

TAIWAN PRECISION HEALTH INDUSTRY CHAIN

2023

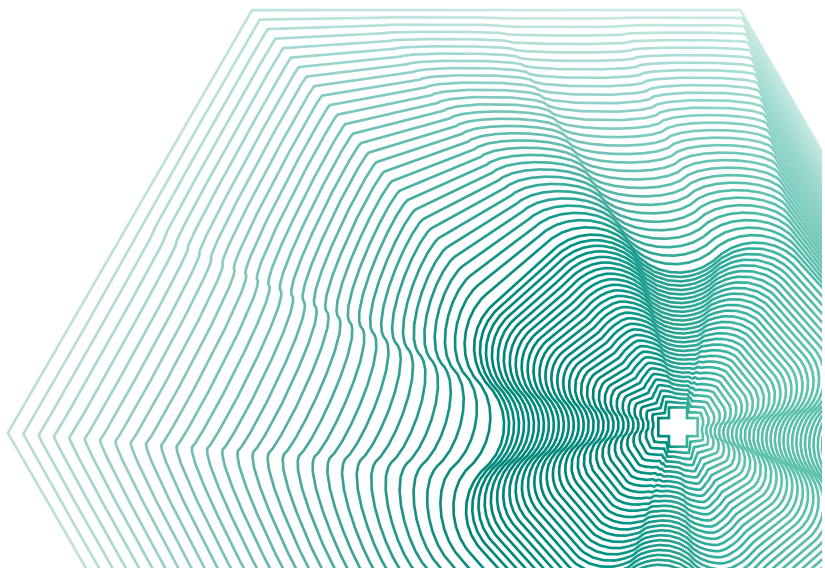


Joint Development of Biopharmaceutical Industry Clusters,
Seizing Business Opportunities for the Development of the Biopharmaceutical Industry

2023

Taiwan Precision Health Industry Chain

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Policy Guidelines

Precision health considers differences in individual genomes, environments, lifestyles, and the molecular basis of diseases to accurately predict, prevent, diagnose, and treat diseases. In the past, “precision medicine” focused on events after the onset of disease, such as diagnosis and treatment. “Precision health” now covers a broader scope before disease onset, including risk assessment, prevention, and health promotion.

The Executive Yuan passed the Program for Promoting Six Core Strategic Industries in May 2021. For the precision health industry, the program promoted the establishment of a gene and health insurance database (Taiwan Biobank) and development of a comprehensive system for precision prevention, diagnosis, treatment, and care. Other program objectives include the development of precision products for the pandemic and expanding international opportunities to promote Taiwan pandemic products and brands.

Main promotion strategies include: introducing digital technology and big data database applications to existing pharmaceutical, medical device, and health and welfare industries to drive cross-sector innovation; fostering growth of the smart health, precision medicine, and regenerative medicine industries by leveraging the value-added and commercially viable applications of health big data and innovative service models; ensuring equal and comprehensive access to the benefits of precision health through diagnosis, treatment, care, and prevention; and creating a brand for Taiwan to market products and services worldwide.

At the end of 2021, an amendment to the Act for the Development of Biotech and Pharmaceutical Industry was introduced, expanding its scope to include new dosage form preparations, regenerative medicine, precision medicine, and digital health applications. The amendment also expanded to include CDMO (contract development and manufacturing organizations) biopharmaceutical companies and extended the implementation period until the end of 2031.

The Executive Yuan is actively fostering the growth of the biotechnology industry and accelerating the development and industrialization of emerging medical technologies in response to the COVID-19 pandemic, which highlighted the strategic importance of the biopharmaceuticals industry to national security. Drafts of the Regenerative Medicine Act and Regulations Governing Regenerative Medical Preparations were submitted to the Legislative Yuan for deliberation in 2023.

Taiwan possesses mature ICT and biomedicine industry chains. The government is actively promoting cooperation with major medical device manufacturers worldwide to develop high-end and special process CDMOs and enter their supply chain, in hopes that public and private sectors will work together to develop another leading industry that protects the nation.

02 Industry Overview

Scale of Output Value

According to the *2023 Biotechnology Industry in Taiwan report* by the Ministry of Economic Affairs (MOEA), Taiwan's biotechnology industry mainly includes five major sectors: pharmaceuticals, medical devices, applied biotechnology, health & welfare and digital health. Total revenue in 2022 was NT\$700.9 billion (Figure 1). The turnover of the health & welfare industry increased by 6.6% compared to the previous year to NT\$226.8 billion, followed by the applied biotechnology industry by 6.44% to NT\$133.9 billion, the pharmaceuticals industry by approximately 4.80% to NT\$96.1 billion, and the digital health industry by 10.09% to NT\$50.2 billion. Only the medical device industry's turnover fell to NT\$193.9 billion in 2022, a decrease of approximately 17.94%, mainly due to the global COVID-19 epidemic. During this period, working from home became the mainstream, which also drove the sales of home health care equipment and continued into 2021. However, as the epidemic eased and life returned to normal, the sales of home health care equipment slowed down. In addition, the base period in 2021 was relatively high, which in turn caused a large decline in the total revenue of medical devices industry.

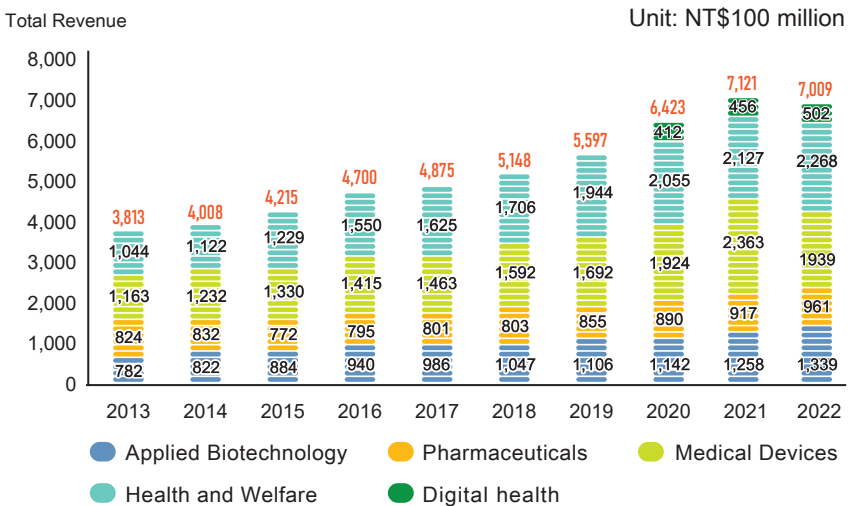


Figure 1: Revenue Growth Trends of Taiwan's Biotechnology Industry
(Source: 2023 Biotechnology Industry in Taiwan, Industrial Development Bureau, MOEA)

Industry Chain

Western pharmaceuticals is an industry that has a longer history in Taiwan, and thus, is more well-developed. Due to global efforts to contain the pandemic, Taiwan's pharmaceutical industry is gaining momentum and achieved excellent performance in the second half of 2022.

New drugs developed by Taiwan pharmaceutical companies, such as Lotus Pharmaceutical, PharmaEssentia, Oneness Biotech, and TaiMed Biologics, have not only been approved for, but also gained an advantage in the U.S. market. Furthermore, several drugs with high market expectations is undergoing clinical trials, unblinding, and drug permit license application. As the pharmaceutical industry continues to grow, funding is being provided to startups and a greater number of companies are acquiring new technologies or products through mergers and acquisitions. Hence, the upward momentum is expected to continue.

Taiwan's western pharmaceuticals industry is mature and includes upstream raw materials supply, pharmaceuticals R&D and production, to downstream logistics channels (Figure 2). Biopharmaceutical companies tend to be slower in adapting to digital innovations (e.g., AI, cloud, and IoT) in their operations. However, the outbreak of COVID-19 forced companies to prioritize investments in digitalization and incorporate the results into each aspect of the industry chain. The biopharmaceutical industry is currently at a critical turning point in its digital transition.

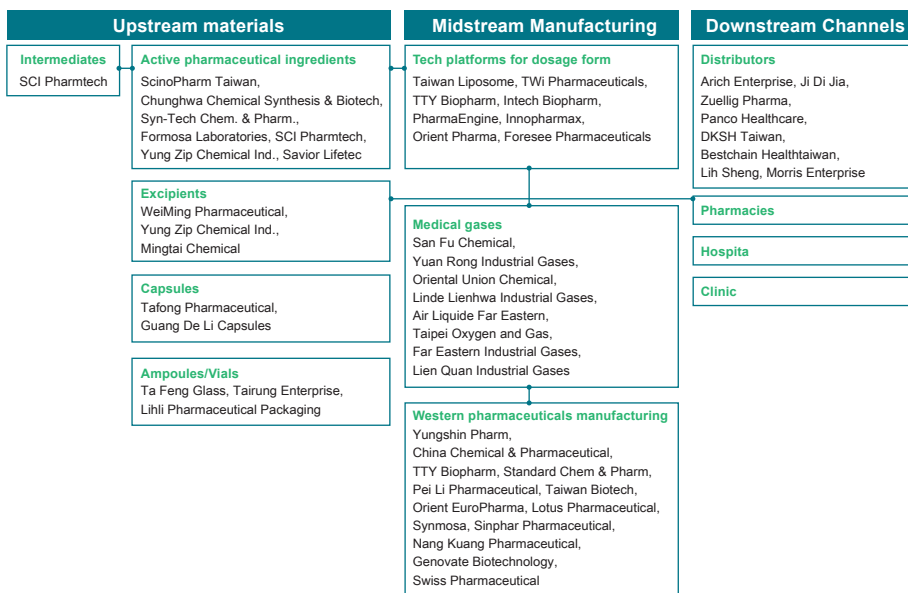


Figure 2. Taiwan's Western Pharmaceuticals Industry Chain

Source: Industry, Science & Technology International Strategy Center (ISTI), Industrial Technology Research Institute(ITRI)



According to Article 3 of the Medical Devices Act, “medical devices” refer to instruments, machines, apparatus, materials, software, reagents for in vitro use, and related articles thereof, whose design and use achieve one of the following primary intended actions in or on the human body by other than pharmacological, immunological, metabolic, or chemical means: (1)diagnosis, treatment, alleviation, or direct prevention of human diseases; (2)modification or improvement of the structure and function of human body; (3)control of conception.

Sales of the global medical device market may surpass US\$460 billion in 2022, and are expected to reach US\$490 billion in 2023. As the pandemic subsides in Europe and the U.S., demand and sales of conventional medical devices, such as contact lenses, blood glucose meters, medical equipment, and consumables are expected to increase. Quite a few Taiwan companies have obtained drug permit licenses or approval to enter domestic and overseas markets for high-end medical devices for minimally invasive surgery and dressings.

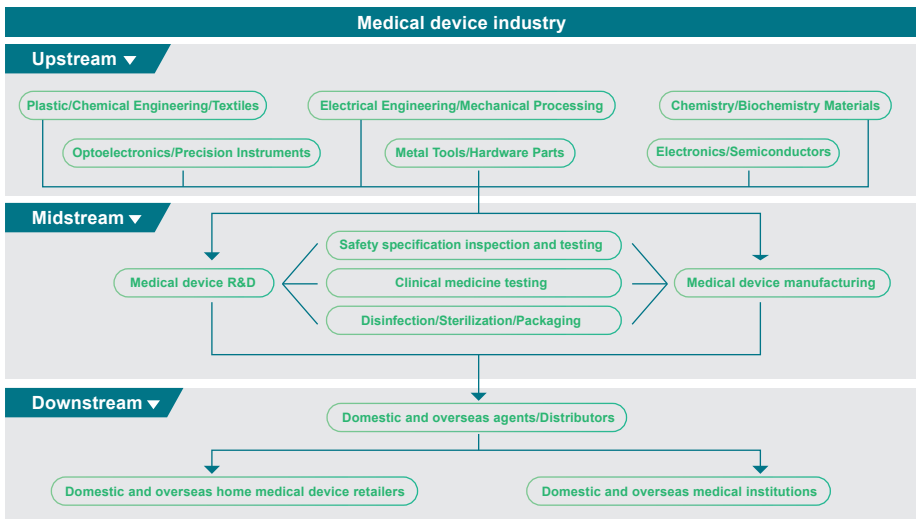


Figure 3. Taiwan's Medical Device Industry Chain

Medical devices and technologies worldwide are mainly aiming to digitalize healthcare information and data, which in turn, is important to the development of precision and smart medicine. Digital medical technologies play a central role in driving innovation within modern medical devices, which are often characterized by their automation. Within the medical device industry chain, suppliers provide materials and components upstream, manufacturers operate in the midstream, and sales agents and distributors constitute the downstream. Currently, digital and AI technologies are propelling advancements in the production of materials, components, and product technologies in the medical device sector.



Industrial Clusters

At present, Taiwan possesses mature biopharmaceuticals industry clusters. The Northern Cluster mainly consists of manufacturers of new drugs, medical devices, and biologics; the Central Taiwan cluster is formed by pharmaceuticals and medical device manufacturers; and the Southern Cluster is mainly formed by active pharmaceutical ingredients, implantable medical devices, and minimally invasive surgical instruments, effectively creating a biopharmaceutical corridor along the west side of Taiwan (Figure 4).

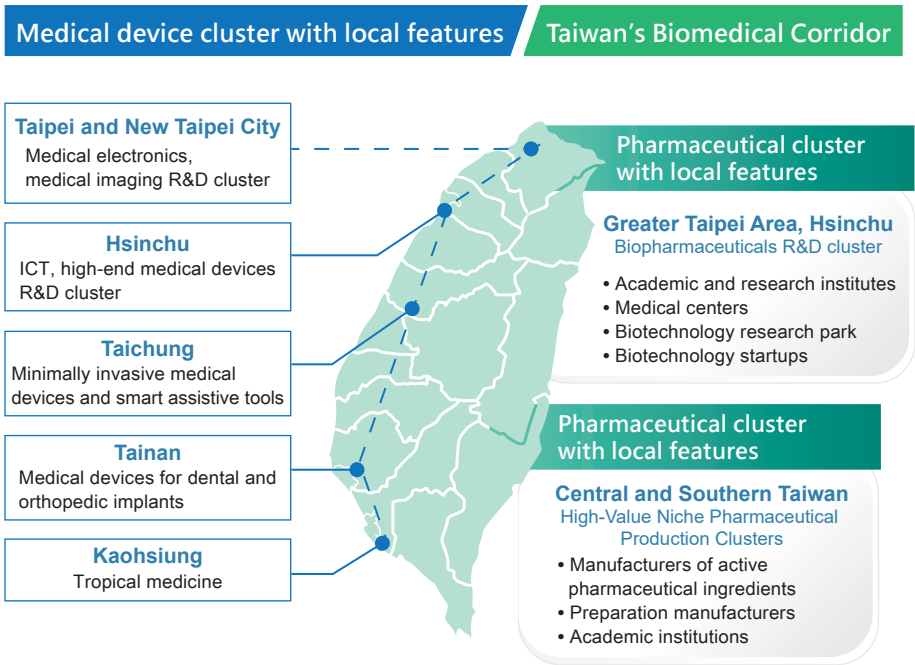


Figure 4. Taiwan's Biopharmaceutical Industry Clusters



Northern Cluster

The Northern Cluster is represented by the National Biotechnology Research Park (Nangang), Taipei Neihsu Technology Park, and Hsinchu Biomedical Science Park. Nangang and Neihsu have ample R&D capabilities and focus on the development of innovative biopharmaceuticals and new medical devices. The Hsinchu Biomedical Science Park integrates the technological advantages of the Hsinchu Science Park and Taiwan's ICT industry for the collaborative development of smart medical technologies and products. The park includes the National Taiwan University Hospital Hsin-Chu Biomedical Park Branch, Biomedical Technology R&D Center, and Incubation Center to form an industry cluster of medical devices, in vitro diagnostic devices, and biologics.

Companies in the park include: Medigen Vaccine Biologics Corp., which actively develops vaccines and related biologics in response to the COVID-19 pandemic; Taidoc Technology Corp., which produces a variety of medical devices based on biochemical technologies, medical electronics, and optical technologies, and has also begun developing rapid test kits; TaiGen Biotechnology, which focuses on the development of anti-infection and hepatitis C related drugs; PharmaEngine, Inc., which focuses on the development of new drugs for cancer. Locus Cell Co., Ltd. is a joint venture of Taiwan and Japan that expects to commence cell manufacturing as a CDMO in 2024. These companies are all located in the Northern Taiwan Biopharmaceuticals Industry Cluster.



National Biotechnology Research Park

The National Biotechnology Research Park established an Incubation Center in coordination with the development of research on biomedical translation, and brought in the National Laboratory Animal Center (NLAC), Development Center for Biotechnology (DCB), and Taiwan Food and Drug Administration (TFDA). Tenants will not only be able to interact with Taiwan's biomedical startups and search for more opportunities for collaboration, but also receive assistance with clinical trials, commercialization of R&D results, and regulatory restrictions.

Contact Information

National Biotechnology Research Park
Website: nbrp.sinica.edu.tw
Contact Number: 02-7750-5500
Address: No. 99, Lane 130, Sec. 1, Academia Rd.,
Nangang District, Taipei City

BioMed Commercialization Center

The National Science and Technology Council established the BioMed Commercialization Center, which integrates related resources and enhances incubation capabilities to provide companies with intellectual property analysis, bridging, rapid manufacturing, clinical trial regulation advice, and market value-added services to accelerate the commercialization of biomedical technologies and expansion of international markets.

Contact Information

BioMed Commercialization Center

Website: www.biip-dcc.org

Contact Number: 02-2652-2677#28

Address: Room C127, No. 99, Lane 130, Sec. 1, Academia Rd.,
Nangang District, Taipei City

Hsinchu Biomedical Science Park

The Hsinchu Biomedical Science Park has a Biomedical Technology R&D Center, Incubation Center, and National Taiwan University Hospital Hsin-Chu Biomedical Park Branch and medical institution cluster. The three centers share R&D resources and enjoy the advantages provided by the nearby Hsinchu Science park. Tenants can work with surrounding ICT industries in basic and translational research on biomedical technologies, conduct clinical trials at the hospitals, and then develop R&D results into products and complete verification, shortening the time to market.

Contact Information

Hsinchu Biomedical Science Park Service Center

Website: www.sipa.gov.tw

Contact Number: 03-667-6489#2712~2714

Address: No. 385, Sec. 2, Wenxing Rd., Zhubei City, Hsinchu County

Central Cluster

Companies in central Taiwan work with the precision machinery industry to develop precision processing for medical devices and pharmaceuticals manufacturing, among other related industries, in the Central Taiwan Science Park. Representative companies include Intai and Hepartech. Intai Technology is a manufacturer of minimally invasive surgical instruments and has built a close relationship with the world's largest medical device manufacturer – Johnson & Johnson, serving as an important surgical instrument OEM. Hepartech is actively developing heparin, heparinoids, collagen packaging materials, collagen casing, and hydrolyzed protein. Heparin is an important natural antithrombotic and anticoagulant agent.





Southern Cluster

In addition to active pharmaceutical ingredients, the Southern cluster also includes companies with high value metal processing for dentistry, orthopedics, minimally invasive surgical instruments, and related medical device industries. These companies built on the existing metal processing industries in Kaohsiung to develop new processes in the Southern Taiwan Science Park (STSP). ScinoPharm is the largest active pharmaceutical ingredients manufacturer in Taiwan at the Tainan Science Park, and is representative of the pharmaceuticals industry. A representative dentistry and orthopedics company is United Orthopedic Corporation, the largest artificial joint manufacturer in Taiwan at the Kaohsiung Science Park. Furthermore, the Pingtung Agricultural Biotechnology Park leverages Taiwan's agriculture and mainly develops functional foods, modern Chinese medicine, animal vaccines, and animal breeding. For example, BiomiXin Co., Ltd., which mainly develops feed additives and micro biologics, and Timing Pharmaceutical Co., Ltd., which mainly develops herbal medicine and health foods, are both located at the Pingtung Agricultural Biotechnology Park.

Agricultural Technology Park, Ministry of Agriculture (MOA)

Agriculture Agricultural Technology Park, MOA is the first park in Taiwan focused on developing agricultural technology, covering an area of approximately 400 hectares. It currently has six industry clusters, namely natural products, aquaculture, livestock biotechnology, biological agricultural materials, energy conservation and environmental control agricultural facilities, biotechnology testing, and OEM services. The park provides industrial talent matchmaking, stable supply of raw materials, complete entrepreneurship guidance and technical support, and one-stop services, including quarantine, inspection, customs, logistics, and transfer. It will also integrate resources with the Taoyuan Agricultural Logistics Park in the future.

Contact Information

Agricultural Technology Park, Ministry of Agriculture (MOA)

Website: www.pabp.gov.tw

Contact Number: 08-7623205

Address: No. 1, Shennong Rd., Dehe Village, Changzhi Township, Pingtung County

Southern Taiwan Science Park (STSP) Precision Health Industry Cluster

The Southern Taiwan Science Park Bureau provides product or technology development, clinical trials, education and training, approval for sale in domestic and overseas markets, and international market expansion services that spans medicine, electronics and ICT, technology, biopharmaceuticals, and medical devices based on advantages of the ICT and biomedical industries in the park, in order to improve the biomedical industry innovation ecosystem and industry cluster development. The bureau combined capabilities of industry, academia, and research institutes in Chiayi, Tainan, Kaohsiung, and Pingtung to develop a precision health industry chain. It also expands domestic and overseas medical markets through diverse marketing channels, and helps increase the revenue and exports of biomedical products. The biotechnology industry in STSP not only has vaccine, pharmaceuticals, test kits, dentistry, orthopedics, and aesthetic medicine companies, it is also actively developing the precision health biomedical industry. It is currently the largest biomedical industry cluster in the Southern Taiwan Biomedical Corridor.



Figure 5. Introduction to
the STSP Precision Health Industry Cluster

Contact Information

Southern Taiwan Science Park (STSP) Precision Health Industry Cluster
Website: www.ssbmic.org.tw
Contact Number: 06-5051001
Address: No. 22, Nanke 3rd Rd., Xinshi District, Tainan City



03 Investment Opportunities

► Joint Development of Biopharmaceuticals Industry Clusters

Taiwan has complete industry clusters in the field of biopharmaceuticals, and has accumulated an abundance of health insurance data, clinical experience, and R&D capabilities, which will help international biotechnology companies establish R&D centers or product manufacturing bases in Taiwan. The government views the biopharmaceuticals industry as a core strategic industry of Taiwan, and is exerting every effort to support reagent manufacturing and new drug and vaccine development through a “complete ecosystem,” “integration of innovation clusters,” “access to resources of the international market,” and “promotion of key specialty industries” under the Biomedical Industry Innovation Program.

Furthermore, the Act for the Development of Biotech and Pharmaceutical Industry was enacted in 2022 to encourage the biomedical industry to engage in cross-sector collaboration and increase the industry’s manufacturing capabilities. Based on the concept of “placing equal emphasis on R&D and manufacturing,” the government has not only expanded the applicability of deductibles for R&D, capital, machinery, and equipment, but also leverages Taiwan’s advantage in the semiconductor and ICT industries to strengthen support for advanced medical developments based on existing new drugs and high-risk medical devices. This is expected to help foreign companies work with Taiwan’s industries to jointly create more business opportunities for industrial development.



» Seizing Business Opportunities for the Development of the Biopharmaceuticals Industry

Taiwan has strong competitive advantages for the development of both biopharmaceuticals and medical devices. In the field of biopharmaceuticals, Taiwan's regulations are aligned with international standards. In addition, the country has strong R&D capabilities and excellent biopharmaceuticals talent. Taiwan has 23 medical centers, 143 clinical trial hospitals, high quality and efficient medical resources, and abundant experience with international clinical trials. Furthermore, biotechnology incubation mechanisms and an industry cluster connected north-to-south make Taiwan the best place for innovation and R&D of new drugs and new medical devices. In the future, foreign companies will be able to accelerate the R&D and launch of new products by investing in Taiwan, and rapidly seizing business opportunities in the biopharmaceuticals industry.

» Pandemic Efforts Showcased Taiwan's Manufacturing and R&D Prowess

Taiwan has successfully developed nanovaccines and glycoprotein vaccines (currently undergoing clinical trials), thanks to Academia Sinica and the National Health Research Institutes, as well as through cooperation between biotechnology companies. Taiwan has produced excellent results in the treatment of influenza, enteroviruses, and liver diseases thanks to top-notch biopharmaceuticals R&D technologies. These results have attracted advanced countries in Europe and the U.S. to express their intention to jointly develop vaccines or pharmaceuticals with Taiwan, clearly highlighting Taiwan's excellent R&D and manufacturing abilities.

Furthermore, Taiwan leveraged the production management capabilities of its manufacturing industry, R&D strengths in ICT, and ability to rapidly make adjustments in response to market demand, and began manufacturing face masks, protective clothing, and ventilators. In addition, the production and R&D of assistive devices, contact lenses, physiologic monitors, and monitoring devices have also allowed Taiwan to secure an important position in global industries. With viruses constantly evolving, R&D and clinical demand on nucleic acid, gene, and cell therapy and immunotherapy will continue to increase.

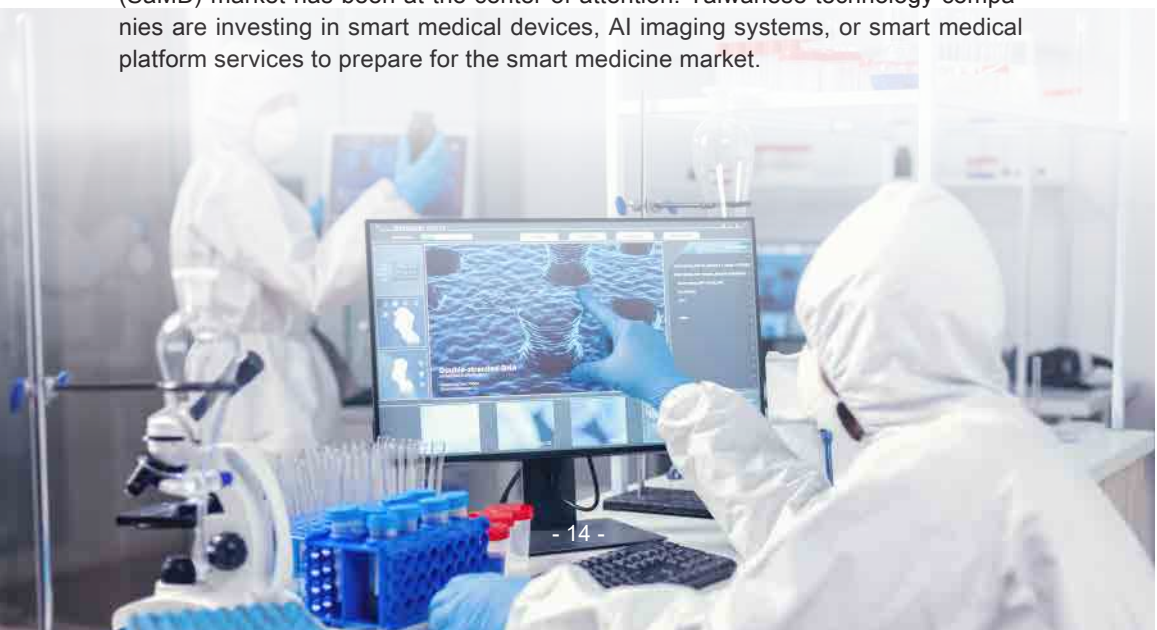
In light of this trend, the Act for the Development of Biotech and Pharmaceutical Industry has included CDMOs within its scope in hopes of leveraging the strengths of biopharmaceuticals, ICT, and semiconductor industries to attract foreign companies to invest in Taiwan or cooperate with Taiwanese companies. This will hopefully develop Taiwan into an important base for CDMOs in the Asia Pacific.

► Seizing Opportunities in the Asia Pacific Market

With the aging population in the Asia Pacific, as well as the rise of emerging economies, such as China and Southeast Asia, demand for basic healthcare, home care, health promotion, and medications has significantly increased, driving the rapid growth of Asia's biopharmaceuticals market. Foreign companies can leverage Taiwan's biopharmaceutical foundation, geographical proximity, international connections, preferential taxes, and industry R&D subsidies. These factors recommend Taiwan as a regional HQ, R&D, or production base.

In response to steady innovation in the biopharmaceuticals industry, Taiwan has continued to amend its regulations and standards related to medical devices, e.g., the Medical Devices Act promulgated in 2020, which incorporates the concept of "design" into the medical devices manufacturing industry and in the management of related repair industries. The Regulations Governing the Application or Use of Specific Medical Techniques or Examinations, or Medical Devices was passed in 2021, lifting restrictions on cell therapy and bone marrow mesenchymal stem cell transplant. This made Taiwan the next country after Japan to allow the use of immune cells to treat various cancers, which will help foreign companies seize opportunities in advanced medicine in the Asia Pacific market.

The pandemic has accelerated the transition of the healthcare industry in recent years, in which smart medicine is a key field to both the biotechnology and technologies industries. According to statistics, the global smart medical device market will grow to US\$70.1 billion at the end of 2028, and the software as a medical device (SaMD) market has been at the center of attention. Taiwanese technology companies are investing in smart medical devices, AI imaging systems, or smart medical platform services to prepare for the smart medicine market.



04 Investment Incentive Measures

► Tax Measures

Besides setting the profit-seeking enterprise income tax rate at 20%, the following preferential tax measures are also applicable to foreign companies to encourage them to invest in Taiwan, support industry innovation, and facilitate industry-academia collaboration:

Items	Preferential Measures
Encouraging Investments in Biopharmaceuticals Companies	<ul style="list-style-type: none">■ Expand the applicability of incentives from new drugs and high-risk medical devices to new dosage form preparation, regenerative medicine, precision medicine, and digital health, and innovative technology platforms exclusive for the biopharmaceuticals industry, and include biopharmaceutical companies that are CDMOs into the scope of application.■ If profit-seeking enterprises participate in the cash capital increase of biopharmaceuticals companies and hold the shares for 3 years, 20% of the proceeds may be deducted from their profit-seeking enterprise income tax, limited to 50% of the tax payable each year. Investments by profit-seeking enterprises in biopharmaceuticals companies that serve as CDMOs are limited to companies not listed on the TWSE/TPEX, or companies that have been listed on the TWSE/TPEX for less than 10 years from the date of registration.■ If an individual invests in a biopharmaceutical company that is not listed on the TWSE/TPEX, the amount invested in a single company reaches NT\$1 million and above in a single year, and holds the company's newly issued shares for 3 years, then the individual may deduct up to 50% of the investment amount from his/her gross consolidated income over 2 years after holding the shares for 3 years; the amount that may be deducted each year is limited to NT\$5 million. For biopharmaceuticals companies that engage in R&D and manufacturing, the limit is within 10 years from the date of registration. For biopharmaceuticals companies that are CDMOs, the limit is within 5 years from the date of registration

Items	Preferential Measures
Deductibles for R&D expenses	<ul style="list-style-type: none"> ■ Biopharmaceuticals companies may deduct 25% of R&D expenses from their profit-seeking income tax payable in the 5 years after they are required to pay profit-seeking income tax. The amount deducted may not exceed 50% of the profit-seeking enterprise income tax payable by the biopharmaceuticals company each year. However, this limit does not apply to the amount deducted in the final year.
Introduce Technologies or Machinery and Equipment	<ul style="list-style-type: none"> ■ If the amount invested by a biopharmaceutical company in new machinery, equipment, or systems for manufacturing reaches NT\$10 million and above but no more than NT\$1 billion in a single year, it may deduct 5% of the profit-seeking enterprise income tax payable in the current year or 3% of the tax payable each year over 3 years. The amount of profit-seeking enterprise tax deducted is limited to 30% each year. ■ 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 Administration, MOEA, exempt from the corporate income tax. ■ Import duties on machinery and equipment not manufactured in Taiwan are waived.
Investments in Smart Machinery / 5G	<ul style="list-style-type: none"> ■ Smart machinery: Use big data, AI, and IoT for new hardware, software, technologies, or technical services, such as automated scheduling and flexible or mixed production lines. ■ 5G: Related investments include new hardware, software, technologies, or technical services of 5G communication systems. ■ Information security: Include investments of companies in new hardware, software, technologies, or technical services for information security products or services into the scope of deductibles.

Items	Preferential Measures
Investments in Smart Machinery / 5G	<ul style="list-style-type: none"> ■ When the investment amount reaches NT\$1 million and above but no more than NT\$1 billion, there are two options for deductibles: “deduct 5% of the investment amount from the profit-seeking enterprise income tax in the current year” or “deduct 3% of the investment amount from the profit-seeking enterprise income tax over 3 years,” but the deductible may not exceed 30% of the profit-seeking enterprise income tax payable each year. ■ Applicable until December 31, 2024.
Technology Invested as Capital Stock / Employee Stock Awards	<ul style="list-style-type: none"> ■ If shares obtained by employees who are high level professionals as a reward, obtained by investors who invested technology as capital stock, or from holding share subscription warrants and the employee continues to serve at the company for 2 years or the investor provides technical services for 2 years, then the shares may be taxed at the price they are sold or acquired, whichever is lower.
Specific foreign professionals	<ul style="list-style-type: none"> ■ Half of the salary income exceeding NT\$3 million of specific foreign professionals that meet the criteria is exempted from being included in gross consolidated income.
Companies in various industrial parks	<ul style="list-style-type: none"> ■ Companies in export processing zones, science parks, and free trade zones will enjoy import duty, commodity tax, and business tax exemptions for imported machinery and equipment, raw materials, fuel, supplies, and half-finished products.
Other	<ul style="list-style-type: none"> ■ Undistributed earnings invested by companies may be listed as deductibles and exempted from the profit-seeking enterprise income tax.

Note: The Act for the Development of Biotech and New Pharmaceuticals Industry was implemented until December 31, 2021, when was renamed the “Act for the Development of Biotech and Pharmaceutical Industry” after revising the contents of deductibles, and is effective until the end of 2031.



➤ Subsidy Measures

1. Global Innovation Partnership Initiatives Program

Companies approved by the MOEA may receive subsidies of up to 50% of total R&D expenses. These incentives are designed to encourage foreign companies that complement and mutually benefit Taiwan's industries to engage in innovation and R&D activities in Taiwan. Activities include the development of advanced technologies surpassing current industry standards in Taiwan, as well as key technologies and integrated technologies needed by industries through collaborative R&D with Taiwanese companies. These endeavors are expected to have a significant positive impact on domestic industries, such as facilitating the establishment and development of an industrial technology R&D and supply chain, improving R&D efficiency, accelerating the timetable from R&D to industry application, and assisting in the active development of international markets.

2. Pioneers for Innovation Leadership on Technology Program

Companies approved by the MOEA may receive subsidies of up to 50% of their total R&D expenses, in order to develop Taiwan into a high-tech R&D center; attract major companies with technological leadership around the world to establish an advanced R&D base in Taiwan; develop prospective technologies and collaborate with domestic industry chains; develop a collaboration system for research, co-creation, and development to strengthen the technical competitiveness of leading industries in Taiwan; and accelerate the development of emerging industry clusters.

3. Industrial Upgrading Innovation Platform Guidance Program

The Industrial Development Administration implemented the Industrial Upgrading Innovation Platform Guidance Program to facilitate the development of industries with higher added value. The program encourages companies to develop high-end product applications market, ultimately raising the industry's value-added ratio. For companies that have a R&D team in Taiwan, 40% to 50% of project funding is subsidized for theme-based R&D projects, and up to 40% of project funding is subsidized for R&D projects proposed by companies.

4. Biomedical Leap Projects for Cross-industry Integration

Assists the biopharmaceuticals industry with cross-industry integration to make breakthroughs in current technology applications through an open request for R&D projects. The scope of subsidies includes the R&D of IoT mobile medical devices, high-end medical imaging and information, in vitro diagnostic devices, compound biomedical materials, minimally invasive surgical instruments, medical big data analysis, and other innovative medical devices. The subsidy amount may not exceed 50% of the project's total budget, and separate subsidy limits are set for individual and integrated projects.

5. Fast Track

To accelerate the output of R&D results and assist companies in creating a value chain that generates profits at each stage, the Department of Industrial Technology, MOEA launched "Fast Track" to help industries use successful examples to guide funding into the development of new drugs and medical devices.

6. Science Parks and Local Government Measures

To support the precision health industry chain and the development of startups, the Central Taiwan Science Park Bureau launched the CTSP Precision Health Industry Cross-Domain Promotion Plan to drive the development of the precision health industry in central Taiwan. The plan aims to develop innovative technologies and medical products in the field of precision health through collaboration between different industries, academia, research institutes, and medical institutions using its application mechanism and open request for proposal. The plan establishes a demonstration area for innovative products or service models combined with clinical verification, which accelerates the application of precision health products, and assists the clinical promotion and marketing of products. Subsidies are limited to NT\$10 million. Local governments at each level also provide resources, such as "investments or subsidies" through reviews or competitions, establish "incubators or accelerators," deliver "talent training" for professional competencies and knowledge, and provide free or economic "office spaces" to help startups grow. These resources are also available to the biopharmaceuticals industry.



05 Taiwan Representative Companies

An overview of representative companies in the field of Western pharmaceuticals, biologics, biotechnology products, and medical devices is provided below:

Western Pharmaceuticals

ScinoPharm Taiwan., Ltd.

www.scinopharm.com.tw



Founded in 1997, ScinoPharm is an important manufacturer of active pharmaceutical ingredients in Taiwan, and capable of providing complete development and manufacturing services for active pharmaceutical ingredients and intermediates. The company's active pharmaceutical ingredients for treating cancer currently have the greatest advantages. Besides providing active pharmaceutical ingredients to major generic drug companies around the world, the company also provides active pharmaceutical ingredient outsourcing services for new drug development companies and brand-name drug companies.

YUNGSHIN PHARM IND. CO., LTD.

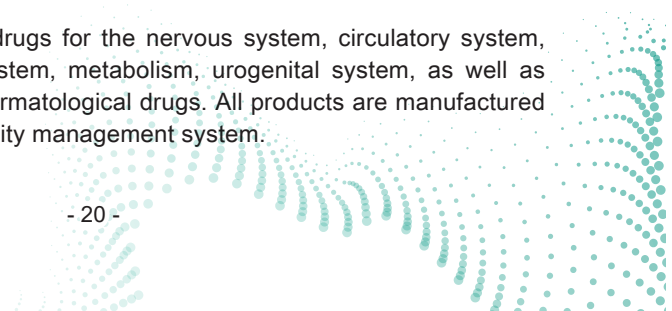
www.ysp.com.tw



Established in 1965, Yung Shin began exports to Southeast Asian countries in 1974, established plants and branches in the United States, Malaysia, and China to manufacture and sell pharmaceuticals and health foods, became the first company in Taiwan with all products obtaining GMP certification in 1986, and became the first pharmaceuticals company in Asia to export to the United States after obtaining FDA approval.

The company produces and sells approximately 700 products, including pharmaceuticals for humans, cosmetics, health products, active pharmaceutical ingredients, and special chemicals. The company's main products are pharmaceuticals, which account for approximately 76% of revenue.

Important products include drugs for the nervous system, circulatory system, respiratory system, digestive system, metabolism, urogenital system, as well as ontological, antimicrobial, and dermatological drugs. All products are manufactured according to the PIC/S GMP quality management system.



Center Laboratories Inc.

www.centerlab.com.tw



Center Laboratories was established in 1959 and initially manufactured all dosage forms. It currently specializes in the manufacturing of oral solutions and has developed diverse solution products through its advanced technology platform, research on specialized prescriptions, and prescription design analysis, becoming the largest oral solution manufacturer in Taiwan.

The market share of Center Laboratories' liquid products was already above 70% in 2008. The company has decided to expand the scale of its operations, and not only optimize the portfolio of its liquid products and expand to drugs of the psychiatry and neurology department, but also transform Center Laboratories into a "biotechnology industrial bank" and establish the most professional biotechnology incubation platform in the Asia Pacific.

Standard Chem & Pharm CO., LTD.

www.standard.com.tw



Established in 1967, Standard Chem & Pharm is one of the top three generic drug companies in Taiwan. It focuses on the production and sales of drugs and health foods for people and animals, and has expanded to active pharmaceutical ingredients, channels, and formula and nutritional products through vertical integration with subsidiaries.

The company mainly focuses on the R&D of special dosage forms, new drugs, and new drug delivery systems, and jointly develops niche products with strategic appliance partners overseas, in order to reduce R&D costs and shorten the development period.

The company's products include drugs for high blood pressure, diabetes, psychiatry, gastroenterology, and blood circulation. The company has developed injections, sustained-release, laser drilled sustained release, and rapidly dissolving dosage forms to reduce side effects. It provides sole source new drugs and quasi new drugs, and has obtained sales permits for numerous drugs. One such drug is laser-drilled sustained-release dosages that utilize the Zero-Order release mechanism to stably release the drug.





➤ **Biologics**

PharmaEssentia Corporation

www.pharmaessentia.com



PharmaEssentia mainly engages in the R&D of new drugs, clinical trials, cGMP manufacturing, and commercial mass production, marketing its products around the world using the MIT (Made in Taiwan) model. The company established subsidiaries in China, Japan, and the United States in 2017.

The company used its original long-acting protein drug R&D PEG technology platform and small molecule synthetic drug technologies from drug design, and through international R&D, successfully completed the first biologic P1101 (product name: Besremi) to help patients fight blood cancer, chronic hepatitis, and cancer.

After completing a clinical trial for polycythemia vera (PV), the company submitted a Marketing Authorization Application (MAA) to the European Medicines Agency in 2017, and received approval on February 19, 2019, becoming the first protein drug of Taiwan approved by the EU. The first small batch of commercial drugs was sold to Europe's AOP in March 2019. It obtained a drug permit license in Taiwan in June 2020, obtained licenses in South Korea and the United States in 2021 Q4, and Japan in March 2023.

ADIMMUNE Corporation

www.adimmune.com.tw



Established in 1965, Adimmune is one of few influenza vaccine manufacturers in Asia to possess both EU GMP and US FDA certificates. Adimmune also has a human vaccine biological preparation plant that complies with the latest PIC/S GMP specifications. The company's main products include trivalent influenza vaccine, quadrivalent influenza vaccine, H1N1 pandemic influenza vaccine, Japanese encephalitis vaccine, tetanus toxoid, and tuberculin.

EirGenix, Inc.
www.eirgenix.com



Established in April 2013, EirGenix inherited personnel and capabilities from a pilot plant belonging to the Development Center for Biotechnology (DCB). Expertise include cell line cultivation, process development, protein characteristics analysis, and quality control technologies, and continued to operate two TFDA certified cGMP plants for animal cells and microorganisms. The company has cGMP 300-500L mammal cell cultivation facilities, 20-100L cGMP microorganism enzyme and cGMP production technologies for related genetic engineering products. The company develops high-quality and cost effective biosimilars and biobetter products.

▶ Biotechnology Products

CHANG GUNG BIOTECHNOLOGY CO., LTD.
www.cgb.com.tw



Chang Gung Biotechnology Corporation, Ltd. was established in 1998 and is an affiliate of the Formosa Plastics Group. The company combined the resources of the Chang Gung Memorial Hospital, Chang Gung University, Ming Chi University of Technology, Chang Gung University of Science and Technology, and foreign scholars to establish a biotechnology R&D center and high-tech production base. Its main products include health foods, health equipment, functional health products, and health instruments.

GRAPE KING BIO LTD
www.grapeking.com.tw



Established in 1969, Grape King mainly engages in the production, manufacturing, and sales of health products. The company has a professional R&D team to develop health foods, energy drinks, and other beverages suitable for all ages. It stays up to date on the latest market trends and has established a vertically integrated OEM/ODM platform with different dosage forms and OEM items.

▶ Medical equipment

United Orthopedic Corporation

tw.unitedorthopedic.com



Since it was founded in 1993, United Orthopedic Corporation has developed into the leading brand of innovative and diverse orthopedic instruments. The company is headquartered in Taiwan and has 9 locations worldwide, providing high quality orthopedic implants and surgical instruments. The company mainly engages in the manufacturing and sale of artificial joints, and is the only artificial joint manufacturer in Asia that has obtained the US FDA approval and EU CE certification. It is also the largest artificial joint manufacturer in Taiwan.

Karma Medical Products CO., LTD.

www.karma.com.tw



Founded in 1987, the company develops mobility aids such as wheelchairs and mobility scooters. The company set the milestone for the first aviation-grade aluminum alloy wheelchair in Asia. The company's international R&D team has accumulated over 100 patents in various countries, and assisted over 1 million families and users in need of wheelchairs. The company current has business locations in the United Kingdom, China, Thailand, India, and Spain.

BenQ Medical Technology Corporation

www.benqmedicaltech.com



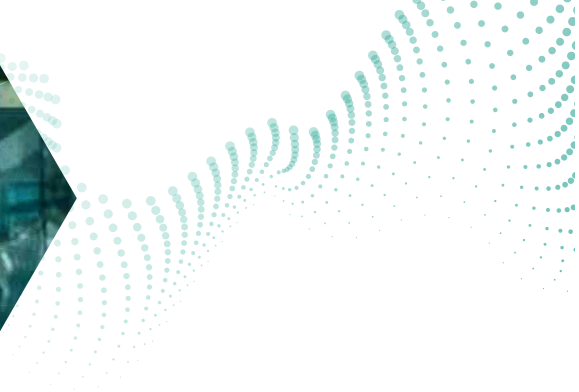
Founded in 1989, the company specializes in the R&D and manufacturing of surgical lamps, operating tables, and ultrasound equipment. It is the agent for numerous precision and specialized medical consumables overseas, and its products have obtained the GMP, ISO9001, ISO13485, ISO14001, and SGS certifications. It also provides integrated system solutions for operating rooms.

06 Examples of Foreign Investment

► Development of Clinical Trials

Taiwan's excellent medical technologies and abundant clinical trial experience attracted the Dutch pharmaceuticals company GSK and Switzerland's Novartis to establish a new drug clinical trial and research center in Taiwan. Germany's Merck, the United Kingdom's AstraZeneca, and the American companies Pfizer and Johnson & Johnson have all established clinical trial or cooperation mechanisms with Taiwanese medical or research institutes, such as the Veterans General Hospital, China Medical University Hospital, National Taiwan University, and Industrial Technology Research Institute. Taiwan's outstanding efforts in containing the pandemic have also attracted Moderna, which announced an investment in Taiwan in February 2022. It will not only engage in clinical trials and medical cooperation in Taiwan and support Taiwan's needs for mRNA vaccines and treatment drugs, but also facilitate cooperation between Taiwan and the United States in the field of biotechnology.





» Investments in Manufacturing

The plant of Locus Cell Co., Ltd., which is a joint venture of Metatech and Hitachi, located in Hsinchu is scheduled to be completed and begin production in 2024, and will become the largest automated cGMP cell manufacturing plant in Asia. Foxconn announced that it will work with GyroGear, a neurological medical device company in the United Kingdom, and handle manufacturing and marketing of the wearable medical device “GyroGlove” in Asia. GyroGlove is the world’s first wearable medical device customized for tremor patients. It uses gyroscope functions to mechanically control hand tremors, and will improve the ability of Parkinson’s or tremor patients to take care of themselves.

In the field of animal drugs, Virbac (France) has operated in Taiwan for over 30 years. Taiwan was the first location of Virbac outside of France and is responsible for developing the entire market in Asia. It established the subsidiary Virbac (Taiwan) Co., Ltd. in 2002, and has secured a place in Taiwan’s animal drugs market. Virbac began focusing on developing the “economic animals” market in recent years. Besides developing drugs, it also began strategically developing economic animal vaccines, focusing on ruminant animals, pigs, and aquatic animals. Virbac and Schweitzer Chemical Corporation established a joint venture at the end of 2011, and jointly operate an economic animal vaccine plant, providing the production basis for Virbac’s Asia strategy. This also shows the ambition of Virbac (Taiwan) to provide comprehensive products for the livestock market.

► Promoting R&D and Technical Cooperation

Intel began working with members of the ecosystem in Taiwan and medical field after considering the R&D and manufacturing abilities of Taiwan's ICT and semiconductor industries. Companies in the ecosystem include Advantech, Asus, Avalue Technology, Biomdcare, HippoScreen Neurotech, IEI Integration, imedtac, JelloX Biotech, KenKone Medical, MedAlliance, Microsoft Taiwan, Netown, Onyx Healthcare, Qisda, Roche Diagnostics, WASAI Technology, Wincomm, and Wistron Medical Technology.

Intel, Roche Diagnostics, and JelloX Biotech announced the establishment of a digital pathology industry alliance, which will use processor and 5G technologies to develop AI medical solutions and promote applications of the next generation digital pathology platform in medicine. JelloX Biotech utilized the 12th generation of Intel Core processors and the open source tools OpenVINO and OpenFL to develop MetaLite, an open digital pathology federated learning and edge computing solution, which combines the CE/IVD/TFDA certified digital slide scanner of Roche Diagnostics. It can be provided to medical centers, regional hospitals, and other medical institutions, and is currently going through proof of concept (PoC) at the National Taiwan University Hospital Hsin-Chu Biomedical Park Branch. The alliance also plans to expand cooperation to medical centers in the Asia Pacific.



2023

Taiwan Precision Health Industry Chain



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