

2 The Singapore Economy

New Complexities Are Shaping Singapore's Growth Dynamics

The Singapore economy grew by an average of 3.0% q-o-q SAAR in Q4 2014 and Q1 2015. External factors such as volatile commodity and financial markets dominated the moderate but uneven growth outcomes, even as the domestic electronics industry continued to be weighed down by the ongoing restructuring towards higher-value manufacturing and services.

For the rest of the year, a firmer recovery in the G3 will provide some support for the external-oriented sectors. However, the extent of this uplift may be capped by other global developments, including the slowdown in China, corporate realignments in the IT industry and lingering weakness in the oil-related transport engineering sector. Meanwhile, the domestic-oriented industries will be bolstered by firm demand and temporary respite from the deferment in foreign worker levy hikes. All in, the Singapore economy is poised for moderate growth of 2–4% for 2015.

Apart from achieving rapid economic growth, Singapore's remarkable development journey over the past 50 years has been characterised by a progressive broadening and deepening of its economic structure. In particular, the manufacturing sector has played an instrumental role in transforming Singapore into one of the highest income per capita countries in the world. Concomitantly, the role of services has evolved from catering mostly to domestic demand, to serving the growing Asian market. The next phase of economic development will be characterised by a knowledge- and skills-based economy, driven by productivity gains to overcome inevitable supply-side constraints.

2.1 Recent Economic Developments

Disparate Growth Drivers

Over the past six months, new complexities in underlying growth drivers have resulted in an uneven growth profile for the Singapore economy. External shocks, as well as idiosyncratic and industry-specific factors, have had a disproportionate impact on domestic growth. While the oil-related industries were buffeted by a fall in global oil prices towards the end of last year, sentiment-sensitive segments in the financial services sector benefited from large payoffs in fund management and volatility in the foreign exchange market. In Q1 2015, external headwinds receded slightly for the oil-related industries, but electronics production waned as structural shifts towards higher-value production and services continued.

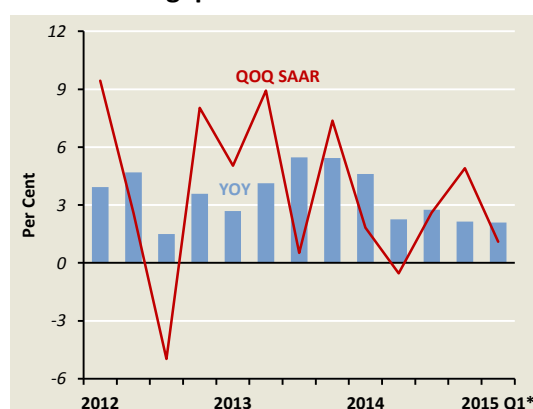
Growth in the Singapore economy was uneven across most sectors in the last two quarters.

After registering three quarters of sluggish growth, activity in the domestic economy strengthened towards the end of 2014, expanding by 4.9% q-o-q SAAR. However, the economy lost momentum at the turn of the year, with the latest *Advance Estimates* pointing to a mild increase of 1.1% in Q1 2015. (Chart 2.1)

From a sectoral perspective, the step-down in growth momentum in Q1 2015 largely resulted from a contraction in the services-producing industries, following a strong outturn in the preceding quarter. (Chart 2.2) From recent high frequency economic indicators, the financial services-related indicators—such as loans, stock market turnover and forex turnover data—experienced a sharp pullback after the surge in Q4 2014. Meanwhile, wholesale trade and transport activities recorded healthy gains. The construction sector saw a spike in Q1 2015, underpinned by a surge in the residential building segment, with certified payments growing by an average of 7.2% m-o-m SA over the first two months of the year.

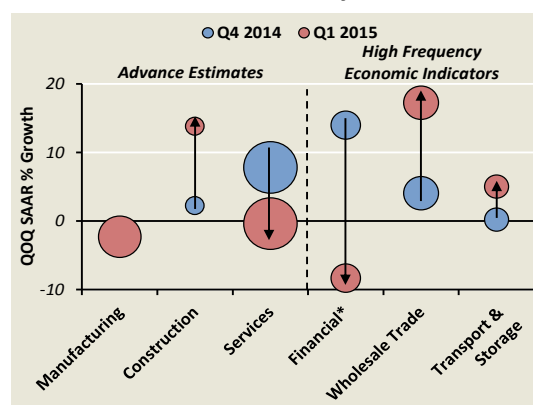
These somewhat disparate sectoral outcomes reflect the increasing complexity of Singapore's growth drivers. Apart from broad macroeconomic trends, several idiosyncratic factors have had a disproportionate impact on the Singapore economy.

Chart 2.1
Singapore's GDP Growth



* Advance Estimates.

Chart 2.2
Performance of Key Sectors



Note: Financial activity is proxied by data that includes DBU and ACU loans, stock market turnover and forex turnover. Total export volume was used as a gauge of wholesale trade activity. The size of the bubble corresponds to the sector's share of nominal GDP.

* Readings for Q1 2015 are based on Jan–Feb data.

In particular, the oil-related industries were confronted with weak product prices and sluggish demand towards the end of 2014, but regained ground early this year. In comparison, the sentiment-sensitive cluster within the financial services sector was boosted by significant payoffs in the fund management industry and an increased volume of activity in the foreign exchange market in Q4 2014, before experiencing a pullback in Q1 2015. At the same time, the domestic electronics manufacturing sector recorded a mild expansion in Q4 2014, supported by the upturn in the global IT cycle, which was subsequently capped by the transitory negative effects from the ongoing shift towards more advanced products and services in Q1.

The turmoil in the global oil market and softer demand in some regional economies weighed on the oil-related industries in Q4 last year.

Amid turmoil in the global oil market, activity in the oil-related industries retracted in Q4 2014.¹ Within the chemicals cluster, the steep fall in output of petroleum and petrochemicals led to an overall contraction in the domestic manufacturing sector. (Chart 2.3)

The fall-off in chemicals output resulted from a confluence of demand and supply factors. Notably, regional demand was sluggish, with Singapore's export volumes of petrochemical products to key regional markets, such as China and Indonesia, declining during the quarter. (Chart 2.4) Some firms were also reported to have cut production in response to the plunge in global and Asian petrochemicals product prices. (Chart 2.5) Scheduled plant maintenance shutdowns of oil refineries in Oct–Nov 2014 further exacerbated the fall in production in the oil-related cluster.

Pockets within the trade-related services industries were also affected by weakness in the global oil market. For example, oil export volumes—a proxy for oil wholesale trade—contracted by 2.4% q-o-q SA in Q4 2014, while sea transport of oil-related products also fell during this period.

Chart 2.3
Manufacturing Output by Cluster

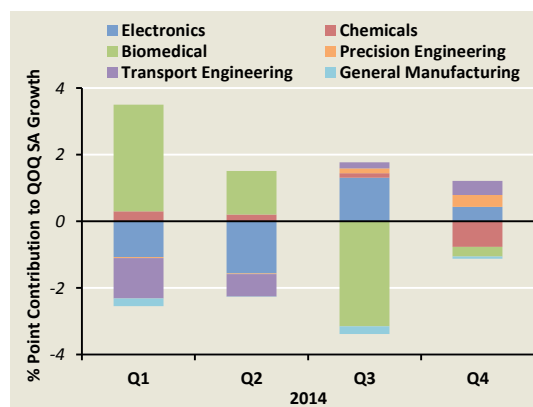
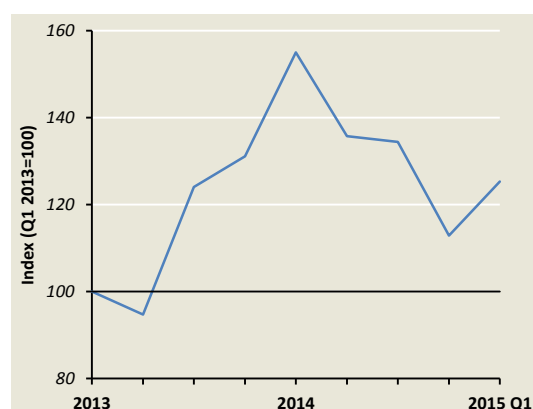
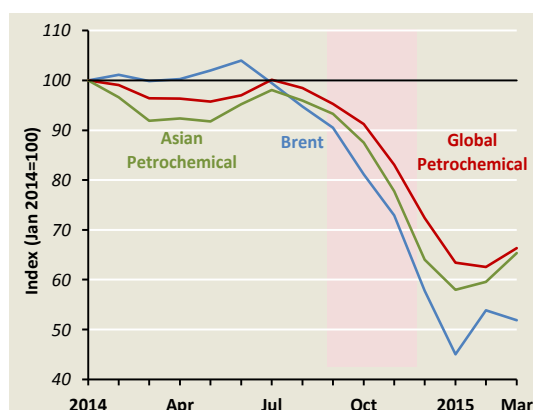


Chart 2.4
Export Volumes of Major Petrochemical Products to China and Indonesia



Source: EPG, MAS estimates

Chart 2.5
Prices of Brent Crude Oil and Petrochemicals



Source: Independent Chemical Information Service and IMF

¹ The oil-related industries comprise petroleum and petrochemicals within the chemicals cluster, marine & offshore engineering within the transport engineering cluster, oil wholesale trade and oil transport.

Although oil prices have continued to languish, the oil-related segments recovered ground into early 2015 with the resumption of production in plants that had shut down for maintenance in Oct–Nov last year. The turnaround in oil refining output, in turn, had positive spillovers on the oil wholesale and transport sectors. Specifically, the volume of oil exports rose by 7.3% q-o-q SA in Q1 2015, as reflected by significant gains in the volume of bulk mineral oil sea cargo handled.

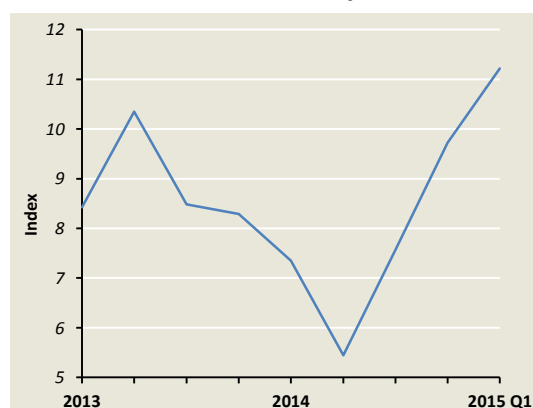
Shifts in sentiment led to swings in financial services over the last six months.

The financial services sector surged by 36.2% q-o-q SAAR in Q4 2014, the biggest boost to growth since Q2 2009. In particular, the fund management industry saw a significant rise in net fees and commissions, as a result of the stellar performance of portfolio managers. Indeed, a number of local hedge funds achieved robust returns on their investments in 2014, placing them among the top-performing hedge funds globally.²

Meanwhile, volatility in the currency markets rose amid renewed concerns over the durability of the global recovery, turmoil in the global oil market and uncertainty about monetary policy in the major economies. (Chart 2.6) As traders attempted to capitalise on the ensuing opportunities, daily average turnover volume of the forex market grew by 8.3% q-o-q SA in Q4 2014, up from 7.7% in the preceding quarter.

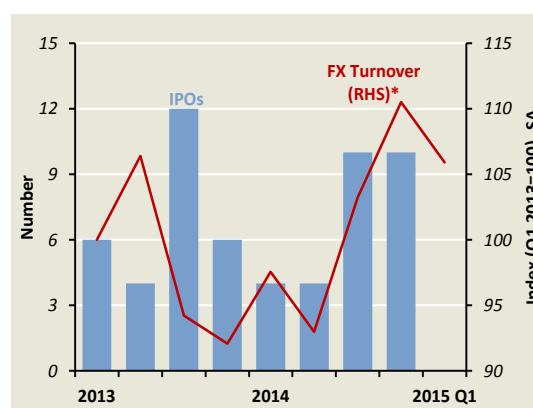
In Q1 2015, the financial services recorded a reversal of momentum, stemming largely from the sentiment-sensitive segments. The local bourse saw no new listings during the quarter, alongside some step-down in regional IPO activity since Q4 last year. (Chart 2.7) Forex turnover retracted in Jan–Feb 2015 following a strong performance in the preceding quarter. The fund management industry could also have seen a sequential pullback, as the one-off effect of the sizeable annual performance fees dissipated.

Chart 2.6
Global FX Volatility Index



Source: JP Morgan

Chart 2.7
Sentiment-sensitive Activities in the Domestic Financial Services Sector



Source: SGX and EPG, MAS estimates

* Readings for Q1 2015 are based on an average of Jan–Feb data.

² Effinger, A and Burton, K (2015), "Finding Gems", *Bloomberg Markets*, February.

The expansion in the global IT industry provided some cyclical uplift to the domestic electronics cluster, but transitional challenges continued to exert a drag.

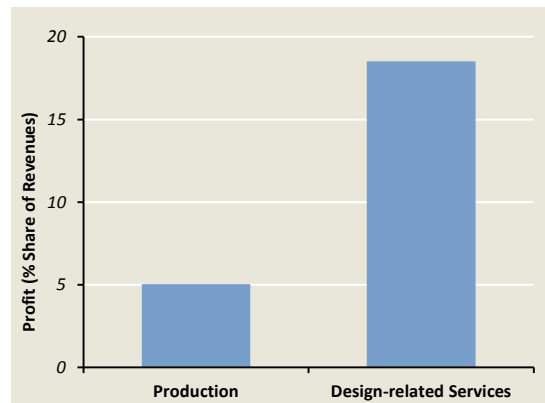
As the drag from firm-specific factors receded in the latter half of last year, the domestic IT industry reverted to an expansionary path, on the back of a cyclical uplift in the global IT industry. Accordingly, IT output, especially semiconductors, recorded its second straight quarter of growth in Q4 2014.

However, IT production slipped back into contraction mode in Q1 this year, due to pullbacks in the info-communications & consumer electronic devices and semiconductor segments, as firms renewed their restructuring efforts towards higher-value production and services-oriented activities.

In the broader domestic electronics sector, the profitability of firms geared towards services-based manufacturing, such as design and development of IT hardware, was much higher than for firms engaged in traditional production activities. (Chart 2.8)

There was likewise a divergence in the electronics trade data. Domestic export volumes of electronics fell by 4.4% q-o-q SA in Q1 2015. In comparison, IT re-exports recorded a sequential expansion of 5.5% over the same period. Leveraging on Singapore's position as a distribution and logistics hub, domestic electronics re-exporters have been able to benefit from the wave of global demand for mobile computing devices. The launch of a slew of smartphones, including Apple's well-received iPhone 6 late last year, was a boon for local re-exporters both in the fables³ segment and those engaged in packaging and testing activities.

Chart 2.8
Profitability of Production and Services-based Manufacturing Firms



Source: DP Database Top 1000 Singapore companies (2014) and EPG, MAS estimates

³ Fables companies focus on the design, development and marketing of semiconductor chips and devices while outsourcing the manufacturing of silicon wafers to specialised manufacturers, otherwise known as semiconductor foundries.

2014 In Perspective: The Economy In Transition

Domestic restructuring has continued apace despite external headwinds.

2014 marked the fifth year since Singapore embarked on its economic restructuring process, with an emphasis on inclusive growth and higher productivity. Notwithstanding the external headwinds confronting the economy over the course of last year, structural adjustments have proceeded apace. A decomposition of GDP growth from its four perspectives—production, expenditure, supply-side and income—provides insights into the interaction between the ongoing structural changes in the economy and the cyclical dynamics.

While the trade-related sectors were muted by the still-uneven global recovery and softer regional demand, modern services remained a strong growth driver.

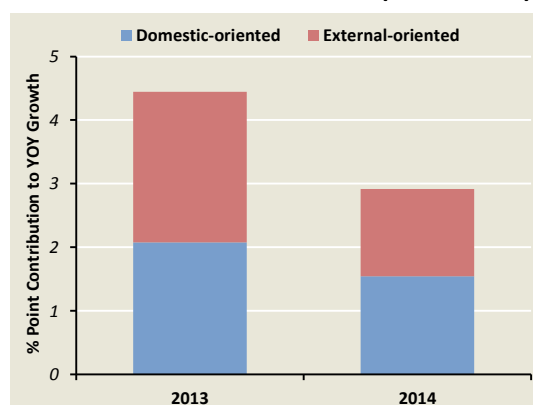
Against a backdrop of a still-hesitant and patchy recovery in the G3, moderate activity within the region and domestic supply-side constraints, 2014 saw a broad-based downshift in growth across the major sectors of the Singapore economy. Overall GDP grew by 2.9%, a step-down from the 4.4% in 2013. From the production perspective, the moderation in growth largely reflected a more modest outturn in the external-oriented industries, even as growth within the domestic-oriented industries remained firm. (Chart 2.9)

While trade-related services conceded momentum last year, other exportable clusters, notably modern services, made a solid contribution to GDP growth.⁴ (Chart 2.10) Indeed, the demand for modern services has risen in prominence in recent years, with its share of GDP increasing from 25% in 2000 to 32% in 2014.

Investment in machinery and equipment declined, in tandem with structural shifts in the economy.

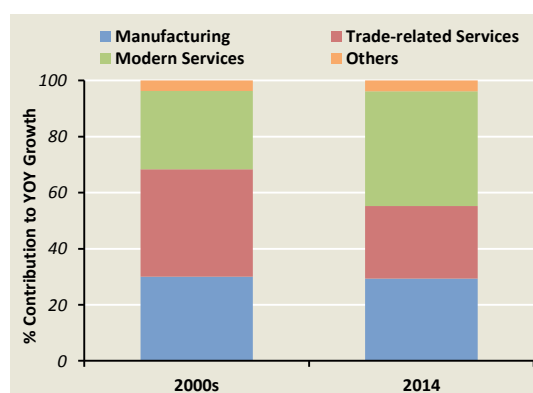
From an expenditure perspective, the modest overall growth in 2014 stemmed partly from a drag in investment. (Chart 2.11) In 2014, gross fixed capital formation (GFCF) shrank by 1.9%, the first contraction since 2003.

Chart 2.9
Contribution to GDP Growth (Production)



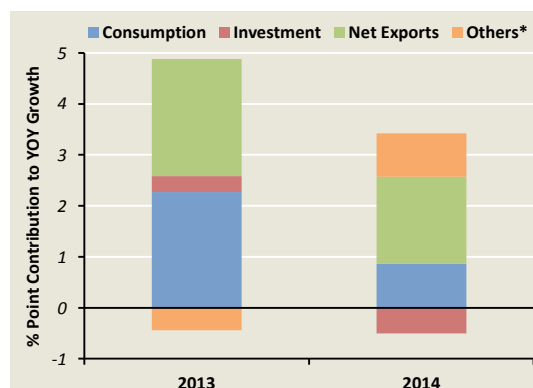
Source: EPG, MAS estimates

Chart 2.10
Exportable Sectors' Contribution to GDP Growth



Source: EPG, MAS estimates

Chart 2.11
Contribution to GDP Growth (Expenditure)



* Includes changes in inventories and statistical discrepancy.

⁴ Modern services refer to finance & insurance, business and info-communications services.

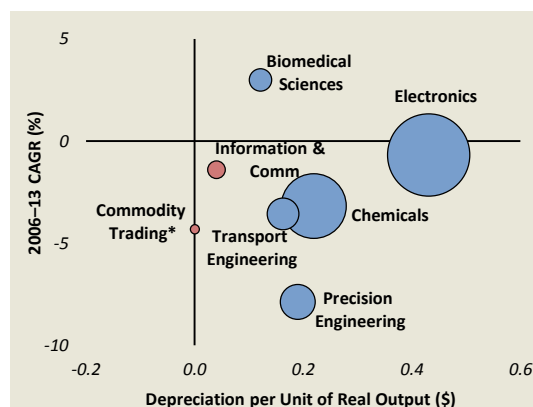
Notably, the fall in GFCF last year was broad-based. Construction & works recorded its first decline in 10 years largely due to a pullback in non-residential projects, more than offsetting the strong growth in major infrastructural and transport works. In addition, investment in machinery and equipment contracted for the second consecutive year. Imports of capital goods declined in tandem with the fall in investment.

The decline in machinery and equipment investment largely stemmed from underlying shifts in the nature of domestic economic activity. As the share of modern services in GDP increased in 2014, this could have dampened fixed asset investment growth, given that the former is inherently less capital-intensive than traditional manufacturing. Using depreciation expense as a proxy for capital expenditure, Chart 2.12 shows that the scale of capital deepening in services, such as info-communications, is unlikely to surpass that of manufacturing, which has a much larger capacity for investment.

From the supply-side perspective, the moderation in capital deepening weighed on productivity growth in 2014. (Chart 2.13) Indeed, a decomposition of productivity growth, based on the growth accounting methodology in Nomura and Amano (2012)⁵, shows that the contribution of capital deepening to productivity growth fell from 0.6% point in 2013 to 0.4% point in 2014. (Chart 2.14) Meanwhile, the drag from total factor productivity (TFP) worsened in 2014.

The weakness in overall productivity growth stemmed partly from transitional frictions from ongoing domestic restructuring, as shifts in resource allocation unfold. First, as discussed in the October 2014 issue of the *Review*, the domestic manufacturing sector is undergoing reconfiguration in response to supply-side constraints. Moreover, recent corporate manoeuvres and consolidation at a global level could have played a part in suppressing growth in the interim. (See Section 2.2.)

Chart 2.12
Depreciation Expense and Growth



Source: EPG, MAS estimates

Note: Bubble size represents 2013 depreciation.

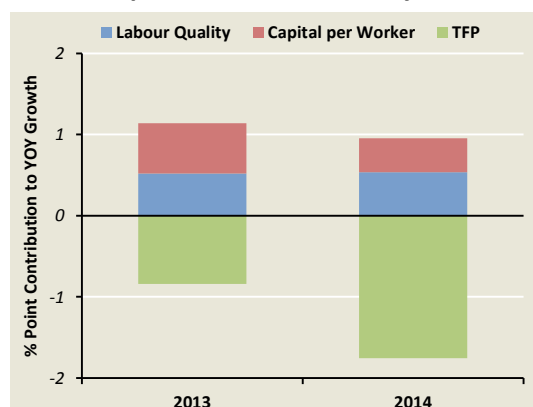
* Data up to 2012.

Chart 2.13
Contribution to GDP Growth (Supply-side)



Source: EPG, MAS estimates

Chart 2.14
Decomposition of Productivity Growth



Source: EPG, MAS estimates

⁵ Nomura, K and Amano, T (2012), "Labor Productivity and Quality Change in Singapore: Achievements in 1974–2011 and Prospects for the Next Two Decades", *KEO Discussion Paper* No. 129.

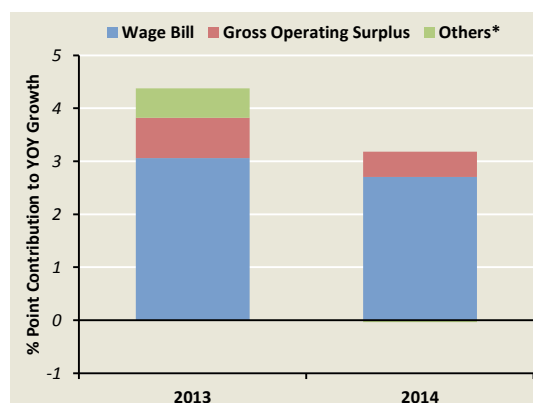
Second, and to a lesser extent, compositional changes in the labour market are taking place during this period of adjustment. The shift in employment gains from the manufacturing sector to traditional services industries, such as retail trade, could have weighed on productivity growth.

While firms continued to face margin pressures, resident labour benefited from a rising income share.

From the income perspective, firms continued to face pressures on corporate profits in 2014 (Chart 2.15), following four consecutive years of decline in the contribution of gross operating surplus to GDP growth. This occurred amid a tight labour market. The attendant rise in business costs, especially from firm wages, invariably weighed on profit margins. For the second year in a row, businesses in the domestic manufacturing sector were also buffeted by declining product prices.

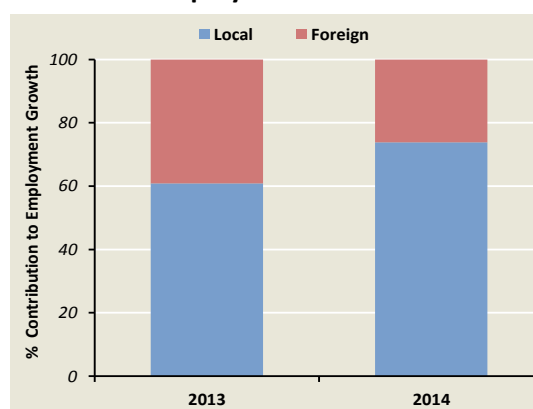
In comparison, workers benefited from an increasing income share. In 2014, the wage bill accounted for 86% of GDP growth, with the wage share at 43% of nominal GDP, the highest in the last decade. The bulk of the gains in the wage bill accrued to resident workers in view of a rise in local employment. Indeed, in 2014, local employment made up nearly three quarters of employment growth, up from 61% in 2013. (Chart 2.16) Further details on labour market developments will be discussed in Chapter 3.

Chart 2.15
Contribution to Nominal GDP Growth (Income)



* Includes taxes and statistical discrepancy.

Chart 2.16
Local and Foreign Share of Employment Growth



2.2 Economic Outlook

Crosswinds On The Horizon

A firmer recovery in the G3 will provide a broad-based boost to the external-oriented sectors of the Singapore economy. However, the extent of the uplift will be capped by developments in specific markets and industries. Uncertainties include a slowdown in China, corporate realignments in the IT industry and continued weakness in the oil-related transport engineering sectors due to a downshift in oil and gas exploration. The domestic-oriented industries will be supported by firm demand and a temporary reprieve from the deferment in foreign worker levy hikes. All in, the Singapore economy is on track to post moderate growth of 2–4% this year.

External factors should provide some support, while domestic-oriented industries will enjoy some reprieve from supply-side constraints.

Following two quarters of uneven growth, the profile of the domestic economy for the rest of the year will be shaped by various crosswinds. While the broad macroeconomic outlook is expected to be positive, the extent to which Singapore will benefit from the cyclical uplift will depend on developments in specific markets and industries.

The recovery in the G3 should provide a fillip to the external-oriented sectors but this will be offset by a slowdown in China. Likewise, the global IT industry is expected to benefit from firmer demand in the developed economies in 2015 but ongoing consolidation in the industry may have spillover effects on the domestic electronics sector as firms restructure and rationalise their global operations. Some strengthening of global oil prices in the latter half of the year could provide support to the oil-related manufacturing segments, which saw a pullback following the collapse in oil prices late last year. Nevertheless, there will be lingering weakness in segments such as transport engineering, due to the downshift in oil exploration activities.

Meanwhile, the domestic-oriented industries will be supported by firm demand and a temporary respite from the deferment in foreign worker levy hikes. On balance, the domestic economy should record moderate gains for the rest of this year, with GDP growth likely to be in the range of 2–4% for 2015.

A more concerted pickup in the G3 would support exports while a slowdown in China will constrain overall growth.

As highlighted in Chapter 1, a firmer recovery in the G3, particularly the US, bodes well for Singapore's export-oriented industries. With the Eurozone and Japan also registering stronger economic activity, this should provide additional support to goods and services exports.

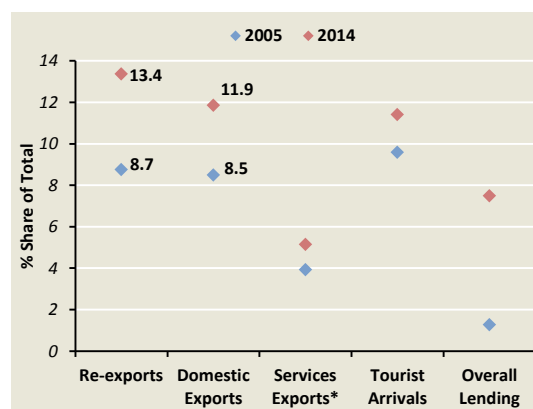
However, China's economy could be held back by property market weakness, consolidation within heavy industries and the temporary effects of ongoing structural reforms. While the Singapore economy remains closely tied to improving final demand in the developed markets, China's weakness will have some impact on domestic GDP growth. Over the past decade, Singapore's direct economic linkages with China have increased significantly. For instance, China's share in Singapore's domestic exports and re-exports rose from 8.5% and 8.7% in 2005, respectively, to 11.9% and 13.4% in 2014. Other industries that increasingly rely on support from Chinese demand include services exports, such as tourism and offshore lending. (Chart 2.17)

Ongoing consolidation and restructuring in the global IT industry may impact Singapore's electronics sector.

The domestic economy is also likely to benefit from the continued expansion in the global IT industry in 2015. Industry analysts have projected growth rates of around 5% for global chip sales, following the 9.9% growth last year. Nonetheless, the domestic IT industry will also be affected by important structural changes that are taking place in the global IT landscape.

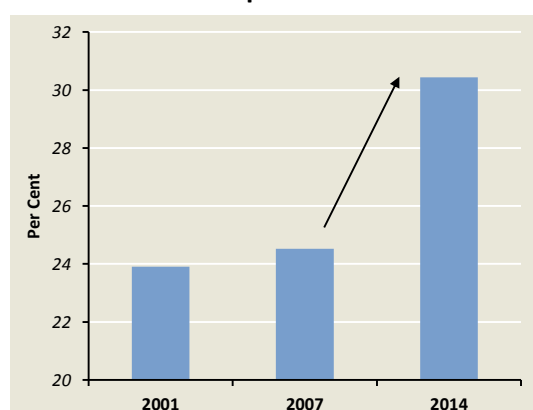
Notably, there was a step-up in M&A activities in the global semiconductor industry last year. Prominent examples were Infineon, Avago and MediaTek, which made sizeable acquisitions or merged horizontally along the supply chain. This ongoing consolidation, which stretches back to 2007, has caused the market share of the top three semiconductor manufacturers to rise to 30.4% in 2014, from 23.9% during the early 2000s. (Chart 2.18)

Chart 2.17
Singapore's Economic Linkages with China



* Based on 2013 data.

Chart 2.18
Market Share of Top 3 Semiconductor Firms



Source: IHS iSuppli

The consolidation was motivated by rising barriers to entry such as higher capex requirements to produce smaller, but higher-powered, semiconductor chips.

Restructuring also featured strongly among PC manufacturers, such as Hewlett-Packard and IBM. The former is splitting into two entities, separating its fast growing corporate hardware and services operations from its computer and printer business, while the latter has sold its x86 server division to Lenovo. These realignments of the business model were prompted by a secular shift away from traditional PCs and servers. As shown in Chart 2.19, the end-use of semiconductors has been shifting towards mobile devices, such as cellphones, tablets, wireless networks and the internet of things including wearables and smart appliances.

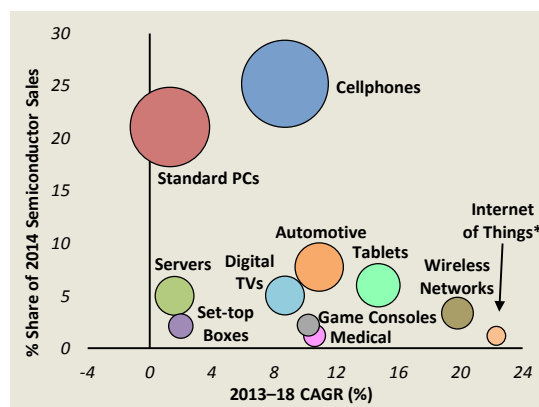
These developments could lead to manpower and cost rationalisations across the IT firms' operations around the world as they seek to reap cost efficiencies from economies of scale. Singapore, being a key node in the regional IT supply chain, is likely to be affected by these corporate realignments.

The net outcome of these global manoeuvres is still unfolding. As discussed in Section 2.1, while Singapore's electronics sector has seen consolidation of some firms, particularly on the production front, other firms have benefited from the switch towards the newer high-growth areas.

An anticipated modest rise in oil prices will bolster the oil-related manufacturing sectors.

As oil prices start to rise moderately from their current levels, Singapore's oil-related industries are poised to recover from the broad-based retraction in Q4 last year. Already, the sector has risen by 4.3% q-o-q SA in Q1 2015, although this was due, in part, to the resumption of oil refining activities following maintenance shutdowns last year. (Chart 2.20)

Chart 2.19
Integrated Circuit End-use Markets

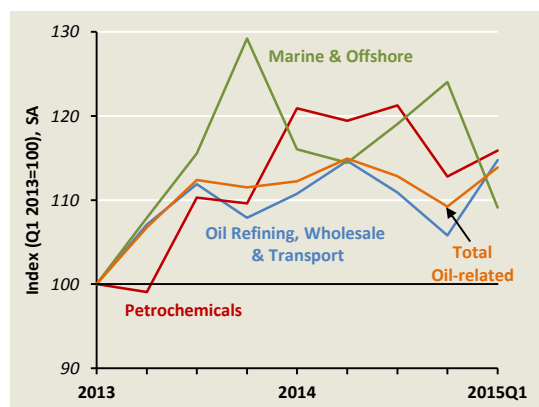


Source: IC Insights

Note: Size of the bubbles represents semiconductor sales in 2014.

* Covers only the internet connection portion of systems.

Chart 2.20
Oil-related Activities in Singapore (Real)



Note: The Index of Industrial Production (IIP) of petroleum and petrochemical products and marine & offshore engineering captures activities in these clusters. Oil wholesale trade is measured by total oil exports in real terms, while oil transport refers to sea cargo (oil products) handled.

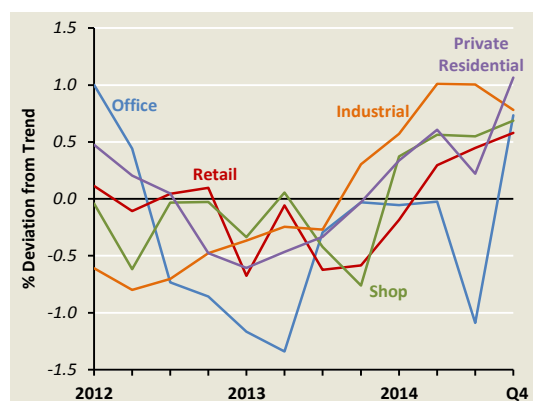
However, pockets of weakness remain in the marine & offshore engineering (M&OE) industries. The M&OE segment is going through an uncertain period as a prolonged slump in oil prices has led to a sharp cutback in global oil and drilling firms' capital expenditures. An oversupply of rigs over the near term further dampens prospects in this sector. Indeed, according to the latest *Business Expectations Survey*, the outlook for the M&OE sector is the most pessimistic among all manufacturing industries.⁶

Domestic-oriented industries will support overall growth and enjoy some reprieve from supply-side constraints.

Even as the external-oriented sectors of the economy face growth headwinds, the domestic-oriented industries will be supported by firm demand. In the construction industry, transport infrastructure projects, intended to bolster Singapore's status as a global logistics hub, will provide support for the sector and its related industries, although its contribution to overall GDP growth will be smaller than in recent years. Large-scale projects, such as Changi Airport Terminals 4 and 5, the development of the Tuas seaport, and the construction of new MRT lines are projected to cost \$26 billion over the next five years. Demand for non-cyclical domestic services, such as education and healthcare, will also remain firm as the population's needs continue to grow.

Furthermore, there will be some reprieve from the deferment of foreign worker levy increases this year, particularly for the more labour-intensive retail and food & beverage industries. An easing in rentals is also expected, in response to the rising supply and vacancies in retail and shop space. (Chart 2.21) With final demand holding firm, this should support margins for businesses in the domestic-oriented industries.

**Chart 2.21
Vacancy Rates by Segment**



⁶ According to EDB's *Survey of Business Expectations of the Manufacturing Sector* for Q1 2015, a net weighted balance of 39% of M&OE firms expect a deterioration in business conditions in the months ahead, compared to just 3% for the overall manufacturing sector.

2.3 Evolution Of Singapore's Economic Landscape

Defying The Odds, Facing New Realities

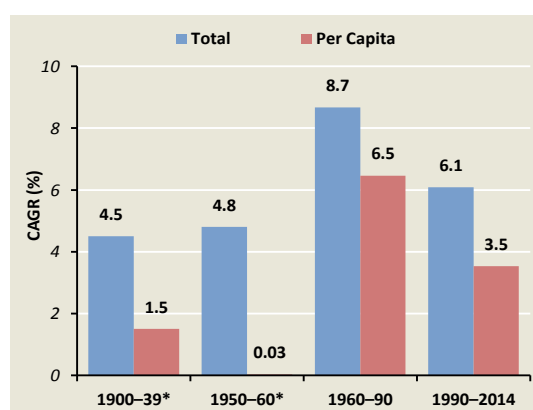
The Singapore economy today has markedly increased in breadth and depth from the early days of independence. Beyond rapid GDP growth, important changes have taken place in the composition of its industries. The initial industrialisation drive resulted in the rise of the manufacturing sector, which continues to account for a sizeable share of GDP. The services sectors have also evolved to overcome the limitations of the small domestic market through exports of high value-added modern services to the region and beyond. These developments have, in turn, resulted in changes in trade relationships and inter-industry linkages. The next phase of economic development will be characterised by a knowledge- and skills-based economy, driven by productivity gains to overcome inevitable supply-side constraints.

The Singapore economy has experienced a remarkable transformation since independence.

Rapid economic development has been a key feature of the Singapore landscape over the past five decades. Real GDP growth of close to 8% per annum transformed Singapore into an advanced nation today. (Chart 2.22) The average growth rates achieved since the 1960s were also much higher, compared to the pre-independence era. In particular, real GDP per capita registered solid growth of around 5% between 1960 and 2014, compared to just 1.5% and 0.03% for the periods 1900–39 and 1950–60, respectively.⁷ As a result, Singapore outperformed countries which were at a similar stage of development in the early 1960s and now has one of the highest levels of GDP per capita in the world, comparable to Norway on a PPP-adjusted basis. (Chart 2.23)

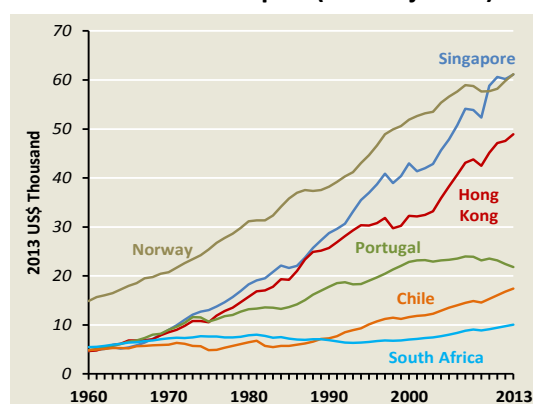
During this period of rapid growth, important compositional shifts in the industrial structure have taken place. Before 1965, services accounted for around three-quarters of the economy. (Chart 2.24) Trade-related services, such as wholesale, transport & storage and business services flourished, given Singapore's role as an entrepôt trading centre. As the industrial drive gathered pace after independence, the share of goods-producing industries rose to a peak of around 37% in early 1980s, driven by both manufacturing and construction. From the late 1980s onwards, services gradually regained their former prominence and now account for slightly over 70% of nominal GDP.

Chart 2.22
Real GDP Growth



* The underlying real GDP series for these periods are in 1914 prices and are measured in Straits dollars.

Chart 2.23
Real GDP Per Capita (PPP-adjusted)



Source: The Conference Board Total Economy Database and EPG, MAS estimates

Note: Between 1960–65, Chile, Hong Kong, Portugal, Singapore and South Africa had similar levels of GDP per capita in the range of \$5,000 to \$6,000 on a 2013 US\$, PPP-adjusted basis.

⁷

See Special Feature B of this Review.

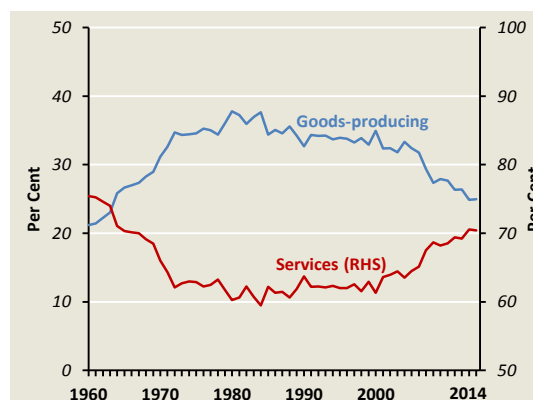
Manufacturing has played an important role in Singapore's development journey.

While it appears that Singapore's GDP composition has reverted to its starting point in the 1960s, these overall trends mask significant developments within industries, in particular, the evolution of manufacturing as an engine of growth. Over the past five decades, domestic manufacturers successfully scaled the value chain, transforming Singapore from an oil refining centre in the 1960s and 1970s to an IT production base in the 1980s, and a high-end manufacturing hub specialising in sophisticated semiconductors and pharmaceuticals in the 2000s. As a result of this rapid makeover, manufacturing accounted for an average of 24% of overall nominal GDP in the new millennium, up from just 12% in the early 1960s.

Despite this remarkable growth of the manufacturing sector, some degree of deindustrialisation has taken place in recent years. Rodrik (2015) documents a secular decline in the importance of manufacturing in the advanced economies, particularly in terms of the share of workers employed.⁸ In Singapore's case, the employment share of manufacturing peaked at 31% in 1980 and has since fallen to 15% in 2014. (Chart 2.25) In a relentless pursuit of higher-value production, capital investments enabled manufacturers to benefit from higher labour productivity growth than in the rest of the economy. At the same time, the increasing demand for services, driven by growing domestic and regional affluence, has accelerated the shift in labour resources away from manufacturing.

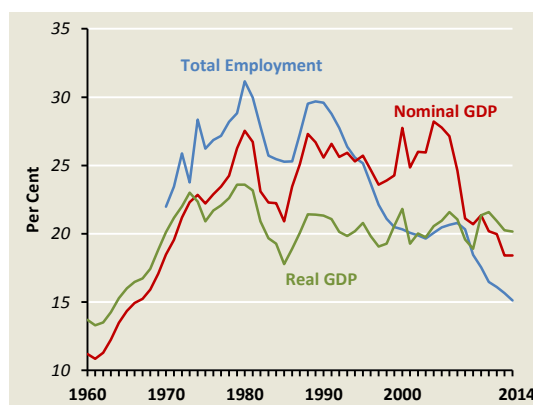
Besides employment share, the value-added share of manufacturing at current and constant prices can also be used to illustrate Singapore's post-independence industrialisation. The share of manufacturing rose across all measures as Singapore rapidly transitioned from an entrepôt trading centre in the 1960s to a manufacturing hub in the 1980s. As the country entered into the more advanced phases of economic development, the share of manufacturing in total employment and nominal GDP started to fall from the late-1980s and mid-2000s respectively, while its share in real GDP stayed at around 20% across the decades. (Chart 2.25) This is consistent with Rodrik's findings for the developed countries, where the share of manufacturing in real output has largely held constant, while employment and nominal GDP shares have been declining.

Chart 2.24
Goods and Services Share of GDP



Note: Owner-occupied dwellings make up the rest of GDP, while taxes on products are excluded.

Chart 2.25
Shares of Manufacturing in Total Employment, Nominal and Real GDP



⁸ Rodrik, D (2015), "Premature Deindustrialization", *NBER Working Paper* No. 20935.

However, the performance of Singapore's manufacturing sector was stronger than would be expected from global experience in two key aspects. First, the income levels at which manufacturing employment and nominal GDP shares peaked were significantly higher in Singapore compared to the representative country in Rodrik's sample. Specifically, the peaks occurred at real GDP per capita levels of US\$9,000 and US\$13,000 respectively in Singapore, as compared to the global benchmarks of US\$5,500 and US\$9,000. Second, while other industrialised economies generally saw declining output prices in manufacturing relative to the overall economy, Singapore registered increases from the 1960s to the early 2000s. (Chart 2.26) Singapore's current manufacturing share of nominal GDP (18.4%) and real GDP (20.2%) exceeds the OECD average of 16.1% and 16.7%, respectively.

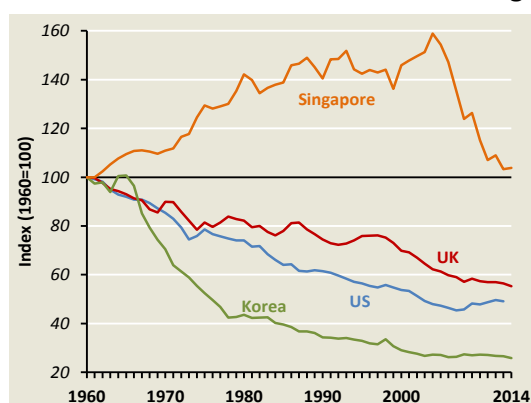
The domestic manufacturing sector will need to adapt to a slowdown in global trade flows ...

Looking ahead, the domestic manufacturing sector will inevitably undergo further reconfiguration and upgrading. Apart from domestic resource constraints (see the October 2014 issue of the *Review*), Singapore-based manufacturers will also have to take into account the structural shifts taking place in global manufacturing and trade.

The growth in global trade has remained sluggish since the one-off rebound in 2010, averaging 4.1% over the period 2011–14, compared to 7.1% between 1987 and 2007. (Chart 2.27) While this can be partly attributed to cyclical weakness in the Eurozone, a recent IMF study has identified several structural reasons for the persistent slowdown in global trade growth post-GFC.⁹ In particular, trade elasticity with respect to income fell, due largely to a decline in the goods trade elasticity, on account of slower growth in global supply chains.

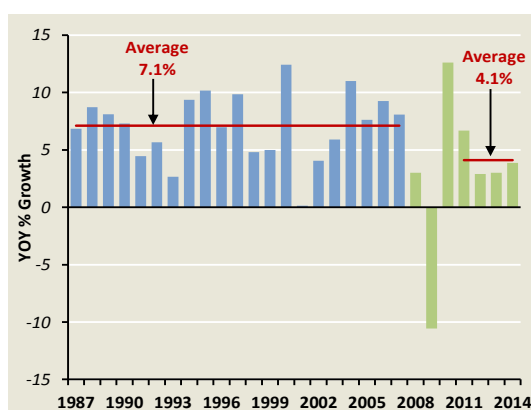
In the 1990s, product fragmentation and offshoring of production from the US to China and the rest of the Asian region contributed to a rise in the trade elasticity. However, this appears to have been exhausted in the 2000s and into the post-GFC period, as China

Chart 2.26
Relative Price Deflator of Manufacturing



Source: Timmer *et al.* (2014)¹⁰, Datastream and EPG, MAS estimates

Chart 2.27
World Trade in Goods & Services



Source: IMF World Economic Outlook

⁹ Constantinescu, C, Mattoo, A and Ruta, M (2015), "The Global Trade Slowdown: Cyclical or Structural?", *IMF Working Paper* No. 15/6.

¹⁰ Timmer, M P, de Vries, G and de Vries, K (2014), "Patterns of Structural Change in Developing Countries", *Groningen Growth and Development Center Research Memorandum* No. 149.

restructured and reduced its demand for intermediate goods imports from other Asian economies.

... alongside a decline in its trade elasticity with respect to world GDP.

Mirroring these trends, the relationship between Singapore's merchandise trade and world GDP in real terms has also changed. In particular, the responsiveness of total merchandise trade to global growth appears to have diminished over the past decade. EPG's econometric analysis shows a broad downtrend in the long-run elasticity of Singapore's merchandise trade growth with respect to global GDP growth since 2000. (Chart 2.28) From a geographical perspective, the lower elasticity after 2006 stemmed from a dip in our trade responsiveness to regional economies, such as China and Malaysia, reflecting possible shifts in cross-border production networks. Specifically, the growing centrality of China's manufacturing sector in the region's production network, especially for intermediate goods, has reversed the fragmentation of production seen in the early 2000s. This, in turn, has weighed on Singapore's trade flows.

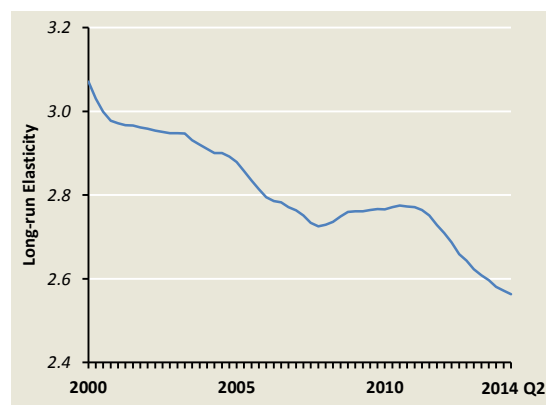
The domestic manufacturing sector has gradually been building up new capabilities.

In a constant push towards the frontier, locally-based manufacturers have been nimble in the adoption and development of new technologies, while enhancing the capabilities of existing ones. The present focus on newer growth engines, such as biologics, sophisticated semiconductor equipment, offshore and gas platforms, and medical technologies, has placed Singapore in good stead. To stay ahead of the curve, the domestic manufacturing sector has also geared its research and development towards cutting-edge technologies, such as 3D printing and robotics, which holds great potential in both the consumer and corporate segments. Accordingly, Singapore's gross expenditure on R&D rose to \$7.6 billion in 2013, from \$3.4 billion in 2003.

The services sector has also evolved to fill various roles over the decades ...

Meanwhile, the ascent of services in recent years was also due in part to global forces, as suggested by the stronger growth in worldwide commercial services exports compared to that of merchandise goods over 2000–13. (Chart 2.29)

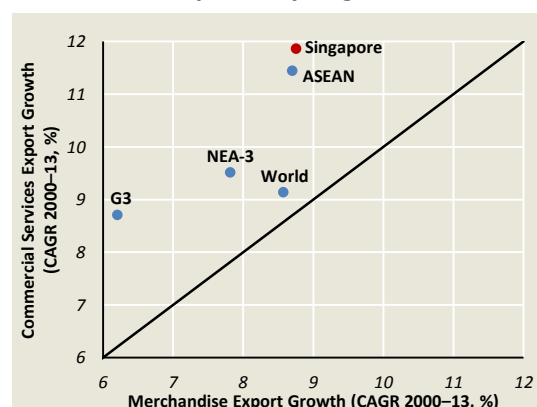
Chart 2.28
Long-run Elasticity of Singapore's Total Merchandise Trade to World GDP (Recursive Estimates)



Source: IMF IFS and EPG, MAS estimates

Note: The long-run elasticities were derived from an error-correction model based on a cointegrating relationship between Singapore's trade growth and world GDP growth, estimated over 1978–2014. Dummies were included to control for crisis periods.

Chart 2.29
Merchandise and Commercial Services Exports, by Region



Source: World Trade Organisation and EPG, MAS estimates

The extent of this outperformance was especially strong in Singapore, as it reflected our comparative advantage in the provision of modern services over regional competitors (see the April 2014 issue of the *Review*). Modern services such as info-communications, financial and business activities have grown rapidly, reflecting Singapore's development as a global hub for professional services. (Chart 2.30) In comparison, the importance of traditional services, such as wholesale & retail and transport & storage, has gradually receded over the last five decades.

With the changing composition of the services sector, the relationship between services and the rest of the economy has also evolved. In the 1970s, services mainly catered to the domestic market, with domestic consumption and investment accounting for almost half of total services output. (Table 2.1) By the 1990s, services served mainly as intermediate inputs to the rest of the economy.

... and have become more exportable.

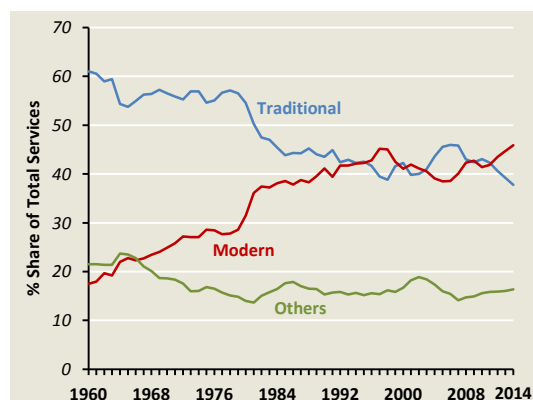
As globalisation gained traction, services became more exportable in the 2000s. During this period, Singapore's services exports expanded rapidly and accounted for an average of 36% of all services output. Input-output data shows that the backward linkages of the services sector also rose during the 2000s.

Singapore's services sector is one of the most open in the world, with our export-to-output ratio for overall services surpassed only by Luxembourg. (Chart 2.31) In fact, Singapore's wholesale and retail trade sector has the largest export share compared to the 48 economies covered by the OECD STAN Input-Output database. Nonetheless, there is still scope for improvement as our export-to-output ratio for modern services is below that of the frontier economies.

Singapore's future development depends on overcoming the odds once again.

Over the last five decades, Singapore has successfully overcome its lack of natural resources with proactive policies to take advantage of rapid shifts in global trade and make the necessary structural changes in the composition of industry and manufacturing. As circumstances change again, Singapore needs to be ready to respond to the challenges arising from supply-side constraints and to transform itself into a knowledge- and skills-based economy, characterised by productivity-led growth.

Chart 2.30
Composition of the Services Sector



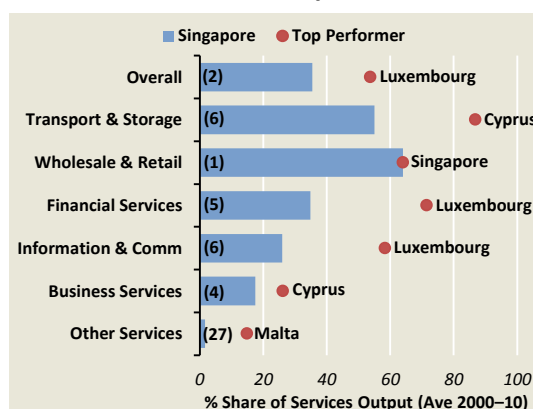
Note: Other services include education, healthcare and social services, among others.

Table 2.1
Demand for Services Output

	Intermediate Inputs	Consumption & Investment	Exports (%)
1970s	26.0	47.8	26.2
1980s	36.0	37.5	26.4
1990s	40.0	33.7	26.3
2000s	36.5	28.0	35.5

Source: Singapore's Input-Output Tables

Chart 2.31
Services Exports



Source: OECD STAN Input-Output Database and EPG, MAS estimates

Note: The numbers in brackets represent Singapore's ranking. The full sample includes Brazil, Bulgaria, China, Cyprus, India, Indonesia, Latvia, Lithuania, Malta, Romania, Russia, Singapore, South Africa, Taiwan, Vietnam and all OECD member states.