



## Increasing value-added: Singapore

### Abstract

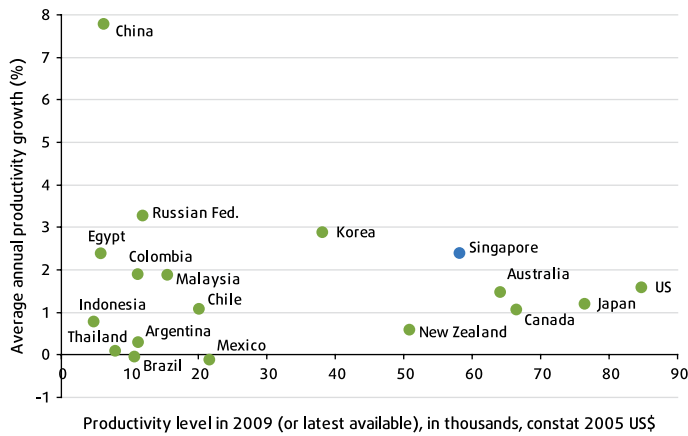
*Despite being a city-state of just over 700 square kilometers that has only been an independent country since 1967, Singapore is a world leader in international trade and investment. The country has successfully combined selective state intervention, market friendly policies, and from the 1970s, an export orientation to power it into the ranks of high-income countries with the 12th highest GDP per capita in the world (US\$43,324 in current dollars). Singapore is a true Asian Tiger. Its journey to this position provides guidance for other economies seeking to increase their value added in international commerce. In its first decade of independence, the country manufactured labor-intensive goods (e.g., soaps, refined oil, basic chemicals, and cement), but in the 1970s the government adopted a more export-oriented approach, and consumer electronics and semiconductors as well as textiles dominated the product portfolio. Manufacturing's share in GDP fell from 14 percent in 1965 to 24 percent by 1978. In the 1990s and 2000s, manufacturing moved toward high value-added sectors, and services became more predominant. This change has been the result of a development policy combining a free-market approach with state intervention. Singapore was able to attract multinational corporations, promoting investment and knowledge transfers as a result of stable macroeconomic conditions, efficient infrastructure services, and a supportive business environment. The country is a research and development center, topping the World Bank's Doing Business rankings in 2010 and 2011. The state invests heavily in education and R&D. In 2007, nearly a quarter of labor force had a tertiary education. The National University of Singapore was ranked 34th in the Times Higher Education World University 2010 ranking, and Singapore scores in the top three in the TIMSS assessment measuring students' performance in mathematics and science. The Economic Development Board focuses on attracting foreign investments and cooperates with other agencies such as human resources for specific industries. Heavy state intervention can cause inefficiencies. But Singapore's combination of institutions, infrastructure, and interventions has rapidly augmented its value added.*

For Singapore, a city-state of 5 million people and land area of 712 square kilometers, raising productivity has been an important factor behind economic growth. Over the years, Singapore became well known for its efficiency, especially as a transportation hub. Luo et al. (2010) found that Singapore is a global leader in port efficiency. Singapore was ranked 3<sup>rd</sup> in the Global Competitiveness Report 2010–2011. The city managed to attract many high-tech MNCs as well as enterprises from the financial and professional business services sectors.

### Growing productivity

Singapore succeeded in keeping productivity levels high. According to World Bank estimates, between 1995 and 2009 productivity in Singapore grew on average by 2.4 percent (figure 18). Wong and Seng (1997) estimate that between 1975 and 1995, total factor productivity (TFP) on average accounted for around 20 percent of economic growth. Productivity growth was weaker in the 1970s and the beginning of the 1980s but accelerated after 1985. In 2010 around two-thirds of value-added was created in the services sector, while manufacturing accounted for the remaining one-third.<sup>1</sup> In the service sector, trade, financial and business services were the three biggest contributors in terms of value-added in 2010.

**Figure 18: Productivity level in 2009 (or latest available) and annual average productivity growth between 1995 and 2009 in selected countries<sup>2</sup>**



Source: World Bank staff estimates.

### FROM TRANSPORTATION TO HIGH-TECH

From a historical perspective, Singapore’s economy underwent an impressive advancement. Since the country’s independence in the 1960s, Singapore slowly became an Asian transportation hub. In the first decade the country manufactured labor-intensive goods, e.g., soap, refined oil, basic chemicals, and cement. In the 1970s the government changed the economic strategy toward more export-oriented industries. Consumer electronics and semiconductors as well as textiles dominated the product portfolio. Manufacturing increased its share of GDP from 14 percent in 1965 to 24 percent by 1978. A decade later textiles started losing importance in favor of electronics, computers, and chemicals. In the 1990s and 2000s manufacturing switched toward high-value-added industries and, together with economic progress, services became more predominant. A growing importance of services is apparent in the last decade or so, based on value-added contributions by sector (Table 1).

**Table 1: Value added by sector (% GDP) in Singapore in 1975, 1985, 1995, 2005, and 2008**

	1975	1985	1995	2005	2008
Agriculture	..	..	..	..	..
Industry	33.7%	36.1%	35.1%	31.0%	25.9%
Services	64.0%	62.9%	64.7%	68.9%	74.0%

Source: World Bank.

Currently, 7 out of 10 employed work in services, in comparison to 6 out of 10 in 1980. Yet manufacturing remains an important part of the economy. Singapore exports mineral fuels, electronic components and parts, as well as chemicals, mostly to Malaysia, Hong Kong, and China.

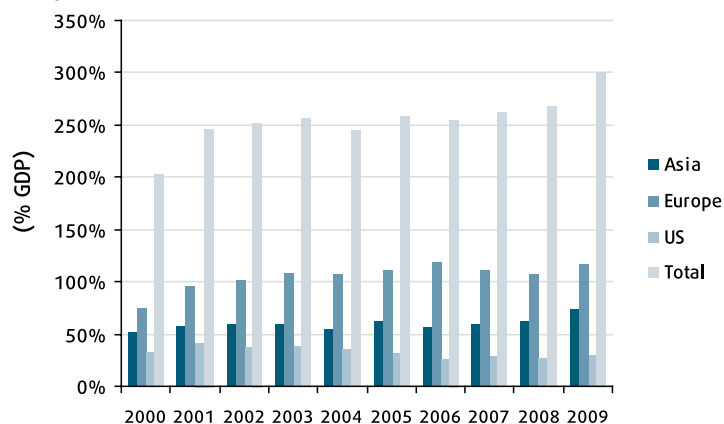
### EFFICIENCY, EDUCATION, AND THE STATE

How did Singapore evolve from a transportation hub to an innovation-driven economy? This note will investigate a few possible scenarios.



Since the country's independence in 1965, development policy has been a combination of a free-market approach and state intervention. Tan and Phang (2004) suggest that the government recognized Singapore's limitations in size and population of the country, and focused on efficiency. Policies introduced before 1965 underscored Singapore's development as a major transportation hub. At the same time, the industrialization program of the 1970s and 1980s pushed for attracting FDI in selected sectors from rich Western economies and Japan. FDI stock has grown in the recent years, despite the crisis (figure 19).

**Figure 19: FDI inflows to Singapore (%GDP) from Asia, Europe, the US, and total as at year-end, 2000-09**



Source: Statistics Singapore.

Thanks to MNCs locating in Singapore, the country was able to benefit from technology transfers, especially in targeted high-tech industries. This is reflected in the ICT sector: in the 1990s foreign enterprises accounted for more than 80 percent of output and 90 percent of value added.

The state was able to attract MNCs thanks to stable macroeconomic conditions, efficient infrastructure services, and a supportive business environment. Singapore was ranked 3<sup>rd</sup> in the World Competitiveness Yearbook 2011. The country topped the World Bank Doing Business rankings in 2010 and 2011. According to the Corruption Perception Index 2010 by the Transparency International, Singapore together with Denmark and New Zealand were the least corrupt countries in the world. Several advancements were introduced on the institutional level to make doing business in Singapore easier. For example, entrepreneurs can use the Enterprise One website, which gathers information from 30 government agencies necessary for setting up, licensing, and running a business.

Although domestic R&D performance still lags behind other industrialized economies, recently the state has been increasing its focus on innovation technologies. Thanks to a favorable business environment many MNCs have set up their R&D activities in Singapore. From the turn of the century, the innovation policy shifted from MNCs toward all enterprises capable of R&D activities, regardless of size. Singapore has ambitious plans: the so-called One-North Development, launched in 2001, aims at becoming a global hub for scientists and researchers working in biomedical sciences, ICT, and media. The center will cost around US\$7 billion to develop over 20 years. Due to the importance of venture capital in the innovation process, the Technopreneurship Investment Fund was established, with initial funding of US\$1 billion.

The state invests heavily in education. In 2007 nearly a quarter of labor force had a tertiary education. The National University of Singapore is ranked 34<sup>th</sup> in the Times Higher Education World University Ranking 2010. Singapore scores in the top three in the TIMSS assessment measuring students' performance in mathematics and science. The country also ranks sixth in the OECD PISA 2009 ranking that captures students' abilities in reading, math, and science.

### **From efficiency to innovation**

The role of the state in Singapore's economic development is substantial. It is the state who selects industries that are promoted. The Economic Development Board (EDB) focuses on attracting foreign investments and cooperates with other agencies—for example, in human resource training for specific industries. However, picking winners at the central level may cause inefficiencies.

Another concern has been the falling productivity rates in the recent years, in comparison to 1980s and 1990s. Rising employment ratios may indicate that Singapore was compensating for slower productivity with greater labor inputs. This might be because Singapore's story could be cast as being more related to efficiency-driven growth rather than total factor productivity growth. According to Sun (2007), between 1970 and 1997, total factor productivity (TFP) growth in the manufacturing sector was partly fueled by the efficiency gains in the low-tech manufacturing sector, rather than technological progress.<sup>3</sup> Some studies find negative TFP growth in the manufacturing sector in 1980s or 1990s.<sup>4</sup> Efficiency alone, however, without successful R&D activities, may not be enough to support economic growth in the long run. Despite high-quality education in the country, Singapore needs to strengthen its domestic research base to allow for spillovers and backward linkages between multinationals and local suppliers. And the state alone cannot replace the willingness of domestic private companies to invest in cutting-edge ideas. For example, in the ICT sector MNCs located in Singapore still rely on technology transfer from abroad: in 2004 two-thirds of largest ICT patent holders were foreign enterprises.

Long-term economic growth in Singapore will depend, among other things, on productivity levels and export performance. An aging population will pose additional challenges on the resource side. Felipe (2010) also suggest that the diversification and flexibility of Singapore's export basket falls behind other industrialized countries. Nevertheless, Singapore should be considered as a useful example of how countries with limited resources can alter their economic future.



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## Notes

- 1 Department of Statistics, Singapore.
- 2 Compound average growth rate of value added in industry and services, constant prices in USD 2005.
- 3 The author defines low-tech industries as textiles, wearing apparel, leather products, footwear, wood products, and furniture.
- 4 Different studies estimate various TFP growth rates of manufacturing sectors. See Tsao (1985) and Koh et al. (2002).