

---

---

**Singapore's Services  
Sector in Perspective:  
Trends and Outlook**

---

---

**Occasional Paper No. 5  
May 1998**

**Economics Department  
Monetary Authority of Singapore**



# **SINGAPORE'S SERVICES SECTOR IN PERSPECTIVE**

## **Trends and Outlook**

**BY**

**DOMESTIC ECONOMY DIVISION\*  
ECONOMICS DEPARTMENT  
MONETARY AUTHORITY OF SINGAPORE**

**MAY 1998**

**\* THE VIEWS IN THIS PAPER ARE SOLELY THOSE OF THE STAFF OF THE DOMESTIC ECONOMY DIVISION, AND SHOULD NOT BE ATTRIBUTED TO THE MONETARY AUTHORITY OF SINGAPORE**

**© THE MONETARY AUTHORITY OF SINGAPORE**

# SINGAPORE'S SERVICES SECTOR IN PERSPECTIVE: TRENDS AND OUTLOOK

	<u>Page</u>
EXECUTIVE SUMMARY	i-iv
1. INTRODUCTION	1
2. EVOLUTION OF THE SERVICES SECTOR	2
3. EXPLAINING DEINDUSTRIALISATION	7
4. SECTORS OF GROWTH WITHIN SERVICES	9
5. IMPACT OF GROWING IMPORTANCE OF THE SERVICES SECTOR	14
6. INTERDEPENDENCE BETWEEN SERVICES AND MANUFACTURING	17
7. OUTLOOK FOR THE SERVICES SECTOR	21
References	23

## EXECUTIVE SUMMARY

1 The importance of the services sector in the Singapore economy has increased steadily over time, particularly over the last one-and-a-half decades. Its share of total output and employment in the economy has risen at the expense of the manufacturing sector, and today accounts for about two-thirds of value-added and seven-tenths of employment. The declining share of manufacturing output has been accompanied by slower growth rates in the manufacturing sector. Trend estimates show that since the late-70s, growth of the service sector has on average exceeded manufacturing growth by about half a percentage point.

2 Deindustrialisation has long been observed in the industrialised countries, and should not be viewed as a negative development but the natural consequence of economic progress. Deindustrialisation in Singapore may be attributed to sectoral differences in productivity growth rates. With higher productivity growth in the manufacturing sector, the services sector requires an ever greater proportion of total employment just to keep output rising in line with that of manufacturing. Between 1981-96, productivity growth in the manufacturing sector averaged 5.7% compared to 4.4% in the services sector. This finding is in line with an International Monetary Fund (IMF) study which found that about two-thirds of the actual decline in the industrial countries' share of manufacturing employment between 1970-94 was accounted for by relative productivity differentials.

3 The decline in manufacturing employment share has been accentuated by two trends: (a) the move offshore of more labour-intensive manufacturing activities to make way for high technology and high value-added activities, and (b) outsourcing of services such as design, logistics and accounting previously done in-house. The trend towards the outsourcing of services is reflected in the growth of the business services industries.

### ***Profile of the Services Sector***

4 The nature of the services sector has undergone tremendous transformation over the years. The days of small-scale, family-owned sundry services have given way to higher skilled and higher value-added activities like financial services and information technology. Financial and business (F&B) services experienced the largest gain in share of total services output since the 1960s to account for 40% of total services output in 1996, followed by commerce

(26%), transport and communications (19%) and social, community and personal services (15%). The main impetus behind the strong growth of F&B services during this period came from exports (47%) and technological change (30%).

5           The financial and business services subsector has also experienced the highest employment growth rate within the services sector (averaging 8.9%) in the 1990s. More than 35% of the employment gain between 1991-96 was absorbed by F&B, a disproportionate amount given its employment share of 11% in 1991. Taken together, the services sector accounted for the bulk of net jobs created since 1991, while the manufacturing sector shed 10% of its workers. Most of the services jobs consisted of executive, administrative and managerial, and technical and professional jobs, requiring a high level of skills and competence. Indeed, average wage in the manufacturing sector in 1996 was lower than those in all the services subsectors with the exception of commerce. The services sector in Singapore also boasts a higher percentage of skilled workers - with at least post-secondary education - compared to manufacturing.

6           Productivity growth in services has also generally not lagged manufacturing until recently. Between 1980-90, productivity growth in services (averaging 5.2%) was marginally higher than in manufacturing (5.1%). This was reversed in the 1990s, with productivity growth in the manufacturing sector (6.6%) significantly higher than that in services (3.4%). Productivity figures for services, however, are likely to be underestimated due to such factors as the inherent difficulties of measuring services output and the relatively higher proportion of part-time workers in services.

### ***Impact of Growing Importance of the Services Sector***

7           The services sector is relatively more stable than other sectors of the economy and acts as a buffer during periods of economic downturn. Between 1981-85, GDP growth was derived entirely from growth in services, while the rest of the economy reeled from the effects of world recessions in the early- and mid-1980s. While the services sector provides some underlying growth in the economy, the performance of the manufacturing sector provides that extra boost to GDP growth. The manufacturing sector has been the swing factor behind GDP growth from one year to the next.

8           The greater stability of services growth rates as a whole belies wide fluctuations in growth within certain subsectors, however. Based on standard measures of volatility, the commerce sector exhibited wider swings in growth rates than manufacturing, while the volatility of transport and communications was not much smaller.

### ***Interdependence Between Services and Manufacturing***

9           The services sector has evolved over time to increase its interdependence with the manufacturing sector. Many of today's large corporations contract out activities such as marketing and computing to the services sector. Data from the input-output tables shows that the share of services output used by the manufacturing sector has been on a trend increase over the years. In 1978, 5.0% of total services output went to the manufacturing sector; by 1990, it had risen to 8.4%. The input-output coefficients also show that the amount of services output induced by every \$100 of manufacturing output increased from \$8.50 in 1973 to \$12.30 in 1990.

10           While the manufacturing sector has increasingly drawn on output produced by the services sector, the converse does not appear to have taken place significantly. The share of manufacturing output going into the services sector declined from 3.7% in 1978 and 1983 to 2.8% in 1990. At the same time, although the amount of manufacturing output induced by every \$100 of services output produced rose from \$5.40 in 1973 to \$6.40 in 1988, it moderated to \$4.70 in 1990.

11           The above finding does not detract from the fact that over time, manufacturing and services activities will increasingly resemble each other, as advances in information and communication technology allow firms to cross the boundaries between manufacturing and services in their development of new knowledge-based products. The advancement of IT into services could make the sector more cyclical like manufacturing. The increasingly capital-intensive nature of services means that services firms could now slash investment plans in a downturn, leading to a drop in output and employment, as well as introducing stockpiling problems. The recessions in the US and the UK in the 1990s, for example, saw the services sector slow by much more than during previous dips. Conversely, manufacturers have increasingly emphasised service-like characteristics such as quality, tailoring products to the requirements of individual customers and 'just-in-time' delivery systems.

12 Hence, as economies become more complex and interconnected over time with advances in IT, the distinction between manufacturing and services will become less meaningful. Instead of emphasising one sector over another, the focus of economic development policy should be on facilitating system-wide gains that maximise the efficiency resulting from the integration of different industries. Government policy should be aimed at ensuring that its labour force receives the best education and training so that they are able to perform any kind of high value-added job.

### ***Outlook for the Services Sector***

13 In line with global trends, the importance of the services sector can be expected to increase over time. Assuming services share continues to increase at the same rate as over the 1990s, its nominal share will rise by 6% points to 72% of GDP in 20 years. The manufacturing sector's share will decline by 9% points to 15% over the same period.

14 The expanding share of services in the economy implies that growth in overall productivity and living standards in the economy will likely be increasingly influenced by productivity developments in the services sector. As such, raising productivity in the services sector will be critical for economic growth.



## 1 INTRODUCTION

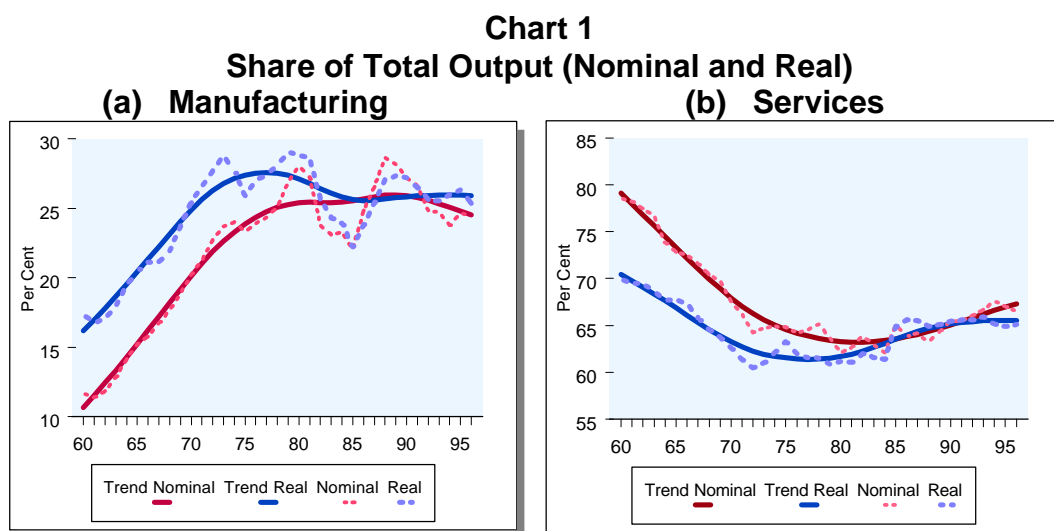
1.1 The importance of the services sector in the Singapore economy has increased steadily over time, particularly over the last one-and-a-half decades, in line with the experience of the industrialised economies. Its share of total output and employment in the economy has risen, at the expense of the manufacturing sector, and today accounts for about two-thirds of value-added and seven-tenths of employment.

1.2 An important characteristic of the services sector is that it has been a more stable source of growth for the economy compared to manufacturing. The sharp slowdown in the manufacturing sector between Q2 96 and Q1 97, underpinned by a downturn in global electronics demand, brought to the fore the greater volatility of the manufacturing sector. In the midst of this downturn, the services sector once again emerged as a resilient source of growth in the economy, notwithstanding its expected slowdown on the back of the regional currency turmoil.

1.3 This paper seeks to take a closer look at the role of services in the Singapore economy, its trends and outlook. The services sector is defined to comprise financial and business services, transport and communications, commerce, and social, community and personal services.

## 2 EVOLUTION OF THE SERVICES SECTOR

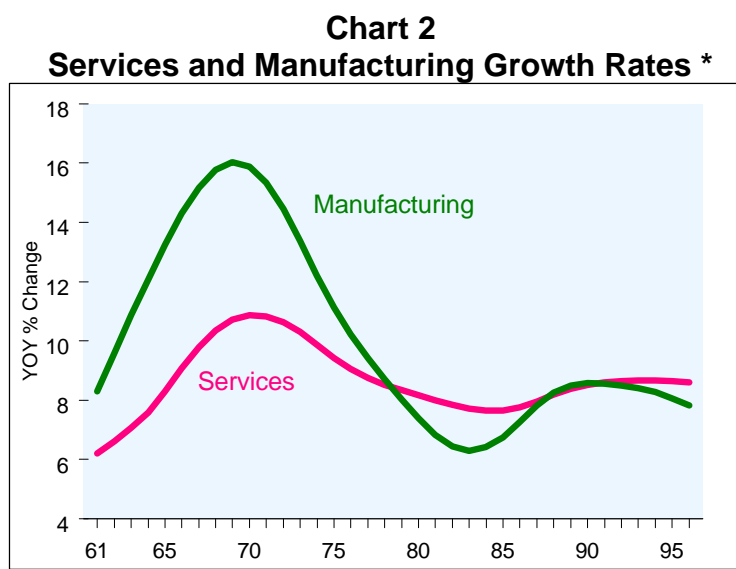
2.1 The services sector has traditionally been the dominant sector in the economy. During the early 1960s, the services sector accounted for about 70% of the economy's total output in real terms, and 80% in nominal terms. Mostly entrepot trade and related supporting services, the share of the services sector declined sharply by more than 10% points by 1971, partly due to the development of direct trade routes between Southeast Asian and western countries. At the same time, the manufacturing sector experienced a steady increase in its share of total output. The 1960s and early 1970s was a period of rapid industrialisation in Singapore, with the manufacturing sector aggressively promoted. The changing shares between these two sectors, in both real and nominal terms, are shown in Chart 1, which also estimates their underlying trends.



2.2 Trend estimates show that since bottoming out in the late-70s to early-80s, the services sector has exhibited a steady uptrend in its share of output, both real and nominal. While services share has stabilised at about 65% in real terms following a sharp increase in the 1980s, its share in nominal terms has continued to rise. This combination of an increasing share in current prices but a stable share in constant prices reflects the relative increase in prices of services compared to other industries, including manufacturing. In contrast, the manufacturing sector has experienced a

discernible decline in its share of output. In particular, its share in nominal terms has fallen-off sharply in the 1990s, while its share of real output has moderated by a smaller extent. (See Chart 1a.) The sharper decline in nominal terms reflects falling prices of manufactured goods.

2.3 The declining share of manufacturing output relative to services has been underpinned by slower growth rates in the manufacturing sector. Trend estimates show that since the late-70s, growth of the services sector has on average exceeded manufacturing growth by about half a percentage point. (See Chart 2.)

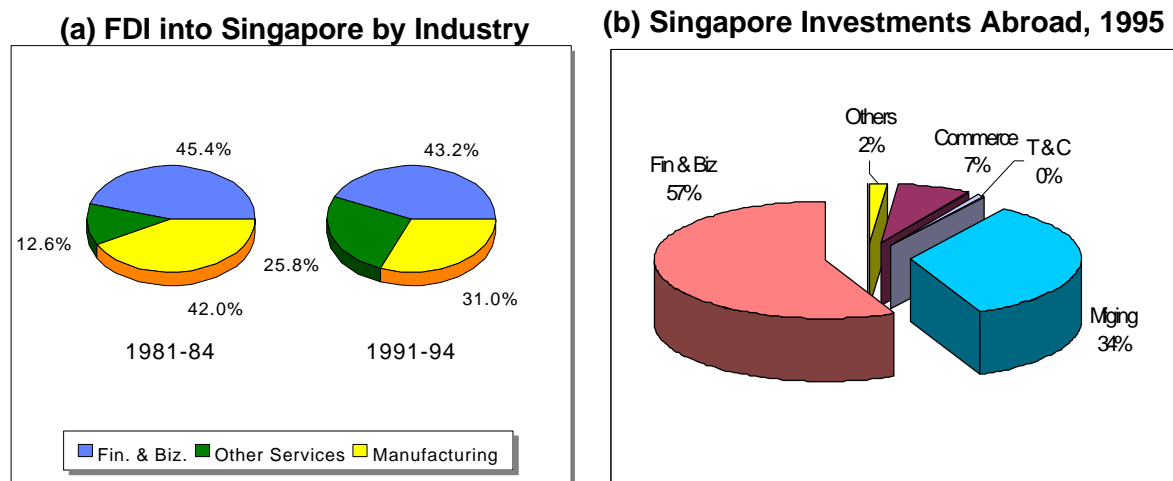


\* Trend growth rates were obtained using the Hodrick-Prescott filter.

2.4 The slower growth of the manufacturing sector has been reflected in a declining share of employment. The manufacturing sector's share of employment fell from 30% in 1980 to 23% in 1996. In contrast, the services sector's share rose from 61% to 70% over the same period. Employment growth in the services sector averaged 3.6% between 1980-96, almost twice manufacturing sector's 1.9%. The services sector is also becoming an important foreign exchange earner for Singapore, and has attracted much foreign direct investments. The bulk of foreign direct investments (FDI) into Singapore are destined for the services sector. Chart 3a shows that since the 1980s, FDIs into the financial and business services

sector alone have averaged higher than those going into the manufacturing sector, with the gap widening over the years. Similarly, the bulk of investments by Singapore firms abroad have been in financial and business services, followed by manufacturing. (See Chart 3b.)

**Chart 3**



2.5 The importance of the services sector may in fact be understated by output and employment figures. Many jobs in the manufacturing sector, for example, are really services. Close to half of all persons employed in the manufacturing sector in 1996 were doing service-type jobs rather than actual production.<sup>1</sup>

2.6 Deindustrialisation should not be viewed as a negative development, but the natural consequence of economic progress. This phenomenon has long been observed in the industrialised countries. Table 1 shows sector employment and real GDP shares in selected OECD countries. In the US, for example, services employment share has risen by 7 percentage points while the manufacturing share has fallen by 6 percentage points between 1980 to 1995. In no country do services jobs account for less than half of total employment. A similar, but perhaps less

<sup>1</sup> These refer to jobs classified under administrators and managers; professionals; technicians and associate professionals; and clerical workers.

pronounced pattern is observed for real GDP shares, reflecting in part higher productivity growth in the manufacturing sector.

**Table 1**  
**Employment & Real GDP Shares in Selected OECD Countries** (%)

Country	Manufacturing		Services	
	1980	1995	1980	1995
<b>EMPLOYMENT SHARES</b>				
<b>Singapore</b>	<b>30.1</b>	<b>23.2</b>	<b>60.8</b>	<b>69.5</b>
<b>OECD countries</b>				
US	22.1	16.4	65.9	73.1
Canada	19.7	15.3	66.1	73.0
Japan	24.7	22.5	54.0	60.4
Germany	33.9	27.0	51.0	59.1
Netherlands	21.5	15.8	63.7	70.1
UK	28.3	19.0	59.7	69.9
Finland	27.0	20.7	51.4	64.4
Sweden	24.2	19.1	62.2	71.0
Switzerland	38.1	20.5	55.0	67.0
Australia	19.7	13.5	62.6	71.9
<b>REAL GDP SHARES</b>				
<b>Singapore</b>	<b>28.8</b>	<b>26.3</b>	<b>61.0</b>	<b>64.9</b>
<b>OECD countries</b>				
US *	21.4	18.9	63.3	75.4
Canada	19.7	18.9	60.9	63.2
Japan	26.1	26.1	55.7	58.0
France	25.5	21.4	60.0	65.5
Germany	33.9	26.2	51.7	29.9
Finland	23.0	27.4	54.4	55.5
Sweden *	23.2	22.7	62.6	64.3
Australia	18.3	13.9	62.4	68.4

\* Latest real GDP share available for 1994 only.

2.7 However, many proponents of the “Manufacturing Is Special School” claim that manufacturing has special growth-inducing characteristics not found in services. First, manufacturing jobs have higher productivity and higher wages, and the shift to services would reduce GDP growth and incomes. Second, manufactured goods have higher export content, with the shift to services imposing a balance of payments constraint on faster growth. Third, the manufacturing sector possesses externalities, such as economies of scale and greater rate of technical progress, that create spinoff growth and jobs in other sectors. The following sections will address some of these

arguments. We put forward the case that even if these were true in the past, they will become increasingly less important in future.

### 3 EXPLAINING DEINDUSTRIALISATION

3.1 Many studies have been devoted to explaining the shift in employment to the services sector. Shifts in employment shares can have important implications for productivity, output and income growth of the economy.

3.2 The most common explanation for shifting employment shares is the increased demand for services with rising income. To test whether demand for services - proxied by real share of services - is income elastic, the demand for services in Singapore was regressed on real income and constant prices of services (derived by applying the national GDP deflator), using annual data over the period 1960-96.<sup>2</sup> The results showed that the overall income elasticity of demand was significantly smaller than unity – a 1% increase in income leads to a 0.6% increase in demand for services. This suggests that the expansion of the services sector in Singapore was not a demand-driven phenomenon underpinned by increasing income.

3.3 The increasing share of services employment may be attributed to sectoral differences in productivity growth rates. With productivity of the manufacturing sector increasing faster than services, the pattern of employment share will shift towards services, which requires an ever greater proportion of total employment just to keep output rising in line with that of manufacturing. This is accentuated by the move offshore of more labour-intensive manufacturing activities to make way for higher technology and higher value-added activities. Table 2 shows that between 1981-96 (the approximate period during which services share increased) the difference in employment growth rates between manufacturing and services has exceeded differences in real output growth between these sectors. The

---

<sup>2</sup> The estimated equation is  $\ln RE = \alpha + \beta \ln RY + \delta \ln (Ps/Pgdp) + \epsilon$ , where RE is real expenditure per capita on services; RY real GDP per capita; Ps and Pgdp the price of services and GDP respectively; and  $\epsilon$  the error term. The nominal and real shares of services is income elastic if  $\beta > 1$ . Our results using the Johansen Maximum Likelihood Estimation Method showed that  $\beta = 0.59$  and  $\delta = -0.14$ .

slower productivity growth in services has also pushed up their relative prices.<sup>3</sup>

**Table 2**  
**Growth of Output and Employment**

	1981-96
Output	
Manufacturing	7.2
Services	8.3
Employment	
Manufacturing	1.8
Services	3.5
Productivity	
Manufacturing	5.7
Services	4.4

3.4 A recent study by the International Monetary Fund (IMF)<sup>4</sup> based on the industrial countries found that about two-thirds of the actual decline in the industrial countries' share of manufacturing employment between 1970-94 was accounted for by relative productivity differentials.

---

<sup>3</sup> This phenomenon is known in the literature as the "Samuelson-Balassa" hypothesis.

<sup>4</sup> "Deindustrialisation: Causes and Implications", by Robert Rowthorn and Ramana Ramaswamy, April 1997.

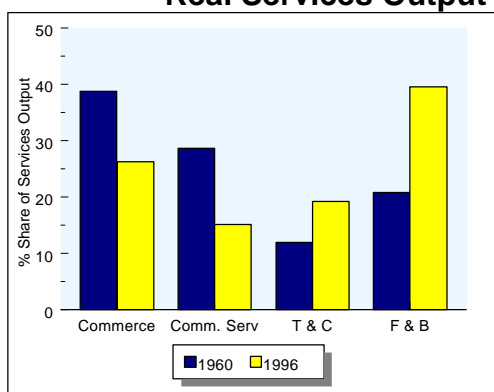


## 4 SECTORS OF GROWTH WITHIN SERVICES

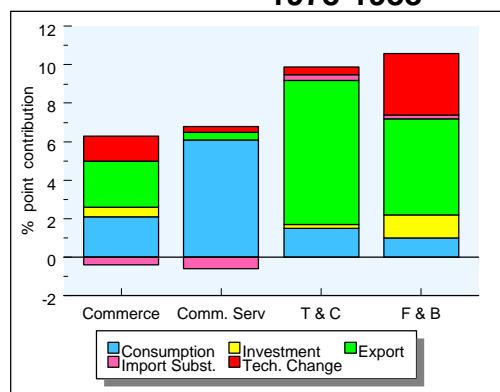
4.1 The growth of the services sector has not been evenly distributed across the spectrum of subsectors, with certain types of services growing faster than others. Reflecting the changing nature of Singapore's services sector over the years, the days of small-scale, family-owned sundry services have given way to higher skilled and higher value-added activities like financial services and information technology. As revealed in Chart 4a, the financial and business (F&B) services subsector experienced the largest gain in share of total services output, jumping by about 19% points between 1960 to 1996, followed by the transport and communications (T&C) subsector (7% points). In 1996, financial and business services account for the largest share of total services output (40%), followed by commerce (26%), transport and communications (19%) and social, community and personal services (15%). This contrasts with the early 1960s, when the services sector comprised largely commerce and social, community and personal services.

**Chart 4**

**(a) Changes in Share of Real Services Output**



**(b) Sources of Growth, 1978-1988**



Source: Input-Output Tables 1988: Models & Applications.

4.2 Estimates by the Department of Statistics (DOS) based on the input-output tables<sup>5</sup> show that the main impetus behind the strong growth of F&B services between 1978 and 1988 came from exports (47%) and technological change (30%). By comparison, growth in the T&C sub-sector was primarily export driven. (See Chart 4b.)

4.3 The financial and business services subsector has also experienced the highest employment growth rate within the services sector (averaging 8.9%) in the 1990s, followed by transport and communications (5.0%). (See Table 3.) More than 35% of the employment gain between 1991-96 was absorbed by F&B, a disproportionate amount given its employment share of 11% in 1991. The services sector as a whole accounted for the bulk of net jobs created since 1991, while the manufacturing sector shed 10% of its workers.

---

<sup>5</sup> The change in output can be decomposed into the following components: change due to domestic final demand + change due to investment + change due to exports + change due to import substitution+ change in technology. Import substitution is measured by changes in the ratio of domestic demand for domestically produced goods to total domestic demand. Technological change is defined as changes in the pattern of input mixes across, and linkages between, industries.

**Table 3**  
**Employment Gains by Industry and Occupation, 1991-96**

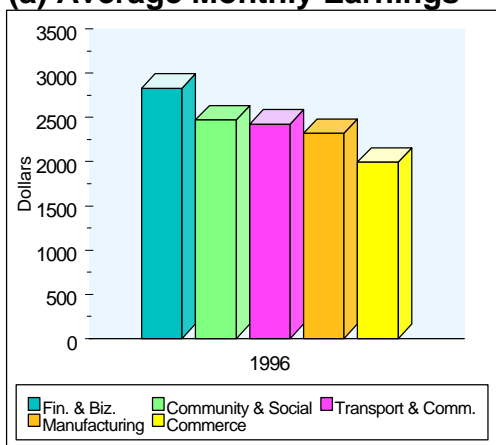
Industry & Occupation	Employment Gain		Growth (% p.a.)
	Number	Share (%)	
<b>INDUSTRY</b>			
Total *	223825	100.0	2.8
Financial & Business Services	82699	36.9	8.9
Social, Community & Personal Services	45648	20.4	2.7
Transport & Communications	42404	18.9	5.0
Construction *	15992	7.1	3.1
Commerce	60568	27.1	3.6
Manufacturing	-23294	-10.4	-1.1
<b>OCCUPATION</b>			
Total *	223825	100.0	2.8
Legislators, Administrators & Managers	77907	34.8	9.7
Technicians & Associate Professionals	121862	54.4	10.7
Professionals	51316	22.9	10.9
Clerical Workers	37811	16.9	3.6
Production & Related Workers	-75063	-33.5	-2.5
Service Workers	14590	6.5	1.4

\* Figures include foreign workers, except those staying at construction sites.

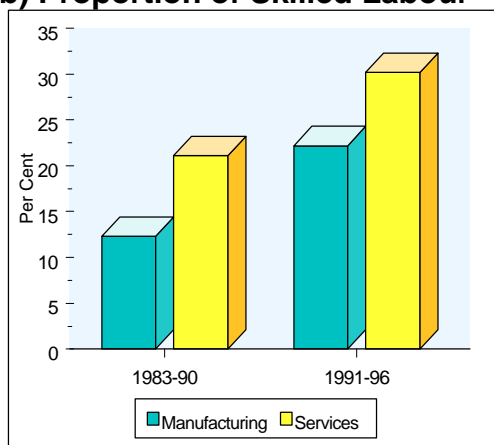
4.4 Concerns that services jobs are characterised by low pay, low skills and low productivity are misplaced. As Table 3 shows, most of employment growth has been in executive, administrative and managerial, and technical and professionals jobs, requiring a high level of skills and competence. Indeed, many of the lower skilled jobs were found in manufacturing. Average wage in the manufacturing sector in 1996 was lower than those in all the services subsectors with the exception of commerce. (See Chart 5a.) Moreover, the services sector in Singapore has always had a higher percentage of skilled workers - defined as those with at least post-secondary education - compared to manufacturing. (See Chart 5b.)

**Chart 5**

**(a) Average Monthly Earnings**



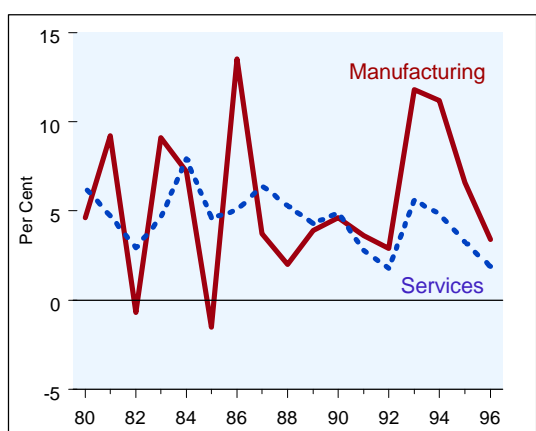
**(b) Proportion of Skilled Labour**



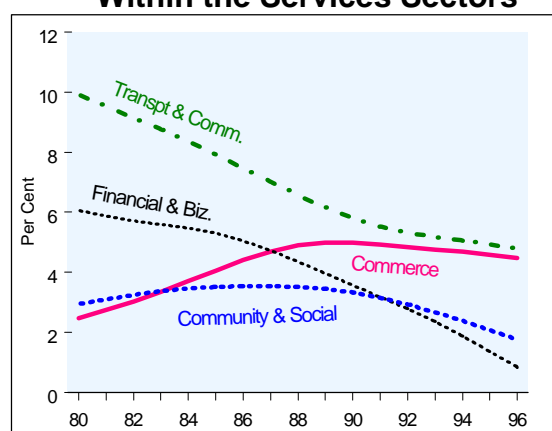
4.5 Productivity growth in services has also generally not lagged manufacturing until recently. Between 1980-90, productivity growth in services (averaging 5.2%) was marginally higher than in manufacturing (5.1%). This was reversed in the 1990s, with productivity growth in the manufacturing sector (6.6%) significantly higher than that in services (3.4%). (See Chart 6a.) From trend estimates, the slowdown in productivity growth was attributable to a sharp decline in productivity growth of F&B since the mid-80s<sup>6</sup>, and the plateauing of the commerce sector following steady increases during the 80s. (See Chart 6b.)

**Chart 6**

**(a) Productivity Growth Rates**



**(b) Productivity Growth Trends Within the Services Sectors**



<sup>6</sup> This may be partly due to the incomplete coverage of output of the F&B subsector, including derivatives trading.

4.6 Productivity figures for services, however, are likely to be underestimated for several reasons. First, it is difficult to measure output of workers that are not easily quantifiable. Second, the failure of data to reflect quality improvements is likely to be more severe for services than manufacturing. For example, the output of the non-market services subsector in the national accounts is calculated as the cost of inputs and by definition excludes improvements in quality or productivity. Third, services data may ignore differences in hours worked, and hence may underestimate the productivity of services because of the relatively higher proportion of part-time workers in services.<sup>7</sup> Fourth, the returns on IT investments into the services sector are not easily captured by productivity data. For example, Griliches (1994) found that three-quarters of computer investment in the US went into the "hard-to-measure" sectors.

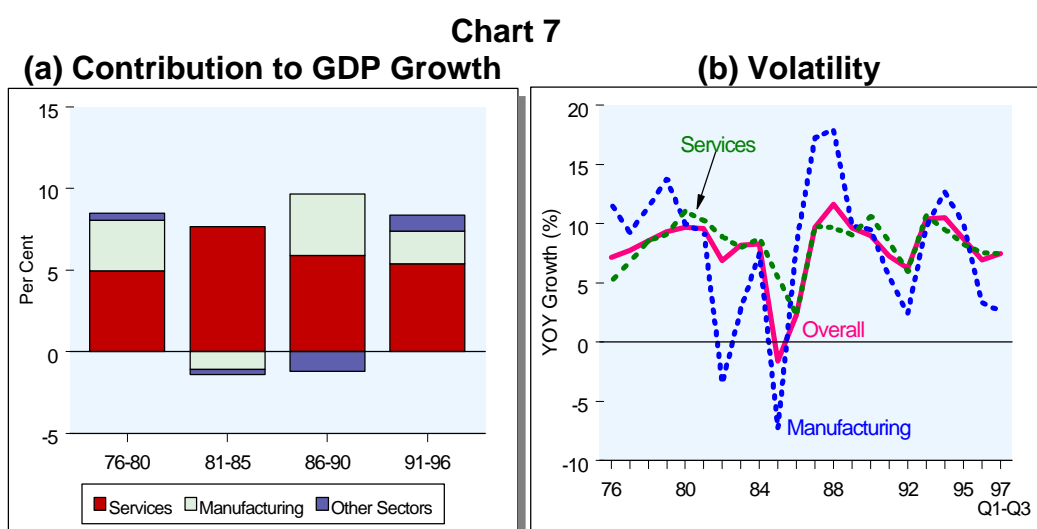
---

<sup>7</sup> Between 1992-96, 3.3% of all employed persons in the services sector were part-time workers, compared to 2.6% for manufacturing.

## 5 IMPACT OF GROWING IMPORTANCE OF THE SERVICES SECTOR

5.1 The services sector has been the bulwark of the economy, providing stability and contributing significantly to GDP growth. Chart 7a shows that the services sector accounted for about two-thirds of real GDP growth in the 1990s.

5.2 The services sector provides a stable source of income for the economy and acts as a buffer during periods of economic downturn. (See Chart 7a.) Between 1981-85, GDP growth was derived entirely from growth in services, while the rest of the economy reeled from the world recessions in the early- and mid-1980s.



5.3 While the services sector provided some “baseline” growth in the economy, the performance of the manufacturing sector had provided that extra boost to GDP growth, particularly during the 1990s. The manufacturing sector has been the swing factor behind whether GDP grew faster or slower from one year to the next. The greater volatility of the manufacturing sector growth rates vis-à-vis the services sector is shown in Chart 7b.

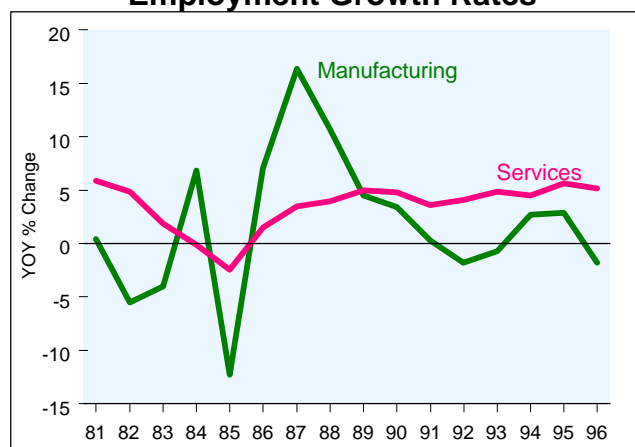
5.4 The greater stability of services growth rates as a whole belies wide fluctuations within certain subsectors. Based on standard measures of volatility, the transport and communications, and commerce subsectors tend to exhibit wide swings in growth rates. Over the period 1961-96, the coefficient of variation (standard deviation divided by mean) was higher for commerce than manufacturing, while that for transport and communications was not much smaller. (See Table 4.)

**Table 4**  
**Volatility of Growth Rates across Sectors, 1961-96**

Manufacturing	Commerce	Transport & Communications	Financial and Business Services	Social, Community & Personal
0.688	0.816	0.539	0.386	0.267

5.5 Employment in services has also been much less vulnerable to cyclical economic fluctuations than employment in manufacturing. (See Chart 8.) During periods of economic slowdown in the years of 1982, 1985, 1992 and 1996, manufacturing employment fell by an average 5%, in contrast to the services sector which saw an employment growth of 3%. And in 1996, employment in services grew by 5% compared to a contraction of 2% in manufacturing.

**Chart 8**  
**Employment Growth Rates**



5.6 As the share of services increases over time, economic cycles are expected to become less severe. A study by Lee (1996) found that as the share of service jobs increased, the response of both unemployment and personal income to shocks, both demand and supply, will dampen. However, some authors have pointed out that the advancement of IT into services could introduce greater volatility, a view that is addressed in the following section. Nevertheless, it remains that the greater importance of the services sector implies that the future growth of the economy will depend more and more on the growth performance of the services sector and its productivity.



## 6 INTERDEPENDENCE BETWEEN SERVICES AND MANUFACTURING

6.1 The services sector has evolved over time to increase its linkages with the manufacturing sector. The communications industry creates the market for fax machines and cellular phones, the transport industry drives aerospace development, and the health industry shapes the research of pharmaceutical companies.

6.2 The trend towards outsourcing of some manufacturing processes to the services sector provides further illustration of this growing interdependence. Many of today's large corporations contract out activities such as marketing and computing to the services sector. In the past, services ranging from factory cleaning to design, logistics, accounting and auditing were done in-house. This trend is supported by data from the input-output tables, which shows that the share of services output used by the manufacturing sector has been on a trend increase over the years. In 1978, 5.0% of total services output went to the manufacturing sector; by 1990, it had risen to 8.4%. (See Table 5.) The input-output coefficients also show that the amount of services output induced by every \$100 of manufacturing output increased from \$8.50 in 1973 to \$12.30 in 1990.

**Table 5**  
**Distribution of Intermediate Output**

	(%)			
	1978	1983	1988	1990
<b><u>Share of Manufacturing output going into Services</u></b>				
	3.7	3.7	2.6	2.8
<b><u>Share of Services output going into Manufacturing</u></b>				
	5.0	6.8	7.6	8.4

Source: Singapore Input-Output Tables, Department of Statistics, various issues.

\* Services excludes other services such as education, government services, repairs of household goods, etc.

6.3 It appears that while the manufacturing sector has increasingly drawn on the output produced by the services sector, the converse does not appear to have taken place significantly. The share of manufacturing output going into the services sector declined over the years, from 3.7% in 1978 and 1983 to 2.8% in 1990. At the same time, although the amount of manufacturing output induced by every \$100 of services output rose from \$5.40 in 1973 to \$6.40 in 1988, it moderated to \$4.70 in 1990.

6.4 However, the above finding does not detract from the fact that over time, manufacturing and services activities will increasingly resemble each other, as advances in information and communication technology allow firms to cross the boundaries of manufacturing and services in their development of new knowledge-based products. Many services are becoming increasingly high-tech, with firms in increasingly interconnected and complex financial markets needing ever more sophisticated computer programmes. The telecommunications and entertainment industries are going digital at breakneck speed, while the rapidly growing health care business calls for increasingly sophisticated medical and pharmaceutical research. About 80% of information technology (IT) sold in US and nearly three-quarters of computer systems sold in UK, were purchased by service providers.<sup>8</sup> Although no figures on capital investments by sector are available for Singapore, these figures point to the extensive use of technology in the services sector.

6.5 The advancement of IT into services will make the sector more cyclical like manufacturing. The less volatile nature of services compared to manufacturing has often been associated with demand for services being less sensitive to changes in income. Several reasons that could account for this include greater difficulty of postponing purchases of services, the absence of inventory cycle, and the less capital intensive nature of services given that investments tend to be the first thing a firm cuts in a recession.

---

<sup>8</sup> "The Growing Strength of Services", by Andrew Wyckoff, The OCED Observer, No.200, June/July 1996.

However, the increasingly capital-intensive nature of services means that services firms could now slash investment plans in a downturn, leading to a drop in output and employment. The spread of information technology through the services sector has also introduced stockpiling problems. For example, advances in IT, which allow the “codification” of knowledge, make it increasingly easy to “store” services in the form of software systems (e.g. telemedicine for medical diagnosis or expert systems for handling simple legal tasks, such as drafting wills). Greater competition as the services sector is deregulated (e.g. telecommunications) will also contribute to its vulnerability, as firms are forced to become leaner.

6.6 The recessions in the US and the UK in the 1990s saw the services sector slow by much more than during previous dips. In UK, overall output fell by roughly the same amount in the latest recession as in the previous one in the early 1980s, but the share of manufacturing in that earlier downturn was ten times as great as that of services; in the early 1990s, it was only one-and-a-half times as important.<sup>9</sup>

6.7 Even as services become more like manufacturing, so also have manufacturers increasingly emphasised service-like characteristics such as quality, tailoring products to the requirements of individual customers and 'just-in-time' delivery systems, with technologies such as flexible manufacturing systems reducing the necessity of maintaining large inventories. In Singapore, this is reflected in the fact that all new jobs created in the manufacturing sector in the 1990s have been in service-type jobs; the number of production workers actually fell by about 30%.

6.8 Hence, as economies become more complex and interconnected, the distinction between manufacturing and services become less meaningful. Instead of emphasising one sector over another, the focus of economic development policy should be on facilitating system-wide gains that maximise the efficiency resulting from the integration of different

---

<sup>9</sup> "The Ups and Downs of Services", *The Economist*, 6 July 1996.

industries. In this context, infrastructure improvements - such as in transport, communication and education systems - that connect different sectors will be important. Government policies should aim at providing its labour force with the best education and training so that they can fit into any kind of high value-added job.

## 7 OUTLOOK FOR THE SERVICES SECTOR

7.1 The importance of the services sector can be expected to increase over time. The contribution of services to the economy will expand as Singapore strives to develop the economy into a regional hub for medical and health care services, information technology hub under the IT2000 plan, as well as a centre for world class tertiary education.

7.2 Assuming that services share continues to grow by 0.4% p.a. as in the 1990s, its nominal share will rise by 6% points to 72% of GDP in 20 years, while the manufacturing sector's share will decline by 9% points to 15% over the same period. (See Table 6.)

**Table 6**  
**Changes in Sector Shares**

Period	Services			Manufacturing			Others*		
	share	contr to growth	increase in share	share	contr to growth	increase in share	share	contr to growth	increase in share
1961-69	73.7	78.6	0.7	14.9	15.2	0.2	11.4	6.2	-4.5
1970-79	65.0	61.4	-0.8	23.6	28.2	3.0	11.5	10.4	-1.4
1980-89	63.4	73.2	1.7	25.6	-32.2	-25.3	11.0	59.1	48.9
1990-96	66.4	68.4	0.4	25.2	20.0	-2.5	8.4	11.6	4.6

\* This comprises construction, utilities, agriculture & fisheries, and mining & quarrying.

7.3 The expanding share of services in the economy implies that growth in overall productivity and living standards in the economy will be increasingly influenced by productivity developments in the services sector. Hence, increasing the productivity of the services sector would appear to be at least as important as that for manufacturing. In the US, for example, over half of the purchaser's price of durable household furnishings and nearly half of the sale price of apparel is attributable to trade and distribution margins.<sup>10</sup> Efficiency gains in wholesale and retail trade or transportation would have significant impact on reducing the cost of the final product.

<sup>10</sup> US Department of Commerce (1977), "The Input-Output Structure of the US Economy, 1977".

7.4 To explore the implications of deindustrialisation, Baumol, Blackman and Wolff (1989) categorised activities which experienced relatively high rates of productivity growth as “technologically progressive” and activities with relatively lower rates of productivity growth as “technologically stagnant”. If manufacturing is considered “technologically progressive” and services “technologically stagnant”, then according to the theory of “asymptotic stagnancy”, in the long run, the average rate of growth will be determined by the activity in which productivity growth is slowest, i.e. the services sector. The intuition is that over time, the dominance of services will overwhelm manufacturing to such an extent that even high rates of productivity growth in manufacturing will only have a small impact on overall productivity growth in the economy. As such, raising productivity in the services sector will be critical for economic growth.

7.5 The evolution of productivity growth in the services sector will depend on future developments in areas such as information technology. New technological developments will make it feasible for some services to grow faster than others. Nevertheless, product innovations in manufacturing will continue to be important because of the spillover effects on productivity growth of services.

(sin-svc1)

---

## REFERENCES

Baumol, W.J., S. Blackman, and E.N. Wolff, "*Productivity and American Leadership: The Long View*", MIT Press, 1989.

Brown, Richard and Julius, Deanne, "Is Manufacturing Still Special in the New World Order?" in Richard O'Brien (ed.), *Financial & the International Economy:7*, Oxford University Press, 1993.

Department of Statistics, *Singapore Input-Output Tables*, various issues.

\_\_\_\_\_, Time Series Retrieval and Dissemination Electronic Database (TREND), Singapore.

Ministry of Labour, *Report on the Labour Force Survey of Singapore*, various issues.

\_\_\_\_\_, *Report on Wages in Singapore*, 1996.

\_\_\_\_\_, *Profile of the Labour Force of Singapore*, 1983-94.

OECD, *Labour Force Statistics*, 1976-1996.

\_\_\_\_\_, *National Accounts*, various issues.

US Department of Commerce, *Survey of Current Business*, various issues.

*The Economist*, "Why Services are Different", 18 July 1992.

\_\_\_\_\_, "Asia, At Your Service", 11 February 1995.

Falvey, Rodney E and Gemmell, Norman, "Are Services Income-Elastic? Some New Evidence", *Review of Income and Wealth*, Series 42, No.3, September 1996.

Griliches, Z., "Productivity, R&D, and the Data Constraint", *American Economic Review*, 84(1), pp.1-20, 1994.

Julius, DeAnne and Brown, Richard, "Services Can Offer Scope for Growth", *Financial Times*, 14 Apr 94.

Kozicki, Sharon, "The Productivity Growth Slow-down: Diverging Trends in the Manufacturing and Service Sectors", *Economic Review*, First quarter 1997.

Lee, Jaewoo, "*Do Services Temper Business Cycles?: Implications of the Rising Service Sector*", University of California, Irvine, mimeo, October 1996.

OECD, "Structural Shifts in Major OECD Countries" in *Industrial Policy in OECD Countries, Annual Review 1992*.

OECD, "Industrial Policy Issues and Initiatives", in *Industrial Policy in OECD Countries, Annual Review 1993*.

Quah, Danny T, "Increasingly Weightless Economies", *Bank of England Quarterly Bulletin*: February 1997.

Rowthorn, Robert and Ramaswamy, Ramana, "Deindustrialization: Causes and Implications", *IMF Working Paper*, April 1997.

Summers, R, "Services in the International Economy", in R. P. Inman (ed.), *Managing the Service Economy: Problems and Prospects*, Cambridge University Press, Cambridge, 1985.

Toh Mun Heng and Low, Linda, "*Input-Output Tables 1988: Models and Applications*", Department of Statistics, January 1994.

US Department of Commerce (1977), "The Input-Output Structure of the US Economy, 1977", *Survey of Current Business*, table B, p.46.



Vickery, Graham and Wurzburg, Gregory, "Intangible Investment", *The OECD Observer*, Oct/Nov 92.

Wieczorek, Jaroslaw, "Sectoral Trends in World Employment and the Shift Toward Services", *International Labour Review*, Vol. 134, 1995, No.2.

Wyckoff, Andrew, "The Growing Strength of Services", *The OECD Observer*, No. 200 Jun/Jul 96.

## MAS OCCASIONAL PAPER SERIES\*

<b>Number</b>	<b>Title</b>	<b>Date</b>
1	Current Account Deficits in the ASEAN-3: Is There Cause for Concern?	May 1997
2	Quality of Employment Growth in Singapore: 1983-96	Oct 1997
3	Whither the Reminbi?	Dec 1997
4	Growth in Singapore's Export Markets, 1991-96: A Shift-Share Analysis	Feb 1998
5	Singapore's Services Sector in Perspective: Trends and Outlook	May 1998

---

\* All MAS Occasional Papers in Adobe Acrobat (PDF) format can be downloaded at the MAS Website at <http://www.mas.gov.sg>.