

IT Hardware & Electronics – International Regulatory and Policy Environment

Mexico

Mexico's IT hardware industry has witnessed a remarkable growth over the last two decades on the back of state reforms involving liberalisation and economic integration into NAFTA. From being a highly protected industry before 1990, today the computer industry in Mexico is one of the favourite destinations for global IT majors and contributes substantially to exports. Today, leading world hardware manufacturers are well established in Mexico and have local production facilities, viz. HP, IBM (now part of Lenovo) and Acer.

After the World War II, Mexico followed an import-substituting industrialisation (ISI) policy until the early 1980s, wherein protection was provided to domestic companies from foreign competition by way of high import tariffs and import licensing requirements for a wide range of products. A series of foreign investment laws were also passed in 1970s aimed at increasing national self-sufficiency in technology. However, the economic slowdown during 1982-83 caused by decline in oil prices and a rise in interest rates, followed by a second economic downturn in 1986 along with the stock market crash and devaluation of the Mexican currency (peso) in 1987, forced the Mexican authorities to undertake market reforms leading to trade and investment liberalization. The market liberalisation was followed with Mexico's entry into NAFTA in 1994, which has been a catalyst in leading Mexican economy on a high growth path.

During the pre-liberalization era, the IT hardware assembly and manufacturing received a boost under the ISI policy that gave incentives for the emergence of enterprises bases in the national capital. The industry also enjoyed tariff advantages and production incentives in certain regions. However, with the opening up of the economy to foreign trade and investment post the 1980s crisis, and the entry into NAFTA has accelerated the growth of IT hardware sector in Mexico. Since 1994, FDI in the sector has surged and major global OEMs and Contract Manufacturing (CM) companies have entered Mexico with a view to reduce their operating costs.

Mexico's hardware industry has attracted huge FDI as it enjoys competitive edge against competing countries on account of availability of large qualified personnel at low cost, gateway to the Latin American market, and geographic proximity to the US market. The passage of NAFTA has further encouraged foreign companies to supply their Mexican operations from Mexico, rather than bring in parts from Asia. In addition, the short product cycles of the computer industry have forced computer makers serving the US market to shorten their supply chains to improve their speed to market. Further, NAFTA provides a 'zero duty' environment for Mexico's computer and hardware exports to the US, rendering the Mexican exporters competitive against their counterparts from China and other countries, which have to pay import duty. Other tax advantages available to companies working in Mexico include exemption of property tax, exemption of permit costs, training costs redemption for new hires and cash returns for R&D activity.

Mexico has established a series of incentive programs designed to encourage export and job creation. Two major incentive programs included the Maquiladora and PITEX programs. These programs have allowed the temporary importation of goods, (machinery and equipment, tools, raw materials, etc.) permitting these goods to be imported into Mexico with no customs duty or import VAT cost. On November 2006, the Mexican authorities modified the Maquiladora program and repealed the PITEX program to form a new program now known as Promotion of the Manufacturing, Maquila and Export Service Industry (IMMEX). The IMMEX program provides important customs benefits. The Maquiladoras under the program are entitled to several beneficiary treatments regarding VAT, including the following:

- No import VAT as a result of conducting a temporary importation.
- A 0% VAT rate applies on the maquiladora services fee invoiced to its related party (related to export production).
- Certain sales of goods that are physically located in Mexico and imported temporarily are exempt from VAT. This exemption includes sales between non-Mexican companies as well as certain sales between non-Mexican companies and maquiladoras.
- A non-Mexican company may purchase goods from certain Mexican suppliers with a 0% VAT rate as long as the goods are physically delivered to the maquiladora's facility.
- A Mexican company operating under the IMMEX program is eligible for VAT refunds within 20 business days (as opposed to the regular 40 business days).
- Companies operating under the IMMEX program that obtained a certified importer status will be eligible for VAT refunds within 5 business days.

Industrial policies for Computer Industry - Mexico

Period	Policy	Key objectives/ key features
1980s	Program to Promote the Manufacture of Electronic Computing Systems, Their Central Processing Units and Their Peripheral Equipment (Programa de Computadoras)	<ul style="list-style-type: none"> • Trade: Access to the domestic computer market was limited to companies that would produce according to the program's provisions. • Foreign investment: Foreign ownership was limited to 49% in the production of PCs and peripherals. • R&D: Foreign companies were required to invest a fixed percentage (between 3% and 6%) of gross sales in R&D, and to fund the creation of research centres and training programs. • Government procurement: Preferential treatment was given to companies registered in the program. • Domestic content: A minimum proportion of domestic parts and components were required in final products (45% for PCs and 35% for minicomputers). • Fiscal and credit incentives: New companies in the computer industry could receive fiscal credits and soft loans from government development funds.
1990s	Various policies as a part of liberalisation and economic integration with NAFTA	<ul style="list-style-type: none"> • Elimination of import permit • Reduction in import tariffs to zero by 1998 • All companies given access to government procurement contracts • Focus on development of local production through



		<p>creating a supplier base to support the multinationals producing in Mexico; Local supplier development programmes are being run by SECOFI, CANIETI and CADELEC.</p>
2000s	National Development Program (NDP)	<ul style="list-style-type: none"> • PCIEAT (Program for the Competitiveness of the Electronics and High Technology Industry): The PCIEAT seeks to provide the existing electronic industry in Mexico with the conditions to facilitate the recovery of worldwide competitiveness as well as to consolidate Mexico as the American centre for the electronics industry and a major supplier for the American, Asian and European markets. • PECyT (Space Program of Science and Technology): This program seeks to integrate and coordinate elements from the National System of Science and Technology to foster scientific and technological activities, and promote innovation in Mexico. • Prosoft (Program for the Development of the Software Industry): This program has the objective to promote the software industry and expand IT markets in Mexico through temporary subsidies for projects that foster the creation, development, consolidation and viability of companies in the IT sector. • Digital Mexico Foundation: This is a private non-profit organization to promote and improve production processes of small and mid-size industries (PYMES) through the use of Communications and Information Technologies (CIT). The objective is to achieve the strengthening of production chains through technology, aiming to increase competitiveness of the economy as a whole. • PYME Fund Program: This fund seeks to support companies -especially small sized- and entrepreneurs to promote the economic development of Mexico through temporary financing to programs and projects to promote the creation, development, consolidation viability, productivity, competitiveness and sustainability of micro, small and mid-size companies. • The National e-Mexico Program: E-Mexico was established in 2000 by presidential mandate in order promote public policies to propitiate, conduct and integrate all necessary efforts to include most of the population within the information and knowledge society. This program has three guiding axes: connectivity, contents and systems. The program includes e-learning, e-health, e-government and e-economy. • Accelerators of High Speed Businesses



		(TechBA): These promote incubators and sources of support for Mexican PYMES through a technological base abroad.
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Singapore

The electronics industry has played a key role in Singapore’s economic growth over the last few decades, contributing nearly one-third of the country’s manufacturing value added. The sector has evolved in structure as well as technology over the years on account of various government initiatives and reforms for the sector.

Singapore has served as a regional entrepôt since the early 19th century on account of its location advantages and the development of transportation, commercial, and financial infrastructure and facilities. Initially, the entrepôt was largely used for importing Western goods for redistribution in the region and collecting the region’s primary commodities for marketing to the West. Since the early 1950s, however, the entrepôt’s growth has been constrained as neighbouring countries developed their own ports for marketing of their primary products. Thus to reduce its dependence on entrepot activities, Singapore began industrialisation in 1960. Since the industries were nascent in the initial years, the government largely pursued import substitution policy. Singapore was merged with the Malaysian economy in 1963, but was soon separated in 1965 due to political conflicts. The independent Singapore so formed was faced with weak industries with low technological base and declining entrepot activities. Hence, the new government felt it imperative to boost export manufacturing and attract multinationals to improve the technological levels of the industry. To meet these objectives, various measures were undertaken, including development of infrastructure and skilled workforce. The electronics industry in Singapore thus emerged as a budding industry in the late 1960s, with foreign companies coming to Singapore to set up assembly plants for products such as transistors and low-end consumer electronics, attracted by Singapore’s low manufacturing costs. The industry led Singapore on a growth path and provided employment to almost one-third of the labour force. By the late 1970s, Singapore had become a major world production centre for electronic products and components.

The rapid economic growth led to rise in costs and thus began eroding Singapore’s advantage as a low cost manufacturing base. Consequently, the government launched policies for industrial restructuring in the early 1980s. The economic strategy of Singapore Economic Committee (1986) and Strategic Economic Plan of Singapore Economic Planning Committee (1991) laid out the framework for promotion and development of Singapore as a total business centre and the development of high-tech and high value-added manufacturing and services as twin engines of growth and strategic responses to the changing external and domestic economic environments. The Strategic Economic plan suggested development of clusters, whereby 13 clusters were identified in manufacturing and services; electronic products clusters were among these targeted clusters.

Investment measures

Singapore Economic Development Board (EDB), the investment promotion agency, plays an important role in aggressively seeking investments for the key industries including the electronics sector. The electronics cluster thus continues to attract large investments in manufacturing as the EDB actively

promotes investments in firms to manufacture high value-added products, carry out R&D, create and manage intellectual property, and manage regional operations.

Further, the foreign investors have maintained Singapore as a favourite hub for IT hardware and electronics due to the inherent advantages offered by the city state such as strategic geographical location; excellent transport and communications infrastructure, logistics, and financial services; political stability, a conducive environment for business and good living environment for executives; availability of good-quality skilled human resources and the widespread use of English; the strong supportive role of government institutions, such as Singapore Economic Development Board (EDB) and Singapore Trade Development Board (TDB) and minimal transactions costs of investment, trade, and immigration procedures; protection of intellectual property rights; and liberal tax incentives. Singapore also provides special incentives directed at high-tech firms, such as the Initiatives in New Technology, Research Incentive Scheme and Technopreneur Investment Incentive. Further, the availability and proximity of good supporting industries have also attracted investments in the semiconductor industry. Over the years, Singapore has built up a large base of over 160 local and multinational companies offering equipment, parts, components, materials, gases, chemicals and technical services for semiconductor manufacturing operations.

Singapore government, through EDB actively invests in enterprises in the strategic sectors. For instance, it has invested in several wafer fabs, including an initial 90% stake in Chartered Semiconductor. The EDB has also invested in a joint venture with Philips and Taiwan Semiconductor Manufacturing Co. The Singapore government has also played a major role in developing IT infrastructure in Singapore. Recent developments include the implementation of nation-wide broadband services. The government offers attractive financial incentives to both adopters and innovators of IT technology, and is actively encouraging the development of a knowledge-based economy.

Fiscal measures

To improve competitiveness and move into high value added industries, the Economic Review Committee in 2003 suggested that Singapore lower direct taxation and raise the GST, promote the growth of the service sector, reform its compulsory Central Provident Fund savings scheme, divest non-strategic GLCs, foster greater labour market flexibility, and strengthen job training programmes. To address the ERC's recommendations on lowering costs, the Government has lowered the corporate tax rate progressively, to 17%. Singapore government additionally provides several tax incentives to enterprises. A list of such incentives is provided in the table below.

Activity	Tax incentive	Features
Manufacturing and Services	Pioneer (Manufacturing) service companies	Tax exemption on income from qualifying activities (pioneer incentives).
	Development & Expansion Incentive (DEI)	Reduced tax rate from 5% to 15% on incremental income from qualifying activities.
	Investment allowances	Allowance of not exceeding 100% of approved fixed capital expenditure on top of normal 100% capital allowance



	Approved Foreign Loan Incentive	Reduced withholding tax of 0%, 5% or 10% on interest payments on loans taken to purchase productive equipment.
Headquarter activities	Regional Headquarters (RHQ)	Reduced tax rate of 15% on incremental income from qualifying HQ activities (RHQ).
	International Headquarters (IHQ)	For companies that commit to exceed the minimum requirements of the RHQ Award, customised incentive packages with lower concessionary tax rates (0%, 5% or 10%) on qualifying income could be considered in discussion with the EDB.
Trading activities	Global Trader Programme	Reduced tax rates of either 5% or 10% on qualifying transactions/trades in qualifying commodities, futures and derivatives (including structured commodity financing).
Research and Development (R&D) activities and intellectual property (IP) hub	Writing-down allowances for IP acquisition	Automatic 5-year write-down if legal and economic ownership of IP are acquired. EDB's approval is required if only economic ownership of IP rights is acquired.
	Writing-down allowances for Approved Cost-Sharing Agreement for R&D activities	1-year write-down for R&D cost-sharing payments
	Approved royalties incentive	Reduced WHT of 0% or 5% on royalty payments to access advanced technology and know-how.
	Research Incentive Scheme for Companies (RISC)	Co-funding to support the set-up of R&D centres, and/or the development of in-house R&D capabilities in strategic areas of technology. Supportable project costs include expenditure in the following: <ul style="list-style-type: none"> • Manpower cost (50% support); • Equipment and materials (30% support); • Professional services (30% support); and • Intellectual property rights (30% support).
	Initiatives in New Technology (INTECH)	Co-funding to support the manpower development in the application of new technologies, industrial R&D and professional know-how. <p>For company specific projects:</p> <ul style="list-style-type: none"> • for trainees (a fixed quantum per trainee day); and • For trainers (50% to 70% of allowable costs). Support is subject to a maximum total grant of S\$10,000 per trainer per month. <p>For industry-wide projects:</p> <ul style="list-style-type: none"> • support of up to 70% of allowable costs; and • Equipment and building costs may be supported for projects that benefit the whole industry.

Source: Deloitte

The Singapore government also provides non-tax incentives to the enterprise with a view to raise their competitiveness. A brief overview of such non-tax incentives is provided in the box below.

<u>Overview of non-tax incentives in Singapore</u>	
Local Enterprise Finance Scheme (LEFS)	
This scheme is designed to assist and encourage local SMEs to upgrade and expand their operations. LEFS loans are available for factories and machinery.	
Local Enterprise Technical Assistance Scheme (LETAS)	
The LETAS encourages and assists local SMEs in obtaining external expertise to improve their operations. Generally, assistance is up to 50% of the cost of engaging an external expert for an approved short-term assignment.	
Start-up Enterprise Development Scheme (SEEDS)	
SPRING SEEDS Capital assists start-up companies engaged in the development of innovative products or processes or intellectual content. It will disburse the funds for an equity stake in the companies.	
Technopreneur programmes	
To develop new economic activities and new markets, which can supplement Singapore's role as a manufacturing base for multinational corporations and as a service hub for region, EDB offers various incentives for high-tech business under the programme.	
Skills Development Fund (SDF)	
The SDF provides incentive grants for the training of persons in employment and the retraining of retrenched or redundant workers through the Training Grant Scheme.	
Initiatives In New Technology (INTECH)	
This scheme, administered by the EDB, is designed to encourage manpower development in the application of new technology, industrial research and development, professional know-how, and design and development of new products, processes, and services so as to establish new capabilities within a company or an industry. Grants cover up to 50% or 70% of the allowable costs of training, which may include salaries, airfare, cost of living allowance, and course fees.	
<i>Source: WTO</i>	

Trade measures

Singapore's economy remains one of the most open, and thus competitive, in the world, in terms of international trade and foreign investment. Almost all tariffs are set at zero. Singapore's liberal import regime consists of only a few border measures, maintained mainly for security, health, and environmental reasons. Various trade measures provided to the exporters and importers in Singapore are illustrated below.

Trade measure	Key features
Trade facilitation	TradeNet system, one of the world's first electronic single windows for customs declarations, has been improved to further simplify the regulatory processes for importing and exporting.
Export charges	Singapore has no export taxes or levies
Tax concessions	IE Singapore provides tax concessions to companies engaged in international trade. The Global Trader Programme (GTP) provides a concessionary tax rate of 5% or 10% on qualifying international trading activities of approved commodities and products. In addition, tax holidays are provided to encourage other activities such as international shipping, cyber trading, and for local companies to globalize their activities.



Export insurance	Export insurance and guarantees are available from several foreign insurers as well a local company ECICS Ltd, which was previously a subsidiary of Temasek Holdings.
Export promotion	IE Singapore has an overseas network of 36 offices that promote Singapore products abroad, help to provide market information to Singapore-based companies, and provide on-the-ground business facilitation services. Export promotion and marketing assistance is provided mainly by IE Singapore, through programmes, such as the Double Tax Deduction Scheme, which allows companies to deduct against their taxable income twice the eligible expenses incurred in activities such as participation in overseas trade fairs, setting up of overseas marketing offices and other investment expansion activities.
Free Trade Zone	There is no requirement for local content in re-exports. Goods can be stored within the zones without any customs documentation until they are released in the market, and they can be processed and re-exported with minimum customs formalities. Customs permits are not required for goods discharged directly into an FTZ or for transshipment of non-dutiable goods unless subject to import restrictions or prohibitions. GST is suspended as long as the goods are stored in the bonded warehouse, and is only payable if they are sold domestically

Skill development

Singapore established in September 2003, the Singapore Workforce Development Agency (WDA).The WDA aims to enhance the employability of the local workforce and the competitiveness of industries by developing a comprehensive, adult continuing education and training framework that is closely linked to the changing demands of the economy. The WDA helps industries develop their capabilities to plan and meet their manpower needs, as well as upgrade human capital management practices.

China

China’s IT Hardware industry witnessed rapid growth over the last decade, enabling the country to emerge as the largest computer manufacturer in 2004. Several factors have contributed to this achievement including strong domestic demand, foreign investments and supportive government policies. Government’s role in the success of the industry has been towards promoting domestic production as well as consumption of computers and attracting foreign capital and advanced technology in return for market access.

Chinese government’s interest in computer technologies can be traced to the government’s first long term science and technology development plan in1955. The first computer in China was built in 1958,copying a Soviet model and thereafter in the 1970s, China began producing computers for industrial and commercial uses, and its first microcomputers were built in 1977.However, these computers relied on imported components and were produced in small quantities. China’s drive to create a commercially oriented computer industry formed part of a larger effort to create an electronics industry, which formally began in 1986 with the Seventh Development Plan. Since then, China’s electronics industry has

received special emphasis and support as a “pillar” industry for the growth and development of the economy.

Similar to the other Asian countries like Japan, Singapore etc., China’s major entry into IT hardware industry followed the success and experience in consumer electronics (TVs, Radios, etc.). When demand for consumer electronics slowed during 1990s, the industry players were left with idle capacities of nearly 50% and viewed computer manufacturing as a growth opportunity. The Chinese government recognised the importance of developing the budding sector and hence subsidized and restructured the industry in an effort to transform inefficient electronics firms (mostly state enterprises) and move them into IT hardware manufacturing.

The Chinese government has facilitated rapid growth of the IT hardware industry through its industrial, investment and trade policies as well as by serving as a major consumer of various IT hardware products such as IC cards. Various government policies with respect to the IT hardware sector are discussed below.

Industrial policy – IT hardware/ computer industry

Ministry of Information Industry (MII) plans China’s information infrastructure, develops its national computer policies, and licenses and selects key government-supported companies. Its strategy for developing domestic industry has two key parts: leveraging access to its market in exchange for technology and investment from foreign firms, and stimulating domestic firms through regulation and subsidies.

Computer policy goals

China’s computer policy encompasses all computer types but focuses mainly on the PC industry, as expressed in the major goals of the Ninth Five-Year National Development Plan, 1996-2000:

- a) increase the percentage of domestic components in Chinese-assembled computers and increase the nation’s capacity to produce peripherals such as monitors, printers, disk drives, add-on cards, and high-definition displays;
- b) achieve a per capita national computer penetration of one percent, 20 percent among urban families;
- c) develop two to three domestic PC manufacturers into enterprises with an annual production capacity of more than US\$1 billion;
- d) apply computer technologies to the renovation of traditional industries; and
- e) develop uniform PC standards via a production licensing system to answer complaints about lack of service and intellectual property protection on clone PCs.

The Ninth Development Plan also emphasized a series of “golden projects” intended to serve several Purposes:

- a) modernize the country’s IT infrastructure on a very large scale,
- b) integrate the central government with the provinces and integrate the ministries within the government,
- c) stimulate computer use throughout the country, and
- d) support the information technology industry—specifically the hardware, software, and information services sectors in computers and telecommunications.

As for promotional policies for the IC industry, the government published *Policies for Encouraging the Development of Software and Integrated Circuit Industries* in 2000 and proposed several actions to support the industry, including publicly subsidized bank loans, government investments, tax breaks, and funding for design centres.

Central government policies have been complemented by the provincial governments and municipalities, which have played a major role in attracting IT hardware companies to their regions. The local governments play a direct role in the industrial development by providing basic infrastructure, building sites, financing, and other support measures. The local governments compete with each other in attracting computer firms to their region and provide lucrative offers to the enterprises. For example, Beijing offers a Shanghai _ 1 policy to add a year to any financial incentive offered by Shanghai.

Investment policies and measures

In the 1990s, limited investment was identified as the primary reason for the slow growth of China's IC industry. Consequently, the government took efforts in attracting foreign investors to fuel the industry's growth. China thus opened its computer sector to foreign firms to attract investment and technology. It has also promoted exports by joining the global production networks of multinational corporations.

Most hardware in China is produced by multinational companies – especially those from Taiwan (China). In the late 1990s, rising land and labour costs forced Taiwanese firms to shift production to mainland China. In 2001, the Taiwanese government changed regulations restricting the location of strategic activities outside Taiwan and thus the immediately following years witnessed a mass exodus of Taiwanese computer manufacturers relocating their production capacity to mainland China.

The development of advanced technology in the industry can be attributed to the government's policy of allowing market access to foreign firms only in exchange of bringing foreign capital and transferring technology to domestic firms by forming joint ventures and alliances with them. Given the size and potential of China's market, many foreign firms have been willing to make this trade-off. Thus, multinational companies such as Hewlett-Packard, Toshiba, and Compaq formed joint ventures with local companies to market their own products and gain access to local distribution channels.

The government is however reluctant in giving foreign firms control of its computer market due to strategic importance of the sector. It restricts foreign control by promoting domestic firms through direct and indirect support such as favoured treatment in government procurement and access to technologies developed in state R&D institutions. The foreign PC makers have thus set up production in China and work with local distributors by employing strategies such as:

- pursuing joint ventures with domestic companies,
- forming alliances with domestic enterprises favoured by the government,
- using their partners' sales channels to sell their own products, or
- aligning themselves with local governments seeking high-tech companies

Trade policy and measures

The economic reforms of China in the 1990s witnessed substantial liberalization of trade, with sharp reduction in import tariffs across a variety of products. In case of computer hardware too, China had

historically discouraged the direct import of computers by maintaining high tariffs and taxes, but post liberalization these have considerably come down; from 82 percent in 1992 to 35 percent in 1993 and to 15 percent since 2001.

Additionally, to encourage exports, the government has created export processing zones in which imported materials used in production are free from duties and taxes when exported directly. The government also slowed foreign firms and increased their costs with certification processes regarding quality, local content, and export limits. All these measures were intended to allow domestic firms time to get established.

Taiwan

The IT Hardware and electronics manufacturing is one of the chief drivers of Taiwan's economic growth. Taiwan is regarded as one of the dominant players in global IT hardware industry and a large number of Taiwanese hardware and electronics products such as motherboards, scanners, monitors, notebook computers, IC, LCD panels, etc. have leading market shares globally.

Taiwan, known as one of the Newly Industrialising Countries (NICs) of Asia, has witnessed high growth rate over the last five decades, which has been achieved on the back of focused developmental strategies of the state. Taiwan's development strategy in the 1950s was to focus on labour-intensive import-substituting industries in order to lay a stable foundation for economic growth; in the 60s it was to orient domestic industries toward export promotion in order to create jobs; in the 70s it was to launch heavy and capital-intensive industries in order to facilitate industries' upward vertical integration; and in the 80s it was to promote "strategic industries" (such as IT hardware) and national key technologies in order to lead industries' upgrading and improve industries' structures.

The development of Taiwan's electronics industry can be attributed to the efforts of the Japanese and American governments which focused on Taiwan for off-shoring their manufacturing and assembly of electronic components. American electronics assembly plants were initially established in Taiwan between 1966 and 1970 and by 1984, electronics capital made up over half of American investments in Taiwan, representing nearly 42% of total foreign capital in Taiwan. In the case of Japan, the market shrinkage stemming from American competition and soaring wages at home during 1960s stimulated Japan's electronics manufacturers to expand the scale of existing subsidiaries abroad and establish new production facilities in Taiwan, with the encouragement of the Japanese government. The Japanese government issued the 'Tax Credit Program for Technology Exports', administered by MITI, to encourage Japanese firms in technology exports. "Under the program a technology exporting firm could deduct from its taxable corporate profits 70% of the income earned from technology exports". Consequently, by 1984, Japanese investments represented 30% of foreign capital in Taiwan, among which 31% was directly related to electronics capital.

Along with the investments and set-ups by the US and Japanese electronics multinationals in Taiwan, the government too aimed to establish domestic electronic plants to undertake subcontract work from companies in other key countries that had not yet started off-shore activity in Taiwan. Thus, Taiwan established a 'Working Group for Planning and Development of the Electronics Industry' and held major exhibitions to bridge and foster the relationship between foreign investors and local manufacturers. Thus,

the electronic industry in Taiwan emerged from being almost non-existent prior to 1960s to being an export oriented industry right from the inception.

As a result, by early 1970s, Taiwan became a major hub for multinational electronics players. They were attracted by the following factors: (1) three Export Processing Zones (Kaohsiung, Natze, and Taichung) built at the recommendation of USAID; (2) financial incentives such as tax holidays, exemption of import duties, and unlimited repatriation of profits; and (3) cheap and non-unionised labour.

Post 1970s, the electronics industry in Taiwan faced a crisis as labour costs rose on account of shortage of labour, which in turn lowered its attractiveness to foreign players as against other south east Asian countries like Philippines and Malaysia. To overcome this crisis and accelerate further development of the strategic sector, government intervention was inevitable; the government established various strategic agencies to undertake R&D in the electronic sector (Committee for Promotion of the Information Industry, and the National Science Council (NSC)); created various research centres (Industrial Technology Research Institute (ITRI), Computer Industry Development Centre, Institute for Information Industry (III) and Industrial Technology Transfer Corporation); and established *Hsinchu science industrial Park*(details provided in box below)to lay a strong foundation for the growth of the electronics sector. The government also recognised the importance of higher education to meet the long term requirements of electronics manufacturing and thus provided generous grants for establishment of several departments and institutes related to electronics.

Hsinchu Science Industrial Park (HSIP)

A particularly impressive effort of the state lies in the development of Hsinchu science industrial park (HSIP). The Park was opened in 1979 under the supervision of the National Science Council modelled on the Stanford Industrial Park in Palo Alto, California. The Park induced a second generation of multinational investments. It aims at stimulating indigenous technical advancement and enabling local firms to establish independent operations, gradually decreasing reliance on foreign technology suppliers.

A series of special investment incentives was launched to ensure successful development of Hsinchu, including five-year tax holidays, venture capital from the state, low interest loans, reduced land rent, no limits on foreign equity, and ultramodern R & D facilities.

The growth of IT hardware industry was closely linked to the electronics industry. Direct links existed between colour TVs and colour monitors, between integrated circuits (ICs) widely used in many consumer electronic products and computers, semiconductors and other components. Moreover, the technical expertise gathered by the electronics industry was easily transferrable to the information industry. The government has actively supported the IT sector too as it was also recognised as one of the strategic sectors. In November 1984, Taiwan's "information industry strategy" was presented with following objectives:

- to promote effective utilization of computers in order to improve productivity and efficiency and add to living standards,
- to open up the domestic market in order to spur the development of the information industry, and

- to upgrade technology in the information industry and then to expand the domestic market into world export markets.

The information and computer industries were eligible for special government assistance, including following:

- asking designated development funds and financial institutions to grant preferential loan services to computer-related strategic products,
- empowering the Hsinchu Science-based Industrial Park to give preferences to applications for computer-related development and manufacturing activities,
- including computer-related strategic products in the Statute for Encouragement of Investment as eligible for those special incentives earmarked for "essential manufacturing activities," and
- favourable government procurement of locally made computer-related strategic products.

By the 1990s, Taiwan's information hardware technology was almost at par with that of the global giants. However, Taiwan's information hardware industry lagged behind in development of many key parts/components. Hence, to enhance the industry's competitiveness, the government made great efforts to promote investment in key parts/components; for instance Taiwan's TFT-LCD industry was created due to the great demand for downstream notebooks and monitors as well as the government's promotion.

Another set of governmental initiatives that have helped Taiwan's IT hardware industry is Taiwan's policy thrust towards China. In 2001, the Taiwanese government changed regulations restricting the location of strategic activities outside Taiwan and thus several Taiwanese computer manufacturers relocated their production capacity to mainland China. Further recognising China's manufacturing capabilities and economic supremacy, Taiwan has launched several new initiatives with China such as cross-strait cooperation in industrial standards, the Building Bridges Project, ECFA (Economic Cooperation Framework Agreement) and the deregulation of Chinese investment in Taiwan.