The TCI Asian Industrial Cluster Competitiveness Conference

Taiwan’s current cluster situations

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Self Introduction

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- Industry, Science and Technology International Strategy Center (ISTI) of Industrial Technology Research Institute (ITRI)
- **Main Fields:** Input-Output Analysis, Time Series Models
- **Major Focus:** Taiwan’s manufacturing industries, including Semiconductor, Machine Tools, Automotive, Petrochemical industries…etc.
Presentation Outline

• Organization introduction
• Current development of Taiwan industries
• Policy orientation of Taiwan industries
• Future prospects
Organization introduction
Industrial Technology Research Institute (ITRI)  
Taiwan’s Largest and One of the World’s Leading High-tech Applied Research Institutions

- Founded in 1973
- 27,000+ Patents
- 6000+ Total Staff including 1400+ Ph.D
- Incubated 270+ Startups & Spinoffs
- 600+ Transferred Technologies Per Year

INNOVATING A BETTER FUTURE

- Committed to utilizing its R&D results to drive industrial development and create economic value
- Focuses on the fields of Smart Living, Quality Health, and Sustainable Environment
- Overseas branch offices in the U.S., Europe, and Japan in an effort to extend its R&D scope and promote opportunities for international cooperation
Industrial Technology Research Institute

INNOVATING A BETTER FUTURE!

Honor

Has won 36 R&D 100 Awards since 2008
Named Thomson Reuters Top 100 Global Innovators in 2014

Also a winner of
- Frost & Sullivan Best Practices New Product Innovation Award
- Aviation Week’s A&D SIC Awards
- WSJ Technology Innovation Awards
- Thomson Reuters Taiwan Innovation Awards

Organizations

- ITRI Southern Region Campus
- ITRI Central Region Campus
- Biomedical Technology and Device Research Laboratories
- Green Energy and Environment Research Laboratories
- Material and Chemical Research Laboratories
- Mechanical and Mechatronics Systems Research Laboratories
- Information and Communications Research Laboratories
- Electronic and Optoelectronic System Research Laboratories
- Industry, Science and Technology International Strategy Center
- Laser and Additive Manufacturing Technology Center
- Smart Microsystems Technology Center
- Intelligent Machinery Technology Center
- Computational Intelligence Technology Center
- Service Systems Technology Center
- Center for Measurement Standards
To rise to the many challenges Taiwan is facing regarding the development of industrial technologies for the future, ITRI has decided to merge the Industrial Economics and Knowledge Center (IEK) and ITRI International Center, effective August 1, 2018. The new entity, named “Industry, Science and Technology International Strategy Center”, will devote its efforts to bringing together industrial expertise, connecting international strategic partners, and tapping into the global network of innovation ecosystems.

The new Center will focus on blue ocean industries and market strategies related to advanced technology and its applications. By strengthening collaborations with international advanced technology R&D organizations, the center can connect with the global innovation ecosystem network, and facilitate Taiwanese industries entering the global advanced technology market.

**Our Background**

Industry, Science and Technology International Strategy Center combines industry research and international partnership facilitation to help Taiwanese industries enter the global market.
Our Vision

Master the global industry and technology trends, and lead and facilitate international development strategies of Taiwanese industries and academic and research institutions.

Technology Scouting
Enhance research on global key industries and advanced technology development trends

Ecosystem Networking
Participate in more international cooperation and connect with the global innovative technology R&D ecosystem network

Strategic Partnering
Integrate advanced technology R&D capabilities, facilitate strategic collaborations with global leading technology R&D facilities, and jointly strengthen the commercialization of innovative technologies

Capability Boosting
Integrate industry technology resources and international R&D networks, serving as a platform to improve the overall innovative technology R&D momentum of Taiwanese industries, and academic and research institutions
Current development of Taiwan industries
From the aspect of 7 major living communities, each cluster is characteristic.

Source: IEK Consulting (2018/09)
Science Parks Plays Industry-Driven Role in Taiwan
Current 13 Science Parks focus on 6 Major Industries

1980
Hsinchu Science Park (1,342, 529)
- Longtan Science Park (107, 10)
- Biomedical Park (38, 38)
- Hsinchu Science Park (653, 404)
- Jhunan Science Park (123, 57)
- Tongluo Science Park (350, 12)

2003
Central Taiwan Science Park (1,708, 186)
- Houli Science Park (255, 28)
- Taichung Science Park (466, 122)
- Chung Hsing Park (259, 10)
- Erlin Science Park (631, 13)
- Huwei Science Park (97, 13)

1997
Southern Taiwan Science Park (1,613, 208)
- Tainan Science Park (1043, 134)
- Kaohsiung Science Park (570, 74)

Remark: The numbers in brackets are hectare and companies approved to set up in science park. Those science parks in blue are developed ones, while the others in red are developing ones.

Data provided by MOST, and organized by ITRI IEK (2015.07)
Source: IEK Consulting (2018/09)
Known worldwide semiconductor cluster

Hsinchu Science Park as the core drives supplier chain and service industry

Remark: The color of each county and city differentiates the size of cluster from big to small, and divided into 6 grades.

Forming a complete technology corridor in Hsinchu-Taoyuan-New Taipei
- Extending north to New Taipei from Hsinchu Science Park as the core, this technology corridor owns complete supply chains from upstream to downstream, mainly in IC design and manufacturing, with abundant infrastructure and research resources. The cluster size and growth rate is leading of the country.
- Has been taken as teaching materials of semiconductor cluster by Harvard Business School.
- Production value of Northern cluster takes 80% in Taiwan.

Starting development by leading company
- IC industry in middle Taiwan started rather late, but recently with great support of gov, TSMC’s Fab 15 for 28nm process technology in Central Taiwan Science Park generated over NT$200 billion in revenue last year, and 7nm/10nm capacity is still increasing. Besides, Micron and SPIL also continually expand capacity. These are all expected to drive the growth of cluster size.
- The cluster is mainly based on high-end IC manufacturing plants.
- Production value of Central Cluster takes 5% in Taiwan.

Forming secondary cluster based on wafer foundry and IC packaging business
- Leading companies such as Winbond and TSMC have announced to invest in Southern Science Park, which is expected to form another semiconductor cluster in the future.
- The cluster is mainly based on IC Packaging.
- Production value of Southern Cluster takes about 15% in Taiwan.
Taiwan’s target clusters integrated with local industries become medical device clusters with its own characteristics in the north, middle and south of Taiwan.

**Northern Cluster (Taipei+New Taipei)**
- New drug development, Translational medical, Innovation Team

**Hsinchu Cluster**
- High-end medical device, Precious medicine

**Taichung Cluster**
- Precision instruments/Minimally invasive surgery, Polymer medical device

**Southern Cluster (Tainan+Kaohsiung)**
- Dental/Orthopedic Implants

**Remark**: The color of each county and city differentiates the size of cluster from big to small and divided into 4 grades.

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**Hsinchu Cluster**
- High-end medical device, Precious medicine

**Taichung Cluster**
- Precision instruments/Minimally invasive surgery, Polymer medical device

**Southern Cluster (Tainan+Kaohsiung)**
- Dental/Orthopedic Implants

**Northern Cluster**
- New drug development, Translational medical, Innovation Team

**ICT+Medical Device=High-end Medical Device, Precision Medicine**

Hsinchu Science Park and Biotech Park are the core of this cluster, specializing at new drug development and high-end advanced medical devices such as non-invasive devices, wearable physiological measurement devices. In addition, precision medicine and smart hospital has been developed relying on ICT cluster support of Hsinchu Science Park (The branch of Taiwan Hospital is predicted to complete the project by 2019 Aug, and start to operate in Jan 2020.

**Precision Machinery+Medical Devices=Precision Instruments/Medical Devices for Inspection/Minimally Invasive Surgery System**

**Plastic+Medical Device=Polymer Medical Device/Assistive Device**

Based on local precision machinery industry, it has been formed as a medical device cluster for precision instruments and minimally invasive surgery system. Other than this, PIDC transforms and upgrades to develop polymeric medical devices (drainage tube, tourniquet, Orthokeratology, etc.) or assistive devices, which also lift up conventional industries to another level.

**Metal+Medical Device=Dental/Orthopedic Implants**

To transform and upgrade local metal process industry to the cluster of dental and orthopedic medical device. Future plan is to integrate with semiconductor and optoelectronics industries in the science park to develop smart healthcare, the concept of artificial intelligence and personal healthcare.
Policy orientation of Taiwan industries
Taiwan's focal industry policy

- The government has prioritized 10 major innovative industries.

- Smart Machinery
- Green Energy Technology
- Biotech medicine
- National defense
- Asia's Silicon Valley
- New Agriculture
- Circular Economy
- Digital Taiwan
- Culture technology
- Semiconductors

New Southward Policy
New Southward Policy

• The government expects to engage in cooperation with Australia, New Zealand, and the countries of ASEAN and South Asia.
• Cooperation approaches may include human-power exchanges, resource sharing, and regional linkage.
• With a goal of enhancing the complementary roles and cooperation of Taiwan and the New Southward Policy's target countries.
Future prospects
Future Outlook

- The foregoing is a brief introduction to the current state of clustering in Taiwan.
- We are currently employing clustering analysis to uncover industrial problems and propose innovative policies. The next step will be to employ existing clustering platforms to help Taiwan's companies to enter international markets and assist entrepreneurship.
- New Southward Policy is crucial strategy we’re promoting, hopefully we can become cooperation partner with those New southward countries through meetings and conference, for example, co-research and information sharing.
- International connection is one of the major mission of ITRI, we hope we can spread our capacity to the international community
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Thank You

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