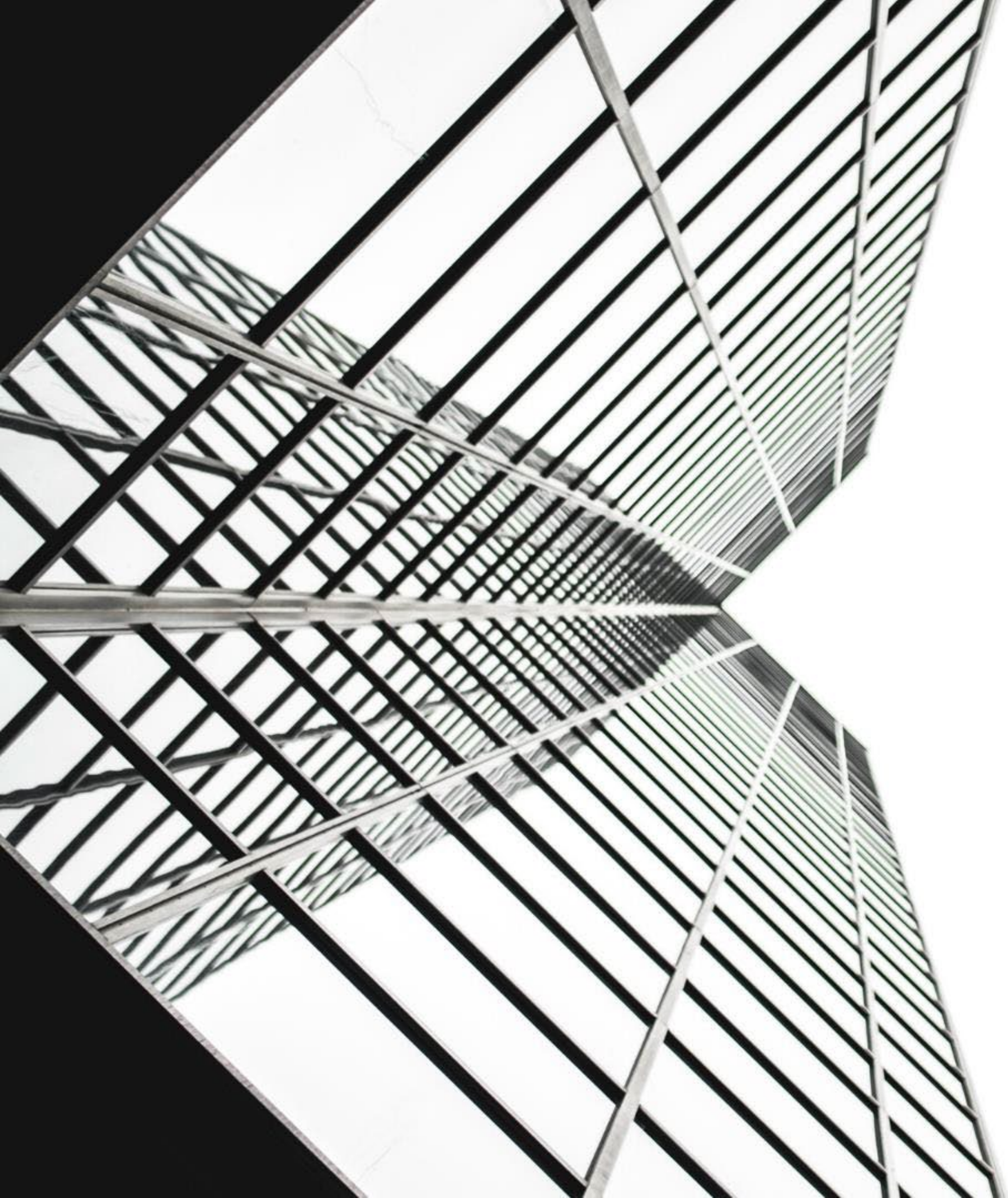

Tractus

Building Global Business

Taiwan Industry Report

February 2024

Cybersecurity

Medical Devices & Pharmaceutical OEMs

Automation & Robotics

UAVs (Civilian Apps)

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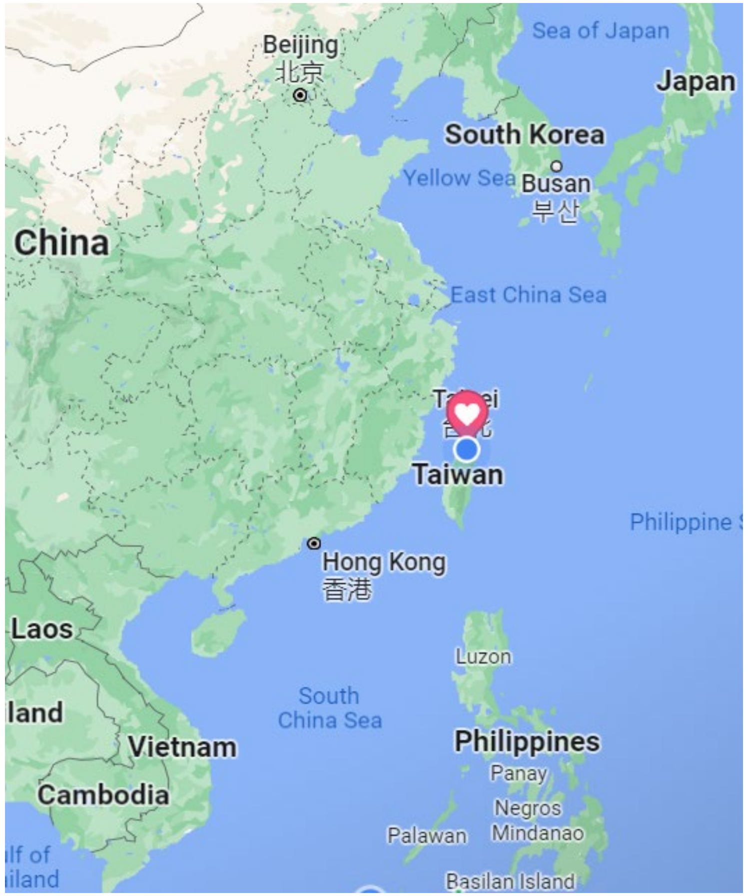
Taiwan Key Facts



Population **23.42 M** (Nov 2023)	***Ease of Doing Business*** **15th** (Global ranking, 2019)	***Net Zero by 2050***
GDP-PPP Per Capita **14th (US$73,344)** (Global ranking, 2023)	***Most Competitive Economy*** **6th** (Global ranking, 2023)	***Super Aging Society by 2026***
GDP Growth **1.43% / 3.15%** (2023 / 2024 projected)	***Safest Country*** **3rd** (Global ranking, 2022)	***Sound Legal System, Robust IP Protection***

Executive Overview

Cybersecurity

- ***Revenue: US$0.73bn (2023)***
- ***Revenue Growth Rate: +11.53% (2023-28)***
- Frequency of cyber-attacks in Taiwan is 3,250/week, much higher than global average, 1,248/week, in 2023 Q1
- Cybersecurity is listed as one of the "six core strategic industries" by the government
- Taiwan has strong capacity for manufacturing network communication hardware, enabling development of cybersecurity

Medical Devices & Pharmaceutical OEMs

- ***Revenue (Medical Devices / Pharma): US$7.6bn (2021) / US$3.65bn (2023)***
- ***Revenue Growth Rate (Medical Devices/ Pharma): +3% (2022-27) / +6.5% (2023-28)***
- Medical Technology & Precision Health is also one of the "six core strategic industries" listed by the government
- Taiwan has one of the best public healthcare system in the world, ranking the first on Health Care Index for five consecutive years
- Pharma and medical device companies have been transitioning into Contract Development and Manufacturing Organizations

Automation & Robotics

- ***Revenue (Machinery & Equipment / Industrial Process Automation / Robotics): US$10.7bn (2023) / US$126.43mn (2022) / US$224mn (2023)***
- ***Revenue Growth Rate (Industrial Process Automation / Robotics): +2.32% (2024-2028) / +2.36% (2023-2030) / +4.41% (2023-2028)***
- Smart machinery is one of the five key innovative industries that government assists to develop
- Taiwan is a machinery and machine tool industry stronghold and has complete supply chains

UAVs (Civilian Apps)

- ***Output Value (Drone): US$258mn (2023) ****
- ***Output Value Growth Rate (Drone): +25.85% (2023-2030)***
- Taiwan government is supportive of development of UAV, establishing National Drone Team, UAS association, and R&D center
- Taiwan's advantages lie in strong capabilities in ICT, electronic hardware equipment, and component manufacturing
- Aerial photography is the main type of application of UAV, representing approximately 86%

* Information may be partial as the market keeps developing

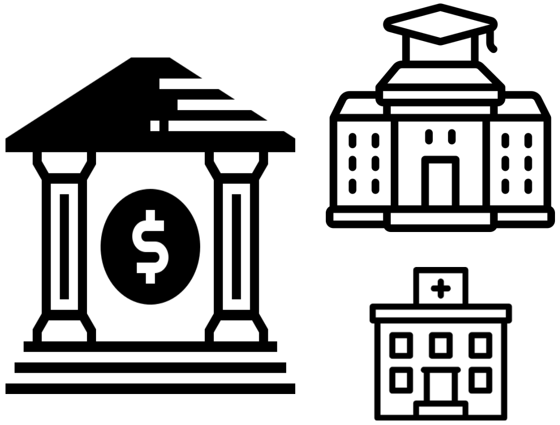
02 Cybersecurity

Growth Drivers

- High frequency of cyber-attacks occurrence
  - Taiwan: 3,250/wk (+24% YoY) vs. World avg: 1,248/wk (+7% YoY) in 23Q1
- Net Zero 2050 policy encourages digital transformation
- Increase adoption of remote or hybrid work mode during/after the pandemic
  - Opportunities are linked to cloud-based corporate information protection
  - Investments related to e-mail security, disaster recovery exercises, and end-to-end security are prioritized by corporates
- Strong capacity for manufacturing network communication hardware with sophisticated technologies
- Government pays immense attention to strengthening cybersecurity capabilities
  - 2018 Published <Information Security Industry Development Action Plan (2018-2025)>
  - 2019 Enacted <Cyber Security Management Act>
  - 2020 Listed information security as one of the “six core strategic industries”
  - 2021 Published <National Strategy for Cybersecurity Development Program (2021-2024)>
  - 2022 Established Ministry of Digital Affairs
  - 2023 Opened National Institute of Cyber Security

Supply Opportunities

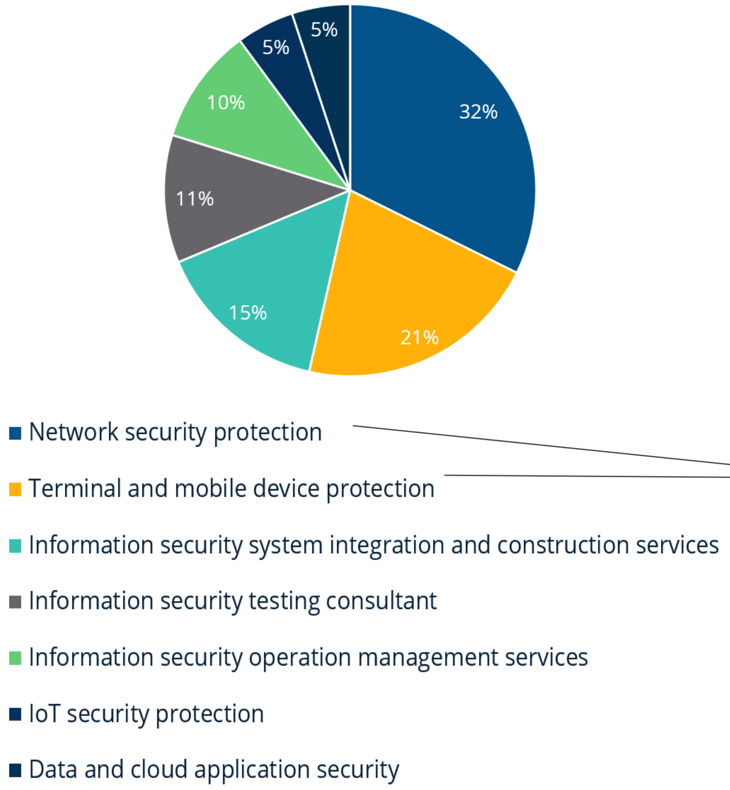
Areas of Application



Banking, Financial Services, and Insurance (BFSI) segment holds the most market share, followed by education and research institutions, then healthcare providers

Types of Products & Services

2022 Information Security Output Value



Subsector Growth Momentum

applied software	+20.45%
industrial computers, modems, telecommunications, and Internet data center (IDC)	+11.23%
system integration	+9.5%

firewalls, biometrics modules, security chips, public key infrastructure applications (PKI), and IoT security gateways accounted for higher percentage of revenue

Source: Industrial Technology Research Institute, 2022

Supply Opportunities

Major Challenges Faced by Domestic Companies

- Cloud service security
- Compliance with domestic regulations
- IoT security applications

Exhibition

Link

In September 2023, Director of National Institute of Standards and Technology (NIST), Laurie E. Locascio, visited Taiwan and met with President Tsai and Director of Ministry of Digital Affairs, Audrey Tang, to discuss about latest cybersecurity framework, US-Taiwan cooperation opportunities, and other topics

Source: US NIST, 2023

Challenges

Insufficient Awareness of Cybersecurity

- While the government has taken many actions to move forward cybersecurity development in recent years, many corporations still have low awareness and are underprepared to potential threats

Limited Resources from SMEs

- The majority of Taiwanese companies are SMEs. Many of them do not prioritize safeguarding cybersecurity because it requires high commitment of resources

03 Medical Devices & Pharmaceutical OEMs

Biomedical Clusters

Integration of local special medical device clusters

Taipei and New Taipei City
Medical electronics and medical imaging R&D clusters

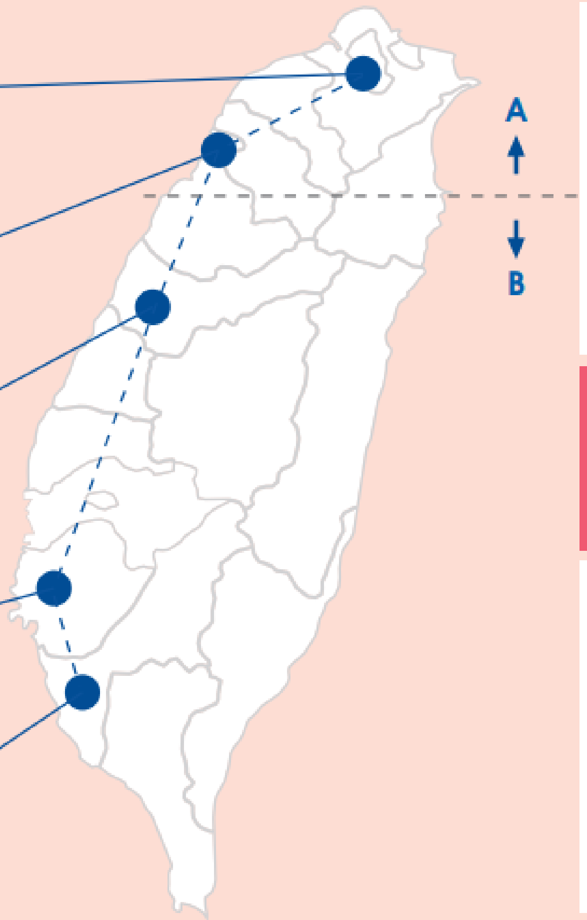
Hsinchu
ICT, high-level medical device R&D clusters

Taichung
Minimally invasive medical assistive devices

Tainan
Dental and bone implant and medical materials

Kaohsiung
Tropical medicine

North to south · biomedical sites linked to form a corridor



A. Integration of local specialty drug clusters

Greater Taipei Area, Hsinchu Biomedical R & D cluster
R&D resources of academic/research institutions, Clinical capabilities of medical centers, Biotechnology research parks, Biotechnology startups

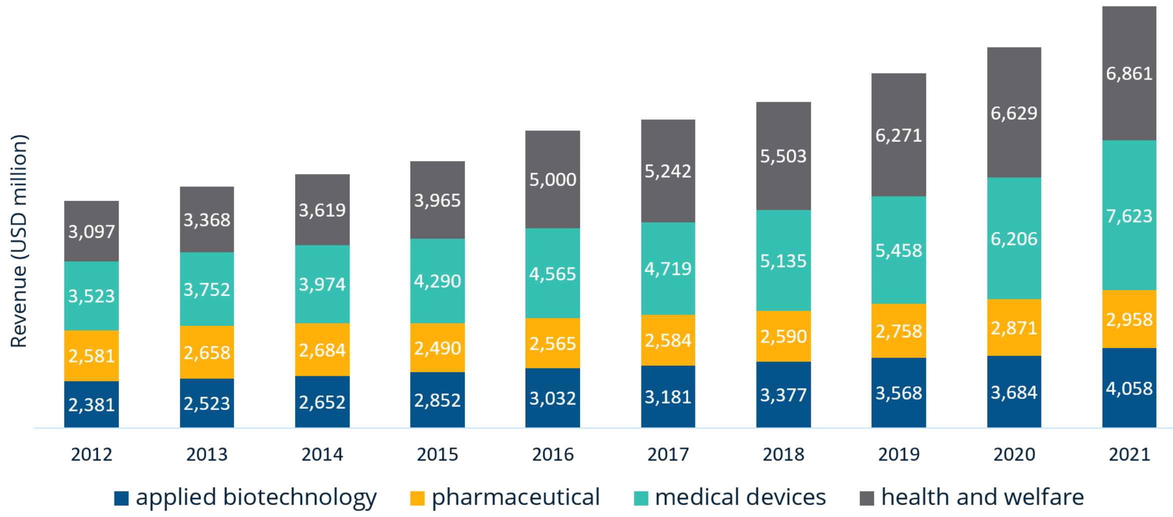
B. Production of drugs needed for clinical and marketing use

Central & Southern Taiwan, High-value Niche Drug production clusters
Active ingredient plants, Pharmaceutical preparation plants, Academic & research institutions

Source: Ministry of Economic Affairs, 2022

Growth Drivers

- Government's full support to biomedical industry
  - Medical Technology & Precision Health is listed in the 6 core strategic industries in Taiwan
  - Ongoing <Biomedical Industry Innovation Program> and amendment of <Act for the Development of Biotech and Pharmaceutical Industry> have facilitated increase in private investments, surged amounts of trained talents, and establishment of bio-medical clusters
- Leading Healthcare System
  - Public healthcare system ranked 1st on the Health Care Index for 5 consecutive years
  - National Health Insurance covers 99.8% of Taiwan citizens and foreign residents
- Taiwan turned into aged society in 2018, and aging population drives demand for biomedical industry

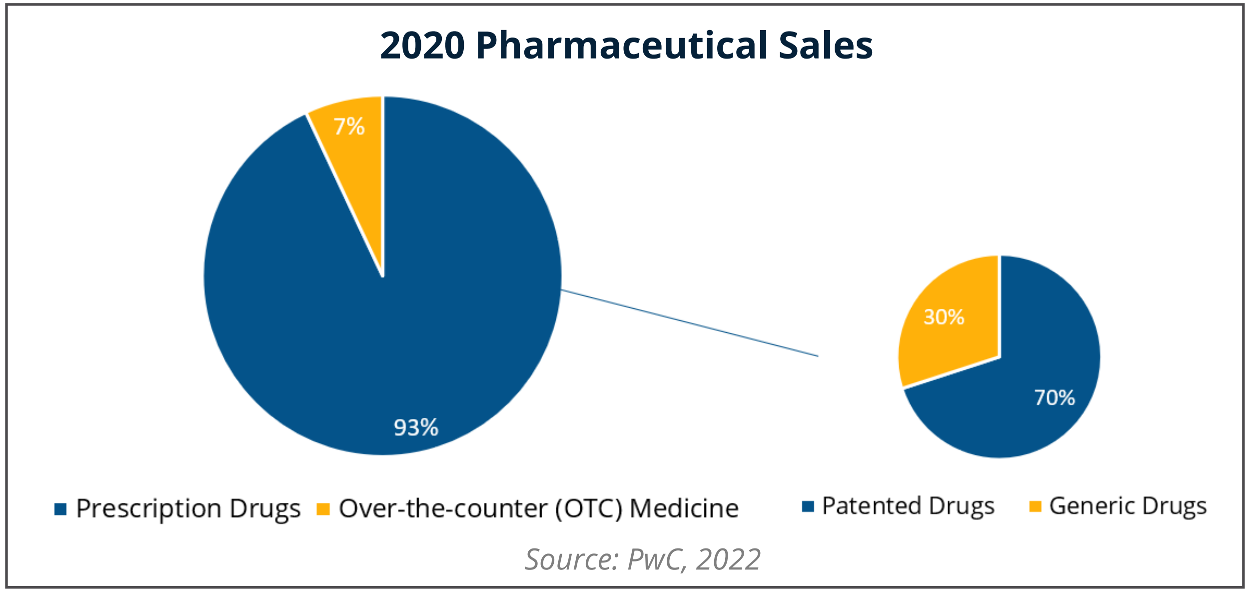


Revenue Growth of the Biotechnology Industry

Source: Ministry of Economic Affairs, 2022

Pharma Opportunities

- ➢ Drugs are more commonly dispensed via prescription due to wide coverage of health insurance
  - That hospitals are allowed to operate pharmacies and thus tend to over-prescribe is beneficial to pharmaceutical suppliers
  - While the OTC was a small segment, the government has been encouraging Rx(Prescription)-to-OTC switching due the cost-containing purpose

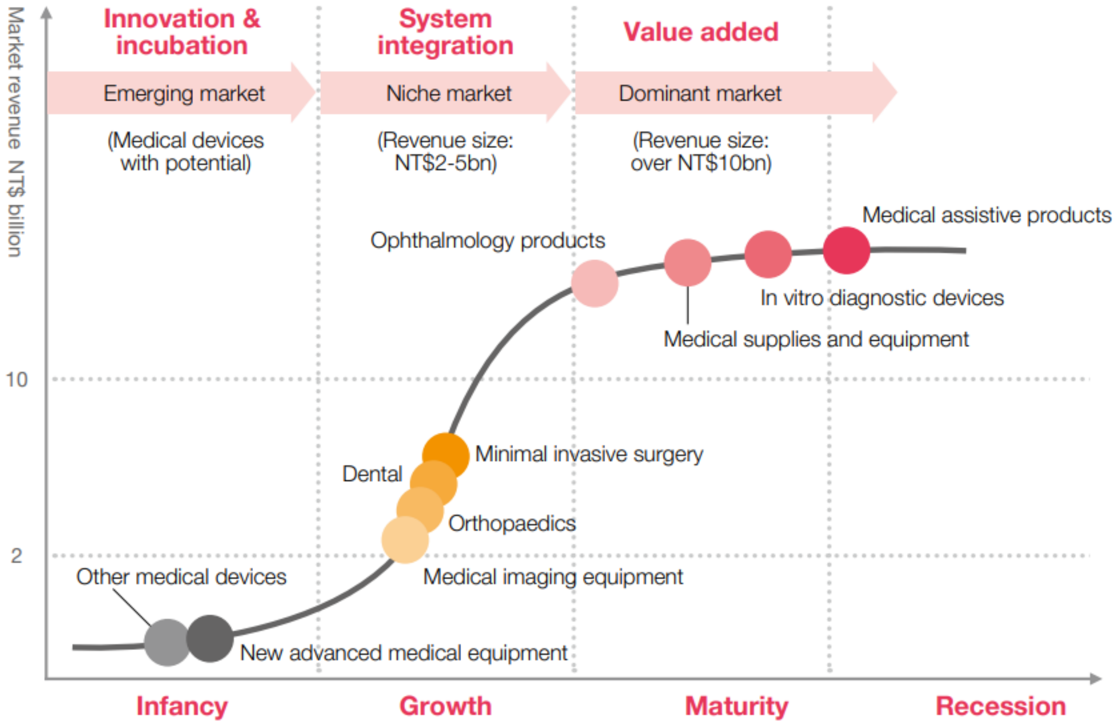


- ➢ Patented drug market is dominated by multinationals
- ➢ Domestic companies have started to develop new drugs recently, mostly Active Pharmaceutical Ingredients (APIs) or finished generics, and are engaging in export

Medical Devices Opportunities

- Taiwanese manufacturers rely on exports, while domestic market depends on imports
  - Domestic medical device makers rely on exports for around 60% of revenue, mostly comprised of mid-to-low-end medical equipment and contracted manufacturing for multinationals
  - 60% of domestic demand is met by imported products, mostly high-end surgical, therapeutic, and medical imaging devices used in hospitals
- Government has prioritized the development of preventive medicine, telehealth, and smart healthcare

Development Status of Taiwan's Medical Device Sector



Source: PwC, 2022

Supply Opportunities

- Healthcare CDMO is the next focus for Taiwanese companies
  - <Act for the Development of Biotech and Pharmaceutical Industry> was revised in 2022 to include Contract Development and Manufacturing Organizations (CDMOs) in the list of incentive recipients
  - Bio Taiwan Committee listed CDMO as essential field of development in August 2023
  - Many domestic pharmaceutical companies that previously focused on developing new products are expanding CDMO-related investments
  - Manufacturing & semiconductor companies have pivoted into medical device CDMO in pursuit of high-margin

- Exhibitions:

Bio Asia Taiwan Link

Healthcare EXPO · TAIWAN 2024.12.05-12.08 Link

MEDICAL TAIWAN INTERNATIONAL MEDICAL, HEALTH & CARE EXPO June 20-22, 2024 Taipei Nangang Exhibition Center, Hall 2 Link

ATLife TAIWAN Assistive Technology for Life 2024/5/16 (Thu) - 19 (Sun) Taipei Nangang Exhibition Center, Hall 1, 1F Link

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Challenges

Government’s Cost Containment

- Taiwan’s authorities have prioritized cost containment, resulting in slow approval process of new drugs, new indications, and reimbursement and issuance of subjective guidance on the use of high-cost drugs

CDMO Market Scope Is Developing

- Taiwanese government and companies have recently begun to develop CDMO businesses. While Taiwan’s CDMO market is relatively small now, future growth is projected

04 Automation & Robotics

Smart Machinery Industrial Clusters

North:
New Taipei City, Taoyuan, Hsinchu

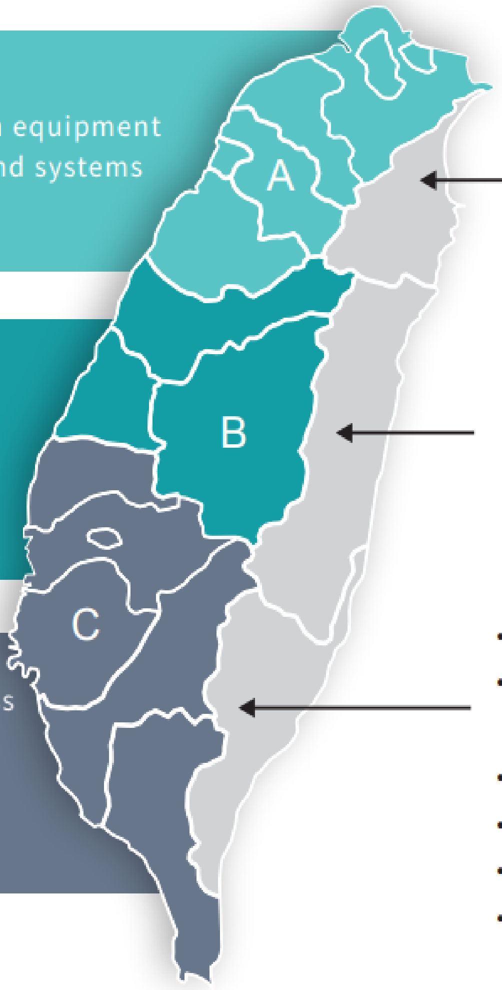
- Precision sensing equipment
- Electronic and semiconductor production equipment
- Integration of automation components and systems
- Industrial computers, controllers

Center:
Taichung, Changhua

- Machine tools, parts and components
- Ball screws, linear rails
- Industrial machinery (woodworking, textile, and rubber and plastic machinery)
- Intelligent robots
- Integration of automation components and systems

South:
Chiayi, Tainan, Kaohsiung

- Machine tools and accessories
- Industrial machinery (fastener shaping and process ing, rubber and plastic machinery)
- Intelligent robots
- Controllers
- Precision molds



- Tucheng Industrial Park
- Wugu Industrial Park
- Guishan Industrial Park
- Hukou Industrial Park
- Pingzhen Industrial Park
- Hsinchu Science Park

- Central Taiwan Science Park
- Taichung City Precision Machinery Technology Park
- Taichung Export Processing Zone
- Taichung Gateway

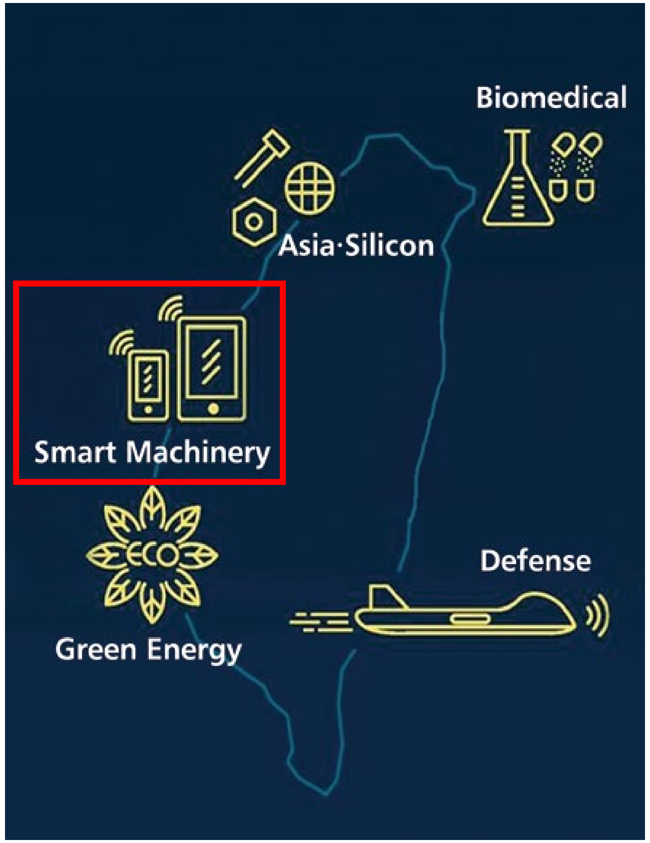
- Dapumei Precision Machinery Industrial Park
- Southern Taiwan Science Park (including Kaohsiung Industrial Park
- Tainan Industrial Park
- Kaohsiung Benzhou Industrial Park
- Kaohsiung Nanzih Export Processing Zone
- Kaohsiung Qianzhen Export Processing Zone

Source: Invest Taiwan, 2023

Growth Drivers

- Smart machinery is one of the five key innovative industries that government has focused on since 2016
- Government provided subsidies and rolled out training projects for domestic companies to introduce smart manufacturing technologies
- ESG Fulfillment
  - Government devised a development plan for manufacturing sector covering process improvement and digitization
  - Companies have been improving supply chain efficiency to fulfill ESG obligations
- Supply chain disruption & US-China Trade War prompted companies to focus on supply chain resilience, shifting mindset from "just-in-time delivery" to "assured supply" thus driving demand for upgrading existing machinery

Five Industrial Innovation Plan

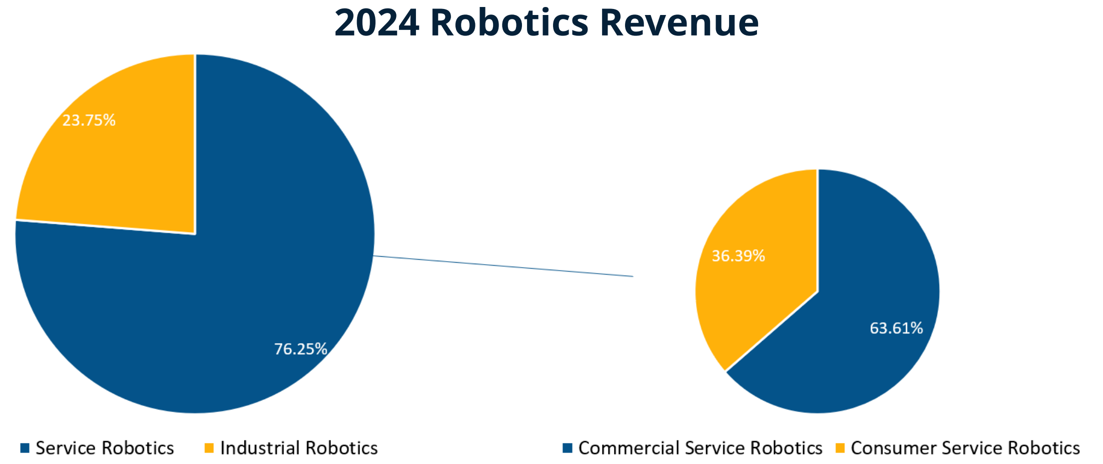


Source: American Chamber in Taiwan, 2017

Robotics Opportunities

- Revenue from service robots is higher than industrial robots

  - Top three fields of application: electronic and electrical manufacturing (55%), car and related components manufacturing (9.1%), and machinery metal manufacturing sectors (7.6%)



Source: Statista, 2023

- Most foreign market players in Taiwan, including Fanuc, ABB, KUKA and YASKAWA, tend to focus on system integration to increase revenue
- Inability to connect different brands of robots or equipment is a major pain point to customers
- Collaborative robots and autonomous mobile robots have strong growth momentum

Supply Opportunities

- Digital transformation progress in manufacturing sector:
  - 63% of early adaptors are in electronic and semiconductor industries
  - Majority of followers are in chemical industry
  - 52% of new entrants are in metal, automobile, and machinery industries
- Government provides preferential taxes and subsidies to foreign companies that engage in investments related to innovations in key industries, including smart machinery
- Implementation of AI, cloud computing, and IoT big data into current automation process is the key trend
- Smart Machinery Promotion Office can help foreign companies participate in testing facilities or exchange platforms and establish supply chain and partner networks in Taiwan
- Key players in the industry
- Exhibitions:

TAIROS Taiwan Automation Intelligence and Robot Show
Link

TMTS 2024 Taiwan Int'l Machine Tool Show MAR 27-31 | TaiNEX 1&2
Link

Challenges

Many Existing Competitors

- Many Taiwanese manufacturers are also providers of automation solutions
- Robot market is currently dominated by Japanese, Swedish, and German companies

Limited Resources from SMEs

- Taiwan's manufacturing sector is home to a multitude of SMEs. Short on capital, SMEs do not pay much attention to upgrading their manufacturing processes

05 UAVs (Civilian Apps)

Growth Drivers

- Government's Initiatives
  - Established National Drone Team in 2023, facilitating development of dual-use drones
  - Established Fuel Cell and Drone Integration League in 2022
  - Established Unmanned Aerial System (UAS) Taiwan in 2022, which include 88 companies as of Jan 2023
  - Inaugurated Drone R&D Center in Chiayi in 2022
- US “Non-DJI” policy
- Taiwan’s Advantages: ICT, electronic hardware equipment, and component manufacturing

UAS Taiwan Founding Ceremony and International Forum

Source: Taipei Computer Association, 2022

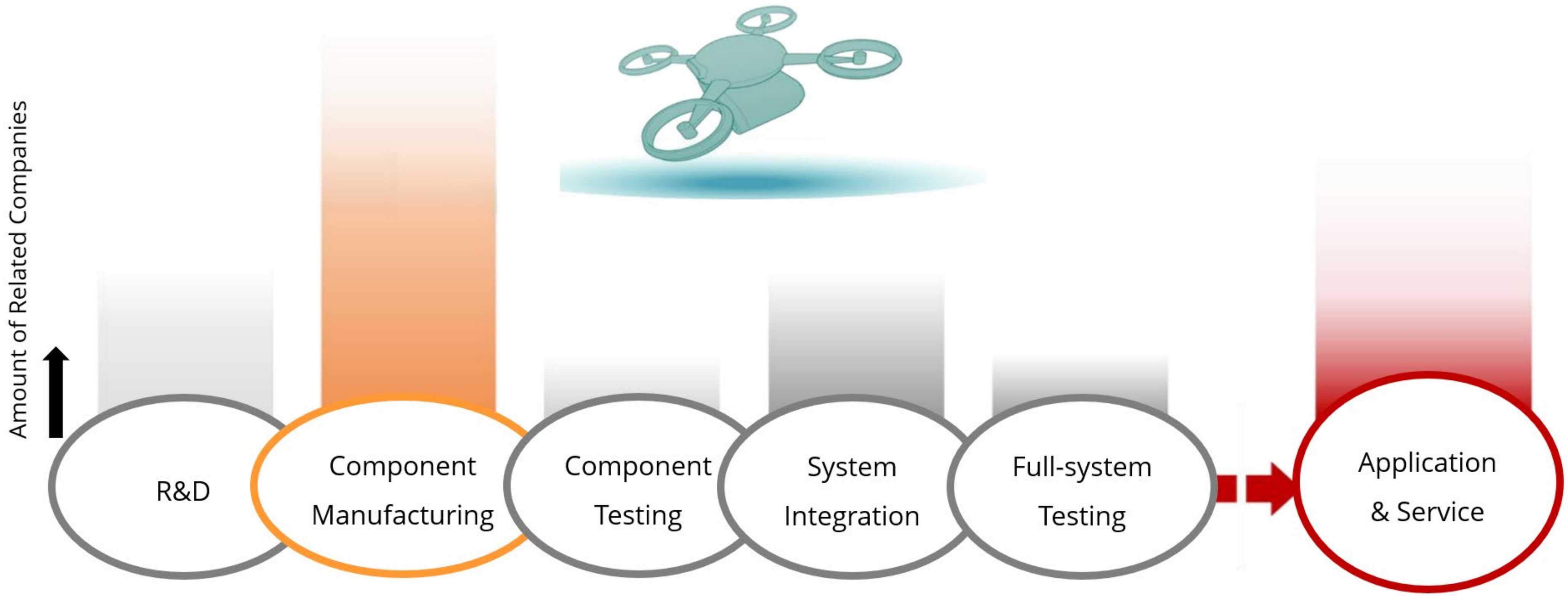
Asia UAV AI Innovation Application R&D Center

Source: Official Facebook fan page

Supply Chain Analysis

Subsystem	Remark
Aircraft Body	• UAVs weighing less than 55 lbs (25 kg) is the mainstream in Taiwan • Casting raw materials into finished products is beyond some manufacturers' capabilities
Propulsion & Power	• Lacks complete supply chain of Lithium polymer battery, which is commonly used to power drones • Large engines, power modules, and propellers are mostly imported
Sensing	• Short of sensing components developers
Payload	• Optical lens are the most important UAV payload in Taiwan since aerial photography is the main application, whereas companies lack this type of system integration ability
Computer	• Taiwan has relatively complete supply chains of these subsystems
Server	
GPS	

Supply Chain Analysis

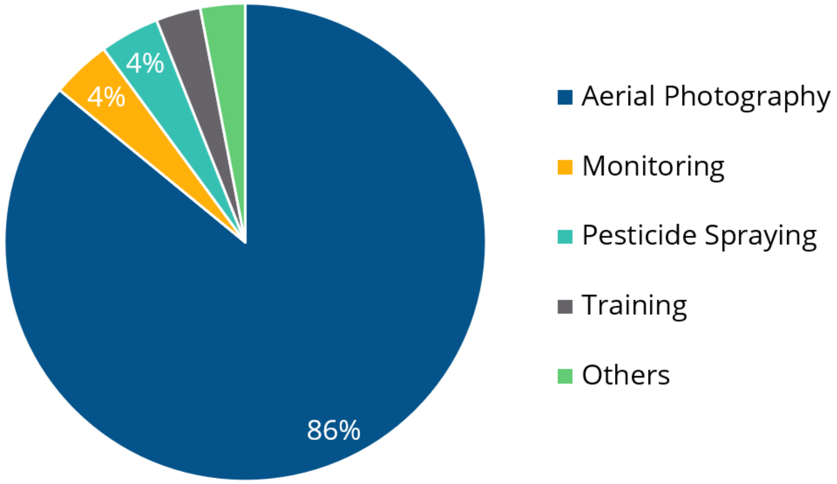


Source: Ministry of Transportation and Communication, 2022

Supply Opportunities

- Aerial photography is the main type of application
- Policy Focus:
  - Short-term (~2025): Solving technology bottlenecks on applications such as bridge inspection & logistics
  - Long-term (2025~): Developing Urban Air Mobility (UAM)
- Exhibition: [Taipei Aerospace & Defense Technology Exhibition (TADTE)]

Intentions of Applying for Permissions to Operate Drones in Restricted Areas



Source: Ministry of Transportation and Communication, 2022

Challenges

Little Demand from Consumer Market

- Drone is more commonly categorized under professional usages as current drone flying regulations limit drone operating areas to few places

Import Regulations

- Must apply for import permission from National Communications Commission (NCC)
- Drones equipped with GPS equipment and with Maximum Take-Off Weight >55lbs (25kg) must go through inspection performed by Civil Aviation Administration (CAA)

06 Recommendations

Recommendations

1. Conduct in-depth research

It is essential to learn about the regulations governing the type of product that you seek to export, and other more specific challenges

2. Find a local representative

Due to language barriers, it is recommended to cooperate with local companies upon entry to Taiwan. US companies can also benefit from their sales experience and network

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With our ***research expertise*** and ***local knowledge***, we are happy to assist your companies to take the next step of entering Taiwan's market