勞 動 力

National Taiwan Normal University

講師：王文誠

一、TFT-LCD與南科發展

- **產業聚集的趨勢逐漸增強**
- －第三義大利 (Third Italy)的傳統產業
- －美國加洲矽谷
- －台灣科學工業園區

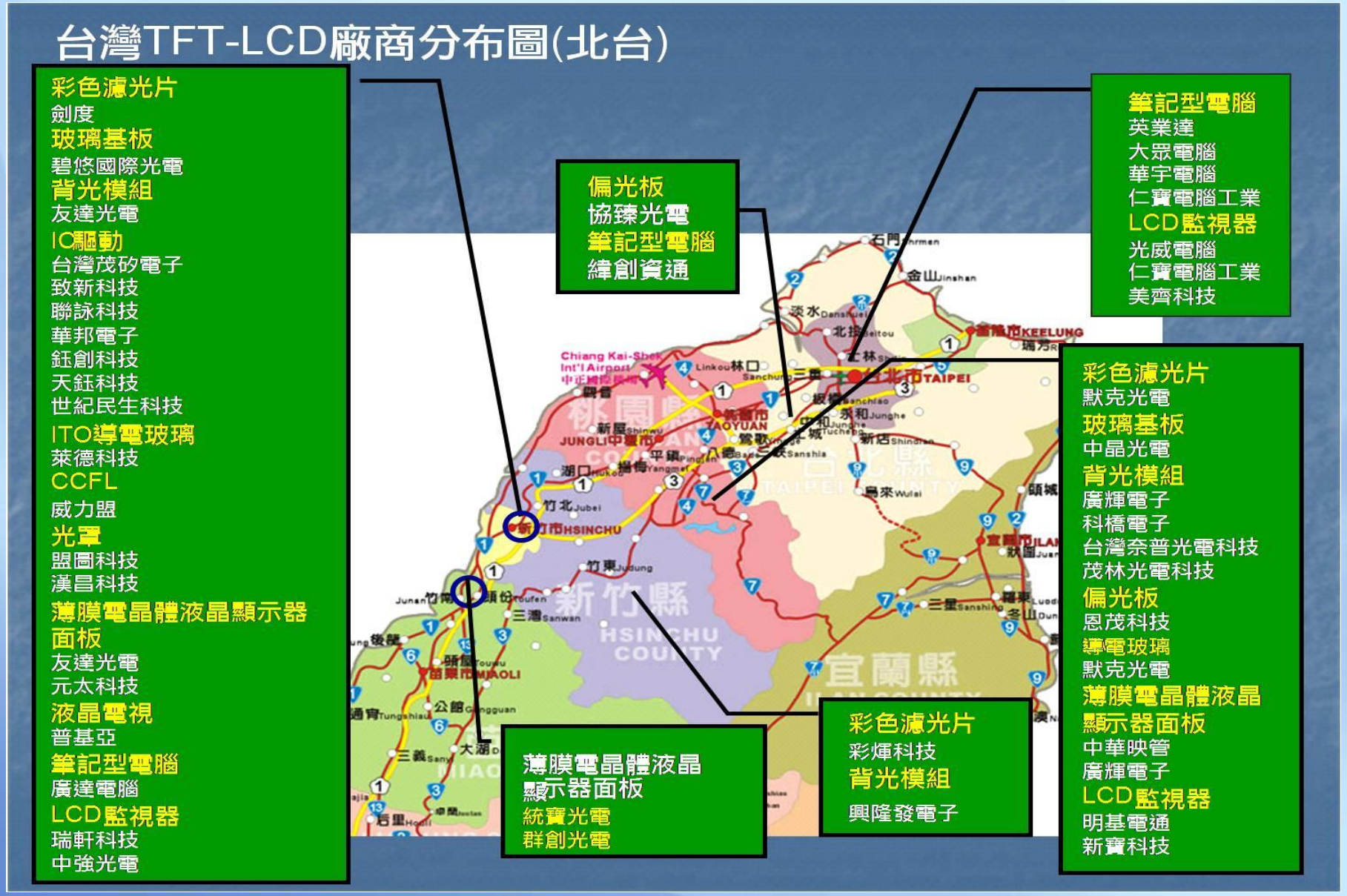
- **南部科學工業園區（八年間）發展**
- －年產值2,594億元
- －就業人數達32,793人
- －引進廠商數達157家

- **相當於新竹科學工業園區成立第十四年的發展規模，為我國光電產業聚落最完整之園區**（南部科學工業園區管理局，2005）。

一、TFT-LCD與南科發展

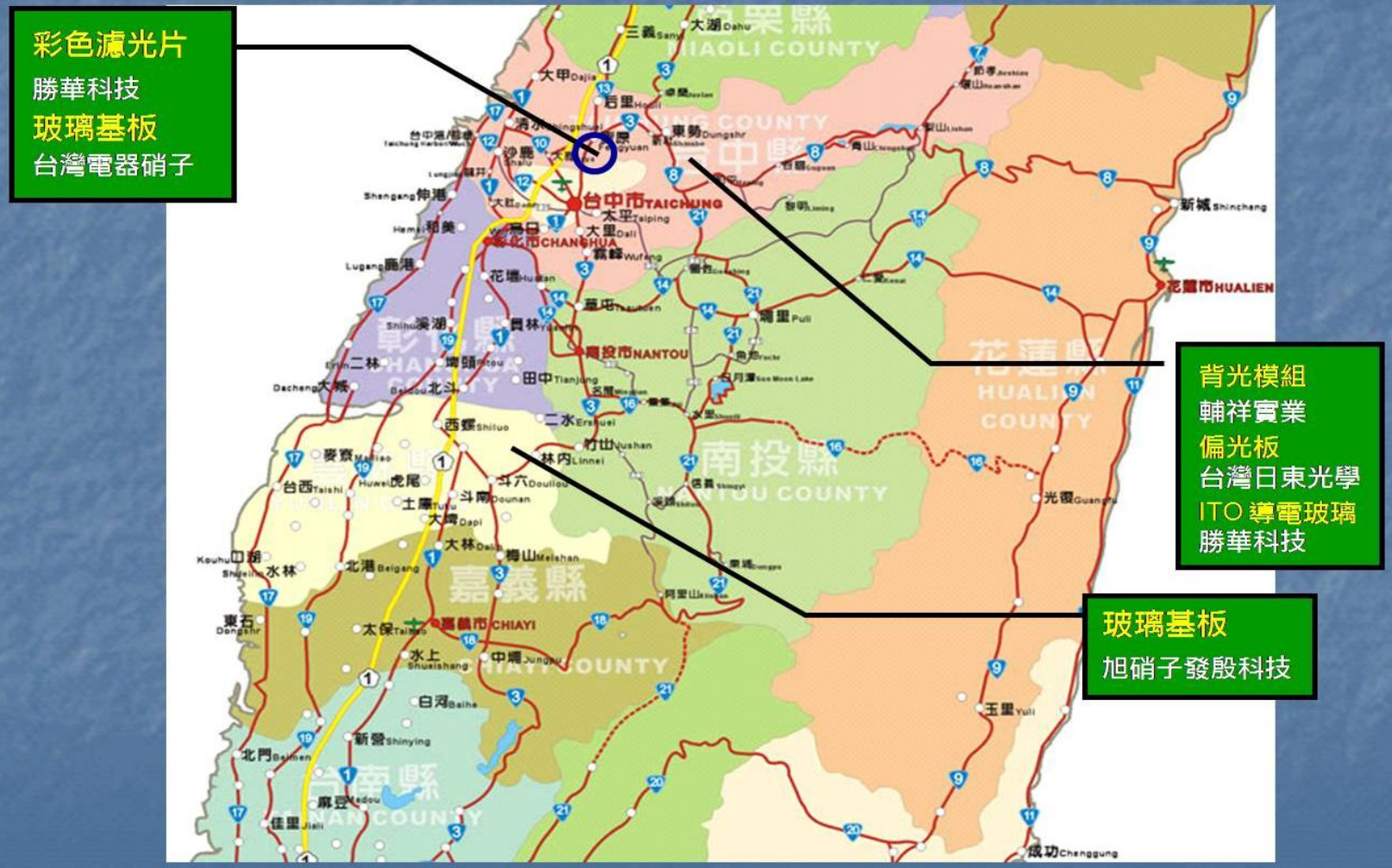
- 南部科學工業園區
  - 台南園區行政區域上的台南縣新市、善化與安定三鄉鎮間；高雄園區行政區域上的高雄縣路竹、岡山與永安三鄉鎮間。
- 研究對象
  - 光電產業的工程師層級
- 南部科學工業園區管理局（2005）統計顯示：
  - 2004年底光電產業營業額為1,685.8億元（64.98%）
  - 2004年底光電產業就業人數為21,306人（64.97%）
  - 2005年5月底光電產業核准入區家數共46家。

一、TFT-LCD與南科發展



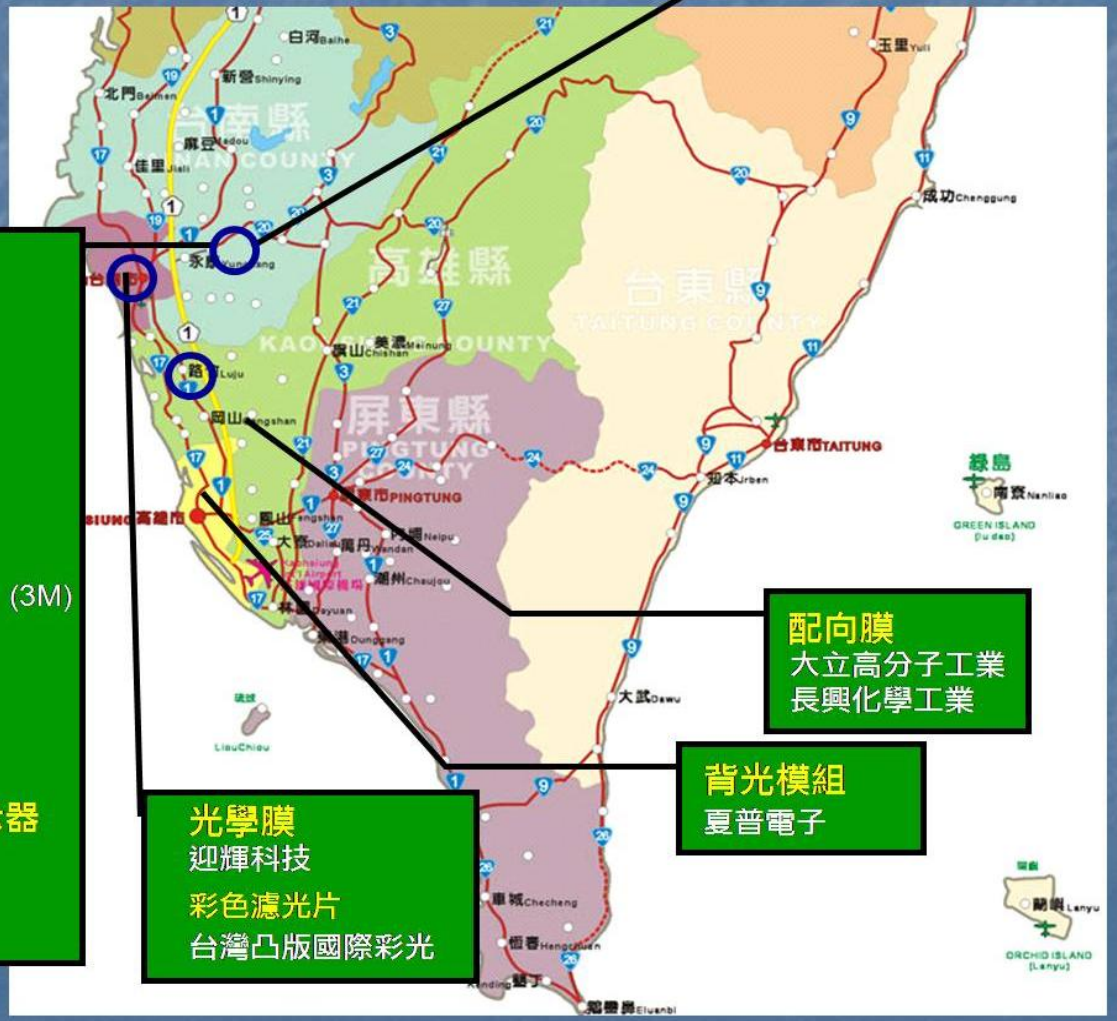
一、TFT-LCD與南科發展

台灣TFT-LCD廠商分布圖(中台)



一、TFT-LCD與南科發展

台灣TFT-LCD廠商分布圖(南台)



CCFL
西虹電子
台灣斯坦雷科技
台達電子
台灣恩益禧光電
擴散膜
中華薄膜
光學膜
台灣明尼蘇達礦業製造 (3M)
光罩
頂正科技
漢昌科技
黏著劑
琳得科精密塗工
薄膜電晶體液晶顯示器面板
奇美電子
瀚宇彩晶

光學膜
迎輝科技
彩色濾光片
台灣凸版國際彩光

配向膜
大立高分子工業
長興化學工業

背光模組
夏普電子

彩色濾光片
南蠶光電
和蠶光電
展茂光電
奇美電子
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背光模組
中強光電
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液晶電視
新視代科技
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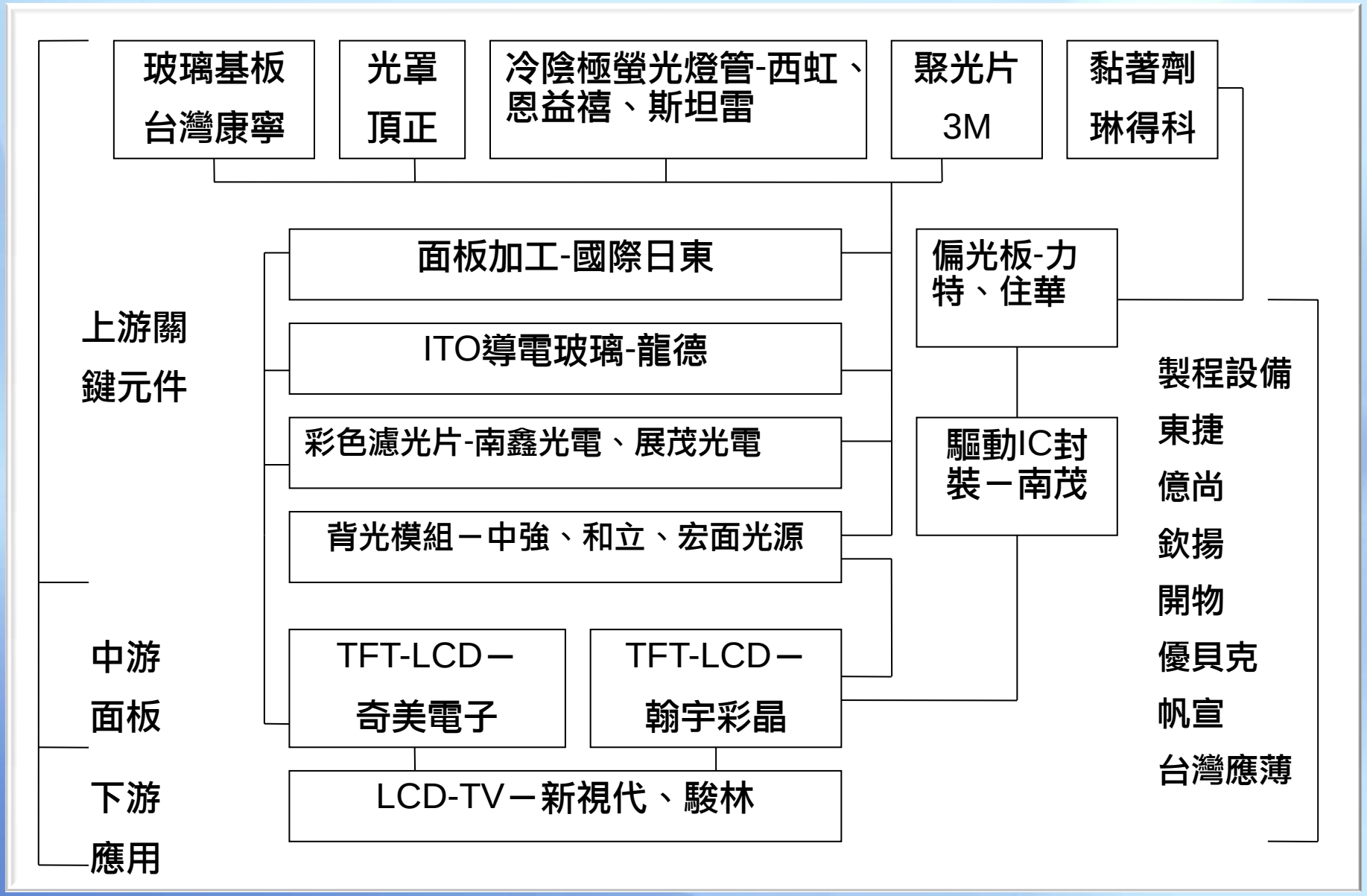
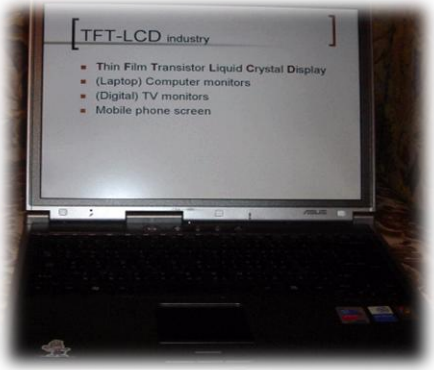
一、TFT-LCD與南科發展



一、TFT-LCD與南科發展

- Thin Film Transistor Liquid Crystal Display
- (Laptop) Computer monitors
- (Digital) TV monitors
- Mobile phone



一、TFT-LCD與南科發展

In 1995 Taiwan commenced the new industry of the TFT-LCD manufacturing via transferring technologies from Japan.

No more than a decade, the development of TFT-LCD cluster has put Taiwan as the world's largest producer, overtaking Japan in 2001 and in 2004 surpassing South Korean (product values).

一、TFT-LCD與南科發展

The development of TFT-LCD industrial geography in Taiwan is considered that Japan's foreign direct investors play an important role.

Taiwan is an important producer of laptop PC, which demands of TFT-LCDs. For example, 49% of global market value of laptop in 1999 was made in Taiwan, but all the flat panel displays were imported from Japan or South Korea.

Japan owns the technologies for massive manufacturing and Japanese firms considered they are the national treasures not easy to be transferred to overseas.

一、TFT-LCD與南科發展

After 1997, while Taiwanese enterprises largely invest in the TFT-LCD industry, that attract Japanese related firms cross-border FDI.

Particularly, Tainan, in the southern Taiwan, has been sculpted as the largest TFT-LCD cluster since the Southern Taiwan Science Park (STSP) was developed by the government in 1997.

Developed at the same time of 2000, Japanese FDI also step into the another industrial complex, the Tainan Technology Industrial Park (TTIP), 30 minutes drive away from the nearby STSP.

二、Japanese TFT-LCD FDI in Taiwan(一)

Place	Japanese FDI Firm	Number	%
Hsinchu Science Park	Tosh Quartz	1	5.9%
Central Taiwan Science Park	International Nitto	1	5.9%
Yunlin Technology Industrial Park	Asahi Glass	1	5.9%
Southern Taiwan Science Park	Finex Tech, International Nitto, Sumika, Nihon, Stanley, Lindo Tech, Ulvac Taiwan, Tosh Quartz, Taiwan Sekiguchi	9	52.9 %
Tainan Technology Industrial Park	Taiwan Toppan, Ulcoat, Toyo Ink, Nippon Sheet Glass, Chaohe Gas	5	29.4 %

二、Japanese TFT-LCD FDI in Taiwan(一)

二、Japanese TFT-LCD FDI in Taiwan(一)

Aim of the Study

- Why do Japanese firms choose Tainan as the location to invest to?
- What is provided in Tainan with institutional and cultural stands for attracting Japanese TFT-LCD FDI?
- Furthermore, What do the TFT-LCD Japanese FDI firms play a role for industrial clustering?
- This study attempts to examine the process, the key determining factors, and the policy effects (industrial clustering).
- The methodology applied in this work is the triangulation approach to carry out the fieldwork, which will coalesce in gaining survey materials, and in undertaking a very extensive set of face-to-face interviews.
- Furthermore, through investigating the interaction and organizational behavior between Japanese and local firms, the paper tries to analyze the mode of the TFT-LCD industrial clustering process to clarify Japanese role on the local economic development.

二、Japanese TFT-LCD FDI in Taiwan(一)

- Japanese Firms Foreign Direct Investment

Shapes of Japanese Firms FDI	**Flying-geese Model**
Scalar fixes	**Industrial Clustering**

二、Japanese TFT-LCD FDI in Taiwan(一)

- Shapes of Japanese Firms FDI

- Taiwan and Japan, because of colonial history (1895-1945) and geographical proximity relations, are in remarkably close relations in mutual trades between each other.
- Up to 2003, number of the Japanese FDI is 4,357 items, account for 28.07% of total FDI cases in Taiwan, and occupy the first rank.

二、Japanese TFT-LCD FDI in Taiwan(一)

Shapes of Japanese Firms FDI

- After World War II, Japanese enterprises of FDI to Taiwan launched in1952, and heated up in the place while Taiwan instituted new initiatives ‘Statute for the Encouragement of Investment’, which included tax exemptions and credit incentives, became Taiwan’s central economic policy and was actively pursued.
- In addition, until Taiwan founded the first ‘export processing zone’ of the world in 1966, Japanese FDI came to enjoy the advantages of the low labour wages, no environment control, educated stable labours, especially the hundreds of thousands of newly available female labour supported with the developmental government .

二、Japanese TFT-LCD FDI in Taiwan(一)

- Flying-geese Model

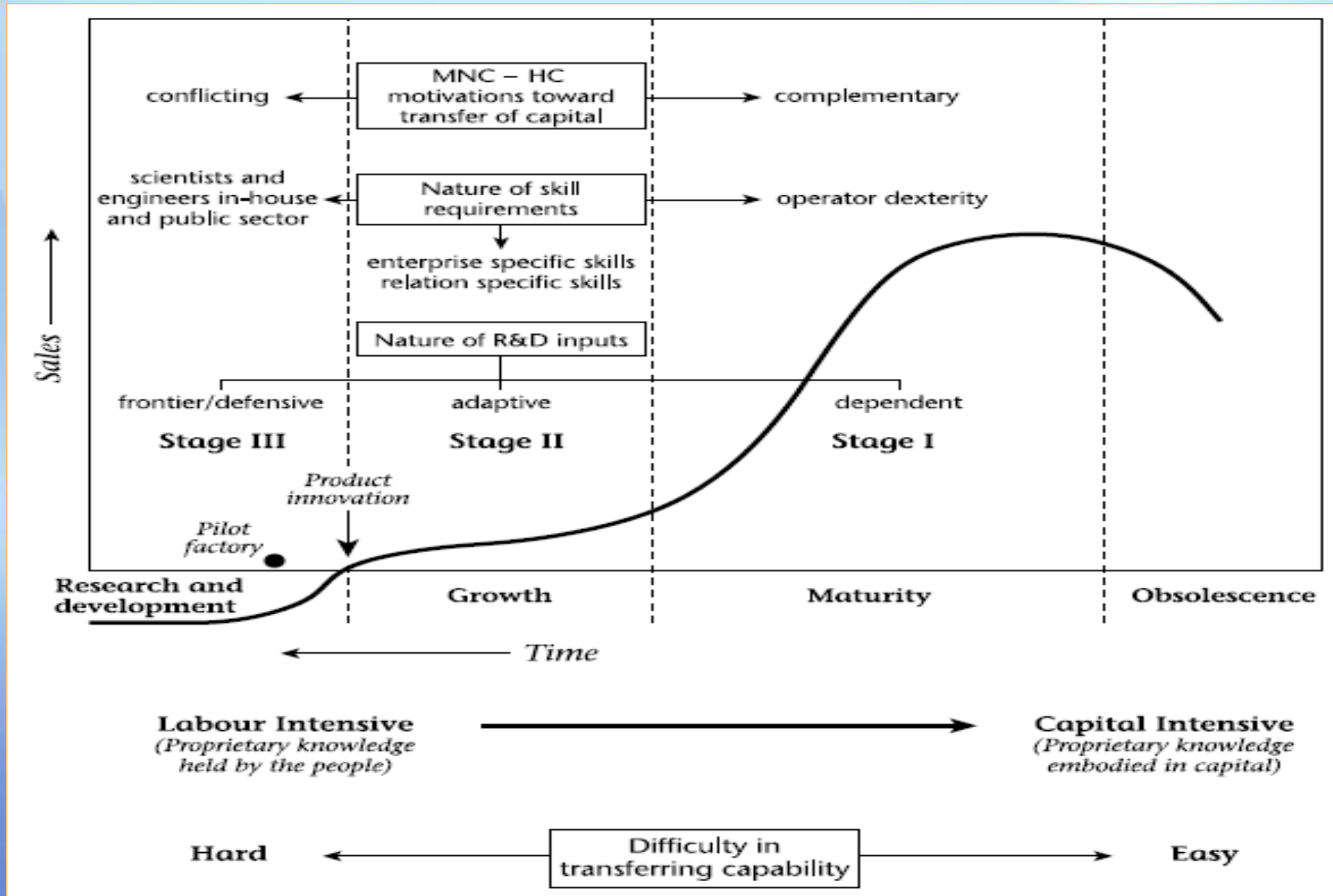
'Flying-geese model' comes from a Japanese scholar while Akamatsu, with flying wild geese immigrant competent metaphor, explains Japan industrial development and trade situation in textile industry and mechanical industry, to inference the concept regarding Japan and other Asian developing countries putting forward of development of industrialization.
Akamatsu claims that product life cycle, from introduction, growth, maturity to decline, processes from one country to another late comers, which is the prolonging phenomenon that appearance reduces after increasing.

二、Japanese TFT-LCD FDI in Taiwan(一)

- Flying-geese Model

The growth of Asian industries and economic development is regarded as the ‘flying-geese model’. That is, Japan goes ahead, the newly industrial economies (South Korea, Taiwan, Hong Kong and Singapore) follow, and the ASEAN (Association of Southeast Asian Nations) and Mainland China get behind.

二、Japanese TFT-LCD FDI in Taiwan(一)



二、Japanese TFT-LCD FDI in Taiwan(一)

- Scalar Fixes

- However, Hayter and Edgington's (2004) empirical evidence provided in the Taiwan's sections is limited.
- More recent as known as high-technology industries development in particularly the integrated circuits industry development, there are more linkages between the US (Silicon Valley) and Taiwan (Hsinchu) (Saxenian, 1997; Saxenian and Hsu, 2001; Hsu & Saxenian, 2000, Wang 2005), rather than Japan played the role.
- In addition, the dynamics of new emergence industries, particularly in TFT-LCD developmental scenario in Taiwan, is also quite different what they described. It is related to the scale and rescale of the political geography.

二、Japanese TFT-LCD FDI in Taiwan(一)

- Scalar Fixes

- scale issues were discussed in terms of the economic geographies of capitalist transformation and the rescaling of capitalist accumulation and regulation issues and new ‘spatial fix’ or ‘scalar fix’.
- as a partial and temporary resolution of the tension of capitalism between homogenization and differentiation

二、Japanese TFT-LCD FDI in Taiwan(一)

Methodology

- a triangulation methodology
- Documentary analyses
- A structured questionnaire in both Mandarin and Japanese and
- Face-to-face interviews to the practitioners, local government, administration of two industrial complexes and the related TFT-LCD firms (i.e. Chi-Mei Optoelectronics) were simultaneously implemented between March and June 2004.
- Thirty respondents were interviewed, each for approximately one hour.

二、Japanese TFT-LCD FDI in Taiwan(一)

- Results and Discussions

- Determinants for Japanese Firms Foreign Direct Investment
- Flying-Geese Model
- Japanese Firms FDI and Chi-Mei Optoelectronics

二、Japanese TFT-LCD FDI in Taiwan(一)

- Determinants for Japanese Firm Foreign Direct Investment

"We forecast that the quantity used of glass substrates of TFT-LCD in Taiwan will reach the first in the world rank…..until 2007, Taiwan consumption of glass substrates will take up to 48% of the world. It means half of world glass substrates manufactured are given to the use of Taiwanese TFT-LCD firms. Cannot you come over to Taiwan?"

Interview ST-6, 2004/5/4

(emphasis is made by the interviewee when interviewed)

二、Japanese TFT-LCD FDI in Taiwan(一)

FDI Motives of the Japanese TFT-LCD firms

District Motive of investment	Southern Taiwan Science Park (n_i =6)	Taiwan Technology Industrial Park (n_j =4)	Percentage
Proximity to local market demands	6	3	90.0%
To expand the market scale	5	2	70.0%
To reduce the production cost	3	2	50.0%
To follow the main customers	3	2	50.0%
To establish new markets	3	0	30.0%
To institute marketing network	2	1	30.0%
Competitiveness in Taiwan	2	1	30.0%
To disperse the production risks	1	1	20.0%

二、Japanese TFT-LCD FDI in Taiwan(一)

- Flying-Geese Model

"… South Korea has a strong anti-Japanese complex, so they find it on intimate relations Taiwan to Japan for transferring technologies. They do not want to let South Korea to be the largest producers alone. In 2002, South Korea had been big alone by having 40% of the TFT-LCD market values. However, Japan declined gradually, so they move the TFT-LCD development to Taiwan by helping Taiwan to grow up to confront with South Korea."

Interview ST-10, 2004/3/17

二、Japanese TFT-LCD FDI in Taiwan(一)

- Flying-Geese Model

"Japanese have not already minded this national treasure. If any country can propose the rational price, Japanese enterprises will sell. Japan's economic situation has been very bad during these years, so enterprises have to sell technology to make money in order to seek survival

Interview ST-7, 2004/5/4

三、Japanese TFT-LCD FDI in Taiwan(二)

Typology of Japanese Panel Firms FDI

Firm	Location of headquarter	FDI in Taiwan	FDI in Mainland China
		International Management Typology	
Sharp	Japan	Quanta Display (strategic alliance, 20% sell return back to Japan, Japanese holds 7.13% shares)	FDI Panel, Module (Wu-Xi)
IBM	Japan	AUO* (strategic alliance, 30-40% sell return back to Japan)	--
Fujitsu	Japan	CMO (strategic alliance, 30% sell return back to Japan)	--
Mitsubishi Electrics	Japan	Chunghwa Picture Tubes (strategic alliance, 30% sell return back to Japan)	--
(Toshiba) Hitachi	Japan	HannStar (strategic alliance, 20-30% sell return back to Japan)	--
Hitachi	Japan	--	FDI Module (Su-Zhou)
Epson	Japan	--	FDI Panel, Module (Su-Zhou)
Hosiden	Japan	--	FDI Panel, Module (Guang-Dong)
OPTREX	Japan	--	FDI Panel, Module (Jiang-Su)
SII	Japan	--	FDI Panel, Module (Huang-Pu, Xi-Li)
Casio	Japan	--	FDI Module (Shen-Zhen)

三、Japanese TFT-LCD FDI in Taiwan(二)

Survive! In fact probably there is not a market in Japan. I have been expressed as like a lot of equipment agents of Japan: if the order of Chi-Mei Optoelectronic (CMO) has not been obtained, this company should close. Some Japanese firms in Japan's locality have a lack of competitiveness and even in Taiwan. If they can survive in Japan, I do not think they will come over here. CMO to require them come over, they can make cost down to save the transportation cost. Because panel size make heavy, if all comes over from Japan, this would be a lot of cost.

Interview ST-2, 2004/4/26

三、Japanese TFT-LCD FDI in Taiwan(二)

- Because ‘Taiwan has more relevant relationships with Japan after all’, the Japanese enterprises have the institutional and cultural advantage in Taiwan for FDI strategies on new economic space to establish both sides production structure relation of interdependences.
- ‘So they [the Japanese firms] come over here’.
- To produce network territories and scalar fixes for the market deeper strength: on one hand, as stated, because of ‘proximity of markets; on the other hand, to expand Japanese enterprises TFT-LCD industry on the scale of the global market. This relation of interdependences cannot be explained by the single direction of flying-geese model. Tainan is a node of the TFT-LCD production network.

三、Japanese TFT-LCD FDI in Taiwan(二)

Connected to collaboration with Japan-Taiwan-Mainland China's production regions to response global competition, Tainan TFT-LCD industrial district accords with the 'global city' debated in previous in this paper: Tainan provides a institutional and cultural advantage for TFT-LCD industrial process striding into this new industrial space. This 'advantage' can be further explained by Dunning's 'eclectic theory' as an analytical framework.

三、Japanese TFT-LCD FDI in Taiwan(二)

Japanese FDI and Chi-Mei Optoelectronics (CMO)

Mechanism of the Japanese TFT-LCD firms FDI in Tainan Districts

FDI mechanism	Southern Taiwan Science Park (n_i =6)	Taiwan Technology Industrial Park (n_j =4)	Total (n =10)	Percentage
Introduced by CMO	5	2	7	70.0 %
Introduced by other Japanese firm	1	0	1	10.0 %
Introduced by other local Taiwanese firm	0	1	1	10.0 %
Government oversea promotion	0	1	1	10.0 %

三、Japanese TFT-LCD FDI in Taiwan(二)

CMO aims to introduce these Japanese firms because not only Japan commences such an undertaking in TFT-LCD industry, but also Chi-Mai has the mutual long-term relations established with Japanese enterprises, to shape the ‘network economy’, which refers to ‘economic activities which are based on personal and inter-firm relationships through information exchange and resource sharing to seek reciprocal benefits’

三、Japanese TFT-LCD FDI in Taiwan(二)

- CMO and Japan vis-à-vis Institution and culture

- Taiwan has not adopted the development obstacles and dependence countries of history that Japan has colonized, and has successfully ruptured with the past, and, in addition, has created a helpful local development linkage with Japanese enterprises.
- Japanese enterprise facilitates Taiwan entering world markets after World War II, to promote 'Made in Taiwan' in the globe, to pervade daily life in every fields.

三、Japanese TFT-LCD FDI in Taiwan(二)

- CMO and Japan vis-à-vis Institution and culture

- Taiwan surmounts the colonialism of Japan as the meta-colonial complex to shape the new relations of mutual trades and economic activities.
- It means that Wen-Lung Hsu (許文龍), Chi-Mei Group's chief, shapes the network economies by his personal relations of meta-colonial complex to Japan and personal enterprise networks, extending to inter-firms economic activity, via production typology of joint-venture, technology transfer, strategic alliance, and merger with Japanese enterprises to create cross-border mutual benefits between intra-industries.

三、Japanese TFT-LCD FDI in Taiwan(二)

Conclusions

- Towards a Model of Flying Geese?
- Tainan District: Hybridization of Geographies between Traditional and High-technology industries
- Industrial Characteristic, History, and Culture in the Mixed Industrial Clustering

三、Japanese TFT-LCD FDI in Taiwan(二)

- Towards a Model of Flying Geese?

- The ‘flying-geese model’ seems to be explainable that is Japan shifts mature tech to Taiwan, and promotes itself to higher tech
- However, the main reason that Japan transferred technologies and FDI is Japan facing domestic economic recession, South Korea rousing itself to catch up, and Taiwan strong appeal of markets.

三、Japanese TFT-LCD FDI in Taiwan(二)

- Towards a Model of Flying Geese?

- Our findings have shown that Japanese FDI in the TFT-LCD relevant industries is due to 'proximity of market' for the expansion of Japanese production competence in Tainan.
- In terms of the depressions of domestic market, Japanese have to adjust themselves for the global re-scaling of the market and scalar fixes to seek the most favorable market.

三、Japanese TFT-LCD FDI in Taiwan(二)

Local enterprises become main driving force that the industry of Tainan districts makes the transition.

CMO impels local industry and shapes Tainan into the TFT-LCD industrial landscape.

Chi-Mei joins the position of the high-technology liquid crystal development, which further hybridization of economic geography spreads out the traditional and high-technology industries

三、Japanese TFT-LCD FDI in Taiwan(二)

- Industrial Characteristic, History, and Culture in The Mixed Industrial Clustering

1. TFT-LCD industrial characteristic. Glass is vulnerable during transportation. The more close to market, therefore, can reduce the broken risk and transportation cost.
2. Historical context of the industry ‘network economy’. The located Japanese enterprises in Tainan are mostly introduced by CMO. Based on personal relationships of Wen-Lung Hsu, Chi-Mai has very positive relationships with Japanese enterprises in the long-term history of local development.
3. The Japanese industrial culture, the development of the group type, and cultivation of the cooperation system in industrial supply chains, particularly when they produce abroad. In addition, the Taiwan largely accepts and connects Japanese enterprises as well as culture via deep surmounting the whirl of colonialism.

三、Japanese TFT-LCD FDI in Taiwan(二)

- Industrial Characteristic, History, and Culture in The Mixed Industrial Clustering

According to our survey, Japanese enterprises do not set up a R&D unit in the Tainan districts, but no matter production equipment or technology import from Japan by even raw materials produced to have mostly in Tainan. It seems quite limited to the local clustering synergies with the view of industrial clustering effects that the Japanese enterprises implemented in the Tainan.

三、Japanese TFT-LCD FDI in Taiwan(二)

- Industrial Characteristic, History, and Culture in The Mixed Industrial Clustering

Finally, the clustering synergies will not be produced when just only putting firms together. The positive effects of the new economic geography clustering in Tainan districts are needed to build and promote via the any possibly formal and informal flows through the networks, hubs and nodes.