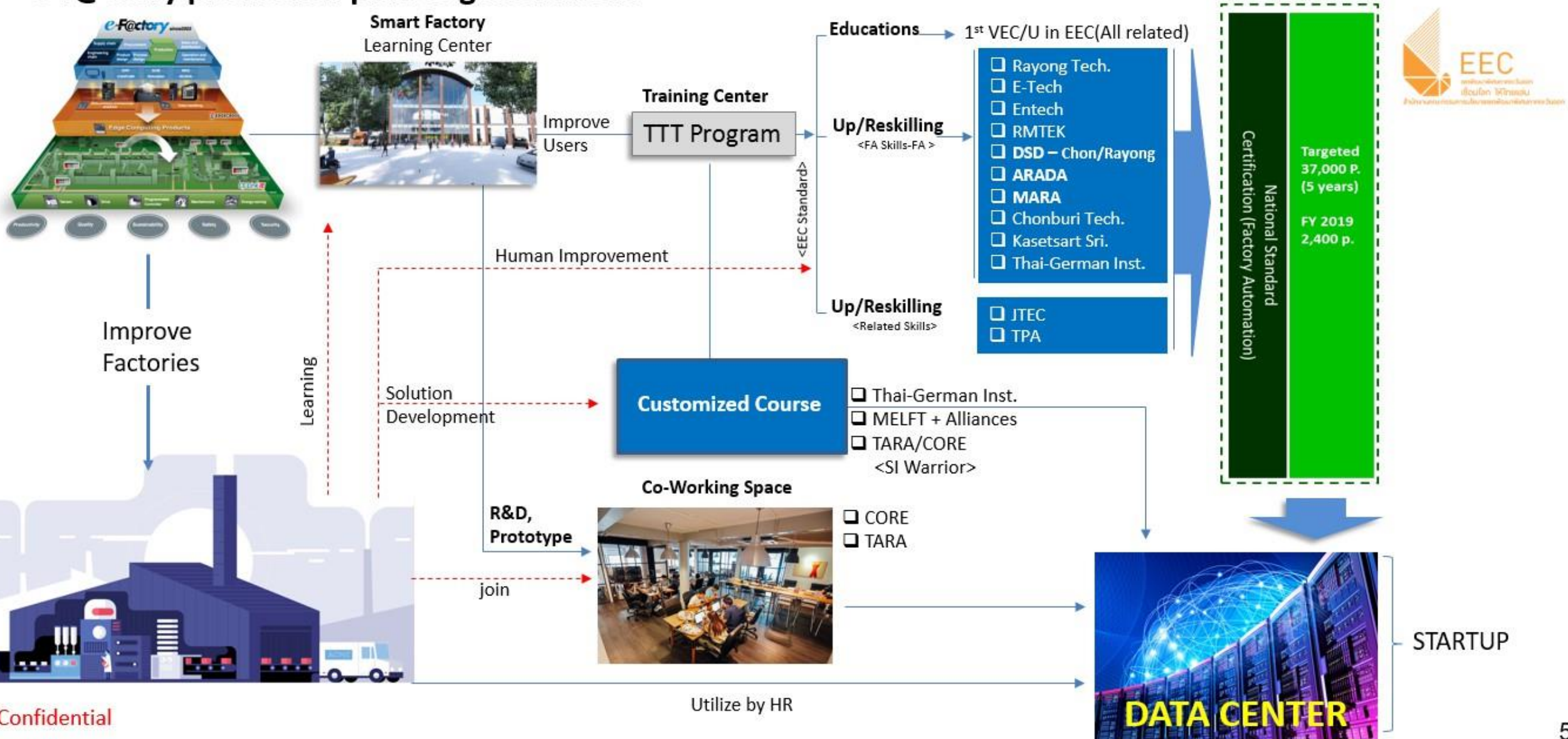


พิธีลงนามบันทึกข้อตกลงความร่วมมือระหว่าง
 บริษัท มิตซูบิชิ อิเลกทริก แพลทฟอร์แมชัน (ประเทศไทย) จำกัด และ มหาวิทยาลัยบูรพา
 ภายใต้ความร่วมมือในการพัฒนากำลังคนด้านเทคโนโลยีอัตโนมัติในเขตพิเศษภาค
 อีส (EEC) ณ อาคารที่ 2562 ถนนสุขุมวิท กรุงเทพมหานคร

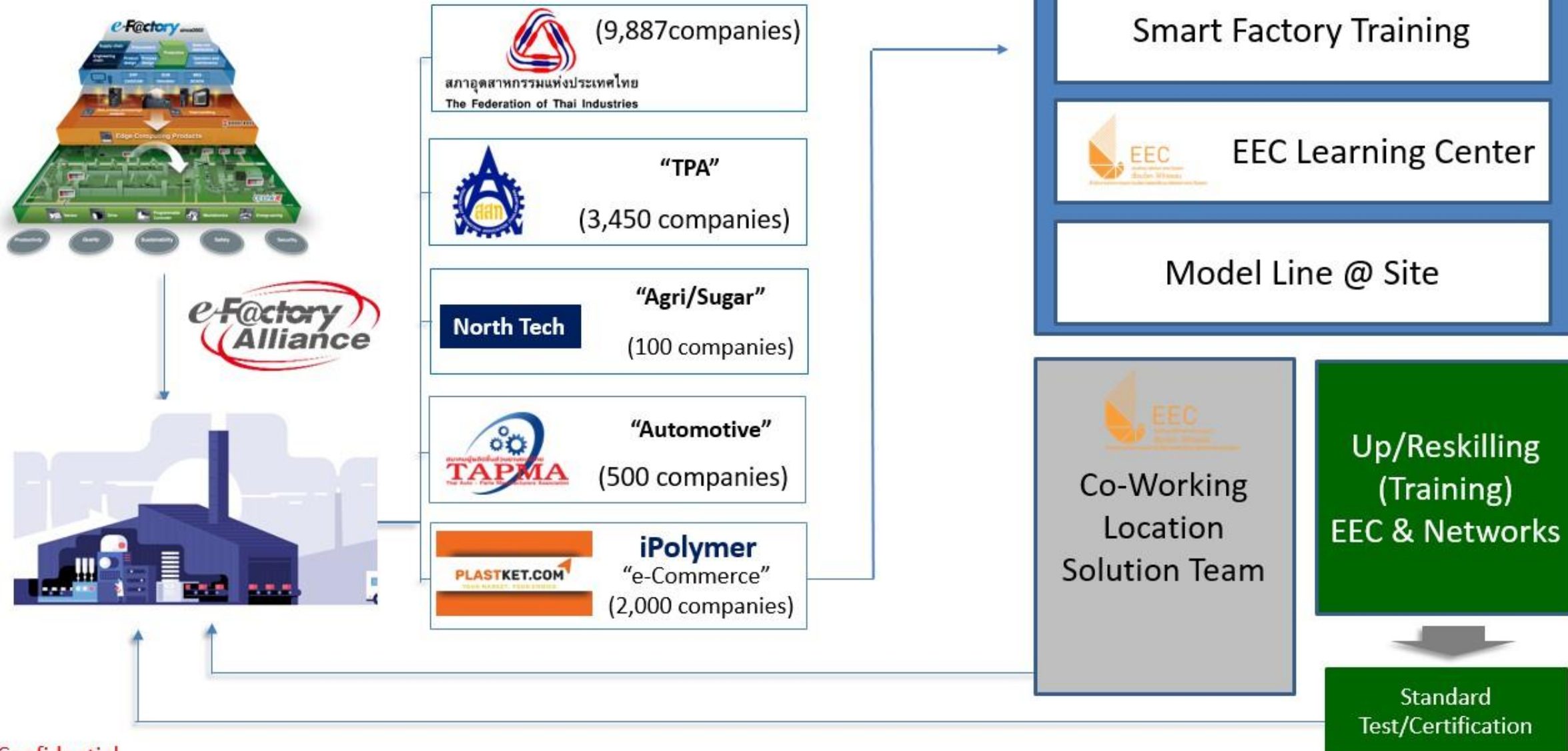


Mitsubishi – Burapa University in Industry 4.0

e-F@ctory promotion plan to government



e-F@ctory promotion plan to specific industry



Mitsubishi – Burapa University in Industry 4.0

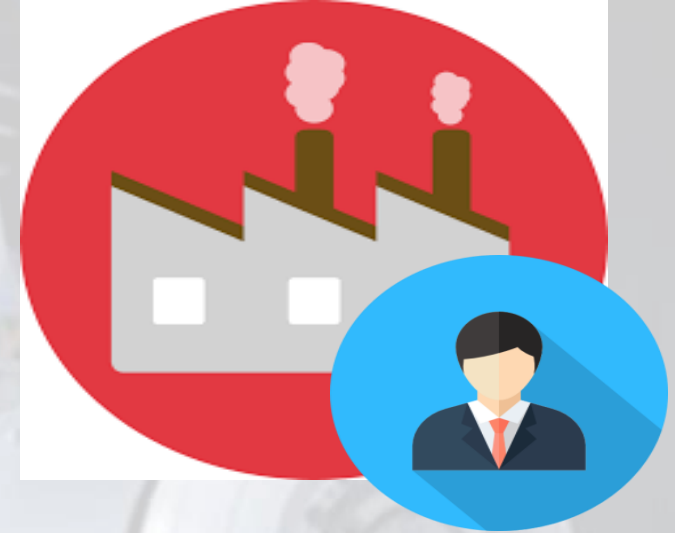
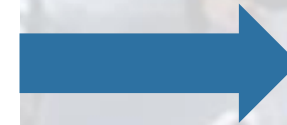
Investment Promotion in Robot and Automation Industry



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



Supply Side

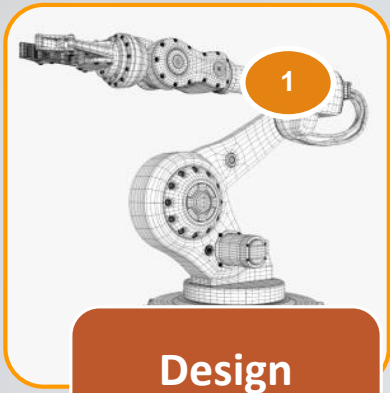
Types of Promoted Business	Exempted from income tax *
Engineering design	8 years (without financial limit)
Manufacture machinery/automation equipment with engineering design (with designing and controlling processes by computer)	8 years
Manufacture machinery/automation equipment with engineering design (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

Investment Promotion in Robot and Automation Supply Side (Continued)



Supply Side



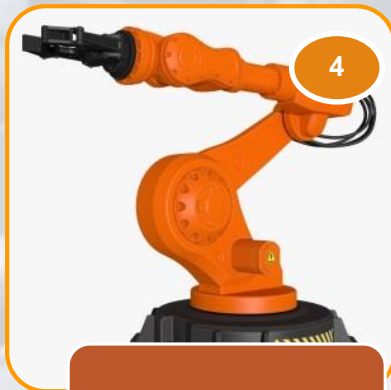
Design
Solution Conceptual Design, Engineering Design & System Integration Design



Control System Design



Procurement / Making Part



Assembly



Installation & Commissioning

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)

Engineering Design

Manufacture machinery/automation equipment with engineering design (with Control System Design)

8 years

Exempted from income tax 8 year (no limit)

Assemble robots and automation equipment or parts

5 years

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



CoRE's Experts

Support consideration for project approval

SI operator/automation production database in
Thailand

Business Matching / Partnering



Center
of
Robotics
Excellence

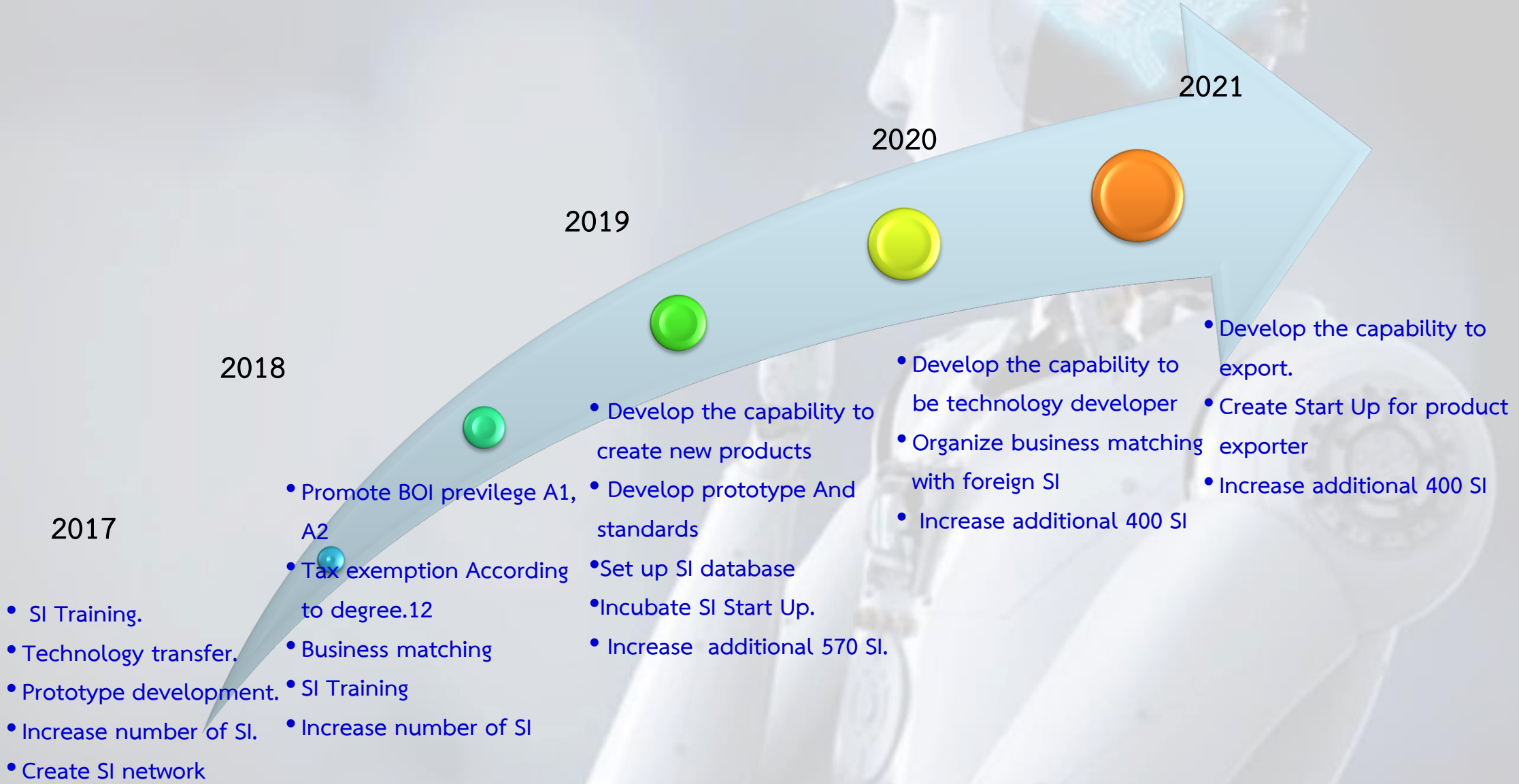
Contact Information

Thai-German Institute Acting Secretary of the Board of Center of Robotics Excellence (CoRE)

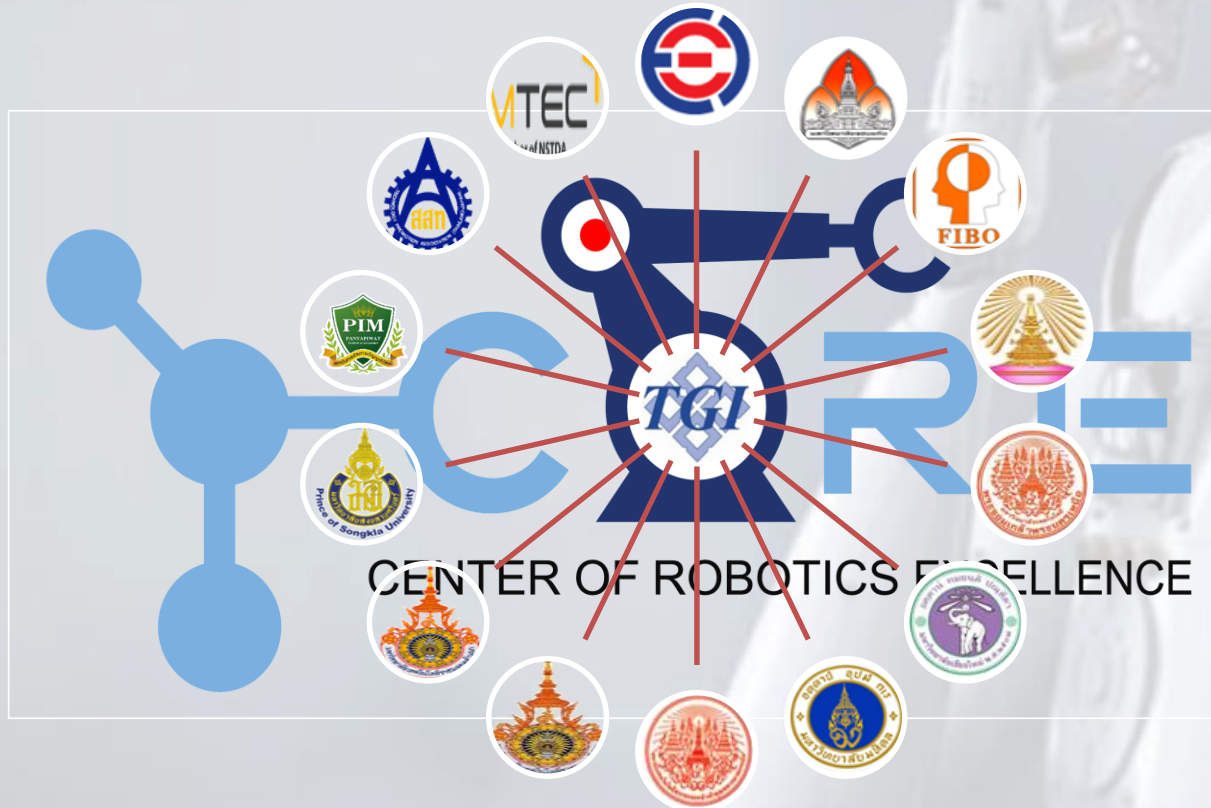
Tel: 0 3821 5033-39, 0 3893 0100 # 1300

E-mail: core@tgi.mail.go.th

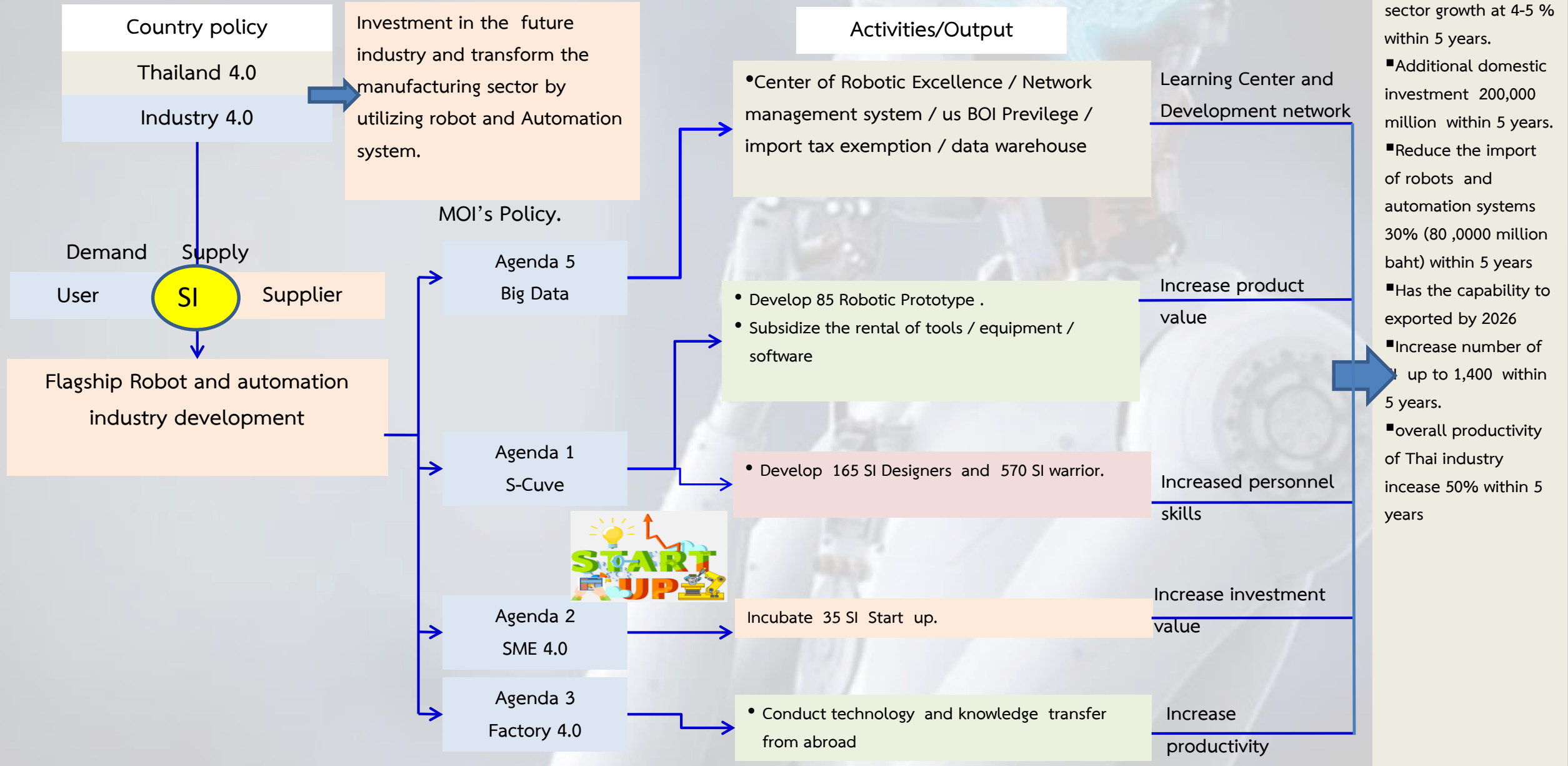
SI Development plan 2018-2021



CoRE Network



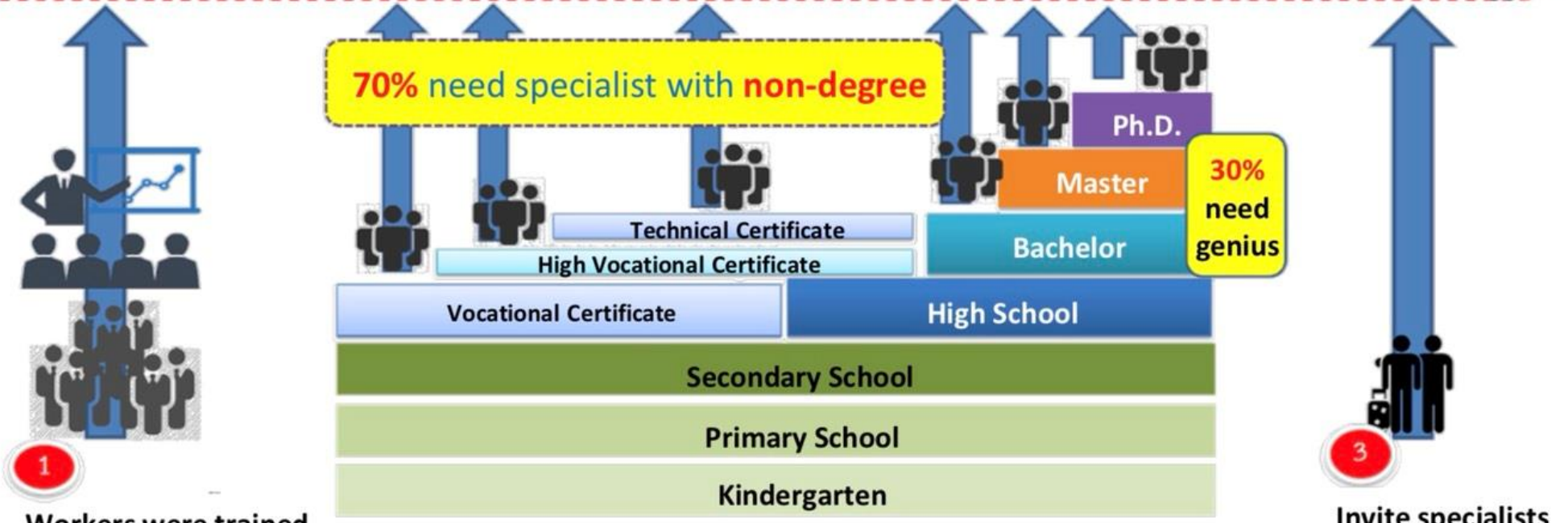
1. Thai-German Institute (Network Chairman)
2. Electrical and Electronics Institute
3. Chulalongkorn University
4. Institute of Field Robotics (FIBO)
5. Khon Kaen University
6. King Mongkut's University of Technology North Bangkok
7. Chiang Mai University
8. Mahidol University
9. King Mongkut's Institute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



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



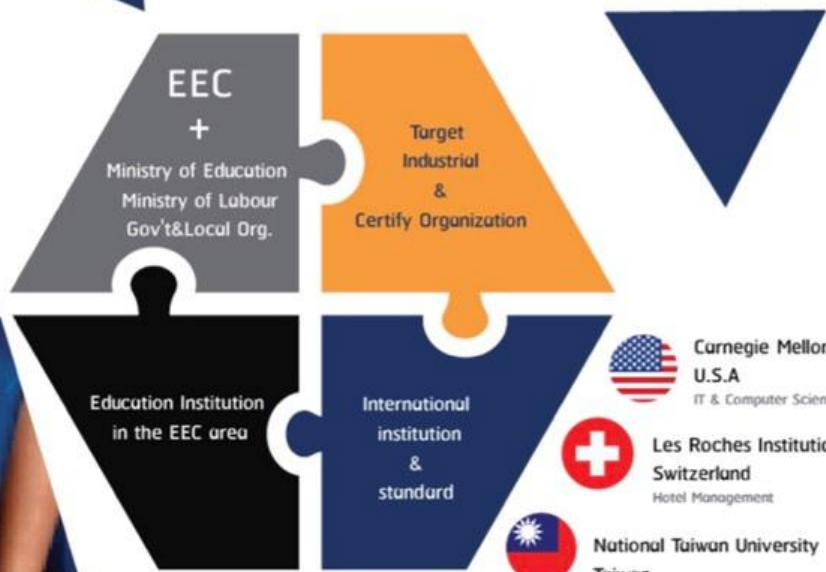
1 Workers were trained could work already

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

3 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



-  Carnegie Mellon University U.S.A
IT & Computer Science
-  Les Roches Institution Switzerland
Hotel Management
-  National Tuiwan University Taiwan
Engineering Intelligent Manufacturing System

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



Employment demand for EEC 2019 - 2023
Total: 475,667 jobs

2. Smart Electronics
58,228 Jobs (12%)
 - Vocatinal 23,500
 - Bachelor's 29,028
 - Master's and Ph.D. 5,700

1. Next-Generation Automotive
53,738 Jobs (11%)
 - Vocatinal 44,492
 - Bachelor's 9,155
 - Master's and Ph.D. 91

10. Biofuels and Biochemical
 Jobs
 - Vocatinal
 - Bachelor's
 - Master's and Ph.D.

9. Food for the Future
 Jobs
 - Vocatinal
 - Bachelor's

10 S Curve Industries

1. Rail Transit System
24,246 Jobs (5%)
 - Vocatinal 20,589
 - Bachelor's 3,230
 - Master's and Ph.D. 427

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

2. Maritime
14,630 Jobs (3%)
 - Vocatinal 3,580
 - Bachelor's 11,050

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

8. Advance Agriculture
 Jobs
 - Vocatinal
 - Bachelor's

3. Logistics
109,910 Jobs (23%)
 - Vocatinal 65,940 อัครา
 - Vocatinal 43,970 อัครา

5. Aerospace
32,836 Jobs (7%)
 - Vocatinal 3,713
 - Bachelor's 29,123

6. Digital
116,222 Jobs (24%)
 - Vocatinal 49,156
 - Bachelor's 67,066

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



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.

