經濟部

TAIWAN

Smart Machinery

Security Industry / New Generation Automobiles / Communications Industry / The Internet of Things / Semiconductor Industry / Biotechnology Industry / **Smart Machinery**

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Policy Initiatives —

Smart machinery industry promotion program

In response to the massive changes brought about by the IoT, 3D printing, AI, and robot technologies to life and industries, Taiwan implemented the Smart Machinery Industry Promotion Program in July 2016 in hopes of upgrading the precision machinery industry into the smart machinery industry. Taiwan aims to increase the output value of the machinery industry through professional talent cultivation, overall industrial upgrade and transformation so as to expand international cooperation and market opportunities.

1 | Smart Machinery Promotion Office |

The Smart Machinery Promotion Office was established in February 2017 to help create a new ecosystem for Taiwan's smart machinery industry. Steps include "digitalization of production management, from Industry 2.0 to Industry 3.0," "establishing the national industrial IoT platform (PaaS)," and "developing service modules for different industry applications (SaaS)." This involves developing various solutions based on Taiwan's precision machinery and ICT industries to help key industries apply smart manufacturing.

From the perspective of companies, the Smart Machinery Promotion Office can assist companies in achieving smart manufacturing through (1) a smart manufacturing consultant team that makes on-site visits and provides consulting, diagnosis, and technical services. (2) Establishing test sites for plumbing hardware and hand tools, aerospace machine tools, auto parts and components, and semiconductor equipment. (3) Linking together domestic and overseas platforms to help companies build partnerships.

2 Smart Manufacturing Pilot Production Site

The Smart Manufacturing Pilot Production Site is a national proofing center that 100% uses domestically produced high-end machinery processing equipment. The site links together domestically developed and produced digital product systems, develops machinery processing application service modules, and realized mixed-model smart manufacturing production lines for 9 parts and components. It serves as the domestic smart manufacturing planning center, and shows the Industry 4.0 applications of domestic equipment to the industry.

Since the site was opened in September 2018, there have been over 4,400 visitors with numerous companies having introduced related applications. Also, international system developers (such as Dassault Systèmes and Mitsubishi) were brought into the site to jointly promote smart integrated technologies with domestic teams.

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3 | Smart Machinery Park |

In coordination with industry characteristics, requirements, and location of industrial clusters, related government agencies have expanded the hinterland of Taichung Fengzhou Technology Science-based Industrial Park (Figure 1) to establish the Smart Machinery Park, providing an option for companies to build factories and use as a test site. At present, 33.44 ha of industrial land has been planned, and the park is expected to allow companies to begin pre-registration for industrial land in September 2019, and allow companies to move in during the first half of 2020. [1]

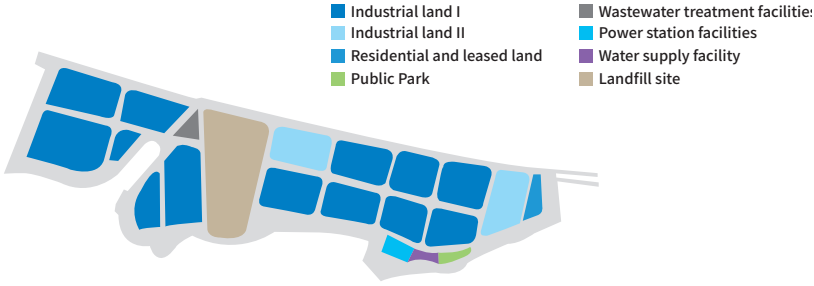

Figure 1 Taichung Smart Machinery Park

Contact Information

Taichung Fengzhou Technology Science-based Industrial Park

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1 Please refer to the official website of the Smart Machinery Promotion Office and Fengzhou Technology Science-based Industrial Park.

Overview of Industrial Development

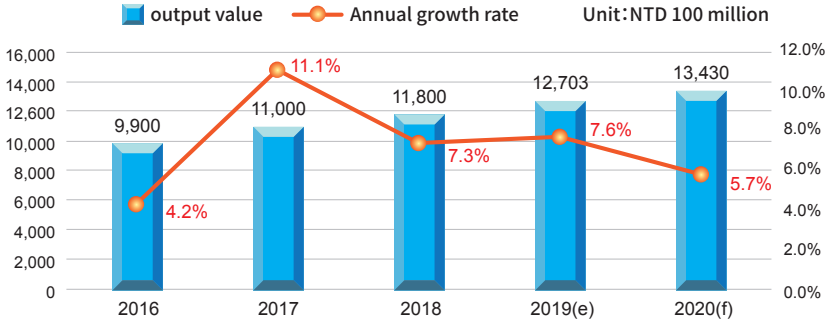
1 | Production Value |

The machinery industry is an important basic industry that has pushed Taiwan's industrial upgrade behind the scenes. The machinery industry became Taiwan's third largest industry in terms of output value in 2017, after the semiconductor and panel industries. Among the variety of machinery products, machine tools, high-tech (semiconductor) production equipment, industrial robots, and key parts and components of automation have relatively high output value in Taiwan's machinery industry.

The output value of Taiwan's machinery industry was approx. NT$1.18 trillion in 2018, up 7.3% compared to 2017. Based on the output value of various products, high-tech production equipment and machine tools have relatively high output value, reaching NT$151 billion and NT$147.6 billion in 2018, down 2.4% and up 9.1% compared to 2017, respectively. The output value of Taiwan's machinery industry is expected to reach NT$1.34 trillion in 2020 under the demand for automation and development of smart manufacturing worldwide (please refer to Figure 2). [2]

According to information of the Taiwan Association of Machinery Industry, the export value of machinery products in Taiwan reached US$27.4 billion in 2018, up 7% compared to the same period last year, making Taiwan the 15th largest exporter in the world. The main export destinations were China, the U.S., and Japan.

2 Refer to the abstract of the ITRI's "Current Status and Trends of Taiwan's Machinery Industry."



Source: Taiwan Association of Machinery Industry, compiled by PMC.

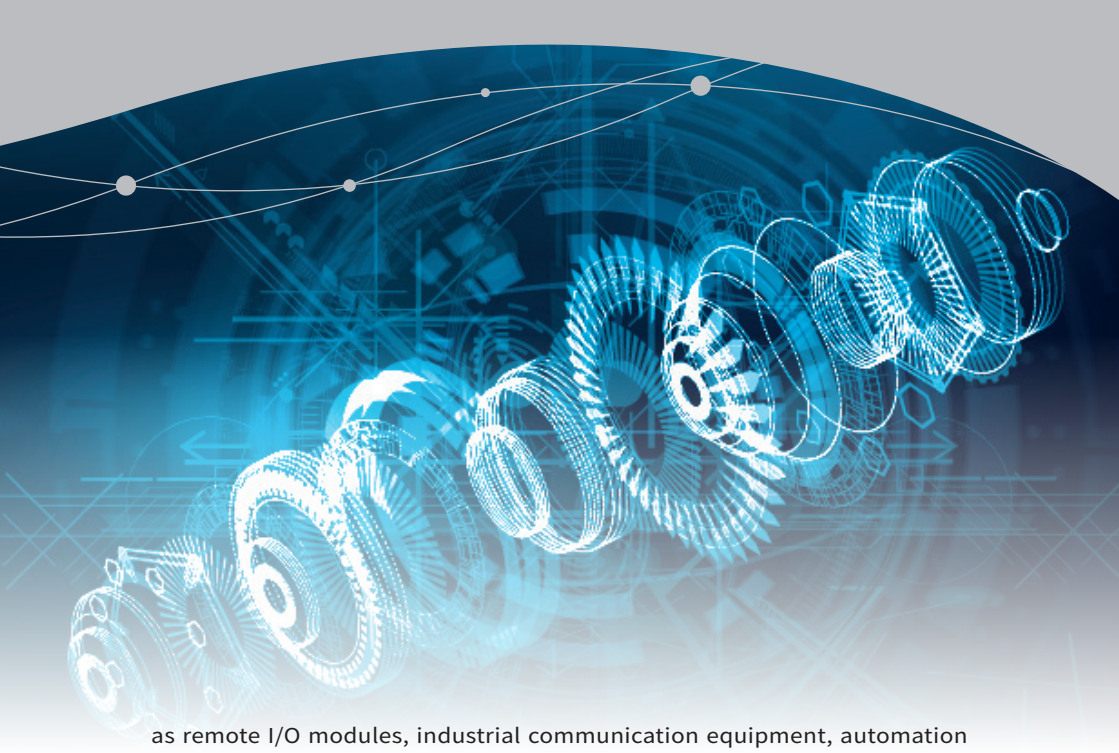
Figure 2 Output value of Taiwan's machinery industry in 2016-2020

2 | Industrial Clusters |

Taiwan's machinery industry mainly consists of SMEs. According to statistics of the Statistics Department, Ministry of Economic Affairs (MOEA), Taiwan currently has approx. 17,000 machinery companies with over 300,000 employees. Industrial clusters have formed in northern, central, and southern Taiwan, which led to the establishment of many important companies.

1. Northern Taiwan

The northern Taiwan industrial cluster formed in New Taipei City, Taoyuan, and Hsinchu consists of precision sensing equipment, electronics and semiconductor production equipment, automated components and system integration, industrial computers, and controllers, with Advantech being the most representative. Advantech was established in 1983 and provides cross-industry production solutions by working closely with system integrators. It is currently a leader in comprehensive system integration and design services in Taiwan. Advantech is optimistic about Industry 4.0 and continues to expand its industrial automation products and services. It currently offers numerous products and services for smart factories, such



as remote I/O modules, industrial communication equipment, automation controllers and I/O, embedded automated industrial computers, industrial tablet PC, smart factory cloud integration, smart equipment automation, overall equipment efficiency management, modulized industrial computer, management of smart connected CNC equipment, and smart workstation solutions. These will effectively help industries improve their production performance, and optimize the management process and decision making results.[3]

2. Central Taiwan

There is an industrial cluster of machine tools and parts and components, integrated ballscrew, linear guide, industrial machinery (carpentry, textiles, rubber and plastics machinery), smart robots, automation components and system integration in Taichung and Changhua. Representative companies include HIWIN, Victor Taichung, and the Fair Friend Group. HIWIN was established in 1989 and is headquartered in the Taichung Industrial Park. The company mainly engages in the R&D and manufacturing

3 Official website of Advantech, https://www.advantech.tw/solutions/ifactory?utm_source=CorpSiteHomepage-InPage&utm_medium=link&utm_campaign=CorpSiteHomepage-SolutionsClicks.

of precision integrated ballscrew and linear guide components, and the R&D and manufacturing of industrial robots. It currently has locations in Germany, the U.S., Japan, South Korea, Switzerland, the Czech Republic, France, Italy, Singapore, China, and Israel. In coordination with industrial development trends, HIWIN is gradually transitioning from individual parts and components to system development, and is actively investing in medical devices, solar power, wind power, semiconductors, ICT, and precision machine tools to aid the development of Taiwan's industries towards smart manufacturing.[4]

Victor Taichung was established in Taichung in 1954. Its main products include CNC lathe, machining center, and plastic injection molding machine. Its business units include machine tool, plastic machine, precision casting, processing and sheet-metal spray paint, precision, and environmental protection. The company currently has locations in Tianjin, Guangzhou, and Shanghai in China, the U.S., the U.K., France, South Africa, Malaysia, Thailand, and Indonesia. Through its continuous R&D and investment in smart machinery and smart factories, Victor Taichung is one of the leading enterprises of Taiwan's smart machinery industry. [5]

The Fair Friend Group was established in 1979 and has three business groups – machine tools, industrial equipment, and green energy. The company currently has branches or locations in Taiwan, China, Japan, Germany, South Korea, Italy, Hong Kong, Thailand, Russia, India, the U.S., Indonesia, Hungary, France, and Switzerland; 37 brands and 50 production bases in total. The FFG has become a global leader in the machine tool industry with its complete CNC industrial chain, globally shared R&D capabilities, and complete production and sales network.[6]

4 Official website of HIWIN, https://www.hiwin.tw/history.aspx; https://www.moneydj.com/ KMDJ/wiki/wikiViewer.aspx?keyid=6ad2daf5-a3a9-4900-bcf4-75026e988867.

5 Official website of Victor Taichung, https://www.victortaichung.com/web/smart_factory/headpage.php.

6 Official website of the FFG, http://www.ffg-tw.com/front/bin/home.phtml.

3. Southern Taiwan

As for Chiayi, Tainan, and Kaohsiung, these areas have industrial clusters for machine tools and parts and components, industrial machinery (fastener forming and processing and rubber and plastic machinery), smart robots, controllers, and precision molds, in which Tongtai Machine & Tool is the most representative.[7] Tongtai was established in Kaohsiung in 1969, and has invested 3-5% in R&D every year. Besides developing cutting machine tools and conducting application research, the company has expanded to advanced processes for ultrasound assisted processing, laser processing, and metal 3D printing. The company has a complete production line, such as cutting processing equipment, printed circuit board processing machine, laser processing machine, additive manufacturing equipment, and smart applications, and also excellent turnkey capability. Furthermore, it has over 60 sales and service locations around the world. The Tongtai is able to provide customers with one-stop service, and help the industry develop smart manufacturing capabilities.[8]

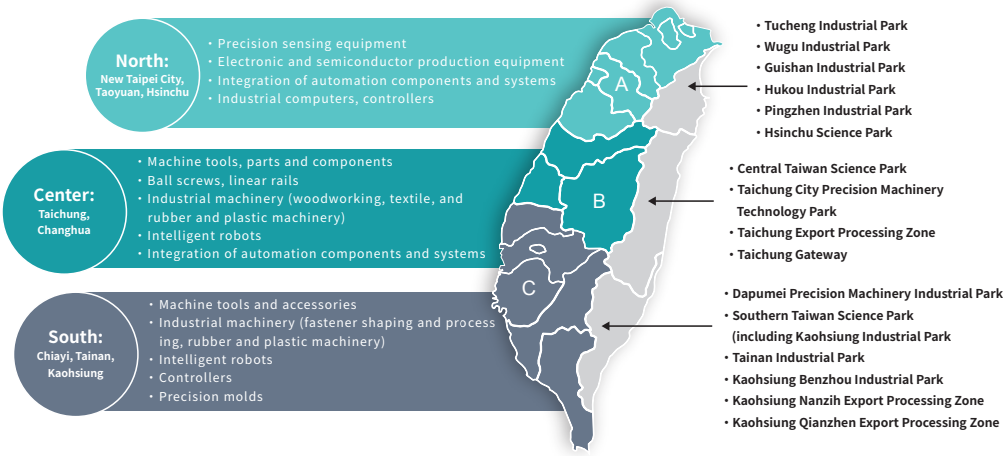


Figure 3 Taiwan's Precision Machinery Industrial Clusters

7 Reference the MOEA's news release "Key Industries in Taiwan – Smart Machinery."

8 Official website of the Tongtai Group http://www.tongtai.com.tw/tw/introduction.php.

Potential Investment and Collaboration Opportunities in Taiwan

1 Joint development of smart manufacturing applications

Taiwan has developed complete industrial clusters for semiconductor, ICT, metal processing, auto parts and components, and petrochemical products. Diverse industries along with the tightly knit machinery industry supply chain, as well as the government's active promotion of industrial parks and preferential taxes, foreign companies will have the optimal site for developing and verifying innovative smart manufacturing application projects. Taiwan has already accumulated R&D capabilities in digital simulation and analysis, product life cycle management, big data analysis, machine learning, and AI, which makes Taiwan the best partner for foreign companies to seize business opportunities in the development of smart machinery.

2 Transformation of R&D results through supply chain collaboration

Taiwan is the world's seventh largest producer and fifth largest exporter of machine tools. Taiwan has complete industrial clusters and supply chains, and has all of the equipment or systems for machine tools, robotic arms/robots, smart factories, and industrial IoT. Furthermore, Taiwan' s machinery industry has detailed division of labor with the flexibility to meet customers' requirements. The abovementioned industrial foundation will benefit foreign companies in establishing R&D or production sites in Taiwan, rapidly transforming R&D results into products.

3 Exploration of the continuously growing smart manufacturing market

Industry 4.0 is a global trend, and the annual growth rate of Taiwan's machinery industry is expected to be 2% in 2019 and reach 5% in 2023. The market scale of smart factories will exceed US$170 billion in 2022, in which 25% of the demand will be from Asian countries. As the semiconductor industry continues to invest in advanced processes, and global ICT, panel, and automobile supply chains expand the scale of investments in response to the growing demand for smart automation, global demand for smart machinery is expected to achieve stable growth. Foreign companies can seize business opportunities of Taiwan's smart machinery industry through investment in Taiwan, and further expand into the regional/global smart manufacturing market.

Investment Incentives

1 | Tax incentives |

The corporate income tax rate of Taiwan is 20%. To encourage foreign companies to invest in Taiwan, support industrial innovation, and promote industry-academia collaboration, foreign companies are eligible for the following preferential taxes (Table 1):

Table 1 Preferential taxes

Encouraged operational activities	Incentives
Establishing operational, R&D, or manufacturing sites in Taiwan	• Up to 15% of the company's R&D expenditures may be deducted from its corporate income tax that year. • Imported machinery that local-manufacturers cannot produce is eligible for duty-free treatment. • Royalties paid to foreign companies for new production technologies or products imported from overseas that have patent rights, trademarks, or various concessions are exempted from income tax after gaining approval from the Industrial Development Bureau, MOEA. • Royalty payments to foreign companies for imported new production technologies or products that use patents, copyrights, or other special rights owned by foreign companies is, with the approval of the Industrial Development Bureau, MOEA, exempt from the corporate income tax.

Encouraged operational activities	Incentives
Investment in smart machinery/5G	• Smart machinery: Automatic, flexible, or mixed-model production that utilizes big data, AI, and IoT. • 5G: Related investment projects include 5G communication systems, new hardware, software, technology, or technical services. • For investments of no less than NT$1 million and no more than NT$1 billion, either "5% of investment spending deducted from corporate income tax (current FY)" or "3% of investment spending deducted from corporate income tax, if total spending spread over three years" may be selected, but the total amount deducted may not exceed 30% of corporate income tax that year. • The applicable period is from January 1, 2019 to December 31,2021 (smart machinery)/January 1,2019 to December 31,2022 (5G).
Promoting industrial innovation and industry-academia collaboration	• Individuals and creators who receive shares via technology investment, hold the shares for 2 years, and meet conditions for serving in Taiwan may choose to pay taxes based on the price of shares when they were acquired or transferred, whichever is lower. • Limited partnership venture capital that makes a larger lump sum investment may be taxed using the transparent entity concept. • Parent company employees that obtain shares of subsidiaries and vice versa are also eligible to be taxed based on the lower share price. • Companies or limited partnerships that use undistributed earnings to make real investments may deduct it from their undistributed earnings.
Moving into industrial parks	• Companies that move into export processing zones, science-based industrial parks, and free trade zones are exempted from import tariffs on machinery and equipment, raw materials, fuel, supplies, and semi-finished products. • The business tax rate is zero for exporters of goods and labor services.

2 | Subsidies |

1. Global Innovation Partnership Initiatives

To encourage foreign companies that complement and mutually benefit Taiwan's industries to engage in R&D and innovation activities in Taiwan, those that: (1) have technologies not yet mature in Taiwan and overseas and will produce strategic products, services, or industries in future industrial development; (2) have potential to let Taiwan produce leading technologies or significantly enhance the competitiveness and increase the added value of important industries; or (3) engage in key and common technology R&D, vertical or horizontal technology integration, and can create an industrial value chain; will be eligible for subsidies of up to 5% of total R&D expenditures after gaining approval from the MOEA.

2. Integrated R&D Program

Companies that (1) engage in key and common technology R&D, vertical or horizontal technology integration, and can create an industrial value chain; (2) establish industry standards, protocols, or platforms; or (3) establish applications, services, and innovative business and marketing models with technological content and increase the industry's added value; will be eligible for subsidies of no less than 40% but no more than 50% of total project funding after gaining approval from the MOEA.

3. Industrial Upgrade & Innovation Platform Program

The Industrial Development Bureau, MOEA and Ministry of Science and Technology jointly implemented the Industrial Upgrade & Innovation Platform Program" to guide industries to develop towards greater value, and encourage companies to enter high-end product application markets to increase the industry's overall added value. The program provides companies with R&D teams in Taiwan with 40-50% of funding required for theme-based R&D projects, and up to 40% of funding for R&D projects proposed by companies.

Successful Examples of Foreign Companies

1 Collaboration in machinery and equipment manufacturing

Taiwan's NEXCOM International Co., Ltd. and Energid jointly developed a 7-axis industrial robot. Applied Materials invested in a manufacturing center of the equipment for producing display in Taiwan. Yaskawa Electric Corporation invested in a robot R&D and exhibition center in Taiwan.

2 Cooperation on testing sites

Dassault Systèmes established an R&D center in Taiwan and formed an alliance with the Fair Friend Group to seize business opportunities of smart factories. It also signed an MOU with the Taoyuan and Taichung City Governments to collaborate in projects relating to IoT, startup ecosystem, and innovation and R&D hubs under the "Asia Silicon Valley" program.

3 Cooperation in talent development

Bosch and National Cheng Kung University jointly established a smart manufacturing innovation facility to cultivate Industry 4.0 talent. Rockwell Automation and Feng Chia University signed an MOU for talent cultivation. Besides introducing smart equipment and offering courses on smart machinery, it also established a corporate IoT application laboratory and smart manufacturing laboratory to assist in the cultivation of middle to high level talent for smart machinery in Taiwan.

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