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The Status of ICT Industry Development in Taiwan

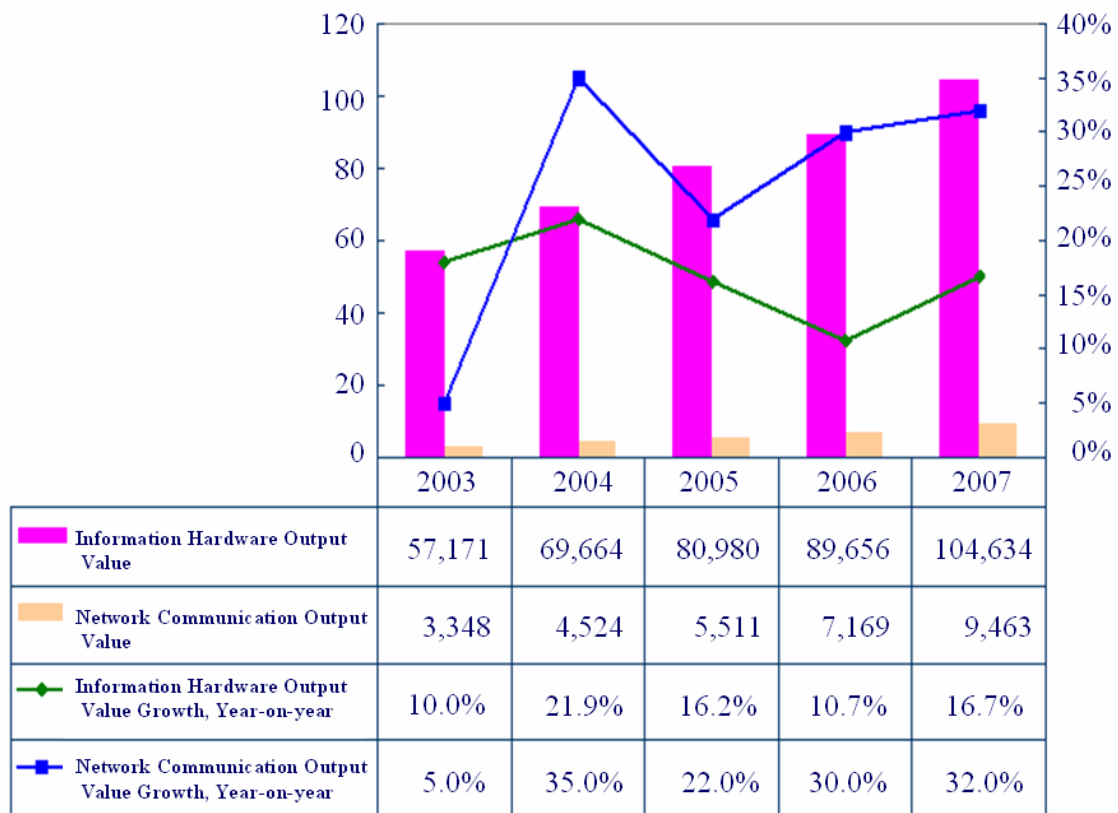
(I) Supply & Demand

Taiwan's ICT industry has always held a significant global position. A lot of ICT products worldwide are processed by manufacturers in Taiwan. In addition, the tendency for the global IT industry to seek out offshore OEM and other cost reduction methods confirms the importance of Taiwan's ICT industry. According to a study by the Industry Technology & Intelligence Services (ITIS) Project of the Ministry of Economic Affairs (MOEA), Taiwan's ICT industry output value has maintained double-digit growth since 2004. The output value of information hardware, in particular, broke the US\$100 billion barrier for the first time in 2007, reaching US\$104.634 billion for a year-on-year growth of 16.7% from US\$89.656 billion in 2006, and surpassing its previous growth records of 10.7% in 2006 and 16.2% in 2005.

The performance of network communication products is even more impressive. In 2003, the output value of network communication products in Taiwan was just US\$3.348 billion, a 5% increase on 2002. Since 2004, however, there has been explosive growth at the rate of 30% per year. In 2007, the output value of network communication products reached US\$9.463 billion, representing a growth of 32% on 2006.

Taiwan ICT Industry Output Value (2003~2007)

Unit: USD million



Source: MOEA ITIS Project; compiled for the present study, 2008/1

To understand the output of products in the entire ICT industry, we must look at some representative products, including notebook computers, LCD TVs, and mobile phones. The output values of WLAN network interface cards (NICs), DSL modems, cable modems, and IP phones have also maintained double-digit growth since 2007. Most impressively, the output value of WLAN NICs has topped US\$150 billion, and IP phones have showed a growth of 100%.

Output for Taiwan's Major ICT Products (2005~2008)

Unit: Million

Item/Year	2005	2006	2007	2008(e)
Notebook Computer Output	40.639	54.254	79.335	98.600
Notebook Computer Output	---	33%	46%	24%

Year-on-year Growth				
LCD TV Output	4.921	8.974	14.613	25.050
LCD TV Output Year-on-year Growth	178%	82%	56%	79%
Mobile Phone Output	84.9	142.5	95.5	108.5
Mobile Phone Output Year-on-year Growth	49.7%	67.8%	-33%	13.6%

Source: Compiled for the present study, 2008/1

Output Values of Taiwan's Major ICT Products (2007~2008)

Unit: USD million

Item/Year	2007	2007 Growth	2008(e)	2008(e) Growth
WLAN NICs	156.888	17.9%	194.778	24.2%
WLAN APs	6.699	34.5%%	7.570	13.0%
DSL Modems	55.852	21.4%	62.554	12.0%
Cable Modems	25.778	15.1%	27.070	5.0%
IP Phones	10.120	100.8%	14.370	42.0%

Source: MOES ITIS Project, compiled for the present study, 2008/01

(II) An Analysis of Existing Gaps in the Industry Supply Chain, Investment Niches, and Prospective Foreign Investors

Taiwan is home to a comprehensive ICT industry chain comprising upstream, midstream, and downstream manufacturers. In the area of upstream parts and components, many manufacturers are working on core components (e.g. IC, panels, motherboards, PCBs, power supplies, passive devices, casings, connectors, cooling modules, and batteries) and peripherals (e.g. mice and keyboards), making Taiwan among the best in the world in terms of both quantity (number of manufacturers) and quality (global manufacturer ranking). Representative manufacturers include Foxconn, MediaTek, AUO, Chimei, ViaTech, Novatek, Sunplus, Asus, Unimicron, Delta, Foxconn Tech, Foxlink, and Yageo.

In the area of midstream OEM assembly, Taiwanese enterprises have a great variety of OEM orders on hand for a variety of ICT products such as notebook computers, mobile phones, LCD TVs, digital cameras, MP3 players, LCD monitors, video games, and network communication equipment. Quanta, Compal, Wistron, Foxconn, CCI, AmTRAN, Gemtek, and Zyxel are the leading manufacturers in this field.

Though the industry has long placed its focus on parts, components, and OEM assembly, the concept of branding has taken hold in recent years. Many domestic brands have emerged in the area of downstream brand marketing, including Acer, Asus, BenQ, Okwap, Dopod, and D-link.

Upstream, Midstream, and Downstream Manufacturers in Taiwan's ICT Industry Chain

Upstream Parts and Components	ICs	MediaTek, ViaTech, Sunplus, Elan, Novatek...
	Panels	AUO, Chimei, Innolux, Chunghwa, Hannstar...
	MBs	Asus, Elite, MicroStar...
	PCBs	Unimicron, Compeq, Wus, Unitech...
	Power Supplies	Delta, Pihong, LiteOn...
	Passive Devices	Walsin, Yageo...
	Casings	Foxconn, Enlight...
	Connectors	Foxconn...
Mid-Stream OEM Assembling	Mobile Phones	Arima, Compal, Qisda, Foxconn, Inventec...
	NBs	Quanta, Compal, Wistron, Inventec, Asus...
	LCD TVs	Amtran, Teco, Kolin, Innolux, Quanta...
	MP3s	Inventec, Foxconn, Asus...
	Video Games	Wistron, Foxconn, Asus...
	DSCs	Asia Optical, Canon...
	Network Facilities	Gemtek, Zyxel, Alpha, Tecom, Accton...
Downstream Brand Marketing	Brands	Acer, Asus, BenQ, Okwap, D-Link...
	Channels	Synnex, Tsann Kuen, Genuine

Source: Compiled for the present study, 2008/1

Taiwan has the following three advantages for ICT industry investment and IPO establishment:

1. Many Taiwanese products take first place in global market share

As mentioned, Taiwan plays a significant role in the global ICT industry, with many of its products capturing more than 80% of OEM orders worldwide and holding the largest portion of global market share. These products include notebook computers (global market share 93.2%), motherboards (global market share 98.3%), cable CPE (global market share 95.4%), DSL CPE (global market share 88.9%), LCD monitors (global market share 76.8%), and WLAN NIC (global market share 88.4%). Other products, such as WLAN access points, cable STBs, desktop computers, and servers, rank second in global market share.

Taiwanese Products with Top Global Market Shares

Product	Market Share in 2007	Product	Market Share in 2007
Notebook Computers	93.2%	Cable CPE	95.4%
Motherboards	98.3%	DSL CPE	88.9%
LCD Monitors	76.8%	WLAN NICs	88.4%
CRT Monitors	52.9%	VoIP Routers	84.0%
Digital Cameras	44.3%	IP Phones	68.3%
---	---	IP STBs	63.1%

Source: MOEA ITIS Project; compiled for the present study, 2008/01

In addition to the industry’s remarkable overall performance, individual manufacturers have also outshone their international counterparts. Foxconn is the world largest connector manufacturer, Quanta is the world’s largest OEM manufacturer of notebook computers, AUO and Chimei are among the world’s top-four panel manufacturers, Groundjay is the world’s largest manufacturer of LCD and CRT monitors, and ASUS is the world largest

motherboard manufacturer. Manufacturers such as Delta, Unimicron, Yageo, Foxconn Tech, Largan, Foxlink, and Merry have also laid claim to outstanding performance in the global market.

2. Taiwan provides a complete one-stop product supply chain

As mentioned, Taiwan is home to a complete industry chain encompassing upstream parts and components, midstream OEM assembly, and downstream brand marketing. As such, Taiwan is able to provide a complete one-stop product supply chain for the OEM assembly of upstream parts and components. Buyers can directly purchase all the necessary parts and components right here on the island, which greatly facilitates product integrity and cost reduction.

Taking notebook computers as an example, we see that together, Taiwan's top-five assembly manufacturers (Quanta, Compal, Wistron, Asus, and Inventec) hold more than 90% of total OEM orders worldwide. A large number of manufacturers are involved in the upstream parts and components industries, ranging from core elements such as CPUs (ViaTech, RDC), chip sets (SiS, ViaTech), panels (AUO, Chimei), batteries (Simplo, DynaPack), power supplies (Delta, LiteOn), PCBs (HannStar, Unimicron), and casings (Foxconn Tech), to peripherals such as keyboards (Sunrex, Chicony), mice (KYE), and disk drives (Quanta Storage). The same advantages can also be found in the mobile phone and LCD TV product supply chains.

Complete One-Stop Product Supply Chain in Taiwan—Notebook Computers

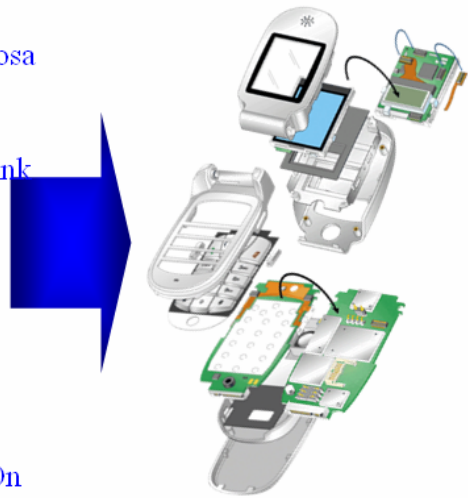
CPUs: ViaTech, RDC
Chip Sets: Sis, ViaTECH
Memories: Powerchip, Nanya
Main Boards: Asus, Foxconn, MicroStar, Elite
Panels: AUO, Chimei
Disk Drives: Quanta Storage
Battery Modules: Simplo, Dynapack
Power Supplys: Delta, LiteOn, LSE
Keyboards: Sunrex, Chicony
PCBs: Hannstar, Tripod
Passive Devices: Yageo, Walsin
Connectors: FCI, Speed Tech, Suyin
Cooling Devices: Chaun Choung, Asia Vital Components, Foxconn Tech
Castings: Foxconn Tech
OEM Assembly: Quanta, Compal, Wistron, Iventec, Asus



Source: Compiled for the present study, 2008/1

Complete One-Stop Product Supply Chain in Taiwan—Mobile Phones

Mobile Phone Chips: MediaTek, ViaTech, Sunplus
Panels: AUO, TPO, Wintek
Battery Modules: Foxlink, Welldone, Lico, Formosa
PCBs: Unitech, Compeq, Wus, Unimicron
Electro-acoustic Element: Merry, Meiloon, CX
Connectors: Foxlink, Speed Tech, ACON, Jess-Link
Casings: Greenpoint, Catcher, Chi Cheng
Optical Cameras: Asia Optical, Largan, Kinko
Passive Devices: Yageo, Walsin
Chargers: Delta, Phihong, LSE
Passive Devices: Yageo, Walsin
Quartz Elements: Siward, TXC
Antennas: Inpaq
Camera Modules : Premier Image, Lite-On, LiteOn
OEM Assembly: Arima, Compal, Quanta, Foxconn(CMCS), Iventec



Source: Compiled for the present study, 2008/1

3. Taiwan is home to the largest EMS manufacturer in the world

Since 2005, Taiwan's Foxconn has surpassed Flextronics as the world's largest EMS manufacturer. Revenues reached NT\$1.3 trillion in 2006, and

Foxconn's position was made even more secure with 2007 revenues exceeding NT\$2 trillion.

Foxconn has subsidiaries throughout the world in Eastern Europe, China, India, Vietnam, and Central America. It also has a wide range of product lines from the OEM assembly of terminal products such as notebook computers, mobile phones, LCD TVs, digital cameras, e-pets, video games, and GPS to the production of parts and components such as connectors, panels, ICs, cooling modules, and casings.

Taiwan is home to a complete ICT industry chain. Potential foreign investors, including CSR, Zeevo, Alcatel, Microtune, Signia Technologies, Silicom Wave, and Zarlink Semiconductor, are strongly encouraged to set up IPOs, R&D and design centers, or operating headquarters on the island, to pave the way for cooperation opportunities such as bilateral technology exchange or bluetooth-chip OEM. More cooperative efforts will create greater ICT output and more abundant business opportunities for the island.

(III) Major Suppliers in Taiwan

Taiwan has always been the world's largest manufacturing and OEM country for notebook computers. Manufacturers in Taiwan, such as Quanta, Compal, Wistron, Asus, and Inventec, receive more than 90% of all orders worldwide. Major notebook computer companies such as Dell, HP, Apple, Sony, and Toshiba are all clients of Taiwanese companies. Increased orders from Japanese firms Toshiba and Sony have raised overall annual output to 79.335 million units, representing a 46% growth on 2006. The continued increase in orders from well-known brand-name firms worldwide in 2008 will help Taiwan retain its double-digit growth in notebook computer output, which is expected to grow 24% to reach 98.6 million units for the year.

Global mobile phone output reached 1.1511 billion units in 2007, representing an 8.3% growth. But 2007 was not an entirely good year for Taiwanese manufacturers—Nokia and Samsung did not release their ODM orders, the purchase orders from LG were small, and Sony Ericsson turned to high-end models; only Motorola placed comparatively large orders with Taiwanese manufacturers. As a result, mobile phone OEM manufacturers in Taiwan relied heavily on Motorola in 2007. However, due to the lack of equilibrium in its 2006 product portfolio, Motorola suffered a serious decline in 2007; as a result of this, Taiwan's OEM output suffered. Taiwan's total output of mobile phones barely reached 95.5 million units that year—a 33% decrease on 2006.

However, Taiwan is expected to bounce back in 2008, when low-end multimedia mobile phones enter the market mainstream and related models and markets will become a battlefield for major brands. As a result, international brands (except Samsung) will be more willing to release orders, especially for CDMA products, while Nokia puts the focus on its GSM series. Moreover, sales performance for the Motorola W series has gone beyond expectation, and Sony Ericsson and LG are actively expanding their respective market shares by advancing on emerging markets for low-end products. All these factors will benefit Taiwan's OEM manufacturers. Hence, Taiwan's mobile phone output is likely to return to 108 million units in 2008.