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兩岸電力電子產業競合分析

The Co-opetition Strategy Between Taiwan and Mainland China's Power Electronics Industries

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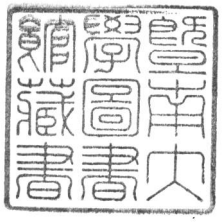

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摘 要

本報告透過分析主要電力電子產品 — 不斷電系統（UPS）、變頻器、交換式電源供應器（SPS）及其上游關鍵零組件功率半導體元件的產業現狀與發展趨勢，總結兩岸電力電子產業特點及兩岸業者之競爭優劣勢，並在此基礎上提出兩岸產業競合策略。

一、兩岸電力電子產業現況

(一)UPS 產業

2003 年中國大陸 UPS 市場規模為 20.37 億人民幣，約佔全球市場比重 5%，預計未來五年年平均成長率為 8%。2003 年中國大陸進口 8.37 萬台 UPS，出口 750 萬台 UPS，出口數目顯示中國大陸目前生產全世界 60%的 UPS 系統。中國大陸市場前五大品牌均為外資品牌，以銷售值計分別是 APC、山特、MGE、Powerware 和 Liebert，2003 年合計市場佔有率達到 74%。若以銷售量計算，台商「飛瑞」轉投資之「山特」品牌排名第一。近年來亦出現一批中國大陸本地 UPS 企業，其中「科士達」規模最大，且最具競爭力。

台灣 UPS 市場規模約在 12-14 億新台幣之間，已基本飽和，未來成長空間不大。廠商數目從 1996 年的 30 家減少至目前的 15 家。台灣業者以承接國外廠商小型 UPS 代工訂單為主要經營方式，但近年來由於小功率產品受到來自中國大陸業者的競爭，利潤不斷降低，亦積極開發中大功率產品。飛瑞、台達、APC 為前三大品牌，2003 年合計市場佔有率為 85%。主要廠商飛瑞為全球前五大供應商之一。

(二)變頻器產業

2003 年中國大陸變頻器市場規模為 55.6 億人民幣，約佔全球市場比重之 11%。由於使用變頻器提高能源利用效率，屬於政府鼓勵項目，預計未來五年年平均成長率為 10%。75kW 以下之中小功率產品約佔市場總銷售值之 67%，90kW 以上之中大功率產品約佔 33%。中國大陸市場變頻器品牌約有 100 個，位居前十位的均為外資品牌。2003 年前五大供應商西門子、富士電機、ABB、三菱及安川合計市場佔有率為 55.3%，台灣廠商「台達」列第八位。中國大陸本土變頻器業者之市場佔有率約為 9.6%，產品線集中於 75kW 以下。

台灣變頻器市場規模約 20 億新台幣，在油價不斷上漲、政府重視能源效率等因素刺激下，預計未來五年年平均成長率約為 5%。廠商約有 50 家，其中中小企業佔 74%。台灣業者在小功率產品市場（＜7.5kW）最具競爭力。台達目前以 24%位居台灣市場佔有率第一，其產品集中於 75kW 以下，第二至第四名均為日本品牌，分別是安川、三菱及富士電機。

(三)SPS 產業

2003 年中國大陸 SPS 市場規模約為 75 億人民幣，廠商家數由 1997 年的 100 家左右，發展到 2003 年有 700 家左右。通訊領域為中國大陸 SPS 最大消費市場，2003 年佔總銷售值之 48%，其次為資訊領域，佔 21%，消費性電子用 SPS（家電及辦公設備等）佔 16%。歐洲廠商在通訊及工業用 SPS 領域佔有率較高；台商在資訊用 SPS 領域佔有率最高；美商和中國大陸本土業者在消費性電子用 SPS 領域具有優勢。

台灣 SPS 產業在下游資訊產業起飛帶動之下蓬勃發展，成為全球資訊用

SPS 專業代工生產基地，最盛時期廠家數目超過 300 家。台達和光寶位居資訊用（桌上型電腦/筆記型電腦/伺服器）SPS 全球佔有率前二名。但是由於資訊用 SPS 構造簡單，產業競爭激烈，目前 90%的產能已轉移至中國大陸，廠商數目也減少至 120 家左右。資訊產品為台灣 SPS 產業最大用戶，2003 年佔總銷售值之 48%，其次為通訊產品，佔 42%。台達、光寶、康舒為台灣 SPS 市場前三大供應商，2003 年市場佔有率分別為 46%、16%和 15%。

(四)上游功率半導體元件產業

電力電子產品中大量使用的新型功率半導體元件，如 MOSFET、IGBT、IPM 等，主要供應商均為歐美日半導體大廠。兩岸電力電子產業應用的功率半導體元件，目前均完全依靠進口。

二、結論與建議

(一)兩岸電力電子產業特點

1、電力電子產業在台灣已屬於成熟期產業，但在中國大陸仍處於成長期階段；
2、新型功率半導體元件技術及產製由國際大廠掌控，受國際大廠的供貨情況控制，而且存在匯率風險；
3、不具備國際品牌和行銷通路，對海外市場均以 ODM/OEM 方式出貨，在中國大陸市場則以自有品牌銷售；
4、兩岸電力電子廠商均以中小功率產品為主力，但兩岸市場結構大不

相同：台灣市場以小功率產品為主，而中國大陸市場對於大功率產品具有相當大的需求。

(二)兩岸產業競爭優劣勢比較

兩岸電力電子產業均處於「微笑曲線」的底部，即附加價值低的製造部分。台灣由於人力成本提高，在台灣製造不再具有競爭力，因此電力電子業者多數已至中國大陸投資設廠。所以，比較兩岸產業的競爭優劣勢，確切地說，是比較在中國大陸投資的台灣業者與其本土業者之間的競爭優劣勢，如下表所示。

項 目	設計研發		生產製造				行銷通路			
	產品設計開發能力	吸引當地研發人才	勞動力成本	原材料成本	規模經濟	品質控制	國外客戶	大陸市場通路	品牌形象	資金
台灣業者	↑	↑	↔	↔	↑	↑	↑	↓	↑	↑
大陸業者	↓	↓	↔	↔	↓	↓	↓	↑	↓	↓

註：「↑」優勢，「↓」劣勢，「↔」差異不大
資料來源：工研院 IEK-ITIS 計畫（2004/10）

(三)兩岸產業競合策略

根據兩岸業者競爭優劣勢比較，僅就生產、研發及中國大陸市場通路方面提出幾點競合策略建議：

1、利用中國大陸勞動力低廉的優勢，提高台灣小功率產品國際市場佔有率；

2、結合兩岸研發優勢，拉大與中國大陸業者間的研發實力差距；

3、與中國大陸本地企業策略聯盟，利用其通路進入中國大陸中大功率產品市場。

Executive Summary

The aim of this research is to propose the co-opetition strategy between Taiwan and Mainland China's power electronics industries. To formulate the strategy, the research takes the following steps:

- First, analyzes the market structures and competitive environment of three major power electronics products – UPS, inverters and SPS industries;
- Second, analyzes the market structure and competitive environment of the power semiconductors industry – the key components of power electronics products.
- Third, summarizes the major characteristics of Taiwan and Mainland China's power electronics industries.
- Fourth, compares the strengths and weaknesses of Taiwan and Mainland China's power electronics industries.
- Fifth, formulates the co-opetition strategy between Taiwan and Mainland China's power electronics industries.

The following gives a summary of Taiwan and Mainland China's power electronics industries, and then presents major conclusions and recommend ations of this research.

I. Current Situation of Taiwan & Mainland China's Power Electronics Industries

A. UPS Industry

The sales revenue of Mainland China's UPS market was RMB 2.037 billion in

2003, approximately 5% of the global sales. The market is expected to grow at a compound annual growth rate (CAGR) of 8% in terms of revenues over the next five years. In 2003, Mainland China imported 83,700 units of UPS systems, while exported 7.5 million units. The export figure indicates that China is currently supplying over 60% of the world UPS systems. Foreign brands dominate the domestic Chinese market. The top five brands are APC, Santak, MGE, Powerware and Liebert, occupying a total 74% of the market in terms of revenues in 2003. If listed by the unit sales figures, Santak, a brand owned by the Taiwanese UPS maker "Phoenixtec", stands at the top. A number of domestic Chinese players have emerged during the recent years, among which Kstar is the biggest and most competitive one.

The Taiwanese UPS market is valued at about NT$ 1.2-1.4 billion. The market is mature and stable, leaving little room for growth. The number of manufacturers has declined from 30 in 1996 to 15 at present. Most of the Taiwanese players operate by supplying low-power ODM/OEM products for international brands. But since the intense competition from Mainland manufacturers has greatly eroded the profit margin of the low-power segment, most Taiwanese makers are actively upgrading their capabilities to develop middle to high-power systems. Phoenixtec, Delta and APC are the market leaders in Taiwan, with a total market share of 85% in 2003. Phoenixtec, the biggest Taiwanese UPS manufacturer, is also one of the top five global suppliers.

B. Inverters Industry

In 2003, Mainland China's inverters market amounted to RMB 5.56 billion,

about 11% of the global market. Since the use of inverters enhances energy consumption efficiency, and therefore is greatly encouraged by the national government, the inverters market is expected to grow at a CAGR of 10% over the next five years. The low to middle-power products (< 75kW) take about 67% of the total market revenues, and the middle to high-power products (> 90kW) take the other 33%. There are around 100 inverter brands in the Chinese market, but the big ten are entirely foreign owned. The top five players include Siemens, Fuji Electric, ABB, Mitsubishi and Yaskawa, with a total market share of 55.3% in 2003. The Taiwanese company Delta takes the eighth. The local Chinese brands occupy 9.6% of the market, with major products below 75kW.

The size of the Taiwanese inverters market is about NT$ 2 billion. As the oil price increases and the government pays more attention to energy efficiency, the market is expected to grow at 5% over the next five years. There are about 50 industry players, 74% of them are small and medium-sized enterprises. The Taiwanese manufacturers are most competitive in the small-power products (< 7.5kW). Delta is the Taiwanese market leader, taking 24% of the market in 2003. Its main products are below 75kW. The second to fourth positions are taken by the Japanese brands — Yaskawa, Mitsubishi and Fuji Electric.

C. SPS Industry

The size of Mainland China's SPS market was about RMB 7.5 billion in 2003. The number of manufacturers has skyrocketed from around 100 in 1997 to 700 in 2003. Telecommunications is the biggest end user market of Mainland China's SPS industry, taking around 48% of the total sales revenue in 2003. IT industry comes

the next with a share of 21%, and consumer electronics takes the third by 16%. European SPS makers grab the highest market share in the telecommunications and industrial segments. Taiwanese players dominate the IT-related SPS market. U.S. and local Chinese SPS makers have comparative advantages in the consumer electronics area.

Thanks to a prosperous IT market in Taiwan, the SPS industry also flourishes. Taiwan used to be the largest production site of IT-related SPS, with over 300 manufacturers at the peak time. Delta and Lite-On Electronics are the world's top two suppliers of Desktop/Notebook/Server SPS. However, since the IT-related SPS is not technically intensive, price constitutes the major competition factor. Currently over 90% of the production capabilities have been shifted to Mainland China. And the number of manufacturers has decreased to around 120. IT industry is the biggest end user of the Taiwanese SPS industry, constituting 48% of the SPS sales revenue in 2003. Telecommunications products take the next with a share of 42%. Delta, Lite-On and Acbel are the top three market leaders, with market shares of 46%, 16% and 15% respectively in 2003.

D. Key Components – Power Semiconductors Industry

The new generation of power semiconductors, represented by MOSFET, IGBT and IPM, are the key components of the power electronics products. The main suppliers are the European, U.S. and Japanese semiconductor giants. At present, both Taiwan and Mainland China's power electronics product-makers solely depend on the global semiconductor companies for the supply of power semiconductors.

II. Conclusions & Recommendations

A. Main characteristics of Taiwan and Mainland China's power electronics industries:

1. Taiwan's power electronics industry has entered the maturity stage, but in Mainland China, the power electronics industry is still rapidly growing.
2. Since the key components – power semiconductors are solely supplied by only a few global semiconductor companies, both Taiwan and Mainland China's power electronics manufacturers are exposed to the risks of uncertain delivery time and exchange rate fluctuations.
3. Without international brands and distribution channels, both Taiwan and Mainland China's players sell to the overseas market through ODM/OEM channel, but establish own brands in the domestic market.
4. Both Taiwan and Mainland China's players focus on low to middle-power products. However, the two markets have different structures: Taiwanese market has a limited demand for high power products, but Mainland China's is the opposite.

B. Strengths and Weaknesses:

If judged by the "smiling curve" theory, both Taiwan and Mainland China's power electronics industries are currently located at the bottom of the curve, i.e. the manufacturing part with little added value. Since the labor cost in Taiwan increases, it is no longer competitive to manufacture in Taiwan. Most of the power electronics manufacturers have invested in Mainland China. So to compare the strengths and

weaknesses between these two regions' industries is actually to compare the competitiveness between the Taiwanese players in Mainland China and the local Chinese players. The table below shows the brief comparison result:

Item	R&D		Manufacture				Sales channel			
	Product R&D	Attract local R&D personnel	Labor cost	Raw materials cost	Economies of scale	Quality control	Overseas customers channel	Sales channel in Mainland	Brand image	Capital
Taiwanese Players	↑	↑	↔	↔	↑	↑	↑	↓	↑	↑
Mainland Chinese Players	↓	↓	↔	↔	↓	↓	↓	↑	↓	↓

Note: "↑"stands for "strong", "↓" stands for "weak", "↔" stands for "no major difference"

C. The co-opetition strategy

Based on the strengths and weaknesses of Taiwan and Mainland China's power electronics players, the report proposes the following three points of co-opetition strategy:

1. Fully utilize Mainland China's labor advantages to increase the Taiwanese players' global market share of low-power products.
2. Combine Taiwan and Mainland China's R&D strengths, solidify the technical advantages of Taiwanese players over Mainland Chinese competitors.
3. Form strategic alliances with local Chinese companies in order to utilize their channels to enter the middle to high-power market in Mainland China.

目 錄

圖目錄