

# Taiwan: Policy Drive for Innovation

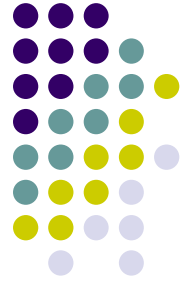
Highlights from GRIPS Development Forum Policy  
Mission

(Light version without photos)

Kenichi Ohno (GRIPS)

May 2011

# Topics

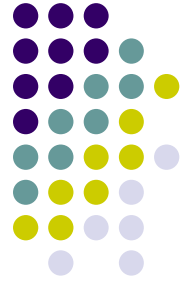


The GRIPS Development Forum Team, with Japanese, Ethiopian and Vietnamese members, visited the Republic of China (Taiwan) during March 21-25, 2011.

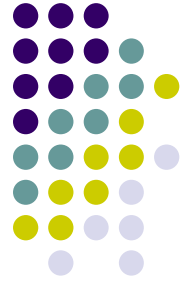
The following issues were studied:

- Evolution of policy and key industries
- Policy making process
- Research institutes
- Hsinchu Science Park
- Export processing zones
- SME Policy

# Profile of Taiwan



- Area – 36,191 km<sup>2</sup>
- Population – 23 million
- Per capita income – US\$19,046 (2010)
- Industry policy focus (key industry)
  - 1950s – Import substitution (food)
  - 1960s – Export expansion (textile)
  - 1970s – Infrastructure (petrochemical)
  - 1980s – Economic liberalization (IT)
  - 1990s – Industrial upgrading (integrated circuits)
  - 2000s – Global deployment (liquid crystal display)



# Policy Evolution

1950s to mid 1980s— “Governing the Market” model with strong state and powerful bureaucracy; SMEs as main producers and exporters

After mid 1980s—(i) growth of private sector; (ii) rise of large domestic firms, relative decline of SMEs & FDI; (iii) trade liberalization; (iv) economic interaction with Mainland China

Current issues:

- Innovation, R&D, soft power, national brands
- Foster larger firms to compete globally
- Cope effectively with Mainland China

# Silicon Island



Taiwan has transformed itself from agro exporter (rice, sugar, bananas) to top ICT manufacturer with global shares as below:

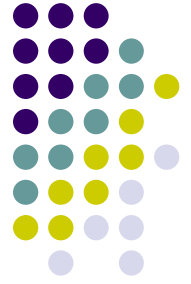
<b>MADE IN TAIWAN:</b> Direct export from Taiwan		<b>MADE BY TAIWAN:</b> Including overseas production	
Mask ROM	93.8%	Motherboard	95.5%
IC foundry	66.4%	Notebook PC	95.0%
Blank optical disk	63.0%	Server	88.9%
IC package	44.4%	WLAN CPE	81.0%
Electronic glass fabric	39.0%	Cable Modem	78.6%
IC design	27.0%	Car navigation device	76.9%
DRAM	21.8%	LCD monitor	71.8%

Note: global market share in 2009 reported by the Ministry of Economic Affairs, ROC.

# Selected List of Taiwan's Large Firms



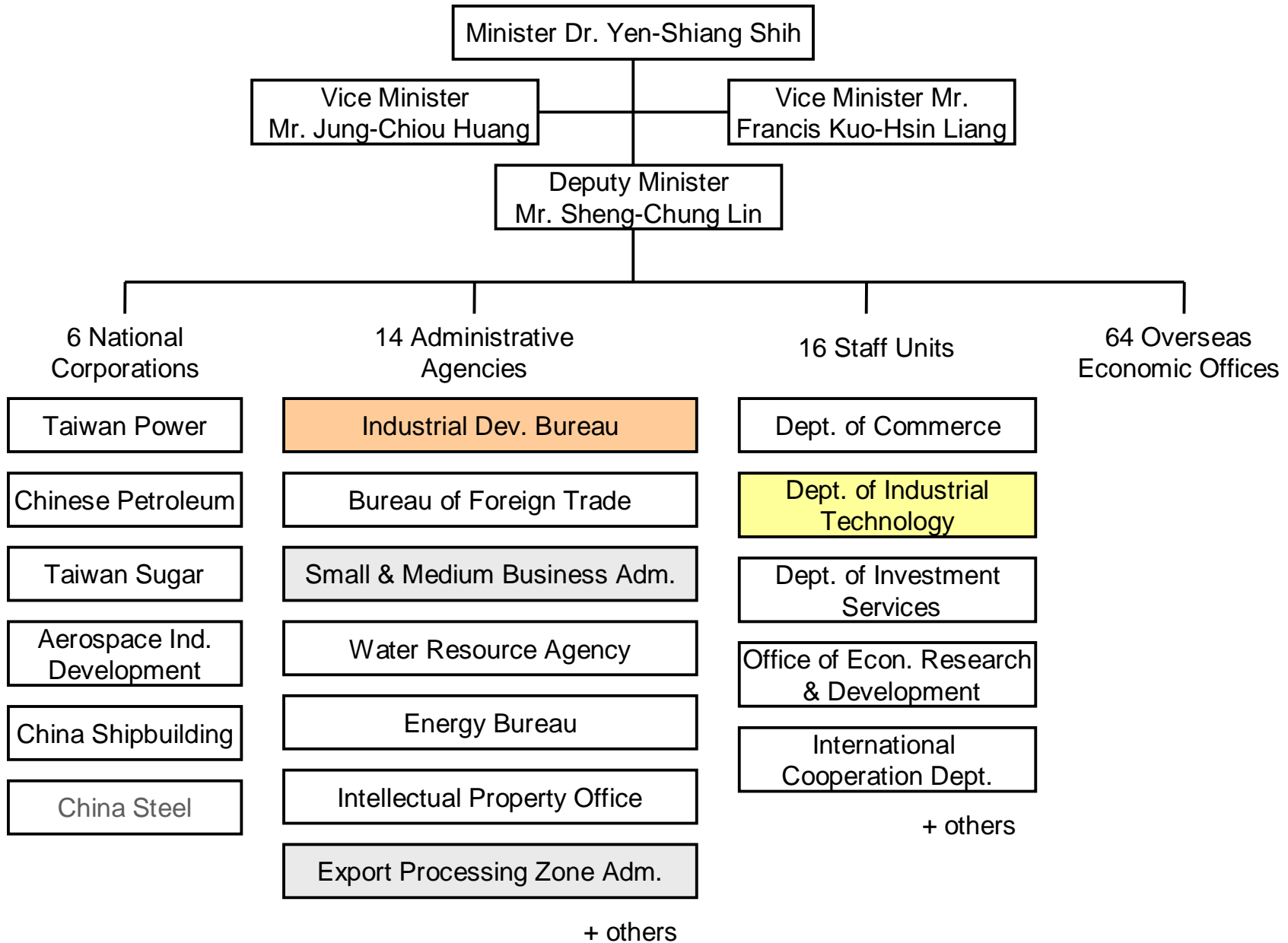
- TSMC (semi-conductor, offshoot from ITRI)
- UMC (semi-conductor, offshoot from ITRI)
- AU Optronics (liquid crystal display)
- Foxconn (electronics manufacturing service)
- Acer (computer)
- Asus (computer)
- Yulon Motor (automobile)
- San Yang Motors (motorcycle)
- Kwang Yang Motor (motorcycle)
- Formosa Plastic (diversifying into artificial fiber, etc)
- China Steel (state-owned)



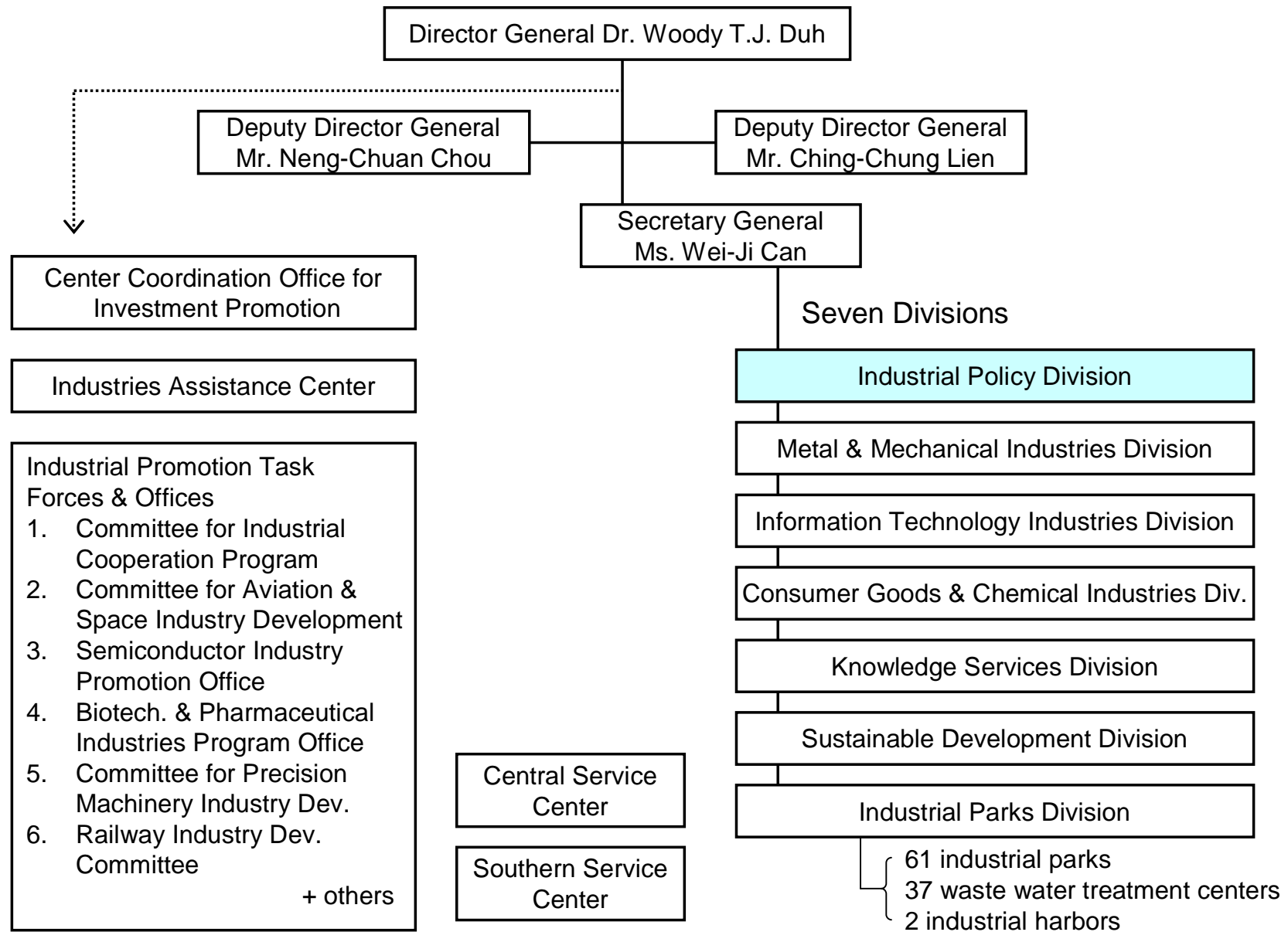
# Industrial Policy Making

- The Ministry of Economic Affairs (MoEA) is the powerful one-stop ministry for industrial policy.
- The industrial statute, a law approved by parliament, is the key document. It guides industrial policy for 2-3 decades:
  - { Statute for Encouragement of Investment (1960-1990)
  - { Statute for Upgrading Industries (1991-2010)
  - { Statute for Industrial Innovation (2010- )
- Taiwan does not produce five-year plans.

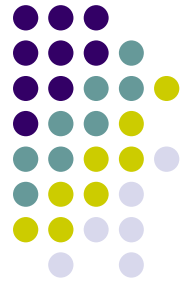
# Ministry of Economic Affairs (MoEA)



# Industrial Development Bureau of MoEA



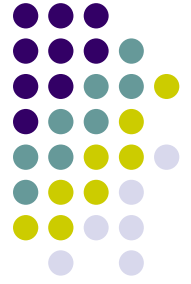
# Current Industrial Policy Tools



- “Industrial projects” commissioned by MoEA and executed by research institutes for innovation and commercialization of R&D

Ex. Hydro forming process project for bicycle industry (undertaken by MIRDC): industry needs survey (2 years); project proposal & approval by MoEA (>1 year); implementation & review (3-4 years)

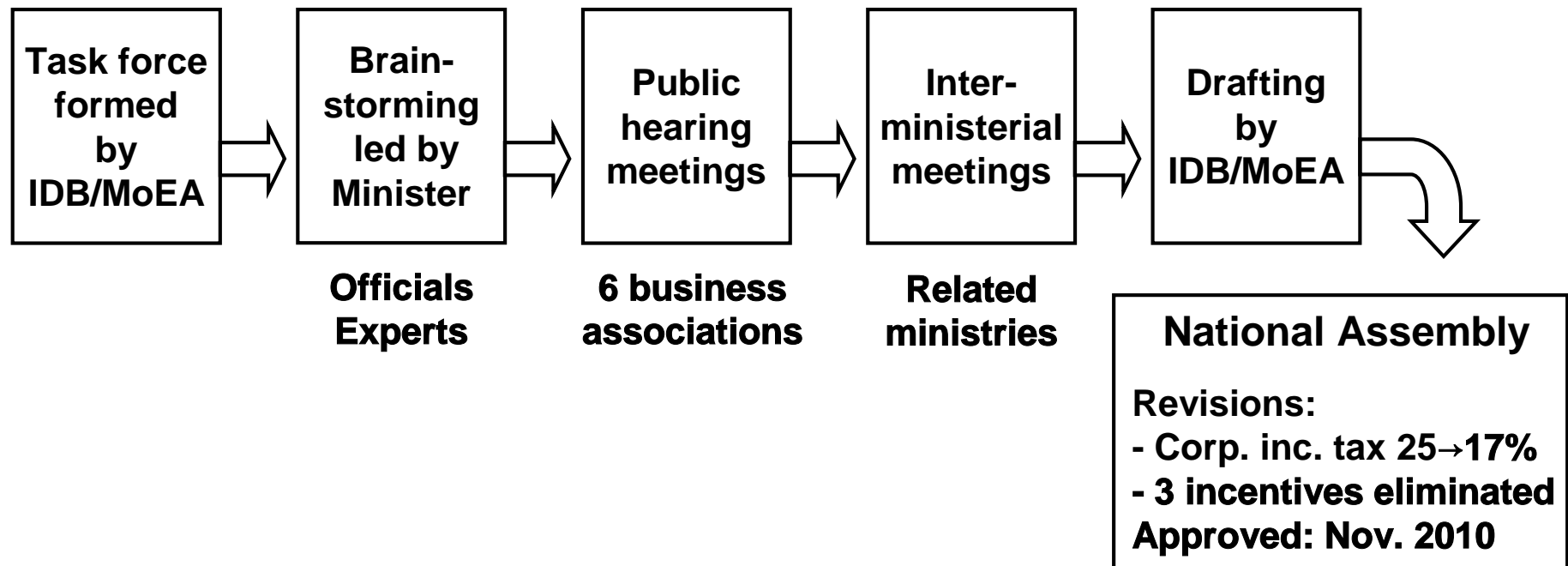
- Industrial estates—science parks, export processing zones, industrial parks
- No incentives (except for R&D)
- Low and uniform corporate income tax of 17%



# Policy Making of MoEA

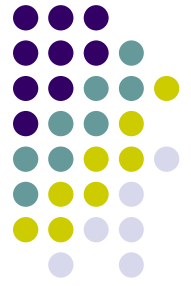
- MoEA minister (Dr. Shih) strongly leads content and coordination.
- Outsourcing of many policy making functions to TIER and CIER (think tanks created by MoEA)—studies, committees, seminars, etc.
- “Committees” are organized for consensus building among ministries and experts.
- “Seminars” are actively used for interacting with private sector.
- National Assembly is powerful and may intervene in policy content in the approval process.

# Drafting of Industrial Statute of 2010



- The whole process takes about three years.
- CIER (think tank) manages the process under MoEA's leadership.
- This process was adopted in the late 1980s. Before that, a few elite technocrats drafted policies without deep prior consultation with stakeholders.

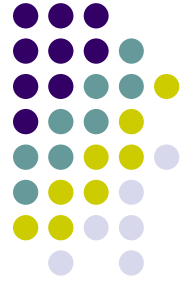
# Policy and Technology Research Institutes



- Taiwan has 19 state-created research institutes playing key roles in designing and implementing industrial policy:
  - { 8 policy institutes for designing policy
  - { 11 technology institutes for implementation
- Some initially received seed money from the state, but they now operate as self-funding NPOs.
- About half of current funding comes from MoEA-sponsored “industrial projects” and other from projects and services for private sector.

# Policy Institutes

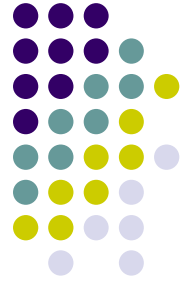
(visited by our mission)



- **Taiwan Institute of Economic Research (TIER)**
  - Maintain industrial databank
  - Domestic and global economic forecasts
  - Secretariat to Ind. Dev. Advisory Council (MoEA)
  - Cross-strait economic cooperation projects
- **Chung-Hua Institute for Econ. Research (CIER)**
  - Economic forecasts
  - Studies on China, global & domestic economies
  - Secretariat to Industrial Statute drafting process
  - Supported WTO entry & operates WTO Center

# Technology Institutes

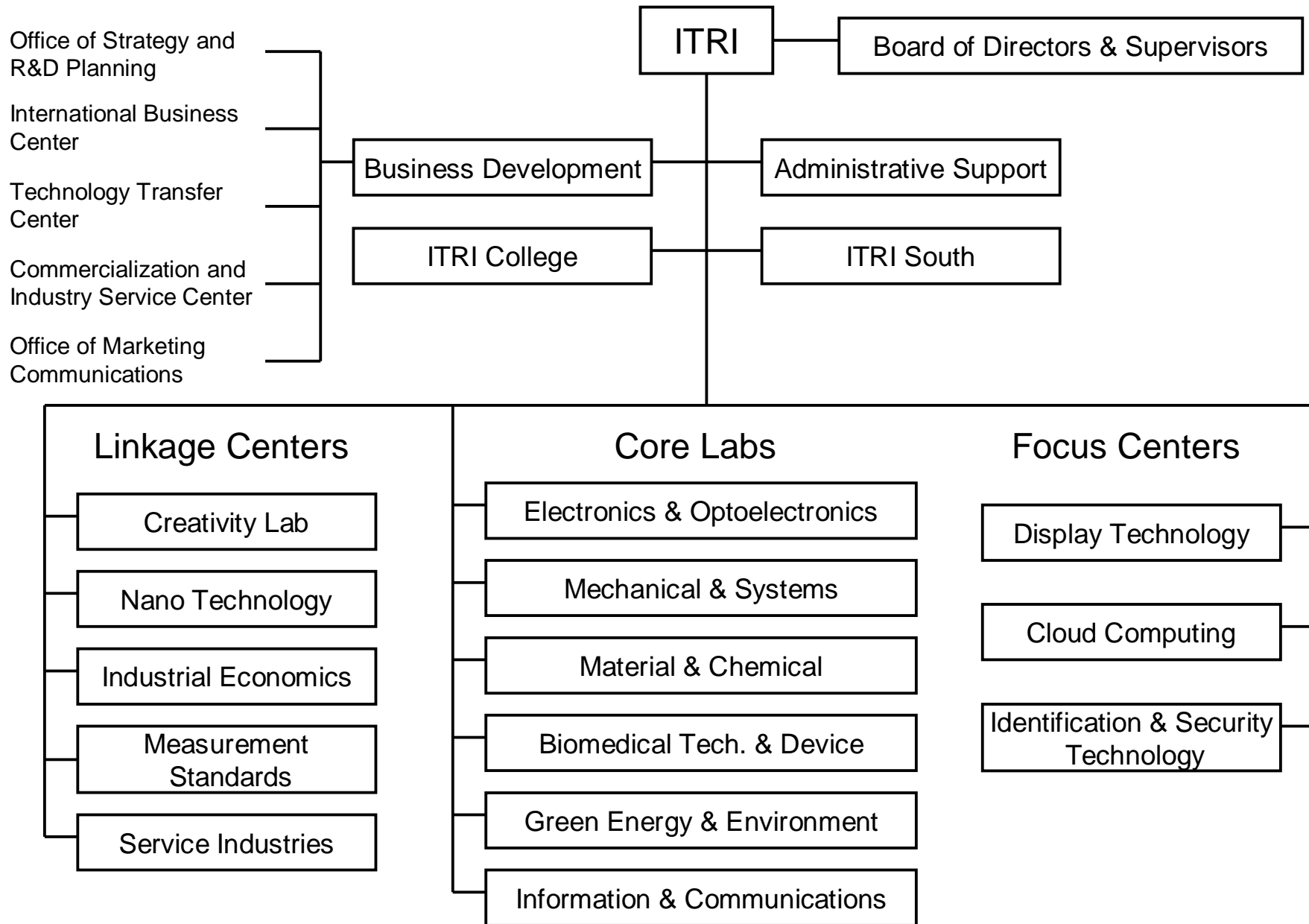
(visited by our mission)



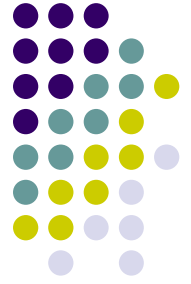
- **Industrial Technology Research Institute (ITRI)**

- Taiwan's largest institute for commercialization of R&D (through licensing, spin-off & joint venture)
- 5,800 staff (young, 80% in R&D; 1,200 with PhD); frequent migration between industry and ITRI
- Open labs for joint R&D with foreign & local firms
- Close cooperation with Hsinchu Science Park and universities
- ITRI College for internal training & training for industry; customized programs for foreign governments (Vietnam, Philippines, India, Poland)

# Organizational Structure of Industrial Technology Research Institute

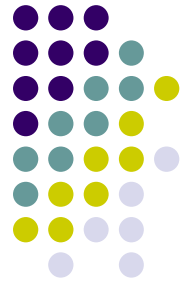


# Technology Institutes (cont.)



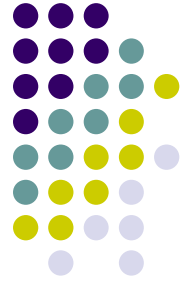
- **Metal Industries R&D Center (MIRDC)**
  - HQ in Kaohsiung with 8 regional branches
  - 612 staff (51 with PhD, 325 with MA)
  - Focus areas: (i) metal materials & products, (ii) mold & die, micro parts, (iii) automotive; (iv) opto-electronics & energy equipment; (v) medical devices
  - A team is formed for 4-5 years for big project and 3-6 months for small project
- Other sectoral institutes – food, plastic, automobile, bicycle, precision machinery, information industry

# Hsinchu Science Park



- There are 13 science parks under Science Park Administration of the National Science Council.
- Hsinchu Science Park (HSP), established in 1980, is the first and most successful. It is Taiwan's central production site for ICT industry.
- As of 2010, HSP had 449 tenant firms with combined sales of \$41 billion/year. Most firms are local; 44 firms are foreign (Japan, US, etc.)
- HSP hires 139,416 employees (including 4,134 foreigners).

# HSP



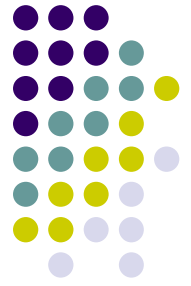
## Industry classification by revenue size

**IC (67.5%)**, opto-electronics (20.7%), computer (6.4%), telecom (2.7%), precision machinery (1.8%), biotech (0.4%), other (0.2%)

## Some prominent tenants:

**TSMC, UMC**, AUO, Acer, ULVAC, Wistron, BENQ, Foxconn, MITAC, Optotec, Logitech, Gintech, Realtech, D-Link, Du Pont, ShinEtsu, Hoya, DNP...

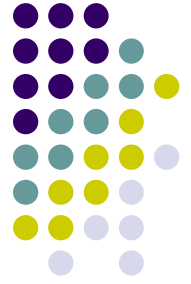
# Hsinchu Science Park (cont.)



- State-owned land and standard factories are leased on 20-year contract with subsidized rent.
- HSP (653 ha) is full but there are entries and exits every year. Firms with small R&D (< 2.28% of sales) are asked to leave.
- About 60 firms are waiting to enter HSP. Applicant firms must take exam in R&D, capital, environment...
- HSP received state money but it now makes profit from management fee, rental & operational revenues.
- HSP supports and monitors other science parks.
- HSP receives about 1,000 study missions annually.

# Success Factors

(As explained by HSP & summarized by GRIPS)



- Formation of industry structure, entrepreneurship, R&D mechanism and venture systems through interaction with Silicon Valley.
- No intervention in companies' activities as long as they maintain high R&D.
- One-stop services from government.
- Excellent infrastructure – water, power, telecom, road, housing, 24-hour customs clearance, banks, clinics, bilingual school, recreation facilities.
- R&D tax deduction & subsidies, no import duties for equipment and materials.

# Export Processing Zones



- In 1966, first EPZ was established in Kaohsiung as combined free trade zone and industrial zone.
- EPZ Administration under MoEA oversees 8 EPZs with total area of 532 ha, 456 tenant firms, and exports of \$10 billion/year.
- Industrial activities in EPZs shifted over time:
  - Low-end OEM in garment & other L-intensive (1966-76)
  - Mid-end OEM in garment & other L-intensive (1977-86)
  - High-end OEM in capital & tech. intensive ind. (1987-96)
  - High-end OEM and R&D (1997-2007)
  - High value-adding industries (2008-)

OEM: Original Equipment Manufacturing (=contract manufacturing of foreign brand products).



# EPZs: Status and Trends

- EPZs' total investment, revenues and trade have increased significantly over the long run.
- EPZs' dominant sector is electronic components (64.2% of total revenue of tenant firms, 2009).
- Compared with science parks, EPZs produce less high-tech and more downstream products.
- About five years ago, EPZ Administration began to promote interaction between industry and academics through student internship, visiting professors, joint R&D, and matching services.

# EPZs: Institutional Transformation



Original EPZ rules were revised over time as follows:

- Manufacturing only → Plus trade, logistics, etc.
- 100% export required → Domestic sale permitted
- Cargo management at door → Account management system
- Two-step customs clearance → Automated
- Trading permit required → Permit free (in accordance with WTO rules)

# Success Factors

(As explained by EPZ Administration)

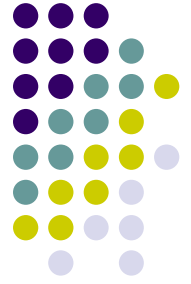


1. Right timing for domestic and global economy
2. Good location close to port, airport, freeway, metro.
3. Effective macroeconomic and land policies
4. Perfect legal system for investing in EPZs
5. Single contact window (all applications processed within 2 weeks, 24-hour rapid customs clearance)
6. Excellent infrastructure, connectivity, incentives, working & living conditions, etc.
7. Skilled workers
8. Adoption of foreign technology
9. Entry of qualified tenant companies

# Small and Medium Enterprise Policy

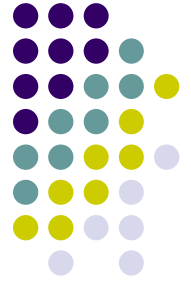


- Definition of manufacturing SME:  
Paid-in capital < NT\$80 million (\$2.5 million) or employees < 200.
- Micro businesses: employees < 5.
- SMEs' share in national economy (2010):  
97.77% of total enterprises, 76.7% of employment, 29.8% of sales, 17.9% of export.
- High start-up ratio: 7.1% of total SMEs per year.
- Support is provided by SME Administration (SMEA) under MoEA. HQ in Taipei, 2 regional offices, and 24 local service centers.



# SME Promotion

- Three levels of support
  - { Award strategy – excellent SMEs (1-3%)
  - { Guidance strategy – middle layer of SMEs (27-34%)
  - { Grouping strategy – other SMEs (65-70%)
- Task areas (corresponding to 5 divisions of SMEA)
  - (i) Policy planning
  - (ii) Management consulting
  - (iii) Business start-up & incubation
  - (iv) IT
  - (v) Finance



## SME Promotion (cont.)

- HQ office operates one-stop service center.
- SME Development Fund and National Development Fund provide financing. These funds are lent by commercial banks or invested by SME investment companies. SME Credit Guarantee Fund also exists.
- Support for management, technology and linkage are provided free of charge to SMEs. These are conducted by private consultants and firms through open bidding. 5S and QCC are standard tools.
- Following the Japanese model, the One Town One Product (OTOP) program develops local specialty industries with city and township as units.



# General Lessons

Despite different income and industrial levels, Taiwan can offer the following general lessons for all countries:

- Powerful and centralized policy authority of MoEA covering all industry-related issues.
- Effective use of government-created institutes in designing and implementing industrial policy.
- Well-designed and executed models of industrial estates as receivers of good investors.
- Gradual evolution and leveling-up of industrial policy based on sufficient preparation and consultation.