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LITE-ON OF TAIWAN: TOWARDS A LEADING GLOBAL TECHNOLOGY CORPORATION

Tang Hung Kei and Chung Sang Pok

This case study traces the development of Taiwan’s first listed electronics company Lite-On Technology Corporation during the period 2000 to 2002. Founded in 1975 and listed on the Taiwan Stock Exchange in 1983, the company began its production of LED (Light-Emitting Diodes). The founders saw the growth potential in the global PC market and decided to expand into the PC peripheral products market in the late 70s. The strategy of riding on the wave of rapid global PC growth paid off. Like a Taiwanese version of the Hewlett and Packard garage start-up legend, Lite-On has become one of the most prominent Taiwanese semiconductor and information technology (IT) firms in terms of revenue and world market share of its key products with a global annual turnover of US$3.4 billion in financial year 2001. The teaching objectives of this case are:

1. To evaluate the critical success factors for the growth and development of a Taiwanese technology company in the context of its social and economic environment.

2. To discuss the long term strategic planning that Lite-On may undertake to fulfill its vision in the next 5 to 10 years in the light of the Internet revolution, technology convergence and the many business opportunities in China.

Associate Professor Tang Hung Kei and Research Associate Chung Sang Pok prepared this case. The case is based on public sources and interviews with key personnel from Lite-On Technology Corporation, Taiwan. As the case is not intended to illustrate either effective or ineffective practices or policies, the information presented reflects the authors’ interpretation of events and serves merely to provide opportunities for class discussion.

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Taiwan was experiencing one of the worst dry spells of the decade in the summer of 2002. The lingering threat of drought had been depressing the business outlook of the high water consumption semiconductor industries of Taiwan. On 10 June 2002, in a much anticipated press conference in Taipei, Mr. Raymond Soong, one of the founders and the chairman of Lite-On Group announced that Lite-On Technology Corp, Lite-On Electronics Inc., GVC Corp. and Silitek Corp. would be merged to form a single business entity - the new Lite-On. (See Exhibits 1 and 2.) The respective boards expected the transaction to be closed by November 2002, pending shareholder and regulatory approval. The combined market capitalisation of the four existing companies, as of June 7 2002, was NT$103.52 billion. (All units of currency implied in this case are in new Taiwan dollars unless otherwise specified)

The 4-in-1 merger was the first of its kind in Taiwan's high-tech industry, following the passing of the new Merger and Acquisition Act in January 2002 in the Legislative Yuan to encourage consolidation activities. The media and institutional investors closely monitored the high profile merger.

The merger aimed to re-position the new Lite-On in the same league as global EMS (Electronics Manufacturing Services) companies and top Taiwan Original Design Manufacturing (ODM) companies, the third largest among high-tech manufacturing companies in Taiwan measured in terms of revenue. This responded to the strategic challenges in the maturing high-tech manufacturing sector. The management believed that the new Lite-On as a broad and volume supplier with design capability would gain new customers, better serve its existing customers and achieve synergies through potential product bundling.

Announced at the same time was the plan to position Taiwan as the global operation headquarters, R & D and information centre for the new entity. The new Lite-On planned to invest NT$30 billion in the next five years to upgrade the R & D capability with the aim of 25 percent revenue growth annually to NT$300 billion by 2005. Mr. Raymond Soong's vision for the new Lite-On which all product lines should strive for, in terms of market share was to be "number one in Taiwan, among the top three in the world".1

LEGEND OF A GARAGE START-UP - TAIWAN VERSION: INSPIRATION FROM LIGHT-EMITTING DIODES

In 1975, Texas Instruments in Taiwan decided to discontinue LED production. Raymond Soong, Paul Lin and C. H. Chen, then in their thirties were colleagues in the same company. Together, they recognised the potential in something other people cast aside - the seemingly insignificant light-emitting diode.

Raymond Soong was in the LED department. Faced with the options of looking for another job on similar lines or starting one's own business venture, Raymond Soong opted for the more challenging, albeit uncertain route of establishing his own business in Taiwan.

He saw the potential in LED:

When you know simply that something can help people in their lives, it's a pity to just let go...LED has the advantages of energy saving and long lasting life...if used for lighting, it can offer energy saving up to 50 percent.2

His thought was:

40 percent of the energy consumption in Taiwan then was for lighting; if LED was applied extensively, there should be substantial reduction in energy consumption as Taiwan is very dependent on imported energy.

Co-founder, C. H. Chen, had 21 years with Texas Instruments. He was only four years away from retirement when he was invited by Raymond Soong to set up their own venture. It was the vision of "writing your own script, directing your own show, and playing your role" that inspired him to join Raymond Soong.

When Paul Lin was a manager with Texas Instruments, he had a scintillating record of pushing the sales revenue from US$8 million to US$100 million in one year. He joined Lite-On after much persuasion by Raymond Soong to realise his dream of building a well-managed,

2 Lite-On Group brochure, pp.2
internationally competitive Taiwanese enterprise one day.

The three gentlemen thus left behind a comfortable life and attractive remuneration offered by the multinational company. Ahead of them was a path full of uncertainties and challenges. They set up the first LED production line of Lite-On in a humble apartment on the outskirts of Taipei City. The factory was so poorly ventilated that they had to work in their undershirts during the sweltering summer season. In the beginning, borrowing money to pay for staff salaries was a nightmare for the founders but they persevered.

**PERIOD OF RAPID GROWTH**

Lite-On was the first electronic company to be listed on the Taiwan Stock Exchange in 1983. At about the same time, the company decided to ride on the PC boom and diversified into the PC peripheral products market with power supply as the first move.

The management had decided to manufacture products that were related to Lite-On's LED or semiconductor products and market these to existing clients who are global IT or electronic giants like Motorola. Tapping into the networks of its clients, Lite-On conveniently found an existing market for the PC peripheral products and sales grew phenomenally.

As the production of PC peripherals reached a sizable scale, Lite-On began to consider the issues of product positioning, corporate structure and business strategy. Subsidiaries of Lite-On were formed according to product lines. Each subsidiary was allocated two or three products to develop its competitive niche based on product quality and market share objectives. (See Exhibit 3.)

To build up the momentum through a series of small victories, Lite-On's initial strategy was to focus on the semiconductor and PC peripheral products that pay back investment quickly.

Silitek Corporation in the Lite-On Group was originally established as the Silitek Rubber Corporation in 1978. Reorganised in 1983, the company has enjoyed stable growth and expansion throughout its history. The five divisions of the company were: rubber, human input solution, image management, electronics manufacturing service and Internet access. The major business in 2002 focused on ODM/OEM. Product lines included office appliances (MFP, printer, fax machine, copier...etc.), Internet appliances (PDA, web pad, ...etc.), computer keyboards, precision rubber keypad, and rubber rollers for office equipment.

Lite-On Technology Corporation was established in 1989 to diversify into various computer technology businesses. It now operates a visual display device (monitor) system and network business units.

The Lite-On Group acquired GVC, then a loss making company, as a strategic move to branch into the wireless telecommunication market in 1999. The financial situation of GVC has since been turned around.

Power supply by Lite-On Electronics Inc and PC keyboards by Silitek Corporation were the first batch of Lite-On products to be incorporated into Dell Computer's supply chain. The orders from Dell opened doors for other PC peripheral products manufactured by the Group. Recognising Lite-On as a reliable contract manufacturer, other international IT firms soon began to place orders. The company then grew at a phenomenal rate to become one of the largest OEM/ODMs in the world today. Many of its products are now taking the lead in terms of global market share. (See Exhibit 4.)

**A Brief History of Development of the Taiwan Semiconductor Industry**

The government of Taiwan has been playing a strategic role in the transformation of the island from a low cost labor-intensive economy to a thriving, high-tech one as seen today. There has always been strong support for "localisation" of firms from which the foreign parents have to be totally divested. The government had been making a conscious effort to be very selective in approving investments and cooperation agreements to ensure there was substantial technology transfer to the strategic industries in Taiwan.³

The electronic industry started to take root in Taiwan during the 1960s when the Taiwanese government realised the importance of developing electronic and semiconductor technology for the next phase of sustainable high economic growth.

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Spearheading the development, the Taiwanese government established National Chiao Tung University (NCTU) in Hsin-Chu, a town about 70 km south west of Taipei, to offer related courses in electronics and semiconductors. In 1964, the first semiconductor lab was set up in the university for research. The infrastructure, support and funding from the government attracted many renowned overseas Taiwanese international scholars and research fellows in the electronic and semiconductor fields to Taiwan.

The development of the integrated circuit (IC) industry in Taiwan began in 1974 when the Industrial Technology Research Institute (ITRI) founded the Electronic Research and Services Organisation (ERSO) to provide a platform for the IC manufacturing industry and basic laboratories and personnel for the transfer of technology. A key milestone for ERSO was a project in 1976 with RCA to transfer CMOS (Complementary Metal-Oxide Semiconductor) IC technology. The project was instrumental in demonstrating the feasibility of research institutions and the government working together to build an industrial sector.4

With the backing of the Taiwan government in the 80s, the United Microelectronics Corporation (UMC) was founded, representing Taiwan's first step towards higher value-added IC manufacturing. UMC’s inception can be traced back to the technology transfer project by ITRI and RCA of US. ITRI, then under the support of the government, was instructed to establish a private semiconductor company. Some management and technical staff in the technology transfer projects were drawn from the ITRI and became employees of UMC.5 Today UMC is the second largest IC foundry in the world in terms of revenue, preceded only by another Taiwan foundry Taiwan Semiconductor Manufacturing Company (TSMC).

During the 80s and 90s, the government of Taiwan continued to adjust its industrial structure by promoting information and electronic industries through incentives and regulations. These measures had a positive effect on the investment climate and helped to build the electronic industry despite global recession.

SILICON VALLEY OF THE EAST: THE HSIN-CHU SCIENCE-BASED INDUSTRIAL PARK

A milestone in Taiwan's move towards a capital and knowledge intensive economy was the establishment of the Hsin-Chu Science-based Industrial Park to create an environment conducive to high-tech production facilities, research and development.

Often referred to as the "Silicon Valley of the East" by the foreign press, the science park was created in emulation of California’s Stanford Research Park. California’s Silicon Valley has grown through spontaneous private sector clustering and interaction. The success of Hsin-Chu Park, on the other hand, has been achieved through careful planning and implementation of public policy. An institutional framework was established with the intention of leveraging advanced technologies around the world and accelerating the uptake and mastering of these technologies by the Taiwanese firms.6 The resulting clustering effect and technology diffusion were critical to the success of the IT and semiconductor industry.

The Park is close to two of the universities in Taiwan renowned for their research and innovation - the National Tsing Hua University (NTHU) and National Chiao Tung University (NCTU). Both institutions provide excellent human resources as well as strong support for professional training for the companies in the Park. Since 1980, the government has invested approximately US$783 million in the infrastructure and administration of the Park.7

Located 5 kilometres east of the Park, the Industrial Technology Research Institute (ITRI), a national-level, government-sponsored non-profit organisation for applied research, houses seven laboratories and four research centres. Since its establishment twenty-seven years ago, ITRI has developed numerous technologies, creating more than 30 spin-off companies within the industrial park.

As part of their global strategies to gain a foothold in foreign markets, 64 of the Park's companies have established branch offices overseas.8 Through international cooperation and strategic alliances,

6 John A Mathews, A Silicon Valley of the East: Creating Taiwan's semiconductor industry, Berkeley California Management Review, Summer 1997
8 Hsin-Chu Science-based Industrial Park Annual Report 2001
research and development resources are being explored to create an integrated technological production network. Meanwhile, joint ventures and mergers had been carried out to facilitate rapid expansion in the internationalisation of Taiwanese high-tech companies.

As of the end of 2000, the Park employed 102,840 people; approximately 62 percent are college degree graduates. Over 4000 returned expatriates with substantial work experience in overseas high-tech companies played a critical role in the Park’s activities through application of technologies and business concepts they brought back.9

Total expenditure in R&D by the high-tech companies in the Park reached US$1,239 million in 1999, representing 5.94 percent of the aggregate sales revenue for the year. This figure compares to an average of just 1 percent for Taiwan’s manufacturing industry in general. Of the total R&D expenditure, the IC industry accounted for US$882 million, more than any other industry. As of 1999, the Science Park had 10,228 researchers, representing 12.5 percent of total employees, and the IC industry employed 5,578 of these, more than any other industry.10

By the mid-90s, the semiconductor industry of Taiwan had reached a level of output preceded only by US, Japan and Korea.

**SOME CHARACTERISTICS OF THE TAIWAN IT INDUSTRY**

Small and Medium Enterprises (SME) dominate the Taiwan economy. In 2000, there were about 1.08 million registered SMEs, accounting for more than 98 percent of the total industries.11 Some of the SMEs were so successful that they eventually grew to become multinational companies.

The concentration of SMEs has resulted in the unique phenomenon of vertical disintegration in Taiwan. The SMEs do not have the financial and technical resources necessary for the integration of production processes of capital and knowledge intensive products. Given the limitations, each firm concentrates on one or a few areas of expertise to develop its competitive niche. Most semiconductor firms in Taiwan only engage in some segments, or a few functions of a segment in the supply chain. The IC design company VIA, for instance, focuses its business activity on the upstream segment of the semiconductor industry. Foundries like TSMC and UMC in the middle stream concentrate on wafer manufacturing whereas the Advanced Semiconductor Engineering Group (ASE Group) in the downstream develops its strength on high quality backend IC packaging and testing services.

The core value of vertical disintegration is derived from each firm in the supply chain through efficient and effective management. Each firm is responsible for its operation and specialised core technology and management, therefore the firms are highly motivated to continuously innovate and improve production processes.

Taiwan experience has demonstrated the following benefits of vertical disintegration:12

- As each segment of the supply chain has shorter operation time than the integrated production process, it is easier to predict, calculate and control the flow of inputs and outputs.
- Each firm in its segment of the supply chain is more responsive to the market demand.
- As companies in each segment of the supply chain have to manage their own costs, there is an incentive to minimise inventory and related costs.
- Vertical disintegration reduces leadtime crucial to IT products which generally have short product life cycles.
- Companies can develop their own niche or move up/down the value chain as strategies require.

As a result of these distinctive features of vertical disintegration, Taiwanese IT and semiconductor firms developed their competitiveness by being cost effective, agile, nimble and responsive to the market changes.

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9 ibid.
10 ibid.
In the global arena, Taiwanese firms generally lack the experience of product branding and extensive international networks of sales and distribution. Very few Taiwanese firms are capable of engaging cutting-edge product development like Sony, HP, Dell and other international IT giants. The value provided by the Taiwanese to the global IT value chain is basically through OEM and ODM. (See Exhibit 5.)

INVESTMENT IN CHINA BY TAIWAN’S TECH-COMPANIES

Despite a volatile political relationship between Taiwan and China, cross-Straits investment and trade had been growing steadily over the past two decades. According to the estimates of the Taiwan’s Mainland Affairs Council under the Department of Economic Affairs, Taiwan had invested US$2.53702 billion in the mainland in 2000.14 (See Exhibit 6.) The cumulated investment in China by Taiwanese firms, according in China’s Ministry of Foreign Trade and Economic Cooperation, had reached US$54.7 billions by 2001.15 (See Exhibit 7.)

Based on the official figures, Taiwan was the 4th largest investor in China in 2000, after Hong Kong, US and Japan. However, it was difficult to quantify the actual investment figures by Taiwanese firms because of their clandestine nature. Investments earmarked for China often passed through other countries first for various reasons - a practice that was not in itself illegal. Such capital outflows of which the government was fully aware were almost impossible for the authorities to trace. As China climbed up the technology ladder and because of its accession into WTO, many Taiwanese IT firms were quick to take advantage of the low production cost and to tap the potential of the vast Chinese market.

The Chinese government views the development of the technology sector as an important part of the country’s economic development. Special treatment aimed at attracting investment includes preferential tax treatment, such as value-added tax rebates, import tariff exemptions, and favorable foreign exchange policies.

As of 2002, 75 percent of Taiwan’s largest firms have invested in mainland China. Some observers attribute more than 60 percent of mainland China’s IT hardware growth to Taiwan investment16 and the percentage is expected to increase as more Taiwanese technology firms relocate parts of their operations to the mainland.

The Taiwanese government might be keen to regulate investments destined for China’s high-tech industry, but efforts to stem the flow of funds into China’s IT industry were easily circumvented. The policy’s intent was to prevent the mainland from gaining too much of an economic or technological advantage over Taiwan whose reputation as a global IT manufacturing hub had proved to be a handy political tool when it came to protecting its national sovereignty.17

Many Taiwanese firms invested in China not by choice but by necessity. Clients of OEM/ODM firms moved to China and no matter how reluctant, the Taiwanese suppliers and the other supporting services had to seriously consider relocation to serve them.

The vast Chinese market opens doors for many OEM/ODM firms which aspire to establish their own brands. Taiwanese firms may have an edge over other multinational firms for their in-depth knowledge of Chinese business practices and culture which are critical for establishing product brand names and distribution channels.

China is catching up fast in the IT industry - thanks to the clustering effect brought about by migration of IT firms from Taiwan. It is widely believed that Taiwan should invest more in R&D, product branding and marketing, management and other high value added services, or its competitive edge over China in the high-tech arena will soon be eroded over the next 10 to 15 years.18

13 Although Taiwan is a de facto sovereign political entity, the government of mainland China does not recognise Taiwan as a separate entity independent from China and aims for eventual reunification with Taiwan by peaceful resolution, and if necessary, by force.
15 Excerpt from Mainland Affairs Council, Department of Economic Affairs, Taiwan. www.mac.gov.tw/gb/statistic/ass_em/9010a.gif
16 Christopher Irwin, Taiwan’s Technology Sector Migrating to China, Standard & Poor’s Rating Digest, 2002, June 11.
17 Craig Addison, Silicon Shield: Taiwan’s Protection Against Chinese Attack,(US, Fusion Press, 2001), Ch 1, pp. 44-48.
18 Presentation at Hsin-Chu Science Park, NTU MBA Business Study Mission to Taiwan, 2002, July 2.
FORAY INTO THE CHINA MARKET

Lite-On began its overseas venture in the late 70s; however, a more strategic internationalisation drive did not start until the early 90s when the company had acquired enough knowledge from its international business partners. As the core management team members were mostly engineers, they understood quite easily the relative technological strength and weaknesses of the investment destinations and how the Group should leverage on these strengths. In the early 90s, the Group ventured abroad to South East Asia, China, Europe and the US through direct investment, partnership, or acquisition. The strategies for acquiring companies in the US were adoption and transfer of new technologies and acquiring distribution networks in US and Europe.

These experiences provided very important lessons for Lite-On's capital-intensive investment in China later on. As a contract manufacturer, its profit margins were miniscule. Continually driving down production costs was crucial for long-term survival as the PC and notebook markets were near maturity. One of the most important reasons to set up production facilities outside Taiwan was to lower production cost significantly.

Lite-On entered China in 1994, first to Shanghai, then to Tien Jin. David Lee, Vice President of the finance department in Lite-On Semiconductor commented on the Group's strategy on investment in China:

*It has never been an easy decision (to invest in China) ... the Taiwanese companies have to balance on the tightrope of business considerations and political sensitivity because of the volatile cross-Strait relationship (Taiwan Strait). As a profit-oriented Taiwanese private organisation, Lite-On consciously focuses on the business aspects of operating in China and steers clear of the politically sensitive issues.*

*(David Lee to the authors, 2003, July 5)*

As of 2002, the Group's investment and R&D facilities in China have reached a scale comparable to that of many MNCs and its footholds in China include Tian Jin, Shanghai, Shenzhen and Donguan (both in Guangdong Province). The 18 factories set up in China have been churning out products like LED, computer keyboards, printers, scanners and the hot selling multi-function products. Comprising 60 percent of the Group's global workforce, Lite-On's China operation contributed to 65 percent of its total production capacity.

David Lee then analysed the cost advantage of the China operation:

The cost of electricity, water and labour are significantly lower than that of Taiwan. Lite-On entered Shanghai in 1995...the cost of hiring a local worker then was Renminbi 200 plus. The labour cost has since quadrupled to Renminbi 800 plus. This is still one fifth that of Taiwan today (2002). In general, Lite-On is quite satisfied with the quality of Chinese workers.

He went on to praise the co-operation of the local authorities of China:

*Lite-On made a substantial investment in China. The local authorities had been very supportive in providing water, electricity, land and clearances for all the necessary administrative formalities...sometimes to the extent of bending backward to accommodate Lite-On's requests. In the Lite-On Industrial Park near the southern city of Guangzhou, the Chinese authorities set up a custom clearance facility specially for Lite-On.*

The cost of land was clearly one of the main attractions; however, the tax incentives and preferential interest rates for loans provided by the Chinese banks were equally important for investment decisions by Taiwanese companies. Lite-On had the policy of not borrowing unnecessarily from Taiwanese banks for its China investments. As Lite-On has a good track record for credit, the Chinese banks were willing to provide generous financial assistance to Lite-On for its ambitious expansion plans in China.

The most ambitious expansion and consolidation plan in China is the US$2 billion Lite-On Industrial Park project. Situated at Dong-Pu near Guangzhou, the 1.6 million square meter industrial park has good access to Guangzhou International Airport, Guangzhou Railway Station and the newly developed Huang-Pu Port. As of early 2002, there were already 17 companies operating in the industrial park including South Korean giant LG. Lite-On had the most substantial investment
commitment with the Group’s Silitek being the first company to move in the Park and three other of its companies scheduled to move in before 2005.

The consolidation of Lite-On factories in China was part of the Group's conscious effort to reduce operating cost. In China, the Group purchased 70 percent of its raw materials, spare parts and components from other Taiwanese suppliers operating in China to keep imports to the minimum.

To facilitate One-Stop-Bulk-Purchase for its clients, Lite-On consolidated and streamlined its procurement, production and administrative functions in China. Silitek also actively sought NT$10 billion single orders or single product orders worth NT$3 billion a year to cut down administrative and other related costs.

RESEARCH AND DEVELOPMENT

Scientific research in Taiwan is motivated firstly by profit; Taiwan's freewheeling market economy provides plenty of incentives for R&D in potentially profitable technology; and secondly, by government initiatives in science and technology policy, R&D activities, and funding for public sector scientific and technological research projects through grants and subsidies.

The high quality manpower resources had been playing a critical role in establishing Taiwan's IT and semiconductor industries. According to the 1997 statistics of the National Science Council, researchers with doctorates and master’s degrees accounted for 45 percent of the research personnel of which 70 percent were concentrated in the fields of engineering. Overseas Taiwanese with substantial working experience in top technology firms, particularly the US firms, have been making significant contributions to the development of Taiwan’s IT capability. Many Taiwanese IT professionals or graduates with IT/engineering backgrounds had returned home to start ventures of their own bringing technical know-how and management expertise with them; thus generating a much needed boost to Taiwan's IT development.

The concerted efforts of the government, research institutes and private enterprises have paid off. The "Global Competitiveness Report 2001" published by the World Economic Forum ranked Taiwan 4th in its technology index, after US, Canada and Finland. Taiwan's ranking climbed to 2nd in the 2002-2003 assessment in the same report. The Swiss International Institute for Management Development (IMD) ranked Taiwan favorably in the categories of science and technological infrastructures in the World Competitiveness Scoreboard in the years 2001 and 2002.

Taiwan was the fourth largest recipient of the "new design" patents awarded by the U.S. patent authorities in 1999, and the sixth or seventh largest recipient of "new invention" patents granted by the US in 2001.19

With the global slowdown in the technology sector in the year 2001/2002, the merger of Lite-On was a proactive response by the Group to the strategic challenges in the maturing high-tech manufacturing sector where industry and market share consolidation had become a reality. New Lite-On's position as a broad and volume supplier with design capability was aimed at gaining new customers, providing more value-added services to the existing customers and achieving revenue synergies through potential product bundling.

Lite-On strived for upgrading of its R&D capability to cope with the rapidly changing market and to stay ahead of competition. David Lim, CEO of the Lite-On Group, has this vision:

The Group planned to invest US$977 million in R&D and increase the number of R&D professionals to 4,500 in the next 5 years. The Lite-On Technology Building, currently being constructed in Nei-Hu (near Taipei City), will be the future R&D base in Taiwan.20 There are also expansion plans for R&D centres in US and China.

Division of labour has been critical to the success of Lite-On, taking into consideration the strengths and weaknesses of both Taiwan and China. Stephen

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19 Information and technology landscape in nations, http://www.american.edu/carmel/ec0897a/governmentpolicy.html
King, Special Assistant to the Chairman, commented:

_Taiwan has been very responsive to the changes in technology and its implications on the future markets of IT products. China, on the other hand, is the most important production base in Lite-On’s global operation; there should be competent technical teams to respond to the needs at production lines on a round-the-clock basis._

_(Stephen King to the authors, 2003, July 3)_

China has accelerated science and technology (sci-tech) progress and enhanced its competitiveness. In the first 11 months of the year 2001, the number of patent applications in China reached 185,000, including 57,000 applied for inventions, a big increase over the year 2000. In 2001, China remained the world’s 8th in number of sci-tech theses published. According to an unofficial estimate, there were 150,000 Chinese students in the US studying electronic and electrical engineering or related subjects, 20,000 in Japan, and 40,000 in Europe. As China develops and prospers, the country is expected to see a reflux of talents as experienced by Taiwan in the 80s and 90s.

Nine universities and research institutes in China have had joint research with Lite-On since the late 90s. Scholarships available only to the Taiwanese students were made available to the outstanding talents in China later on.

Promoting intellectual property rights in a manner conducive to the growth of entrepreneurship and foreign and domestic investment in high-tech industries remains a challenge to the Chinese authorities. The high-tech companies were very concerned with the protection of intellectual property rights in China as many companies had invested heavily in their patented technologies. The investors had been urging the Chinese authorities to improve the legal and business environments for the protection of intellectual property rights.

**THE TRENDS IN THE IT MARKET**

Technology convergence brought about consolidation in the IT market. IT products are characterised by short production cycles and rapid upgrading. The prices of IT products had been falling to the extent that OEM/ODMs were constantly facing the threat of stock obsolescence. Cost management was critical to the survival of all OEM/ODMs. At the same time, land and labour costs in Taiwan had risen, eroding Taiwan’s cost advantage rapidly. To better manage their supply chain, the MNC contractors cut down the number of OEM/ODMs. Orders were awarded to fewer contractors but the quantity and variety of products of a single order had increased. The competition was becoming more intense and only the fittest would survive.

The exponential growth of worldwide Internet users and the potential of broadband and wireless applications had significant impact and implications on the IT industry. The old business models based on PC platforms, emphasising volume production, standardisation and cost reduction, were no longer relevant in the latest round of competition which called for customisation, connectivity, technology convergence and mobility. IT products in the new generation were expected to integrate technology with lifestyle rather than remain as functional tools.

Multi-function IT appliances led the trend in 2002; one of Lite-On’s best selling IT appliances was the compact all-in-one multi-function equipment that integrated printing, faxing, scanning, and copying functions for home and office use.

The convergence of technology and shortening of product life cycle required IT firms to be nimble and responsive to technology changes and market demand. R&D capability was critical in this new round of global competition.

**CHANGE OF CORPORATE STRATEGY AND RE-ORGANISATION**

The PC and peripheral markets have matured to the extent that the players engage in cut-throat competition to maintain market share. In a move to

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reduce production cost, many Taiwanese IT firms shifted their production base to China.

However, there is a limit to what companies can do in lowering cost and improving production processes. Raymond Soong recognised that Lite-On could no longer depend on PC and PC peripherals for high growth in the stiff competition, therefore there was a need to re-organise Lite-On for its future strategic moves.

In 1999, he gathered the management executives from the various departments for brainstorming on Lite-On's future directions. At the same time, he went on a road trip to consult the customers. After a year of deliberation, taking into consideration the external and internal factors, he decided that the Group should remain in the OEM/ODM business but advance towards 3C (Computer, Tele-Communication and Consumer Electronics) markets. All R&D undertakings and company re-structuring should also gear towards the needs of 3C. He was confident that this strategy would meet the needs of the Group for the next 5 to 10 years. (See Exhibit 8.)

The most notable re-organisation moves were the setting up of an e-commerce arm and foray into the telecommunications market by acquiring a company with a whopping loss of NT$3 billion in 1999.

Spearheading the e-commerce business was the Lite-On E-Commerce Corporation set up in June 2000. The new company targeted the Great China region (Taiwan, Hong Kong and China) with initial focus on B2B e-businesses, Internet application service provision, package information outsourcing service, mobile databases, web portals and mainframe management as well as Chinese website businesses.

Raymond Soong took a calculated risk in acquiring the loss making GVC - one of the most controversial moves in the Group's massive acquisition and disposal exercise. Within less than a year, GVC was profitable again following re-structuring and re-organisation. Lite-On was banking on the synergy created by extending its PC applications into telecommunications technology and the acquisition of GVC was Lite-On's first strategic move towards responding to the challenge of technology convergence.

GVC Corporation, established in 1979, was one of the top 5 communications equipment manufacturers in Taiwan. Major product lines of the listed company included modems, motherboards, LAN-related (Local Area Network) equipment, GSM mobile phones and notebook PCs. Since Lite-On had acquired substantial stake in the company, the original divisions in GVC were streamlined and re-organised into communications and computer groups to facilitate integration of communications and computer systems.

A major order from Swedish Ericsson gave GVC a much-needed boost in 2001. Ericsson outsourced design and production of some models of its hand phones to low-cost GVC in a bid to cut down losses from its mobile handset business. The ODM based order lifted the GVC's sales projection in 2002 upward to 4 million units.

THE CHALLENGE OF THE FUTURE

During the past decades, Taiwan had been exporting computers, peripherals, and chips to the world, transforming itself into a semiconductor and IT powerhouse. Much of Taiwan's success could be attributed to its role as a low-cost contract manufacturer to foreign MNCs. However, there was hardly a mood for celebration as China and the rest of the low cost countries were catching up fast. It was increasingly clear that China was challenging Taiwan's manufacturing prowess for many commodity-type electronics products such as motherboards, peripherals, and personal computer assembly. Re-assessment of Lite-On's future strategy to move up the technology value chain was under way.

Lite-On entered China as an OEM when global PC sales were booming. A combination of favourable factors contributed to its steady expansion. Although moving to China may result in substantial cost saving in production, it also introduced new risks such as an uncertain legal and regulatory environment, cumbersome bureaucracy, and possibility of theft of sensitive and strategic technology. Taiwanese firms also experienced the added burden of subtle political intervention when their presence in China became significant.

Lite-On's China business had exceeded that of Taiwan in terms of manpower and scale of operation. As a company fully committed to grounding its roots in Taiwan, Lite-On needed to assess the competitive advantage of both Taiwan and China in the context of its 3C grand plan for
deployment and positioning of R&D and production resources. What should be the relevant factors for this critical decision about division of labour across the Strait?

Despite Taiwan's phenomenal success as a global OEM/ODM base, one of the greatest challenges the Taiwanese firms face has been marketing. With Acer as an exception, Taiwanese companies have yet to demonstrate globally their capability in marketing their own brands and product designs. The potential of the China market seemed to hold promise for many Taiwanese firms aspiring to establish their own brand names and to secure significant market share. Should Lite-On decide to take on the opportunity, what are the factors to be taken into consideration for the Chinese market?
EXHIBIT 1

LITE-ON GROUP ORGANISATION

LITE-ON ELEC, INC.
SILITEK CORP.
LITE-ON TECH CORP.
GVC CORP.
LITE-ON IT CORP.
LITE-ON SEMICONDUCTOR CORP.
DIODE INC.
LITE-ON JAPAN
LITE-ON AUTO CORP.
LITE-ON ENCLOSURE INC.
LITE-ON E SEGMENT
LITE-ON INC.
SILPORT INVEST. CORP.
DYNA INVEST.CO., LTD
LITE-ON CULTURAL FOUNDATION

PC/INTERNET PLATORM, COMM & SEMI BUSINESS

LITE-ON GROUP SINCE 1975
Chairman : Raymond Soong

INVESTMENT BUSINESS & CULTURAL FOUNDATION

Source: Lite-On Technology Corporation
EXHIBIT 2

ORGANISATION CHART OF LITE-ON TECHNOLOGY CORPORATION AFTER THE MERGER

Source: Lite-On Technology Corporation
## EXHIBIT 3

**LITE-ON GROUP LISTED COMPANIES**

<table>
<thead>
<tr>
<th>Country</th>
<th>Company</th>
<th>Stock Ticker</th>
<th>Products</th>
<th>2001 Revenue in 100 million NT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taiwan</td>
<td>Lite-On Elec</td>
<td>2301</td>
<td>OPTO/POWER SUPPLY</td>
<td>153</td>
</tr>
<tr>
<td></td>
<td>Silitek</td>
<td>2310</td>
<td>K/B RUBBER / MFP / EMS</td>
<td>67</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Lite-On Tech</td>
<td>2346</td>
<td>MONITOR / PC SYSTEM / NETWORKING</td>
<td>275</td>
</tr>
<tr>
<td>Taiwan</td>
<td>GVC</td>
<td>2322</td>
<td>GSM / GPRS / MODEM</td>
<td>130</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Lite-On Semi</td>
<td>5305</td>
<td>CIS / DIODES</td>
<td>35</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Lite-On IT</td>
<td>8008</td>
<td>CD(DVD)-ROM / CD(DVD)-RW</td>
<td>260</td>
</tr>
<tr>
<td>USA</td>
<td>Diodes Inc</td>
<td>DIC (Nasdaq)</td>
<td>DIODES</td>
<td>33</td>
</tr>
<tr>
<td>Japan</td>
<td>Lite-On Japan</td>
<td>2703 (Jasdaq)</td>
<td>COMPONENT NT TRADE</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>1105</strong></td>
</tr>
</tbody>
</table>

Source: Lite-On Technology Corporation
EXHIBIT 4

LITE-ON GROUP REVENUE GROWTH

Source: Lite-On Technology Corporation
EXHIBIT 5

OEM MANUFACTURERS IN TAIWAN

Taiwan is one of the most important contract manufacturing bases for many global IT companies. IT products manufactured by Taiwanese OEMs (Original Equipment Manufacturers) are marketed under contractors’ brand names. OEMs who acquired R & D capability over the years to modify their own designs for product differentiation have advanced to ODM (Original Design Manufacturer) status. The profit margin for ODMs is usually better as they are able to co-develop new features or products with their clients and are less likely to face cut-throat price competition encountered by OEMs. OEM/ODMs may decide to establish their own brands as in the case of Acer and Mitac if they have enough resources to market their products and establish their own service and distribution channels. They are then referred to as the OBM (Own-Brand Manufacturing) firms.

While maintaining impressive growth, several leading IT suppliers in Taiwan have been facing the dilemma of remaining in the OEM/ODM business or pushing their own brand names. Both areas offer lucrative business opportunities. Acer, for example, is one of the few Taiwanese IT firms which has a recognisable global brand name and owns OEM/ODM businesses.

The reliance on business from OEM and ODM buyers has increased over the years and recent reports from the Market Intelligence Centre (MIC) indicated that the global industry will continue its dependence on OEM/ODM business to maintain technology superiority and cost advantage in the IT field.

There were a few subtle changes in the OEM/ODM business models in the last few years. For one, several top IT suppliers have divided themselves into different companies to pursue EMS (Electronics Manufacturing Services) or OBM (Own-Brand Manufacturing) businesses separately. The EMS companies are more focused on R&D, manufacturing and worldwide services, whereas OBM companies concentrate on marketing of products and services. This trend not only eliminates the conflicts of interest between the own-brand and OEM production, but also encourages buyers to strengthen their ties with OEM suppliers.

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1 Institute for Information Industry (III) of Taiwan was founded in 1979 as part of the government’s commitment to upgrade and support the then fledgling high-tech industry. MIC under III helps to monitor and analyse market trends, identify emerging technologies, and track industry exports and world rankings.


EXHIBIT 6

INVESTMENT IN CHINA BY COUNTRIES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>4,244,696</td>
<td>4,031,871</td>
<td>212,825</td>
<td>4,935,627</td>
<td>4,071,481</td>
<td>864,146</td>
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<tr>
<td>Hong Kong</td>
<td>1,740,233</td>
<td>1,636,305</td>
<td>103,928</td>
<td>1,672,933</td>
<td>1,549,998</td>
<td>122,935</td>
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<tr>
<td>Japan</td>
<td>306,358</td>
<td>297,308</td>
<td>9,050</td>
<td>306,117</td>
<td>291,585</td>
<td>14,532</td>
</tr>
<tr>
<td>Macau</td>
<td>33,778</td>
<td>30,864</td>
<td>2,914</td>
<td>38,239</td>
<td>34,728</td>
<td>3,511</td>
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<tr>
<td>Singapore</td>
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<td>264,249</td>
<td>3</td>
<td>217,261</td>
<td>217,220</td>
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<tr>
<td>Korea</td>
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<td>127,473</td>
<td>552</td>
<td>150,042</td>
<td>148,961</td>
<td>1,081</td>
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<td>Thailand</td>
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<td>Taiwan*</td>
<td>275,857</td>
<td>259,870</td>
<td>15,987</td>
<td>253,702</td>
<td>229,658</td>
<td>24,044</td>
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<tr>
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<td>104,449</td>
<td>45</td>
<td>116,405</td>
<td>116,405</td>
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<td>Germany</td>
<td>137,363</td>
<td>137,326</td>
<td>37</td>
<td>104,233</td>
<td>104,149</td>
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<tr>
<td>Netherlands</td>
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<td>Italy</td>
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<td>20,951</td>
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<tr>
<td>Switzerland</td>
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<td>0</td>
<td>19,403</td>
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</tr>
<tr>
<td>Sweden</td>
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<td>15,580</td>
<td>16,898</td>
<td>15,924</td>
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<tr>
<td>US</td>
<td>422,255</td>
<td>421,586</td>
<td>669</td>
<td>438,452</td>
<td>438,389</td>
<td>63</td>
</tr>
<tr>
<td>Canada</td>
<td>31,449</td>
<td>31,442</td>
<td>7</td>
<td>31,349</td>
<td>27,978</td>
<td>3,371</td>
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<td>Australia</td>
<td>26,676</td>
<td>26,331</td>
<td>345</td>
<td>30,888</td>
<td>30,888</td>
<td>0</td>
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</tbody>
</table>

Source: China Statistics Year Book 2001

*It is difficult to quantify the actual investment figures by Taiwanese firms because of their clandestine nature. Investments earmarked for China often passed through other countries first for various reasons. The authorities are fully aware of such practices.
EXHIBIT 7

PRC CONTRACTED FOREIGN DIRECT INVESTMENT
(Cumulative till 2001. Total Amount: US$ 745.29 Billion)

Graph: Department of Economic Affairs, Mainland Affairs Council, Executive Yuan, R.O.C., December 2001.
2-2 Chi Nan Road, Sec. 1, 17/F, Taipei, Taiwan, R.O.C.
EXHIBIT 8

LITE-ON GROUP MAJOR BUSINESSES & PRODUCTS

Source: Lite-On Technology Corporation