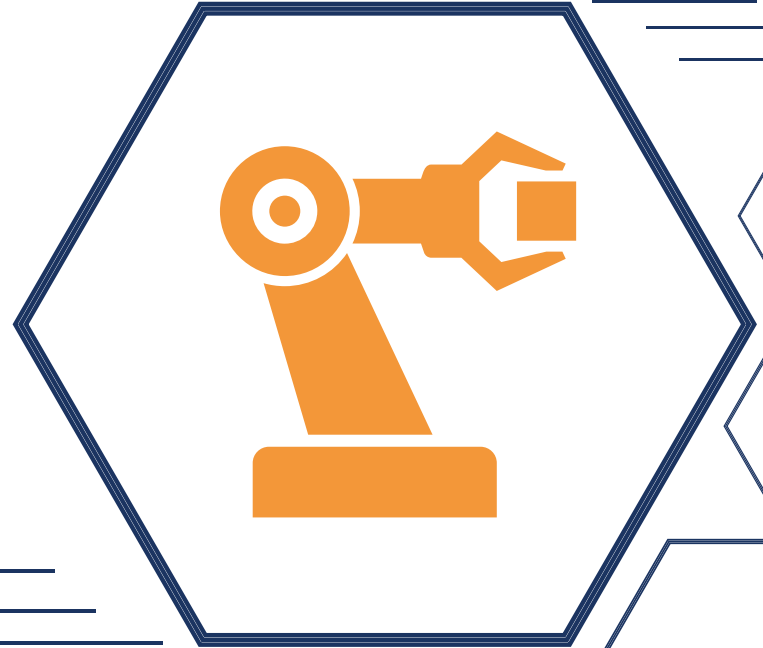




# ***AUTOMATION AND ROBOTICS***

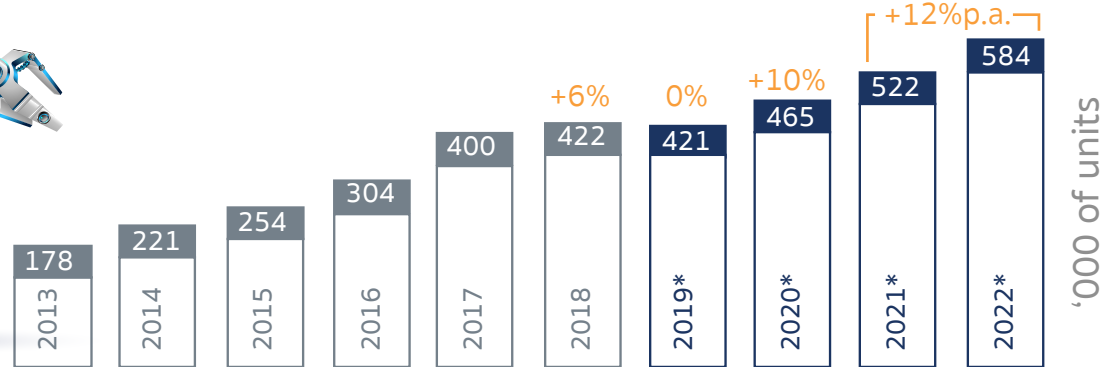


# AUTOMATION AND ROBOTICS

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## Industry overview

Annual installations of industrial robots 2013-2018 and 2019\*-2022\*



\*forecast

Source: World Robotics 2019

Global productivity and modern production landscape have been fundamentally transformed by the automation and robotics industries over the years. By 2022, it is predicted that the industry's global market will reach 584,000 units worldwide, reflecting the increasingly widespread use of the technology.



Global Market

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Incentives  
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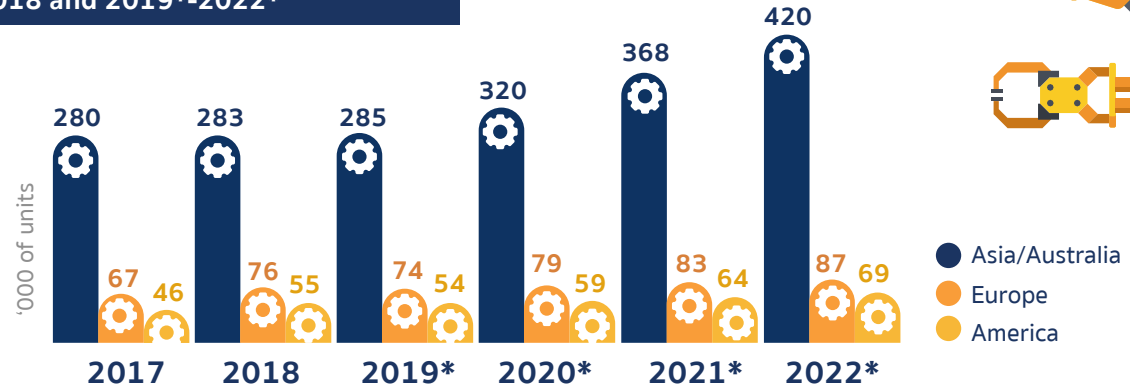
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## Industrial Robot Installations by Regions

Annual installations of industrial robots  
2017-2018 and 2019\*-2022\*



\*forecast

Source: World Robotics 2019

Asia has the world's largest industrial robot market with a total of 283,080 units of robots installed in 2018 (accounting for 67% of newly deployed robot installations globally).

Europe came second in terms of robot installations, reaching 75,560 units in 2018, a 14% increase from the previous year.

In 2018, 55,212 robots were installed in the Americas, a 20% growth rate from the previous year. Like Asia and Europe, this was the new peak for the sixth year in a row.

By 2022, it is expected to see growth in all markets, especially in Asia with almost 50% growth to reach 420,000 units.

Global Market

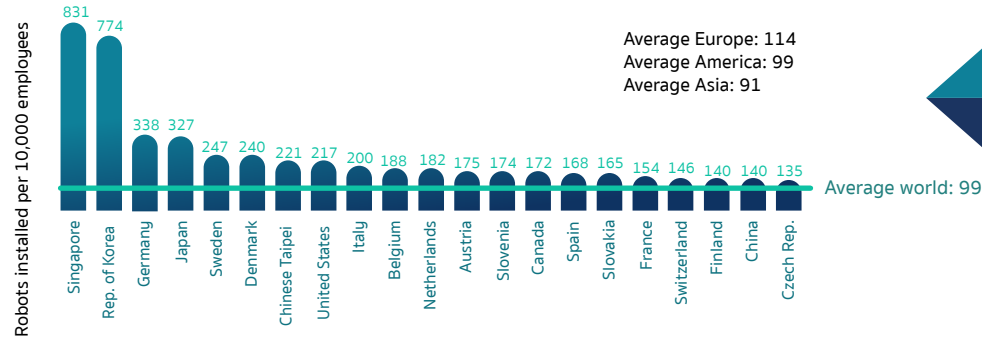
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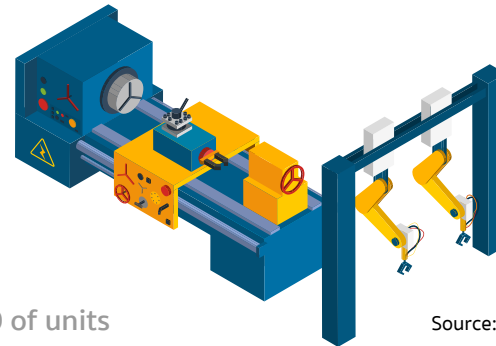
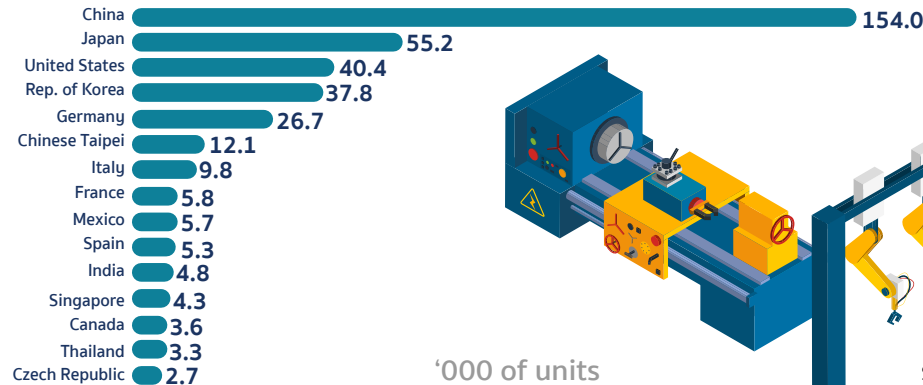
## Robot Density and Industrial Robot Installations by Country

### Robot density in the manufacturing industry 2018



Highest robot density  
in Singapore – lowest  
average in Asia

### Annual installations of industrial robots : 15 largest markets 2018



Source: World Robotics 2019

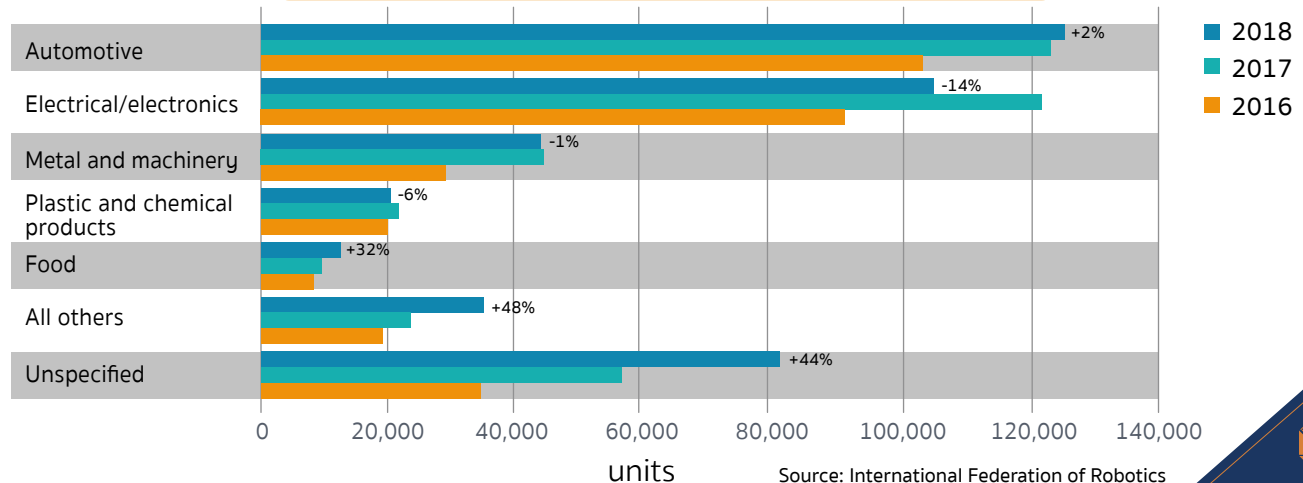


## Industrial Robot Installations by Industries

Almost 30% of all industrial robot installations occurs in the automotive industry, making it the most crucial customer of industrial robots. In 2018, 125,581 robots were installed in the automotive industry (a 2% increase from 2017, setting a new peak), and between 2013-2018, industrial robot installations increased by 13% annually (CAGR).

Since 2013, industrial robot installations increased by 24% annually (CAGR) in the electrical/electronics industry, and in 2017, they accounted for 31% of total installations (121,955 units). The China-US trade crisis, however, detrimentally impacted the global demand for electronic devices and components in 2018, and robot installations in the industry declined by 14% to 105,153 units.

### Annual installations of industrial robots at year-end worldwide by industries 2016-2018



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## Opportunities for Robotics and Automation Systems

There are around 2 million workers employed by Thai companies to carry out labor-intensive tasks in automotive electronic parts production and food & beverage sectors. This serves as great untapped opportunities for robotics and automation systems suppliers in Thailand.

### Thailand's Expectations Over The Next 5 Years



Source: BOI

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## Thai Automation and Robotics Supply Chain

Having established a strong supply chain in the automation and robotics industries, a majority of Thai firms are in the System Integration (SI) business and mechanical brain & software development.

### Supply Chain

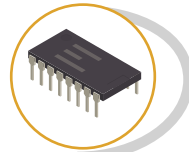
### Capabilities of Thai Automation and Robotics Industries

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#### Parts & Components Manufacturers

Focus on producing mechanic parts, such as gears, joints, and springs that can also be used in other industries' processes and importing highly complicated parts such as sensors from abroad.



#### Software Developer/ Suppliers

Have a strong ability to develop programs or software, but only for in-house use or specific order requests, not for mass production.



#### Original Robot Designers

Have a strong potential for service robots even at the starting point for industrial and medical robotics development.



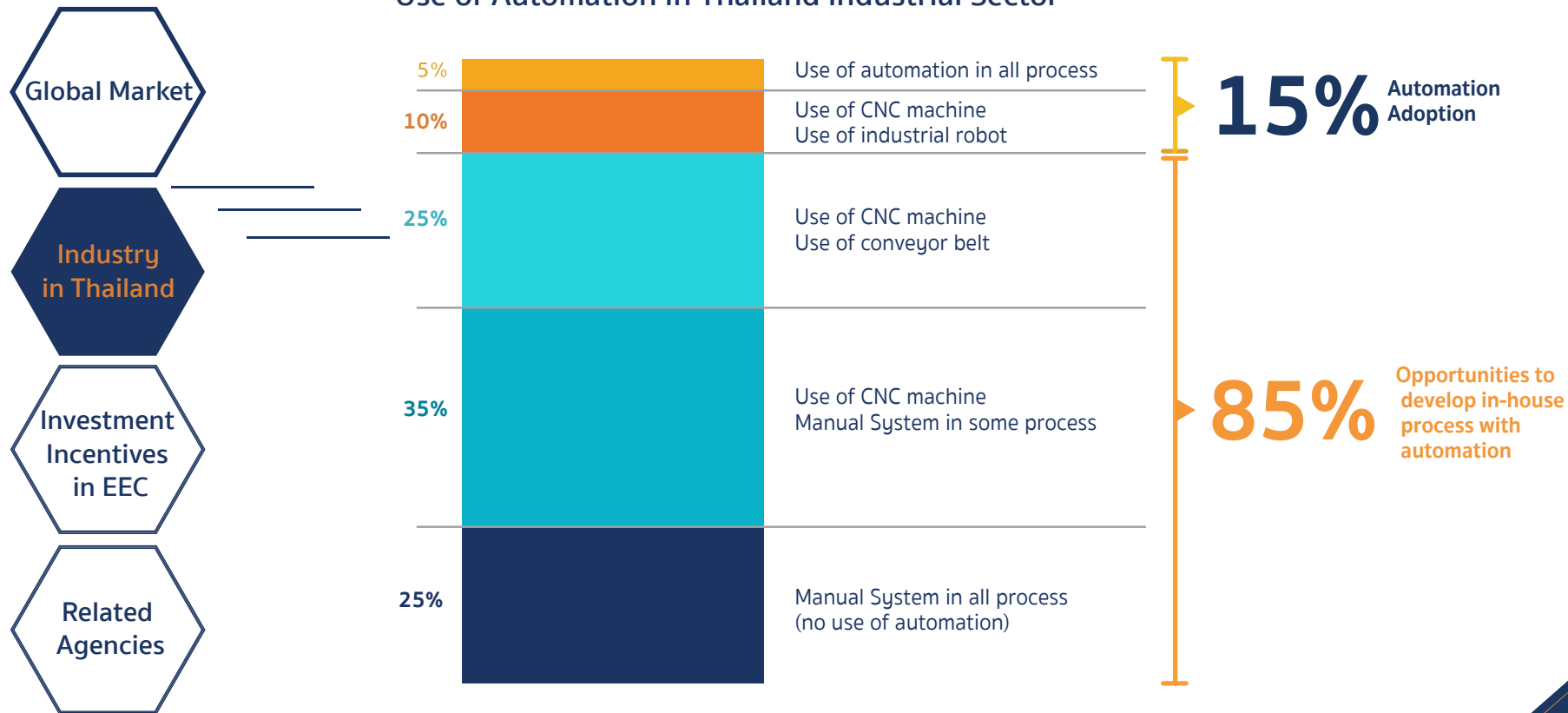
#### System Integrators

Most players are multinational companies.

# AUTOMATION AND ROBOTICS

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## Use of Automation in Thailand Industrial Sector



Source: Report from Office of Industrial Economics, Ministry of Industry

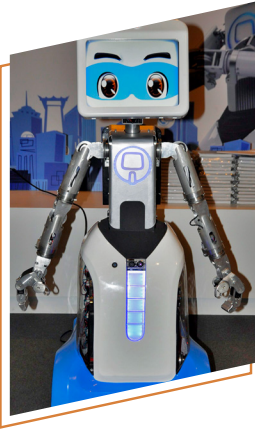
## Example of Thai Service Robots

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**Dinsow**

A robot, equipped with a camera, infrared and thermal sensors, and artificial intelligence, used for elderly care service, developed by CT Asia Robotics



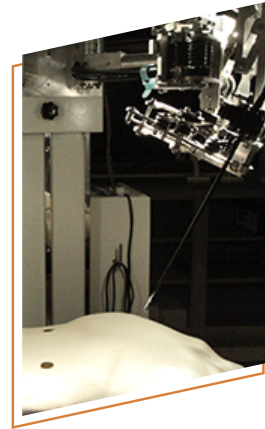
**ZEABUS AUV**

An autonomous underwater vehicle (AUV), developed by Kasetsart University, which has participated in the RoboSub Competition since 2014.



**Fhasai**

Robot-assisted therapy for children with autism spectrum disorders, a winner of the medical robotics idea contest, Med Bot 2014, developed by Mahidol University.



**BART LAB  
Surgical Robot**

Surgical robot systems to assist surgeons and enhance performance, developed by BART LAB, Faculty of Engineering, Mahidol University.



**Ohm**

A receptionist robot developed by FIBO, from an earlier-generation robot called "Namo", capable of recording and projecting memories through a built-in video camera and projector.

## Investment incentive package for investment projects in the Eastern Economic Corridor (2020-2021)

Key features	Investment Incentives	Targeted activities			
		Section 8	A1	A2	A3
1. Standard tax package	Tax holidays	10 Years (no cap)	8 Years (no cap)	8 Years	5 Years

### Human resource development programs (additional tax incentives)

2. Investment projects which are engaged in human resource development programs	Tax holidays	2 Years (no cap)	-	-	-
	50% reduction of CIT	-	3 Years	3 Years	3 Years

### Projects located in the four promoted zones for specific industries (EECi, EECd, EECA and EECmd) OR industrial estates and promoted industrial parks

3. Investments located in EECi, EECd, EECA and EECmd	Tax holidays	1 year (no cap)	-	-	-
	50% reduction of CIT	-	2 Years	2 Years	2 Years

### OR

3. Investments located in industrial estates and promoted industrial parks.	Tax holidays	1 year (no cap)	-	-	1 Year
	50% reduction of CIT	-	-	-	-

### Remarks:

- A1 : Knowledge-based activities focusing on R&D and design to enhance the country's competitiveness.  
A2 : Infrastructure activities for the country's development, activities using advanced technology to create value-added, with no or very few existing investments in Thailand.  
A3 : High technology activities which are important to the development of the country, with a few investments already existing in Thailand.  
Section 8 : Technology and Innovation Development includes targeted core technology development such as development of biotechnology, nanotechnology, advanced materials technology and digital technology.

### New investment promotion measure in EEC

- Starting January 2, 2020

According to the announcement of the Board of Investment No.2/2563, announced on January 15th, 2020,

- Applications must be submitted by the last working day of 2021.

- Projects located in the four promoted zones for specific industries (EECi, EECd, EECA and EECmd) are eligible for the incentives without application deadline.

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## Example of Automation and Robotics Programs



**King Mongkut's University of Technology North Bangkok (KMUTNB)**  
• Bachelor of Engineering in Robotic Engineering and Automation System



**King Mongkut's University of Technology Thonburi (KMUTT)**  
• Bachelor of Engineering in Automation Engineering  
• Bachelor of Engineering in Mechatronics Engineering



**King Mongkut's Institute of Technology Ladkrabang (KMITL)**  
• Bachelor of Engineering in Automation Engineering  
• Bachelor of Engineering in Robotics and Artificial Intelligence Engineering



**Chulalongkorn University**  
• Bachelor of Engineering in Robotics and Artificial Intelligence Engineering



**Kasetsart University**  
• Bachelor of Engineering in Electrical-Mechanical Manufacturing Engineering



**Assumption University**  
• Bachelor of Engineering in Mechatronics Engineering

## RESEARCH CENTERS FOR AUTOMATION

Many Thai academic institutions have been actively devoting time and resources to research on automation and robotics.



### RCRT

Working under the Department of Mechanical Engineering in the Faculty of Engineering at Chulalongkorn University, the Regional Center of Robotics Technology (RCRT) is one of the leading robotics technology and manufacturing research centers in Thailand. The center's topics of research mainly cover the control of mechanical systems. In most cases, the results have been transferred and utilized by real-world industries as well as experts in other related fields.



### FIBO

The Institute of Field Robotics (FIBO) was established in 1995 as a center of excellence in robotics and technology management. FIBO offers undergraduate and graduate programs in robotic and automation engineering. It also features a number of research laboratories – the Bio-Inspired and Educational and Robotics Lab (BEaR Lab), the Micro Robotics Lab, and the Unmanned-Vehicles and Autonomous Robots for Exploration Laboratory (UVAX), to name a few.



## SUPPORTING FACTORS: ASSOCIATIONS AND INSTITUTIONS

There are many institutions and organizations which support technological development and facilitate entrepreneurs in the fields related to automation and robotics.

### Public Agencies



#### National Science and Technology Development Agency

Supports R&D on five target areas, including, agriculture & food, health & medicine, energy & environment, bioresources & community and manufacturing & service Industries



#### National Metal and Materials Technology Center

Creates and enhances capabilities in materials technology through R&D, technology transfer, HRD and infrastructure development



#### Electrical and Electronic Products Testing Center

Supports R&D and product testing of electrical and electronic products



#### National Innovation Agency

Supports R&D of innovative products and embed innovative strategic direction of firms

### Research Institute



#### Thai-German Institute

Assists transformation of Thai manufacturing technology and automation system to meet with International standards

### Associations



#### Thai Robotics Society

Supports research and networking within robotics community and provide public information related to robots



#### Thai Embedded Systems Association

Developer's network for electronic design industry for developers, by developers



#### Thai Machinery Association

Facilitates Thai machinery market, and support research and development of Thai manufacturing system

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