Comparative Economic Structure and Performance in Taiwan and Singapore

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The economic structures of Singapore and Taiwan are strikingly similar. In both economies, the goods producing industries, which consist mainly manufacturing industries, accounted for about one-third, and services producing industries accounted for two-thirds of their GDPs in 2003. They did not start out from the same position, however. Taiwan had an agricultural sector which contributed more than 10 percent to its GDP 30 years ago, while manufacturing and service sectors contributed about 40 percent each. The contribution of the agricultural sector had declined steadily to less than 2 percent in 2003. Manufacturing had expanded and developed rapidly throughout the 30 year period but its contribution had relatively declined to 30 percent due to the even faster growing services producing industries, which made up more than 65 percent of GDP in 2003. On the other hand, Singapore did not have a decent agricultural sector to begin with. Trading, in the form of entrepot trade, was the main economic activity. Industrialisation began in the late Sixties and it overtook the importance of trading later. The service sector, in the form of financial and insurance services, grew together with trading activities. As Singapore developed to become the regional financial centre in Southeast Asia in later years, the service sector expanded further and became the most important sector which contributed more than 65 percent to GDP in 2003.

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I. From Agricultural to Industrial Development

Although the importance of agriculture in Taiwan and its contribution to GDP are limited today, it was an important sector in the early days of development. It was even a critical factor contributing to the birth and development of the industrial sector. During the 50 years of Japanese occupation from 1895 to 1945, the Japanese government adopted the policy of "developing agriculture in Taiwan to support industrialisation in Japan". Its emphasis was placed in growing food, mainly rice, and raw materials such as sugar. Others included vegetable, sweet potato, peanut, tea, tobacco, banana and pineapple. There were also some chicken and pig rearings. Some processing industries were set up to do rice polishing, tea baking, sugar manufacturing and food canning. Superior Japanese technologies were introduced to improve the quality of these products as most of them were exported to Japan. Packaging industry such as gummy sack and paper manufacturing was also developed. These were the primitive form of industrialisation. Later in the early Thirties when Japan invaded China, Taiwan was used as a supply base for war. Japanese began to build infrastructure such as power station, and develop food, chemical, metal, machinery and equipment industries. These were developed to support the war in China and Southeast Asia. Among them, food industry remained to be the most important one (Yuan 1998: 15, 27-33). Due to war preparation and disruption, agricultural production in 1945 fell to about half of the amount in 1938.

From 1902 to 1907, Taiwan's economic structure was predominately represented by primary industries, where agriculture accounted for 79.5 percent of total value of production, forestry for 0.1 percent, fishery for 1.9 percent, mining for 2.8 percent and industrial production for 15.7 percent. In the next 12 years from 1908 to 1919, while agriculture fell to 58.9 percent of total value of production, forestry accounted for 0.8 percent, fishery for 2.0 percent, mining for 2.9 percent but industrial production rose to 35.4 percent. In the third phase from 1920 to 1931, agriculture fell again to 50.8

percent, forestry increased to 2.5 percent, fishery also increased to 3.1 percent, mining maintained at 2.9 percent and industrial production rose to 40.7 percent. The last phase was from 1932 to 1943 in which agriculture further declined to 44.7 percent, forestry increased slightly to 2.6 percent, fishery remained at 3.1 percent, mining increased to 4.2 percent and industrial production rose to 45.4 percent. Table 1 provides a summary of Taiwan's value of total production before and during the Second World War. It shows the shift in the importance of the agricultural sector and the change of Taiwan's economic structure throughout the period 1902-1943.

Table 1. Taiwan's Economic Structure 1902-1943

(In Percentage Shares Of Total Value of Production)

	1902-07	1908-19	1920-31	1932-43
Agriculture	79.5	58.9	50.8	44.7
Forestry	0.1	0.8	2.5	2.6
Fishery	1.9	2.0	3.1	3.1
Mining	2.8	2.9	2.9	4.2
Industrial	15.7	35.4	40.7	45.4
	100.0	100.0	100.0	100.0

Source: Yuan (1998: 19-22).

Agricultural products before the war were mainly rice, sugar cane, sweet potato, peanut, tea, tobacco, banana, pineapple, pork and chicken. Agricultural production reached its peak during 1937-39 when Japan invaded China, but fell drastically in 1945 when Japanese surrendered. The reasons for the substantial decline were, first, young farmers were drafted to fight in the war, and second, shortage of chemicals and fertiliser. Also, irrigation infrastructure was damaged by bombing and a number of natural disasters such as floods had occurred (Yuan 1998: 24-25).

After the war ended in 1945 and the handover of power to the Chinese government, agricultural production in Taiwan gradually returned to the previous level, and grew rapidly subsequently until the late Sixties. Starting from 1970 to 2003, agricultural production had increased marginally in absolute value terms but declined drastically in relative terms as industrial production had grown rapidly. Roughly speaking, the period from 1946 to 2003 can be divided into 3 phases. First, the recovery was from 1946 to 1951. Second, the significant growth took place from 1952 to 1969 and the third, in which production was in stagnation, was from 1970 to 2003 (Liu 2004: 57-92).

In the first phase, the Republic of China (ROC) government imported large quantities of chemicals and fertilisers from the Mainland and provided them to farmers to raise production. As the agricultural infrastructure, although partly damaged by bombing, was largely intact, production recovered and grew rapidly. In 1952, rice production was 1.7 times and sugar cane production was 1.5 times of their respective production quantities in 1946 (Yuan 1998: 110). In the second phase, agricultural production soared because of the successful land reform programme implemented by the government and the introduction of more advanced agricultural technology. The main crops were rice and sugar cane. They were exported for the much needed foreign exchange. Agriculture was used to help finance military purchases and support industrialisation besides satisfying the basic needs as food. The value of agricultural crops went up from NT$5 billion in 1952 to about NT$30 billion in 1970, an increase of 6 times (Liu 2004: 69, Table 1-7). In the final phase, agricultural production became stagnating and even tapered off in the years 2000-2003. Crop productions such as rice and sugar cane had fallen as farmers shifted to produce more horticultural plants such as vegetables and fruits. They also reared more pigs and fishes for export. The agricultural sector moved somewhat from providing foods and raw materials for domestic consumption to an export oriented activity. It also diversified by pig

rearing and seafood farming, besides producing more vegetables and fruits for export markets. The reason why agricultural production failed to expand despite diversification in the last three decades was due to a combination of several factors. The government's slogan in the Fifties was to "make agriculture a support base for industrialisation, which will in turn support agriculture". The truth was agriculture did help indirectly in the process of industrialisation by providing cheap rice and raw materials, earning foreign exchange and releasing farm hands to become industrial workers. But industrialisation itself did not help agriculture directly. In fact, its success hindered and even forestalled the growth of agriculture. Industrialisation and urbanisation induced farm workers to leave their farms and become industrial workers. The farming sector had lost manpower to the industrial sector as a result. The number of people involved in farming was 1.68 million in 1970, out of a total workforce of 4.57 million. It reduced to 1.06 million in 1990, out of a total workforce of 8.26 million. Agricultural employment further declined to 0.69 million in 2003 (Council for Economic Planning and Development 2004: 83). Another factor was the reduction of farm land used for crop plantation. As a result of the need for more land for industrial production and the growth of urban centres, the price of farm land had increased, which inevitably resulted in further losses of land to the industrial sector. The total crop area in 1970 was 1.66 million hectares and it declined to 1.15 million hectares in 1990, and further declined to 0.79 million hectares in 2003 (Council for Economic Planning and Development 2004: 81). The most critical factor of the decline in agriculture was probably due to the very nature of agriculture itself, which was characterised by the low price and income elasticity of demand for agricultural products. The Taiwanese economy began to grow in the Seventies and it took off in the Eighties. Its growth further accelerated in the Nineties. As the standard of living rose with economic growth, the demand for basic foodstuffs such as rice and sugar declined. Bumper harvests made it worse as low price could not stimulate greater demand for agricultural products. Moreover, increasing

import of agricultural products, mainly from US, worsened the competition in the domestic market, and reduced the profit margins and incentive to increase agricultural production.

Although Taiwan's agricultural sector has stagnated since the Seventies, its role and contribution to economic growth cannot be overlooked. First, it supported the government finance in kind. During the period of 1951 to 1965, the government was paid in kind a total of 10.5 million tons of rice by the farming sector. About 70 percent of this amount was used to feed the military and civil servants. Second, the export of rice, sugar and timber, mainly to Japan, earned foreign exchange to facilitate imports of machinery and raw materials for industrialisation. The annual export of rice and sugar alone was worth about US$100 million in value, which was equivalent to the value of American aid. Third, rice production exceeded market demand at times and the government built a rice stockpile serving as a buffer to stabilise the price of rice. This also ensured an adequate supply of rice at a reasonable and cheap price. Cheap rice and food helped to lower labour cost which was beneficial to the development of export oriented industries.

Notwithstanding its contributions, the future of the Taiwanese agriculture remains bleak. The government has in fact set a target of zero growth for agriculture. The current level of production is adequate to meet the domestic demand, and the social cost to produce more for export is far too great. First, the exportables are prawn, eel and pork but their rearing causes unrepairable damage to the environment. Second, rice production has more than enough to satisfy domestic need and the government's guaranteed purchase scheme for rice surplus is a heavy financial burden. The government now even has a scheme to pay farmers not to till their land. Third, trade liberalisation under WTO framework encourages free imports of agricultural products from various sources, which will inevitably worsen competition in the domestic market. For all the above factors, there is no reason and need to expand the agriculture sector. It will therefore remain at the current level of production in the foreseeable future.

II. Trading and Manufacturing

Unlike Taiwan, Singapore's primary industries were small and limited in scope even in its earlier days. It started as a fishing village and gradually developed into an entrepot engaging in trading activities. Due to scarcity of land, agriculture had never been a major economic activity. Some sugar canes and spices were grown in the island as economic crops. Besides, there were chicken and pig farms, which were gradually phased out by 1980's. The primary sector occupies an insignificant position in the modern day of Singapore. Only one percent of the island's land area is used for agriculture, livestock and fisheries. The main activities are chicken rearing for egg production, planting of vegetables and fishing for domestic consumption. Besides, orchid growing and ornamental fish rearing are for exports to international markets. Because of land scarcity, the Singapore government has developed some agrotechnology parks to promote intensive farming using sophisticated technology. The quantities of production are, however, small.[1] Almost all food items are imported for domestic consumption.

Due to its unique geographical location where steamers and containerships sailing through the Malacca Straits from the Indian Ocean to the South China Sea have to pass, Singapore has naturally developed into a busy port. Trading activities thrived as a result even in the early days. The early form of trade was entrepot trading. Singapore was the collection point for indigenous produce in the region. Rubber, timber, spices and other raw materials were sent to Singapore and then exported to Europe and the US after processing and packaging. At the same time Singapore imported manufactured goods from Europe and US, and then re-exported to cities in the region. With the inflow of immigrants to the region, trading activities grew rapidly. Banking, insurance and other related activities also

[1] Vegetable production was 16,563 tons and orchid flowers' production was 13 million stalks in 2003. Local fish production was 6,369 tons in the same year (Department of Statistics 2004: 95).

grew in tandem with the growth in trading activities. As the region gradually developed, Singapore's status as an important trading centre in the far east had been strengthened.

The Singapore economy continued to develop as an indigenous material processing centre and manufactured products distribution centre for the next 50 years from the turn of the 20th century to Japanese invasion in 1942. During this period some primitive industries had emerged. For instance, simple manufacturing of rubber products was started. The inflow of immigrants, mainly from China and India, had added to the variety and vitality of the island society. Singapore continued to grow and its growth had outstripped those of its neighbours. By 1940's, Singapore had firmly established itself as the trading centre in Southeast Asia.

The Japanese invasion in February 1942, however, had destroyed the Singapore economy and its people were enslaved by the Japanese invader for three and half years until August 1945. After the war, the British colonial government returned to rule Singapore again and started to rebuild the infrastructure which was partially destroyed or damaged by the war. People had to pick up the pieces and re-build their life in the shattered economy. Social order was restored and the economy started to move again. New immigrants from China began to flow in again until 1949 when the Communist took power in China, and colonial government put a stop to it.

The postwar economy in Singapore was creeping upward slowly until the outbreak of the Korean War. Korea was broken into two parts and the US supported South Korea to resist the advancing North Korea. China was, on the other side, also involved in the war to support North Korea. The war stimulated the demand for military related raw materials such as rubber and tin. The pan-Malayan economy, including Singapore, expanded rapidly as a result. The Singapore economy, in particulars, benefited from the upsurge in demand for processed rubber and related manufactures. Singapore was unprecedently prosperous. This was the first rapid economic

growth in the history of Singapore.

The Korean War lasted for 3 years and ended with a divided Korea in 1953. The cessation of war efforts in the Korean peninsula had slowed down the pace of economic activities and Singapore's economy slumped to the pre-war level. The recession was deeply felt that ordinary people in the street found it difficult to make a living. Business was bad and unemployment was prevalent. People were frustrated and dissatisfied with the British Colonial Government. Nationalistic feeling arose rapidly and the sentiment for fighting against the British ruler for independence was widespread in Malaya and Singapore. Eventually Malaya became independent in 1957 and Singapore gained its self-rule two years later in 1959. In Singapore, an elected Chief Minister was installed as the head of the administration although most important portfolios including defence and treasury were still held by the British. The limited self-rule did not satisfy the Singapore people and they continued their fight for independence. In 1963 Singapore was allowed to join the newly formed Malaysia as a special state and had formally left the control of the British. This signified the end of the colonial rule in Singapore. Unfortunately, Singapore was expelled and left Malaysia in 1965 because of irreconcilable differences with the Malaysian Federal Government. Singapore hence became a truly independent state in 1965.

After independence Singapore had to re-design its strategy for survival and growth. As a tiny island state, its population was small and its domestic market was almost non-existent. The traditional trading activity could not create adequate employment opportunity to solve the unemployment problem. The only solution was to create jobs through industrialisation. The Singapore Government realised that there was no other option and started to build infrastructure including the Jurong Industrial Estate to spearhead the drive for industrialisation.

III. Strategies and Stages Of Industrialisation

1. Taiwan

On the subject of industrialisation, Taiwan started it much earlier than Singapore. During the half century of Japanese occupation from 1895 to 1946, Taiwan was largely developed as an agricultural base to supply foods and raw materials for industrialisation in Japan. Only a few manufacturing lines which were related to the military activities such as chemicals and metal industries were set up during the war years. Industrialisation began after the war and its pace of development accelerated in the next five decades. Roughly it can be divided into the following phases (Duan 1999: 106; Liu 2004: 99; Li 1994: 23):

Phase 1: 1945 - 1951, Basic industries
Phase 2: 1952 - 1961, Import substitution industries
Phase 3: 1962 - 1972, Export-oriented industries
Phase 4: 1973 - 1980, Accelerated export growth
Phase 5: 1980 - present, Technology and capital intensive industries

Phase 1: 1945 - 1951, Basic Industries

Before 1945, Japanese were engaged in the production of sugar, salt, tea, pineapple cannery, textile, pulp, fertiliser, chemicals, cement and metals, in shipbuilding and power generation. Most of the production facilities were partially damaged and some were totally destroyed in the war. The post-war government took immediate measures to restore the production of the above industries in order to satisfy the need for daily necessities. The restoration of industrial production was slow as the government was involved in the civil war with the communists in the mainland. The priority was placed on the development of power generation, fertiliser and textile manufacturing, which provided a solid support to the growth of agriculture and industrial production subsequently. Electrical power was the prime mover of industrial production and chemical fertilisers were important in raising agricultural productivity. Textile manufacturing was

necessary to reduce import of cloths so as to save the precious foreign exchange at that critical time.

Phase 2: 1952 - 1961, Import Substitution Industries

The industries in the early Fifties were basic industries which provided daily necessities and supported the development of infrastructure. Most were inherited from the Japanese and the government re-organised them into four industrial groups, namely, cement, pulp and paper, mining and agriculture cum forestry. The government allocated the shares of these companies to landlords in exchange for their land titles in the Land Reform. As a result, these companies were privatised and became private companies. Other profitable companies such as Taiwan Sugar, China Petroleum, etc were retained by the government as state-owned enterprises. Some of these companies have remained as state owned enterprises even up to the present days.

The government implemented two four-year plans to uplift the potential of the economy. The first plan covered the period 1952-1956 with the objective of attaining self sufficiency in foods and basic needs. The direction was to develop industries along agriculture-related activities, and to further reinforce the agricultural sector subsequently by expanding industrial production. The government decided to encourage manufacturing activities which required low capital, low skills and basically labour intensive. Manufactured products were used to substitute imports and satisfy domestic needs. At the same time manufacturing created jobs and reduced unemployment. These included cements, glasses, wood products, pulp from sugar canes, papers, fertilisers, flours, edible oils, textiles, plastic raw materials and products, artificial fibres, bicycles, sewing machines and electrical products. Although the policy was to encourage import substitution, agricultural processing industries which made use of domestic raw materials such as sugar, tea, canned pineapple, etc were also encouraged.

The import substituted industries developed quite fast and the domestic market was almost saturated by 1956. They had to find export outlets for further expansion. The government's second four-year plan from 1957 to 1960 therefore sought to "continue exploring domestic resources in order to increase agricultural production, accelerate mining exploration and expand exportables and trade". The purpose was to raise national income, create jobs and balance international payment (Li 1994: 277). The emphasis had been shifted to include export oriented industries.

The industries developed within Phase 2 included both state-owned enterprises and private enterprises. The former were basic industries which were inherited from the Japanese colonial government. They included sugar, fertiliser, soda, petroleum, aluminium, machinery, shipbuilding, salt etc. Besides, there were periphery industries which included foods, cement, paper, agricultural processed products and textile, and were mostly privately owned. Over the years, more and more private businesses were set up with the encouragement of the government and, as a result, the percentage of state owned enterprises had declined. For instance, the percentage of state-owned enterprises was 56.2 percent in 1952. It declined to 40.6 percent in 1963 (Liu 2004: 103). In sum, the industries in Phase 2 were mainly import substitution industries catering for domestic market but they also turned to export markets later when the domestic market was saturated. Within the same period, the percentage of government owned enterprises had declined with the growth of private enterprises.

Phase 3: 1962 - 1972, Export-oriented Industries

In the next ten years from 1962 to 1972, Taiwan's industries went through another process of transformation. The labour intensive, import substituted industries grew so rapidly that the domestic market could not absorb their products. They had to export their products to the world market. The original import substituted industries had become

export-oriented industries as well. The demand for raw materials and machinery to manufacture these products, which were mostly imported, had increased as a result. To produce these raw materials locally and to fabricate these machines in Taiwan were known to be the second wave of import substitution. But the production of raw materials and machinery could not create enough jobs to solve the unemployment problem. Thus the emphasis in this phase of development was placed on export promotion of labour intensive manufactures to the world market. The government adopted a number of measures to help promote export growth. These included import duty rebates, relaxation on foreign exchange control and devaluation of Taiwanese currency to make Taiwanese products more competitive. The government also offered an investment incentive scheme to encourage investments through tax waiver and reduction. It also set up industrial estates, export processing zone and free trade zone to encourage export promotion. All these contributed to the successful formation of an export-oriented industrial sector.

Phase 4: 1973 - 1978, Accelerated Export Growth

The development in the Sixties, especially the growth of the export sector, had created a large demand for raw materials and intermediary products. The demand was so great that it was found viable to set up production in Taiwan to replace the import. As stated earlier, this was called the second import substitution. The government decided to develop heavy industry, namely, iron and steel industry, and chemical industry, namely, petrochemical industry. The former could provide raw materials for the production of metal products and machinery and the latter could provide raw materials for artificial fibre and plastic products. The steel industry and petrochemical industry also served as the foundation to develop new industries such as electrical, electronics, and automobile industries at a later stage and to reinforce the existing textile industry.

The development of the steel, petrochemical and shipbuilding industries were part of the Ten Major Projects unleashed in 1973. The estimated cost of these projects was US$5.8 billion. Seven of these were infrastructure projects such as the construction of airports, seaports, nuclear power plants and highways, which accounted for 63 percent of the estimated cost. The investment in steel, petrochemical and shipbuilding industries accounted for the remaining 37 percent. Out of the three investments, petrochemical industry had the best performance. It strengthened its downstream industries and uplifted its middle and up stream industries. The steel and shipbuilding industries were not as successful as the petrochemical industry. While the steel company China Steel enjoyed limited success, the shipbuilding company China Shipbuilding was a total failure (Liu 2004: 133).

Taiwan's national income had increased rapidly with economic growth during the last five decades. Salaries and wages had also increased significantly especially in the last twenty years. The increase in labour cost had reduced the competitiveness of Taiwanese exportables. Also, the value added of the labour intensive products were low. The energy crisis in the Seventies had further increased costs of raw materials and parts, thus making Taiwanese products even less competitive. The government realised that Taiwan had to move into production of high technology products. In the Ten Year Plan For Economic Development 1980-1989, the government identified machinery industry which included general machinery, electrical machines, precision and automatic machines and transport equipment, and information technology industry which included computer software, micro-computer and periphery equipment, data communication and related products as strategic industries in the future. The government also set up Hsinchu Science Park and Industrial Technology Research Institute (ITRI) to spearhead the development of high technology industry.

Phase 5: 1980 - present, Technology and Capital Intensive Industry

The Industrial Development Bureau under the Ministry of Economic Affairs set up the Executive Committee For Strategic Industries in March 1982. The criteria selected by the committee to identify strategic industries were "large linkage effect, large market potential; high technology intensity, high value added; low energy coefficient, and low pollution". The government identified eight strategic fields in 1983, namely, energy, sophisticated raw materials, information, automation, bio-engineering, laser technology, medical cure for hepatitis and food technology (Kwong 2001: 88-89). Out of these areas, it was the semiconductor industry which emerged as the leading sector in Taiwan's high technology development in the past two decades. It remains as the top industry today which has earned an excellent reputation for Taiwan in the global scene.

As early as 1974, integrated circuits (IC) was chosen as a strategic field for focussed development. The government tried to encourage the private sector to develop IC capability. The private sector was reluctant as the risks involved were high. In 1978, the government set up a joint venture United Microelectronics Corporation (UMC) through ITRI with some private investors to invest in IC business. The state owned 44 percent of the equity and the remaining share was held by private companies[2]. UMC had performed well and there was room for expansion in the industry. In 1984, the government formed another joint venture Taiwan Semiconductor Manufacturing Co. (TSMC) in which the government owned 49 percent, Phillips 27 percent and Taiwanese investors 24 percent. The formation of TSMC was a great success and it has become the star performer in the semi-conductor industry, not only in Taiwan, but also in the world. Several semi-conductor companies, although in smaller scale, were set up by private investors, which were apparently encouraged by the success of UMC and TSMC. These companies, including big and small producers, had made up the Taiwanese semi-conductor industry.

[2] The government's share was reduced to 23 % after UMC's public listing in 1985.

The emergence of DRAM[3] as a new product has helped to place Taiwan's semi-conductor industry in the world map. The technology which produced DRAM was submicron technology. Due to its complexity and sophistication, it was beyond the capability of the private sector to do research and development by themselves alone. The government encouraged private companies in the semi-conductor industry to form a consortium to do R&D on submicron. The government bore the purchase costs of research equipment and shared to pay for its operating expenses equally. As a result, the submicron technology was highly developed and Taiwan has established itself as a leading producer of semi-conductor chips and DRAM in the world today.

Apart from the high technology industry, petrochemical industry has also performed well since its establishment. Other industries, such as shipbuilding and automobile, have not been doing well. Textile industry, like many other traditional industries, have re-located to either China, Vietnam or other third world countries. The challenge which the Taiwanese industrial sector is facing today is the attraction of a big market, coupled with cheap labour and brain power in China. Many traditional businesses have moved to China. Even technology intensive businesses such as computer chips and foundry wafer manufacturing have moved to China as their customers and markets are there. Only the manufacturing of higher quality products which require more sophisticated technology and R&D work have remained in Taiwan. The integration of the Taiwanese industrial sector and China's economy has deepened, and the dependence on the Chinese economy has increased as a consequence.

2. Singapore

The process of industrialisation in Singapore started much later than that of Taiwan. It can be roughly divided into the following phases:

Phase 1: 1959-1964. Preparation for industrialisation

[3] DRAM represents Digital Random Assembly Memory.

Phase 2: 1965-1978. Export oriented industries
Phase 3: 1979-1985. High value added and skill intensive industries
Phase 4: 1986-1997. High growth and development strategies
Phase 5: 1998-2004. Globalised development

Phase 1: 1959-1964. Preparation for industrialisation

After gaining the status of self governance from the British in 1959, the Singapore government began to set up infrastructure for industrial activity. In 1961, a piece of land in western part of the island was earmarked for the development of the Jurong Industrial Estate. The government set up Economic Development Board (EDB) in the same year to design a series of incentives to promote investments. Other economic agencies were also set up during this period. Besides manufacturing, the government recognised the importance of tourism to the economy and established the Singapore Tourism Promotion Board (STPB) in 1964.

Singapore was basically a trading post and its capital formation was small. The lack of a hinterland market made it extremely difficult to develop manufacturing industries. Manufacturing at the beginning was mainly processing of agricultural products and raw materials such as coconut oil and rubber. In 1960, manufacturing accounted for 11 percent of Gross Domestic Product (GDP). Its growth was slow and the percentage share grew to 14 percent in 1964.

Phase 2: 1965-1978. Export oriented industries

One of the important factors which attracted Singapore to merge with Malaysia in 1963 was the promise and prospect of the Malaysian common market, which would have given Singapore an access to the vast Malaysian hinterland market. The policy adopted before 1965 was therefore developing manufactures to substitute for imports. However, Singapore was forced to leave Malaysia and became independent on 9 August 1965 because of irreconcilable differences with the Federal Government. The

dream of sharing the Malaysian common market was no longer possible and Singapore had to switch the policy from import substitution to export promotion.

Two more factors had made the transformation of the economy necessary and strengthened Singapore's resolve to industrialise. The first was the Indonesian economic confrontation against Malaysia, including Singapore. Indonesia objected to the inclusion of North Borneo as a state in Malaysia and started economic confrontation when Malaysia was formed. Singapore was hit seriously as its trade with Indonesia was totally suspended. This dealt a heavy blow to its entrepot trade, and made industrialisation the only alternative to survive. The second factor was the withdrawal of the British troops which had stationed in Singapore since the colonial days. The withdrawal of troops from the British base and shipyard here had led to the loss of 40,000 jobs over the next five years. As a result, unemployment went up to 10 percent. The need for jobs and the pressure to create employment opportunities made industrialisation to be the most urgent and important objective.

Singapore lost no time in attracting foreign investments after leaving Malaysia. As the domestic market was limited, the target industries were export oriented. Singapore was able to attract some Taiwanese investments in a number of traditional industries such as building materials and textiles during this period. Building materials were needed for the development of industrial infrastructure and public housing. Some Taiwanese businessmen moved their textile factories from Taiwan to Singapore to take advantage of the allotted textile quota, and manufacture textile products for export markets. The Taiwanese were therefore the early group of foreign investors in Singapore.

In order to create a conducive environment for foreign investment, the government enacted the Employment Act to set employment standards and spelt out ways of resolving industrial disputes. In 1972, the National Trades Union Congress (NTUC), an umbrella body of labour unions in

various trades, was formed. The government's approach in labour relations was to encourage settlement of industrial disputes through negotiations by unions and employers, not confrontations and industrial actions. The Ministry of Labour, on behalf of the government, would intervene and mediate when union and employer could not reach an agreement. The government also set up the National Wages Council (NWC) comprising representatives from unions, employers and the government to recommend annual wage and salary adjustment, based on a review of economic performance of the year. Although the NWC recommendations were not compulsory to follow, the government and the private sector adopted its recommendations in most cases. The tripartite approach to deal with industrial problems had worked well and ensured industrial peace over a long period, which was essential in attracting foreign investment and industrialisation.

During this period, the development of infrastructure continued. The Jurong Town Corporation (JTC) was formed to plan and manage the Jurong Industrial Estate. A number of government related companies such as Singapore Airlines, Neptune Orient Lines and Development Bank of Singapore were set up. The airlines and shipping lines were necessary for the development of Singapore as a commercial centre. The Development Bank of Singapore provided loans and financial assistance to investors. All these provided the necessary support and contributed to the success of industrialisation in this phase of development.

The government's efforts had been effective and rewarded by a significant increase in investment. The growth in GDP were in double digits, particularly from 1966 to 1973, and the averaged growth rate was 10 percent per year during the period. Correspondingly, unemployment rate dropped to 3 to 4 percent. The growth of industrial output was significant, and its share in GDP increased from 14 percent in 1965 to 24 percent in 1978. By then, the structure of the economy had been significantly changed that almost a quarter of GDP came from the contribution of the industrial sector.

The first phase of industrialisation had borne its fruits of success towards the end of 1970's.

Phase 3: 1979-1985. High value added and skill intensive industries

As industries continued to expand, unemployment dropped further. By 1980, labour was more or less fully employed. It appeared that labour shortage would be a problem which might hinder further expansion and growth. Multinational corporations (MNC), which were the main investors during this period, had difficulties in recruiting enough workers. Although the government had allowed the inflow of foreign workers, there was always a limit on the number of foreign workers Singapore could admit. The labour market was so tight that upward pressure on wages began to emerge. This was in strong contrast with countries in the region where unemployment was high and wages were low. In some traditional sectors in Singapore, wages were relatively low and the use of labour was far below the efficient point. The problem was that the traditional labour intensive industries employed a large number of workers but the value added they produced was low. On the other hand newly formed industries could not get enough workers because there was labour shortage. Singapore government realised that there was no advantage to keep the labour intensive industries which produced low value added because they could not compete with their counterparts in low cost countries in the region. The decision was made after due consideration to restructure the economy towards high value added activities. In order to force the labour intensive industries to release the excessive labour they employed, or even to relocate to low cost areas in the region, the government adopted a wage correction policy in 1980 to allow wage increases over a three year period. To complement the wage upward adjustment policy, the government encouraged industries to make more use of automation, mechanisation and computerisation. Hence, while the general policy of promoting export oriented industries remained unchanged, the emphasis was placed on the

development of high value added and skill intensive industries.

Phase 4: 1986-1997. High growth and development strategies

The switch of emphasis from labour intensive to high value added industries had been effective. Most traditional enterprises which produced low value added moved to lower cost areas in neighbouring countries. The economy continued to grow but it grew steadily at lower rates. In 1985 Singapore was hit by a recession and the GDP suffered from a decline of 1.4 percent. It, however, picked up again in 1986 and there were a number of good years in which the GDP growth rates were about or even exceeded 10 percent. By 1994, Singapore's GDP was twice as much as that in 1985. In other words, the Singapore GDP grew by 100 percent within the ten year period of 1985-1994[4]. As a result of the sustained growth during this phase of development, Singapore was becoming a fully employed economy. Labour and resources were in shortage and these shortages would constrain further growth if the approach remained unchanged. The technology base, although it was upgraded before, remained low compared to developed countries. The competition was extremely keen from other countries. After a careful review of the situation, the Singapore government formulated the following changes[5]:

(1) To uplift technology base

In order to compete effectively with other newly industrialised economies such as Korea and Taiwan, the technology intensity of the industrial sector would have to be deepened. Singapore had to transform itself into a high technology economy for sustained growth. The government announced that it had set aside US$1.2 billion for the

[4] The GDP growth rates were 9.7%, 11.3%and 9.9% for 1987, 1988 and 1989, respectively. GDP grew at 12.3% and 11.4% in 1993 and 1994. The GDP in 1985 was S$51.7 billion and it was S$110.1 billion in 1994. (in constant 1995 prices) Source: Department of Statistics, Singapore, (updated on 27 Feb 2003).

[5] Ministry of Trade and Industry's website: www.mti.gov.sg. See the section under "Economic Development".

development of various projects under the National Technology Plan for the period 1991-1995. The government had also committed to spend US$2.4 billion under the National Science and Technology Plan for the period 1996-2000. The ten year technology plan from 1991 to 2000 mentioned above had uplifted Singapore's technology base and strengthened its competitiveness vis-à-vis other newly industrialised economies.

(2) To tailor development plan for industrial clusters

Industries, or even firms, were grouped in accordance with their supporting relationships into a number of clusters. Plans were developed to improve the competing capability of each cluster industry. The core capabilities within each cluster group were the focus for upgrading. Once the core capabilities were improved, the competitiveness of the industry or firm within the cluster would also be raised. Although the improvement of each cluster industry might vary, the competing capabilities of the entire industrial sector and the economy would be lifted.

(3) To promote service sector

The traditional trading activity was an early form of services in Singapore. Associated activities such as banking, insurance and legal services were also developed in the early days. Besides, tourism was a form of services which could bring in tourists and foreign exchange. The service sector was termed as "factories without chimney and smoke" and was as important as the manufacturing sector. However, the drive for industrialisation in the two decades since independence had overshadowed the importance of the service sector. While the competition in manufacturing was keen and the room for further expansion was limited, the space for the service sector to expand was still available. The government therefore re-asserted the importance of the service industry and made it the second pillar of the Singapore economy besides manufacturing. Encouragements and incentives were also given to investments in the service sector. The services producing industries had expanded very fast, in particular, the tourism industry as a result. In fact, its share in GDP was

more than 60 percent, which was twice as much as that of the manufacturing sector in all years during this phase of development.

(4) To encourage regional development

Recognising the limits of a small nation and the saturation of the domestic economy, the government encouraged Singapore businessmen to seek business opportunities outside of Singapore. The untapped markets in Asia, especially those in the region, could offer vast opportunities, and Singapore entrepreneurs should venture to Asian markets such as Vietnam, China and India. Many Singapore businessmen had heeded the advice of the government and invested abroad. There were, however, varying degrees of success among them. While quite a number of them had found their investments in China profitable, some discovered that the returns to their investments in places like Myanmar and Cambodia were below their expectation.

The push for deepening the technology content of manufacturing had yielded positive results and broadened the path of growth for the Singapore economy. The service sector had also expanded its scope of activities and managed to retain its two-third share in GDP despite the fast expansion of other sectors. GDP growth rates varied from a low rate of 2.1 percent in 1986 to a high rate of 12.3 percent in 1993. It nevertheless achieved a fairly high average rate of 8.6 percent for the phase 1986-1997.

Phase 5: 1998-2004. Globalised development

The growth since the ending of the recession in 1985 continued until it was disrupted by the monetary crisis in 1997. As a result, the GDP in 1998 declined by 0.9 percent. The economy recovered in 1999 and it grew at 6.4 percent and 9.4 percent in 1999 and 2000, respectively. However, the Singapore economy was hit again by a worldwide recession in 2001, which was largely caused by the downturn of the global electronics industry. Furthermore, the terrorist attacks to the twin World Trade Towers in New York on 11 September 2001 aggravated the recession. Singapore suffered

its greatest loss in GDP growth since 1965 by a decline of 2.4 percent in 2001. The economy recovered in the next two years with growth rates fluctuating within the 2 to 3 percent range until a full recovery in 2004 when the growth rate approached 10 percent.

During the Nineties, the rise of China was most noticeable. The growth in China attracted a large number of sizeable investments which would go to ASEAN countries otherwise. Singapore businessmen also had substantial investments in China. The rise of the Chinese economy thus offered both opportunities and competition to Singapore. In the last few years from 2001 to 2004, the opening up of the Indian economy was increasingly evident, which could offer more business opportunities to Singapore and countries in the region.

New strategies were mapped to meet the challenges in face of the development in the world today. In international aspect, Singapore realised that it had to embrace globalisation through WTO framework, free trade agreement and regional cooperation. As regards to domestic issues, Singapore had to reduce costs, especially labour costs, to maintain competitiveness. The government also lowered some business taxes and Central Provident Fund contribution rates. The objective was to lower the costs of doing business in Singapore. The government also promoted entrepreneurship by encouraging people to be more innovative and encouraged business companies to broaden their economic base and explore for more export opportunities. The government also launched, through NTUC and the Ministry of Manpower, a series of training programmes to re-train workers and upgrade labour skills. In view of the small population and small talent pool, the government adopted a policy of welcoming foreign talents to immigrate and work in Singapore. This had helped to ease the shortage of skilled manpower and facilitated the expansion of the manufacturing and service sectors.

Singapore has experienced a number of changes in its short history of development. It began with entreport activities. It tried to develop labour

intensive industries to produce products for import substitution. It then switched to export oriented industries when the common market was not realisable. The labour intensive industries were later abandoned and were substituted by skill intensive and technology intensive industries. At the turn of the 21st century, the knowledge based economy had emerged. The change was from technology intensity to knowledge intensity which included talent, education, information, innovation, entrepreneurship, life long learning, etc. In other words, knowledge was the source for enhancing intellectual capital which was necessary for the creation of higher value added. For sustained growth in future, Singapore had embarked in the development of the knowledge based economy and had seen some positive results of its efforts in the last few years.

IV. Contribution of Manufacturing and Service Sectors

1. Taiwan

As stated earlier, the present economic structures of Singapore and Taiwan are similar. Their service sectors account for 60 percent and manufacturing 30 percent in the contributions to their respective GDP. The difference between them is that Taiwan still has an agriculture sector which produced about 2.5 percent of its GDP during the years 2001-2003. Table 2 shows Taiwan's GDP in constant 1996 prices and its components for the last 30 years from 1973 to 2003. Although the absolute value of agricultural production had increased throughout the 30 year period, its contribution to GDP declined from 13.1 percent in 1973 to 2.4 percent in 2003 as the economy expanded (See Table 3). Manufacturing, represented by "goods producing industries" in Table 2, started from a lower base than the service sector in 1973, grew almost eight times to reach the mark of US$100.6 billion in 2003. But the service sector grew 11 times to achieve the value of US$186.7 billion in 2003. Taiwan's services industries grew much faster than its manufacturing industries during the last three decades, and has become the most important contributor to its GDP. Table 3 shows the percentage

contributions to GDP by various sectors. While the goods producing industries grew rapidly, the services industries grew even faster. Agriculture had declined steadily in percentage terms throughout the period.

As shown in Table 4, the main components of the Taiwanese service sector are retail/wholesale/restaurants, transport/storage/communication, government, and financial insurances/business services. The services industries grew by 11.1 times from 1973 to 2003, and its sources of the spectacular growth came from the finance/insurances/business services and transport/storage/communication sectors which grew 17 times and 16 times, respectively, in the same period. One point which is worth noting is the size of the government service sector. In 2003, it was about 15 percent of the total value of the services industries, or 9.5 percent of GDP, which was significantly high as almost 10 percent of its GDP was produced by the government[6]. Figure 1 shows the upward trend of Taiwan's GDP in constant US dollars and its components during 1973-2003. The curves rose steadily upward between 1985 to 1997 when a dip appeared in 1997. They picked up again subsequently but dipped again in 2001. These dips were consistent with the 1997 financial crisis and the 2001 recession. Figure 2 shows the changes in percentage shares of the various sectors in GDP. While the decline in the percentage share of agriculture is clear, the percentage shares of manufacturing and service industries diverged. Manufacturing's share has declined but service sector's share has increased significantly. Within the service sector, each component has exhibited a consistent pattern which is similar to that of the total services industries. Their rising trends are shown in Figure 3.

[6] The value of Government services was US$27,852.6 million in 2003. The values of Services Producing Industries and GDP for 2003 were US$186,759.7 million and US$294.462.4 million respectively.

Table 2. Gross Domestic Product at 1996 Constant Prices, Taiwan, By Industry, 1973-2003

	GDP (NT$ Million)	GDP (US$ Million)	Agriculture (US$ Million)	Goods Producing Industries (US$ Million)	Services Producing Industries (US$ Million)
1973	1,363,900	34,012.5	4,440.42	12,763.27	16,808.78
1974	1,379,747	36,213.8	4,762.44	13,206.90	18,244.49
1975	1,447,748	38,048.6	4,577.32	14,068.54	19,402.71
1976	1,648,416	43,322.4	4,976.45	17,168.57	21,177.35
1977	1,816,383	47,736.7	5,178.92	19,315.82	23,242.00
1978	2,063,299	57,234.4	5,439.75	24,206.05	27,588.57
1979	2,231,953	61,861.2	5,690.85	25,986.28	30,184.09
1980	2,394,914	66,414.7	5,582.17	28,398.31	32,434.22
1981	2,542,505	67,102.3	5,289.15	28,699.71	33,113.41
1982	2,632,796	65,885.8	5,123.47	27,589.56	33,172.75
1983	2,855,186	70,813.1	5,200.82	29,979.69	35,632.64
1984	3,157,823	79,904.4	5,414.88	34,559.89	39,929.66
1985	3,314,214	83,063.0	5,485.21	35,485.14	42,092.66
1986	3,699,889	104,075.6	6,155.67	45,424.98	52,494.99
1987	4,171,439	145,854.5	8,134.20	63,340.98	74,379.34
1988	4,498,496	159,408.1	8,325.80	67,408.36	83,673.92
1989	4,868,833	186,117.5	8,929.59	75,935.17	101,252.71
1990	5,131,506	189,284.6	8,811.47	73,866.88	106,606.27
1991	5,519,140	214,335.5	9,441.51	83,103.15	121,790.87
1992	5,932,383	233,558.4	9,356.46	89,302.56	134,899.37
1993	6,348,468	238,395.3	9,377.09	89,164.14	139,854.11
1994	6,799,720	259,135.7	9,115.66	96,116.69	153,903.32
1995	7,236,536	265,366.2	9,021.16	97,232.16	159,112.87
1996	7,678,126	279,306.1	8,919.03	99,747.58	170,639.54
1997	8,190,783	250,943.1	7,400.80	89,134.10	154,408.21
1998	8,565,134	265,832.8	7,002.95	92,769.93	166,059.96
1999	9,029,704	287,570.2	7,381.82	99,625.73	180,562.64
2000	9,558,698	289,745.3	7,107.03	100,238.92	182,399.36
2001	9,349,923	267,140.7	6,560.23	88,842.37	171,738.06
2002	9,685,551	278,720.9	6,920.03	93,995.11	177,805.76
2003	10,005,832	294,462.4	7,087.35	100,615.36	186,759.68

Source: Directorate-General of Budget (2004).

Note: All figures are originally in NT$ and are converted to US$ by dividing the figures by US$-NT$ exchange rates.

Table 3. Contributions to GDP By Various Sectors, Taiwan, 1973-2003

(In percentage)

	Agriculture	Goods Producing Industries	Services Producing Industries	Total
1973	13.1	37.5	49.4	100
1974	13.2	36.5	50.4	100
1975	12.0	37.0	51.0	100
1976	11.5	39.6	48.9	100
1977	10.8	40.5	48.7	100
1978	9.5	42.3	48.2	100
1979	9.2	42.0	48.8	100
1980	8.4	42.8	48.8	100
1981	7.9	42.8	49.3	100
1982	7.8	41.9	50.3	100
1983	7.3	42.3	50.3	100
1984	6.8	43.3	50.0	100
1985	6.6	42.7	50.7	100
1986	5.9	43.6	50.4	100
1987	5.6	43.4	51.0	100
1988	5.2	42.3	52.5	100
1989	4.8	40.8	54.4	100
1990	4.7	39.0	56.3	100
1991	4.4	38.8	56.8	100
1992	4.0	38.2	57.8	100
1993	3.9	37.4	58.7	100
1994	3.5	37.1	59.4	100
1995	3.4	36.6	60.0	100
1996	3.2	35.7	61.1	100
1997	2.9	35.5	61.5	100
1998	2.6	34.9	62.5	100
1999	2.6	34.6	62.8	100
2000	2.5	34.6	63.0	100
2001	2.5	33.3	64.3	100
2002	2.5	33.7	63.8	100
2003	2.4	34.2	63.4	100

Source: Derived from Table2. Agriculture, Goods Producing Industries and Services Producing Industries, expressed in US$, are divided by GDP in US$.

Table 4. Contributions to GDP by Services Industries at 1996 Constant Prices, Taiwan, 1973-2003

(US$ million)

	Services Producing Industries	Retail Wholesale & Restaurants	Transport, Storage & Communication	Government Services	Finance, Insurances & Business Services
1973	16,808.8	4,550.3	1,563.7	5,283.4	3,877.0
1974	18,244.5	4,954.3	1,907.5	5,290.5	4,425.8
1975	19,402.7	4,953.4	2,206.4	5,838.2	4,616.0
1976	21,177.3	5,437.1	2,588.6	6,199.2	5,172.5
1977	23,242.0	5,983.8	2,792.8	6,690.5	5,765.7
1978	27,588.6	7,366.7	3,348.6	7,537.8	7,185.4
1979	30,184.1	7,988.9	3,733.5	8,064.4	8,718.5
1980	32,434.2	8,652.1	4,118.1	8,519.4	9,614.1
1981	33,113.4	8,745.3	4,336.9	8,662.0	10,065.7
1982	33,172.7	8,709.0	4,388.1	8,689.0	9,858.3
1983	35,632.6	9,402.2	4,755.5	9,043.2	10,105.2
1984	39,929.7	10,738.3	5,422.3	9,832.7	11,681.8
1985	42,092.7	11,335.2	5,709.6	10,281.0	12,484.2
1986	52,495.0	13,717.3	6,910.6	11,908.6	15,230.0
1987	74,379.3	19,274.4	9,505.1	15,663.8	21,997.2
1988	83,673.9	21,669.0	10,447.9	17,177.9	26,411.8
1989	101,252.7	25,903.0	12,035.6	19,821.0	34,533.3
1990	106,606.3	27,669.1	12,303.1	21,079.2	36,646.9
1991	121,790.9	32,129.4	13,919.7	24,214.6	40,492.6
1992	134,899.4	36,376.5	15,278.5	25,510.6	45,906.9
1993	139,854.1	38,428.4	15,632.7	25,473.8	48,023.0
1994	153,903.3	42,111.6	16,706.8	26,704.7	55,022.6
1995	159,112.9	43,900.4	17,029.7	27,408.0	56,673.6
1996	170,639.5	46,912.5	17,781.0	28,943.9	60,586.2
1997	154,408.2	42,434.6	15,984.7	25,063.8	57,041.1
1998	166,060.0	45,985.3	17,728.3	26,033.0	60,422.0
1999	180,562.6	49,989.4	21,170.8	27,575.4	64,265.6
2000	182,399.4	50,745.1	22,710.1	26,929.9	62,848.9
2001	171,738.1	46,653.0	22,062.3	25,931.9	59,654.5
2002	177,805.8	48,103.5	23,301.2	26,595.5	62,356.9
2003	186,759.7	50,658.4	24,838.2	27,852.6	65,905.1

Source: Directorate-General of Budget (2003).
Note: The above figures in US$ are derived by using US$/NT$ exchange rates.

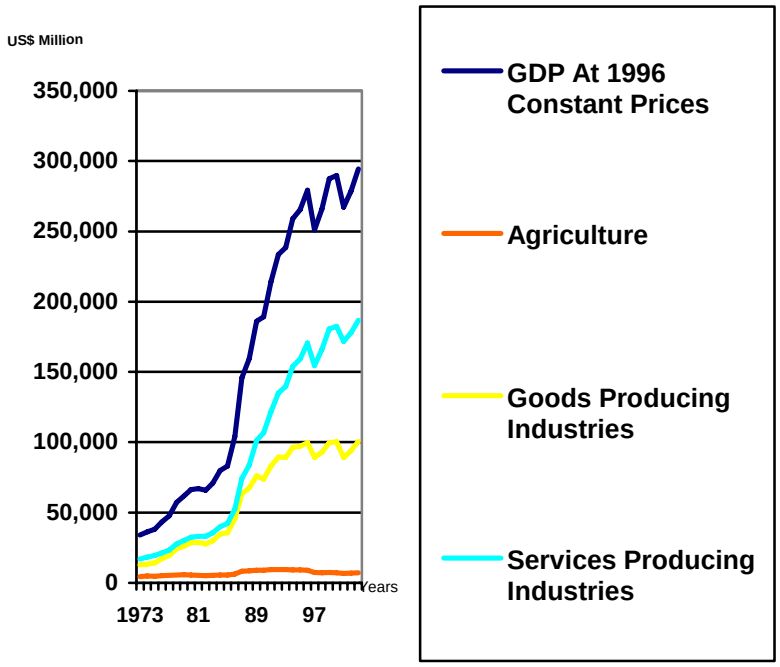

Figure 1. Gross Domestic Product at 1996 Constant Prices, Taiwan, by Industry, 1973-2003

Source: Table 2 Extract of National Income Statistics (www.dgbas.gov.tw) updated in Sep. 2004.

Note: All figures are originally in NT$ and are converted to US$ by dividing the figures by US$-NT$ exchange rates.

2. Singapore

In Table 2, Taiwan's GDP expressed in US dollars rose from US$34 billion in 1973 to US$294 billion in 2003, an increase of 8.6 times. In the case of Singapore, the corresponding growth was from US$9 billion to US$94 billion, an increase of more than 10 times. Table 5 shows the growth of Singapore's GDP over the last 30 years and those of its components, namely, the goods producing industries which consist mainly manufacturing, and the services industries. Goods producing industries grew 8.5 times and services industries grew faster at 12.1 times.

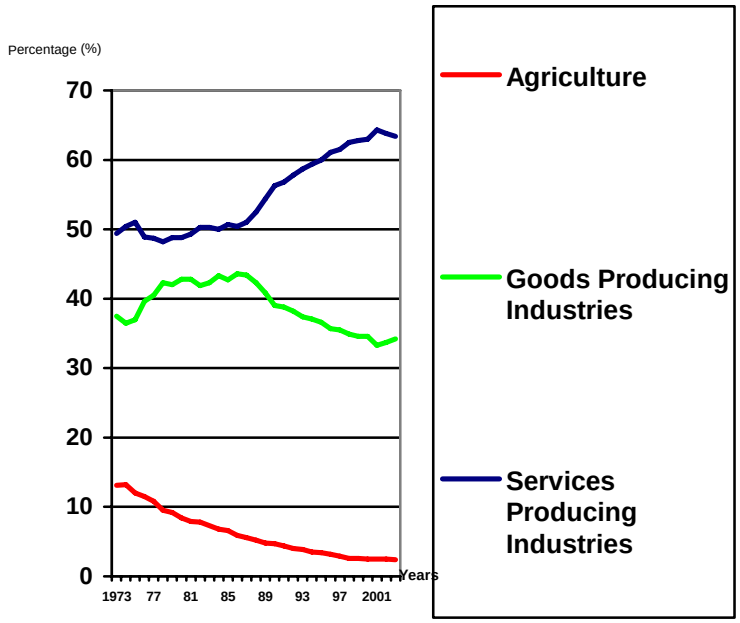

Figure 2. Contributions to GDP by Various Sectors, Taiwan, 1973-2003

Source: Table 3.

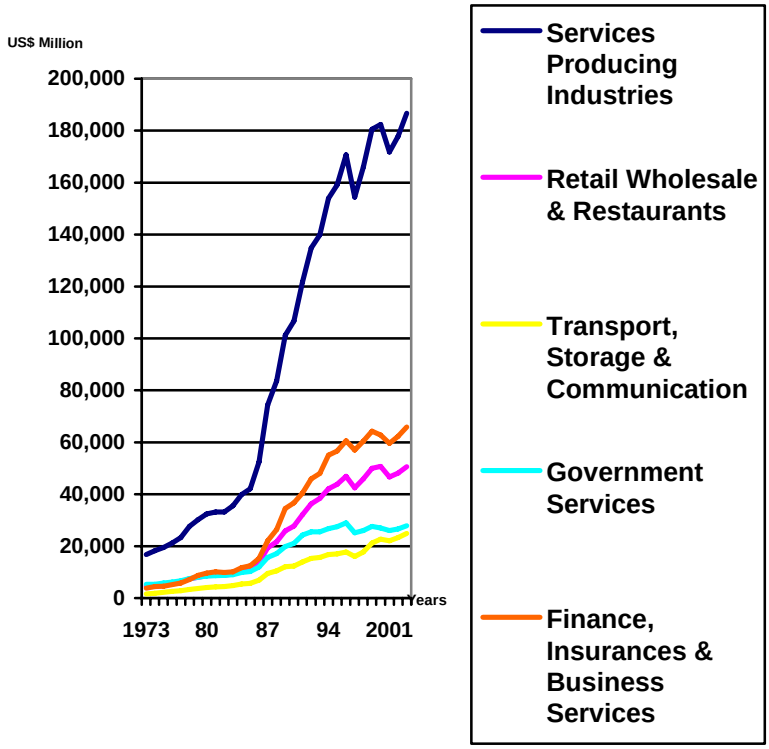

Figure 3. Contributions to GDP By Services Industry at 1996 Constant Prices, Taiwan, 1973-2003 (US$ Million)

Source: Table 4.

Table 5. Gross Domestic Product at 1995 Constant Prices, Singapore, by Industry, 1973-2003

	GDP (S$ Million)	GDP (US$ Million)	Goods Producing Industries[1] (US$ Million)	Services Producing Industries[2] (US$ Million)	Others Industries[3] (US$ Million)
1973	22,886.0	9,313	3,456	4,979	878
1974	24,272.9	9,961	3,612	5,513	836
1975	25,258.8	10,652	3,809	6,042	801
1976	27,040.4	10,944	4,064	6,125	755
1977	29,144.2	11,947	4,387	6,700	860
1978	31,624.9	13,907	5,050	7,865	992
1979	34,602.2	15,912	5,902	8,975	1,035
1980	37,958.6	17,728	6,581	10,138	1,009
1981	41,652.5	19,715	7,379	11,283	1,053
1982	44,622.6	20,852	7,669	12,184	999
1983	48,421.6	22,915	8,566	13,210	1,139
1984	52,457.5	24,592	9,314	14,109	1,169
1985	51,702.0	23,499	8,148	14,381	970
1986	52,809.0	24,253	8,077	14,796	1,380
1987	57,948.2	27,516	9,156	16,776	1,584
1988	64,502.9	32,053	10,788	19,264	2,001
1989	70,899.4	36,353	12,024	21,716	2,613
1990	77,298.9	42,648	14,126	25,876	2,646
1991	82,524.5	47,768	16,044	29,437	2,287
1992	88,047.1	54,050	18,047	33,245	2,758
1993	98,838.2	61,170	19,873	38,114	3,183
1994	110,109.4	72,089	23,771	44,819	3,499
1995	118,962.7	83,930	28,087	51,941	3,902
1996	128,653.0	91,237	30,284	57,103	3,850
1997	139,654.1	94,056	30,929	59,516	3,611
1998	138,345.0	82,663	27,532	52,274	2,857
1999	147,834.4	87,223	28,981	54,847	3,395
2000	162,162.3	94,067	31,643	58,258	4,166
2001	159,073.0	88,783	27,675	57,396	3,712
2002	162,493.2	90,748	28,647	58,243	3,858
2003	164,265.9	94,286	29,508	60,476	4,302

Source: Department of Statistics (2004). The original figures are in S$ and they are converted to US$ by US$/S$ exchange rates.

[1] Goods producing industries include manufacturing, construction, utilities and others.

[2] Services include wholesale and retail trade, hotel and restaurants, transport & communications, financial services, business services and others.

[3] Others include owner-occupied dwellings, taxes and adjustments.

Within the services industries, it is interesting to note that the contributions to GDP by the wholesale/retail trade, transport/communications, and business services sectors were all around US$10 billion to US$12 billion for the years 1995-2003. Out of the three, the transport/communications sector grew much faster than the other two. The remaining sectors, namely, hotels/restaurants and financial services also had significant growth from 1973 to 2003. The former increased by 6 times while the latter increased by 26 times. Table 6 shows these changes from 1973 to 2003. Taking them all together, services industries increased their contributions to GDP by 12.1 times.

With the dramatic changes and growth of various sectors, the relative contributions in percentages of goods producing industries and services producing industries have moved in the opposite direction since 1973. Table 6 shows that the former's share was in the range of 31 to 37 percent and the latter's share was in the range of 53 to 64 percent in most of the past 30 years. This indicates that manufacturing industries had a slight decline in percentage term and services industries had grown steadily. The gap between the two had widened.

Table 6. Contributions to GDP by Various Sectors, Singapore, 1973-2003

(In Percentage)

	Goods Producing Industries	Services Producing Industries	Owner Occupied Dwellings	Total
1973	37.1	53.5	9.4	100
1974	36.3	55.3	8.4	100
1975	35.8	56.7	7.5	100
1976	37.1	56.0	6.9	100
1977	36.7	56.1	7.2	100
1978	36.3	56.6	7.1	100
1979	37.1	56.4	6.5	100
1980	37.1	57.2	5.7	100
1981	37.4	57.2	5.3	100
1982	36.8	58.4	4.8	100
1983	37.4	57.6	5.0	100
1984	37.9	57.4	4.8	100
1985	34.7	61.2	4.1	100
1986	33.3	61.0	5.7	100
1987	33.3	61.0	5.8	100
1988	33.7	60.1	6.2	100
1989	33.1	59.7	7.2	100
1990	33.1	60.7	6.2	100
1991	33.6	61.6	4.8	100
1992	33.4	61.5	5.1	100
1993	32.5	62.3	5.2	100
1994	33.0	62.2	4.9	100
1995	33.5	61.9	4.6	100
1996	33.2	62.6	4.2	100
1997	32.9	63.3	3.8	100
1998	33.3	63.2	3.5	100
1999	33.2	62.9	3.9	100
2000	33.6	61.9	4.4	100
2001	31.2	64.6	4.2	100
2002	31.6	64.2	4.3	100
2003	31.3	64.1	4.6	100

Source: Derived from Table 5. Goods Producing Industries, Services Producing Industries and Other Industries, expressed in US$, are divided by GDP in US$.

Note: Some figures may not add up to 100 due to rounding errors.

Table 7. Contributions to GDP by Services Industries at 1995 Constant Prices, Singapore, 1973-2003

(US$ million)

	Services Producing Industries	Wholesale & Retail Trade	Hotels & Restaurants	Transport & Communications	Financial Services	Business Services	Other Services Industries
1973	4,979	1,377	311	689	372	1,505	1,142
1974	5,513	1,549	324	759	442	1,571	1,234
1975	6,042	1,595	347	861	548	1,663	1,393
1976	6,125	1,556	361	944	557	1,603	1,393
1977	6,700	1,703	399	1,104	583	1,657	1,454
1978	7,865	1,946	467	1,375	705	1,740	1,681
1979	8,975	2,167	529	1,650	829	2,002	1,852
1980	10,138	2,324	605	1,894	1,174	2,201	1,980
1981	11,283	2,462	671	2,136	1,584	2,330	2,110
1982	12,184	2,571	702	2,340	1,542	2,847	2,274
1983	13,210	2,739	730	2,555	1,753	3,039	2,483
1984	14,109	2,893	742	2,764	2,037	3,148	2,593
1985	14,381	2,749	722	2,709	2,365	3,306	2,629
1986	14,796	2,708	763	2,952	2,334	3,283	2,831
1987	16,776	3,092	867	3,307	2,796	3,615	3,155
1988	19,264	3,766	1,049	3,851	2,968	4,254	3,451
1989	21,716	4,174	1,216	4,372	3,451	4,764	3,810
1990	25,876	5,068	1,354	5,121	4,284	5,696	4,440
1991	29,437	5,900	1,434	5,771	4,880	6,557	4,993
1992	33,245	6,435	1,665	6,481	5,597	7,566	5,656
1993	38,114	7,815	1,777	7,220	7,057	8,136	6,148
1994	44,819	9,405	1,974	8,416	8,337	9,594	7,121
1995	51,941	11,177	2,235	10,020	9,238	11,144	8,126
1996	57,103	11,945	2,386	10,830	10,395	12,514	9,033
1997	59,516	12,044	2,411	11,160	11,615	13,015	9,271
1998	52,274	10,046	1,985	10,533	9,425	11,749	8,535
1999	54,847	10,563	2,066	11,189	9,837	12,236	8,955
2000	58,258	11,925	2,204	11,847	10,016	12,717	9,549
2001	57,396	11,094	2,116	11,840	9,854	12,524	9,967
2002	58,243	11,398	2,057	12,423	9,244	12,686	10,434
2003	60,476	12,495	1,857	12,516	9,853	12,809	10,947

Source: Department of Statistics, Yearbook Of Statistics, Singapore various issues.

Note: 1. Some figures in the early years may not add up to the total figures.
2. The original figures are in S$ and they are converted to US$ by US$/S$ exchange rates.

The changes in Singapore's GDP and its components can be seen more clearly in Figures 4 to 6. Similar to the Taiwanese case, Figure 4 shows that Singapore's GDP rose continuously throughout the 30 year period except a minor dip in 1985 and the two declines in 1997 and 2001. The period 1986-1997 enjoyed the fastest growth. The relative shares of the manufacturing and services industries diverged and the gap was larger in recent years as shown in Figure 5. Figure 6 shows the growth of various components of the services industries. Although their values were smaller, the growth of hotel/restaurant and financial services was spectacular, especially the latter.

V. Relative Growth in GDP

Taiwan is larger than Singapore in terms of its land size, population and labour force. Its land area is about 53 times bigger, and its population and labour force are roughly 5 times bigger.[7] Its GDP, however, is only 3 times larger. In 2003, Taiwan's GDP was US$294.5 billion and Singapore's GDP was US$94.3 billion. Because of its much larger population, Taiwan's per capita GDP was about half of that of Singapore in 2003.

[7] Taiwan's land area is 35,961 square kilometres while Singapore's is 683 square kilometres. In 2003, its population was 23 million and Singapore's population was 4.2 million. Taiwan's labour force was 10 million and Singapore's was 2.1 million.

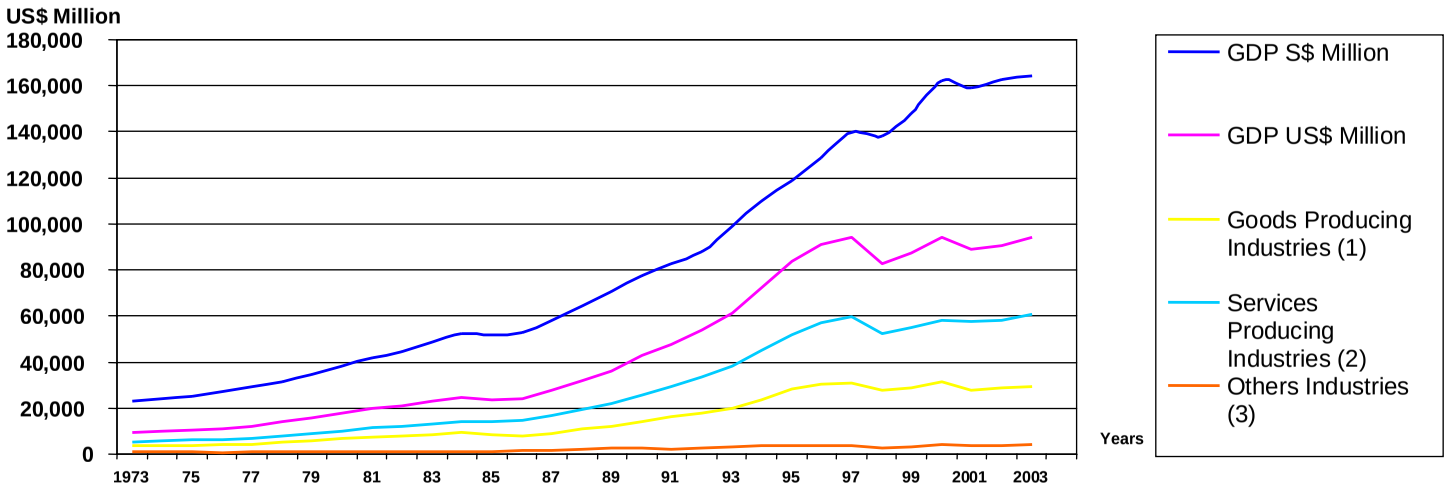

Figure 4. Gross Domestic Product at 1995 Constant Prices, Singapore, by Industry, 1973-2003 (US$ Million)

Source: Department of Statistics (2004), various issues. See Table 5.

Note: 1. Goods producing industries include manufacturing, construction, utilities and others.
2. Services include wholesale and retail trade, hotel and restaurants, transport & communications, financial services, business services and others.
3. Others include owner-occupied dwellings, taxes and adjustments.

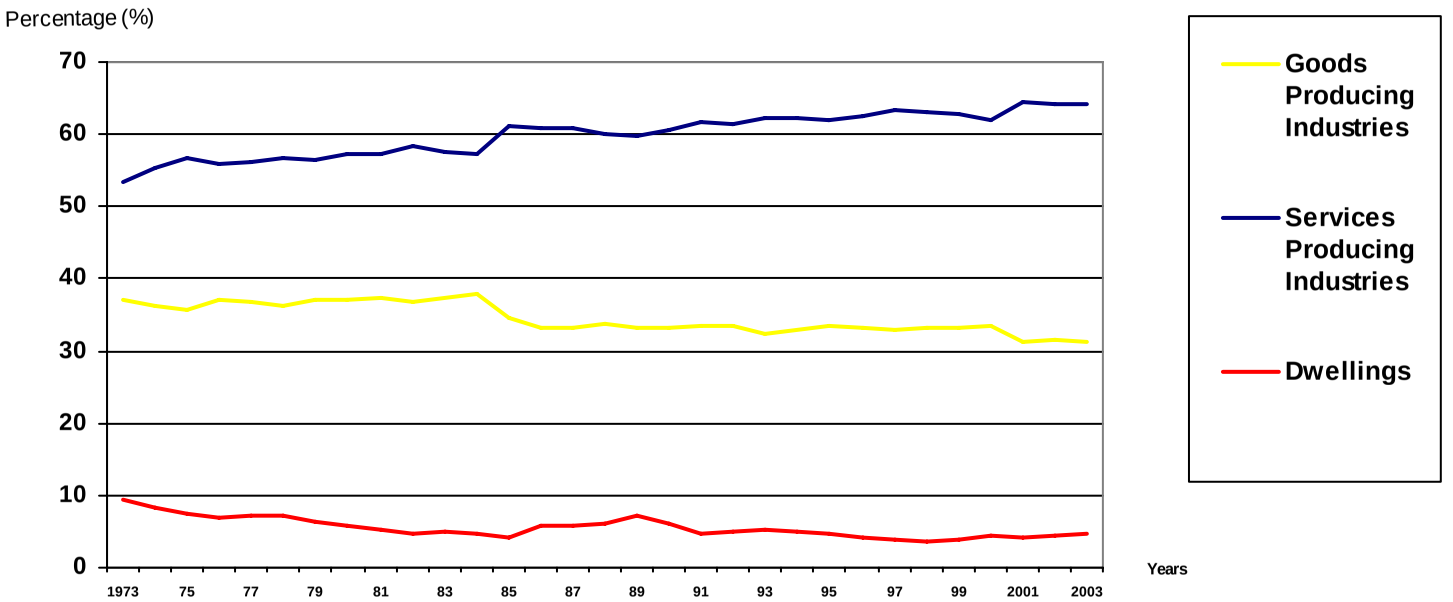

Figure 5. Contributions to GDP by Various Sectors, Singapore, 1973-2003

Source: Table 2.6.

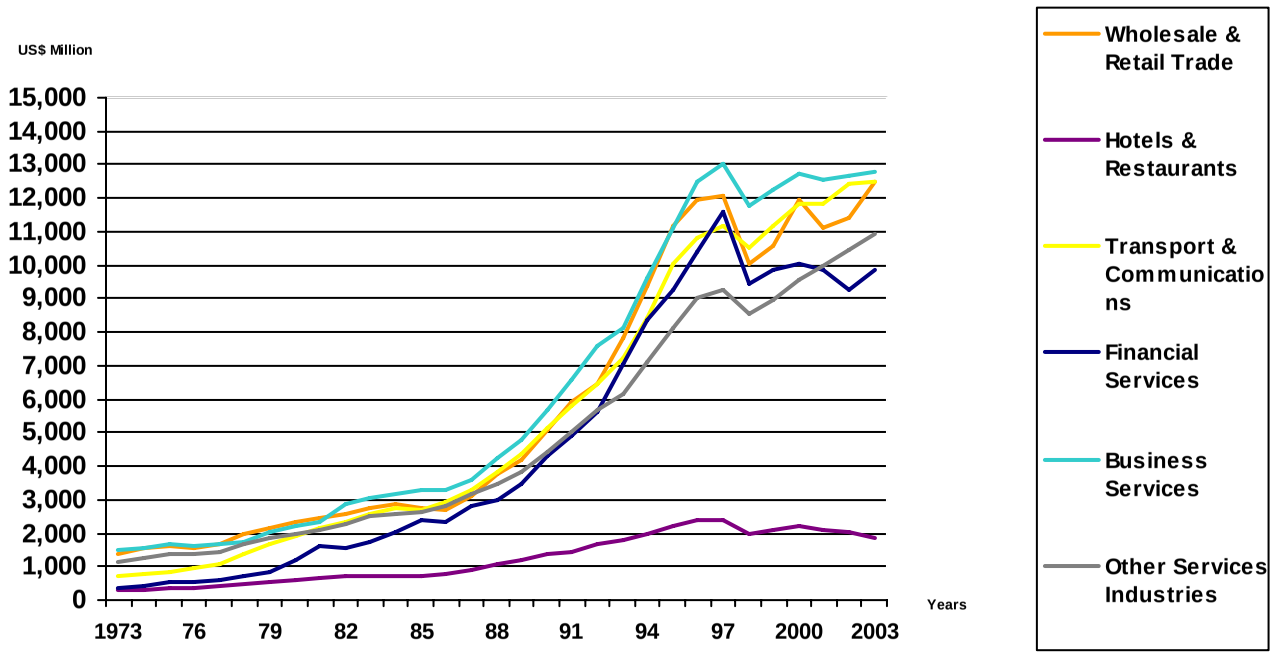

Figure 6. Contributions to GDP by Various Services Sectors, at Constant 1995 Prices, Singapore, 1973-2003 (US$ Million)

Source: Department of Statistics (2004), various issues. See Table 7.

The growth experiences of Taiwan and Singapore throughout the last three decades were similar except Taiwan's economic take off was earlier. It enjoyed double digit growth in quite a number of years in the 1970's and 1980's. Singapore's faster growth came later during 1987 to 1997. Table 8 shows the GDP growth rates of the two islands and the per capita GDP for the period 1973-2003. As it is shown in Table 8, Taiwan's per capita GDP was half of that of Singapore in 1973, and it was still half in 2003, although it rose to be more than half in some years like 1986 to 1994. The lower per capita GDP implies that Taiwan's labour productivity has been lower than that of Singapore. But the real reasons could be due to the underestimation of the value of agricultural output and the exclusion of the underground economy. Besides, the exodus of nearly one million people who are now working and living in China could also be a contributing factor. Another factor could be the transfer of output values from Taiwan to other places where the tax rates are lower. Taking all these into consideration, the actual difference in per capita GDP between Taiwan and Singapore could be smaller.

Table 8. GDP Growth Rates and Per Capita GDP, Singapore and Taiwan, 1973-2003

	GDP Growth Rates %		Per Capita GDP (US$)	
	Singapore	Taiwan	Singapore	Taiwan
1973	11.1	12.83	4,277	2,185
1974	6.1	1.16	4,443	2,284
1975	4.1	4.93	4,708	2,356
1976	7.1	13.86	4,772	2,624
1977	7.8	10.19	5,138	2,839
1978	8.5	13.59	5,909	3,340
1979	9.4	8.17	6,676	3,539
1980	9.7	7.30	7,344	3,730
1981	9.7	6.16	7,784	3,688
1982	7.1	3.55	7,879	3,558
1983	8.5	8.45	8,547	3,769
1984	8.3	10.60	9,001	4,190
1985	-1.4	4.95	8,589	4,301
1986	2.1	11.64	8,873	5,335
1987	9.7	12.74	9,916	7,394
1988	11.3	7.84	11,262	7,989
1989	9.9	8.23	12,403	9,234
1990	9.0	5.39	13,996	9,278
1991	6.8	7.55	15,233	10,402
1992	6.7	7.49	16,723	11,227
1993	12.3	7.01	18,450	11,355
1994	11.4	7.11	21,072	12,236
1995	8.0	6.42	23,806	12,425
1996	8.1	6.10	24,857	12,976
1997	8.6	6.68	24,793	11,541
1998	-0.9	4.57	21,077	12,123
1999	6.9	5.42	22,077	13,017
2000	9.7	5.86	23,413	13,007
2001	-1.9	-2.18	21,491	11,923
2002	2.2	3.59	21,755	12,376
2003	1.1	3.24	22,529	13,027

Source: Department of Statistics (2004) and Directorate-General Of Budget (2003)

Note: The above figures in US$ are derived by using US$/NT$ exchange rates. The Singapore figures are in constant US$ in 1995 while the Taiwanese figures are in constant US$ in 1996.

Figure 7 shows GDP growth of Taiwan and Singapore. It can be seen that Taiwan's curve had a steeper slop between 1985 and 1997, implying that it grew faster. Figure 8 shows the fluctuation in GDP growth rates. Singapore's curve obviously had a greater magnitude of fluctuation. This could indicate that Singapore's growth had been more volatile than Taiwan. Figure 9 shows the curves of per capita GDP in both places. The gap was once narrowed between 1986 and 1994, it widened again afterwards.

VI. Government's Leading Role in Growth

Despite the differences in land area and population, the two island economies have experienced similar development stages during the last 30 years. Both places do not have adequate natural resources, and their internal markets are limited. They have industrialised to create jobs for their peoples and exported their products to world markets. Taiwan, because of its historical linkage with Japan, began to industrialise earlier than Singapore. On the other hand, Singapore's services industries including banking, insurances and other financial services were developed earlier as it had been a trading centre in Southeast Asia.

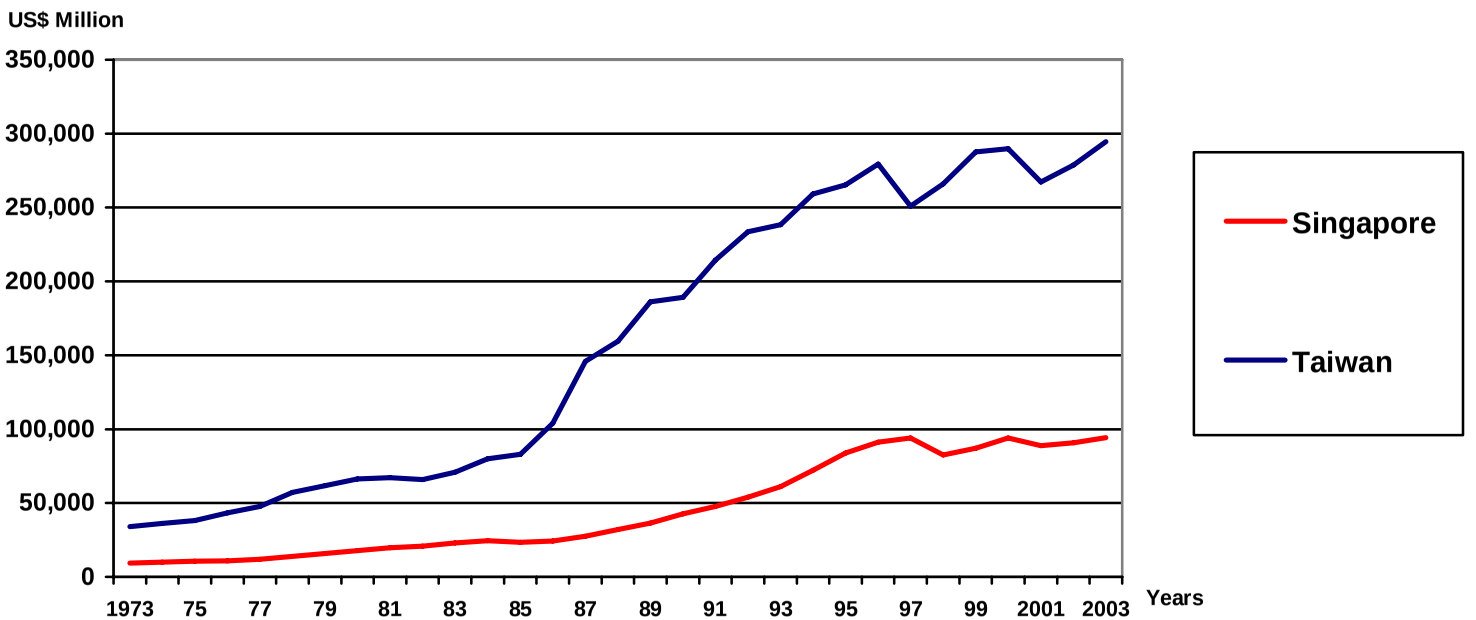

Figure 7. The Growth of GDP, Singapore and Taiwan, 1973-2003

Sources: Department of Statistics (2004) and Extract of National Income Statistics (www.dgbas.gov.tw) updated in Sep 2004. See Table 2 and Table 5.

Note: The Singapore figures are in constant US$ in 1995 while the Taiwanese figures are in constant US$ in 1996.

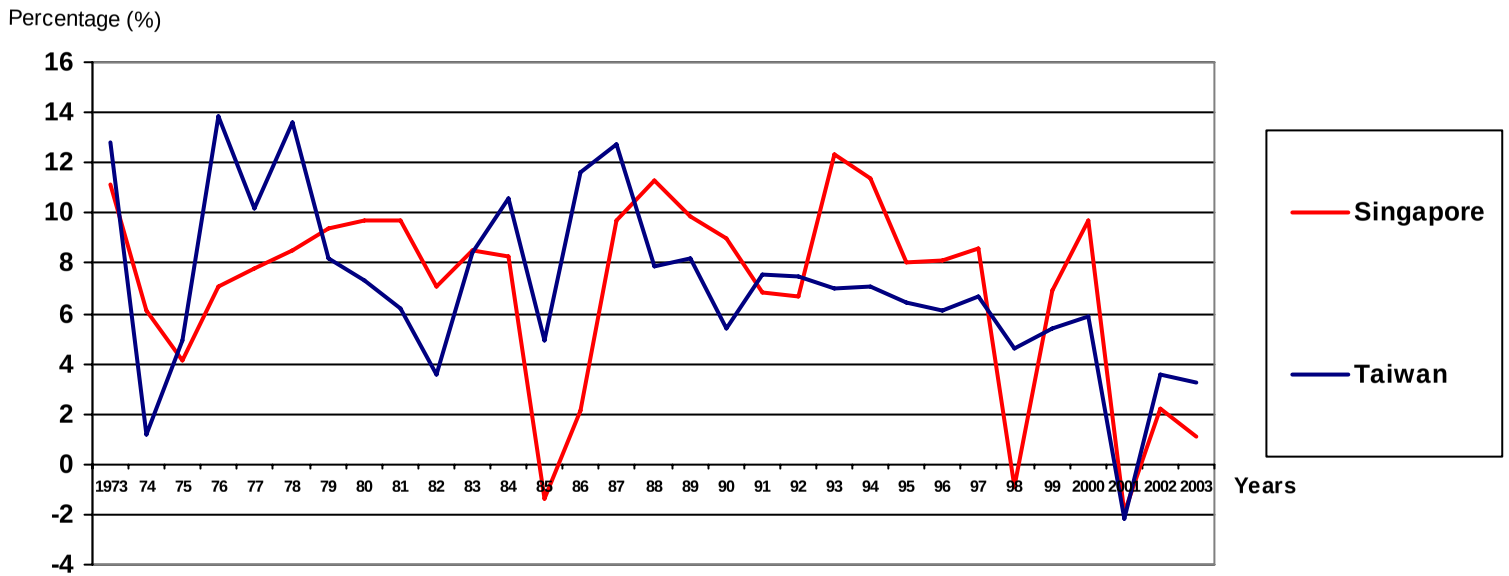

Figure 8. GDP Real Growth Rate, Singapore and Taiwan, 1973-2003

Source: Department of Statistics (2004) & Extract of National Income Statistics, Taiwan. See Table 8.
Note: The above figures in US$ are derived by using US$/NT$ exchange rates. The Singapore figures are in constant US$ in 1995 while the Taiwanese figures are in constant US$ in 1996.

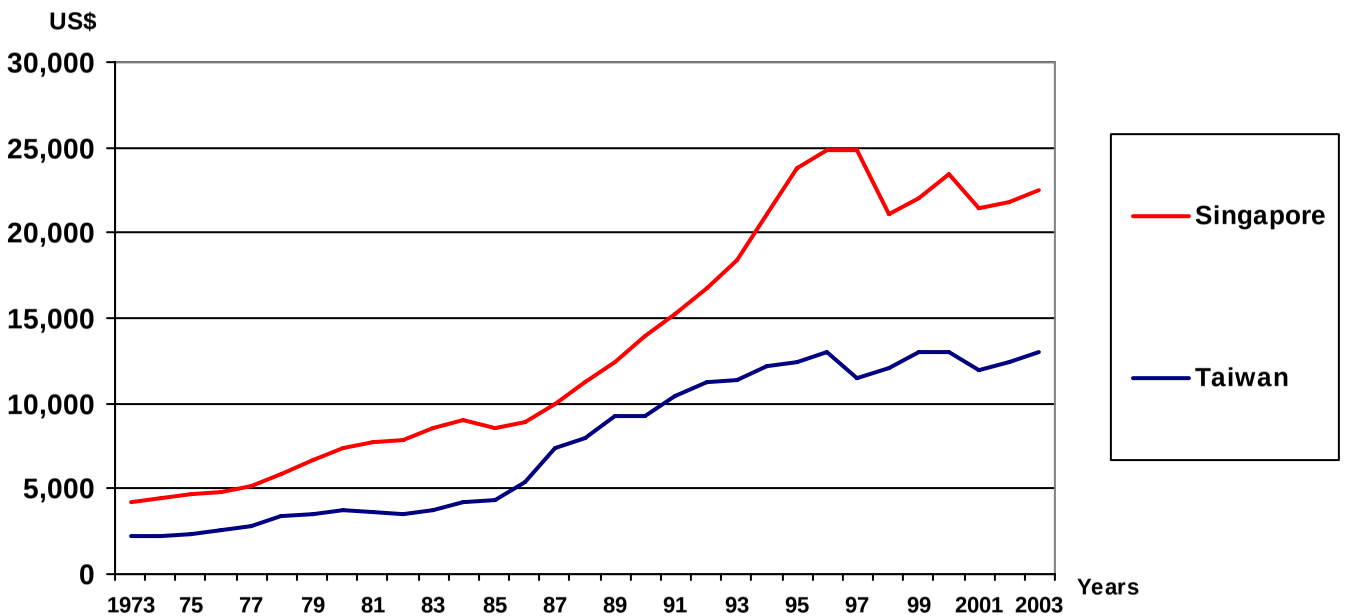

Figure 9. Per Capital GDP in US$, Singapore And Taiwan, 1973-2003

Source: Department of Statistics (2004) & Extract of National Income Statistics, Taiwan. See Table 2.8.
Note: The above figures in US$ are derived by using US$/NT$ exchange rates.
The Singapore figures are in constant US$ in 1995 while the Taiwanese figures are in constant US$ in 1996.

It has maintained the relative share of services industries in GDP through time such that services industries have accounted for two-thirds of GDP while goods producing industries, mainly manufacturing, accounted for one-third of GDP. Taiwan's services industries were lagging behind its manufacturing industries in the earlier years but rose to become the leading sector and have also accounted for two-thirds of GDP, while manufacturing accounted for the remaining one-third. The difference between the two is that Taiwan's high technology sector was developed earlier and has remained stronger than Singapore. One the other hand, Singapore's services industries especially financial services, were earlier developed and have remained better regulated than Taiwan.

Because of its larger land size and labour force, Taiwan's economy expressed by GDP is three times larger than that of Singapore. In 2003, Taiwan's GDP was US$294.4 billion while Singapore's GDP was US$94.3 billion. However, as Taiwan's population and labour force were six and five times larger than Singapore's corresponding figures, the resulting per capita GDP and presumably labour productivity were also lower.

Although their historical backgrounds differed, Taiwan and Singapore had enjoyed high economic growth during the past three decades and were labelled as the two dragons, out of the four Asian small dragons including Korea and Hong Kong. A common factor in the two dragons' rapid development was the leading role of their governments. Taiwan government implemented various development plans to build its infrastructure including the Hsinchu Industrial Park and even provided the pivotal role in setting up various state owned companies and joint ventures including Taiwan Semi-conductor Manufacturing Company (TSMC) to stimulate economic growth. Singapore government also played an important role in building industrial infrastructure, drawing up appropriate industrial plans and attracting foreign investors, mainly multinational corporations (MNC) for economic development. The role of government was therefore the common and critical factor in the development of both

Taiwan and Singapore. It can be noted that rapid economic growth took place under strong governments in both cases. This was particularly true in the case of Taiwan as its economic take off happened in the years under authoritarian rule.

The democratisation in Taiwan in recent years have, however, weakened the authority and function of the government. The weakened government has inevitably affected its role in leading economic development. On the other hand, institutional constraints such as the monopolistic control of the market by state owned enterprises and large financial groups make Taiwan hardly a free market economy. It is therefore not a model of a matured economy and still needs the government to play a leading role. Unless the diminished role of the government could be adequately compensated by a stronger initiative from the private sector, economic development in Taiwan would be difficult to match its past achievements in decades ahead.

Appendix Table 1. Labour Force, Agricultural Employment and Crop Area, Taiwan, 1970-2003

	Total Labour Force (1,000 Persons)	Agricultural Employment (1,000 Persons)	Total Crop Area (1,000 Hectares)
1970	4,654	1,681	1,656
1971	4,819	1,665	1,620
1972	5,022	1,632	1,586
1973	5,395	1,624	1,567
1974	5,571	1,697	1,644
1975	5,656	1,681	1,659
1976	5,772	1,641	1,606
1977	6,087	1,597	1,566
1978	6,337	1,553	1,549
1979	6,515	1,380	1,494
1980	6,629	1,277	1,400
1981	6,764	1,257	1,398
1982	6,959	1,284	1,380
1983	7,266	1,317	1,334
1984	7,491	1,286	1,285
1985	7,651	1,297	1,257
1986	7,945	1,317	1,267
1987	8,183	1,226	1,261
1988	8,247	1,112	1,216
1989	8,390	1,065	1,184
1990	8,423	1,064	1,155
1991	8,569	1,092	1,127
1992	8,765	1,064	1,089
1993	8,874	1,005	1,077
1994	9,081	976	1,035
1995	9,210	954	1,036
1996	9,310	918	998
1997	9,432	878	995
1998	9,546	822	963
1999	9,668	776	963
2000	9,784	740	904
2001	9,832	706	877
2002	9,969	709	850
2003	10,076	696	797

Source: Council for Economic Planning and Development (2004: 17, 31, 63, 65, 81, 83).

Appendix Table 2. Singapore/US And Taiwan/US Exchange Rates, 1973-2003

	S$/US$	NT$/US$
1973	2.4400	40.10
1974	2.4369	38.10
1975	2.3713	38.05
1976	2.4708	38.05
1977	2.4394	38.05
1978	2.2740	36.05
1979	2.1746	36.08
1980	2.1412	36.06
1981	2.1127	37.89
1982	2.1400	39.96
1983	2.1131	40.32
1984	2.1331	39.52
1985	2.2002	39.90
1986	2.1774	35.55
1987	2.1060	28.60
1988	2.0124	28.22
1989	1.9503	26.16
1990	1.8125	27.11
1991	1.7276	25.75
1992	1.6290	25.40
1993	1.6158	26.63
1994	1.5274	26.24
1995	1.4174	27.27
1996	1.4101	27.49
1997	1.4848	32.64
1998	1.6736	32.22
1999	1.6949	31.40
2000	1.7239	32.99
2001	1.7917	35.00
2002	1.7906	34.75
2003	1.7422	33.98

Source: Singapore/US exchange rates are obtained from Singapore Department of Statistics, http://www.singstat.gov.sg/keystats/hist/exchange.html; Taiwan/US exchange rates are from Table 139 in *Statistical Yearbook of ROC* (Directorate-General of Budget 2003: 246). The rate for 2003 is from Central Bank of China (2004: 2)

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