

Lessons from Singapore: from hard disks to digital media

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Visitors to Singapore often marvel at how this small city-state, sometimes known as a “little red dot”, rose from the ashes of World War II as a British colony to become one of the richest nations in Asia.

Singapore has no natural resources, no local market and certainly no hinterland – like mainland China is to Hong Kong – to bank on. What it has had in abundance in its short 40-plus years of history is a willing workforce eager to break out of poverty.

Besides a popularly-backed and strong (sometimes strong-handed) government bent on economic progress, one particular industry has been the major engine room for the country’s growth.

This is the electronics industry, which makes electronics products and components. Think semiconductors, hard disks and mobile phone parts and Singapore often comes to mind.

From 1997 to 2004, 30 to 35 per cent of the world’s hard disks were made in Singapore.¹ This would shrink to about 20 per cent in the next two years, but for a long time, things were rosy for the industry.

Following the computer boom of the 1970s and 1980s, hard disk companies like Seagate, Maxtor, Western Digital, Quantum (merged entity now) and IBM (now sold to Hitachi) opened plants in Singapore and hired thousands of assembly line workers.

With higher literacy over the years, many of these workers’ children would later study in universities and polytechnics and join these companies as engineers and even senior management staff.

If this sounds like a success story, it is. But betting heavily on one sector also means that the country’s growth is very closely tied to it. In 1976, electronics accounted for only 16.5 per cent of domestic exports but by 2001, this had risen to 48 per cent.²

Sure enough, this dependence on one sector was soon shored up. As China and India rose to become economic powerhouses, Singapore’s long-proven strategy of pairing low-cost local labour with technical skills transfer from Western MNCs (multi-national firms) suddenly did not look that fool-proof after all.

As Singapore became a developed nation, wages too began to reflect that of the developed world, which made it less competitive as a manufacturing base.

¹ Ng, Grace. “Hard disk sector feels painful byte”, The Straits Times, July 30, 2006

² Wu, Friedrich and Thia, Jang Ping. Singapore’s changing growth engines since 1965: An economic history of nimble adaptability, http://app.mti.gov.sg/data/article/358/doc/ESS_2002Q2_EnginesGrowth.pdf, 2002

As early as 1993, the Singapore's government leaders spoke of a "second wing" that Singapore companies have to expand into, or risk stumbling as a newly-industrialised economy.³

The message was urgent, because other Asian Tigers like South Korea and Taiwan were quickly going global after enjoying the electronics boom with Singapore.

New markets that Singapore businesses were urged to go into included China and India, where low-cost manufacturing and outsourcing of business processes would very quickly take away jobs from Singapore.

But many Singaporeans, used to decades of job security, did not see the competition coming. It was only after thousands of engineers and assembly line workers lost their jobs in the past two years that change finally dawned on people.

2006 will be remembered for a year when the hard disk industry practically packed up most of their stores. 3,500 people lost their jobs in August, when Maxtor closed its Singapore plant after a merger with rival Seagate.

Before this, consolidation in the industry and the flight of hard disk makers to China and other Southeast Asian countries like Thailand were already taking its toll.

The figures told the story. In 1997, Seagate alone hired 20,000 staff here, but by 2005, this was the total number of workers in the hard disk and hard disk media industries combined in Singapore⁴.

Singapore's exports of disk drives also dropped from a high of S\$18.7 billion in 1998 to S\$13.45 billion in 2005.⁵

This time, the bad news finally hit home – Singapore had lagged behind its economic rivals in labour costs as well as R&D. The country, which had thrived on the growth of the electronics boom for decades, suddenly found itself without an edge.

For this reason, the market crash after 9/11 was especially tough for many Singapore workers. In 2001, the economy shrank 2 per cent, contributing to the worst recession since independence.⁶

More seriously, for perhaps the first time, Singapore faced structural unemployment. Electronics engineers trained in almost assembly-line fashion in polytechnics and

³ Zuraidah Ibrahim, "SM Lee: Singapore will become failed NIE if its people do not venture abroad", The Straits Times, Jan 3, 1993

⁴ Ng, Grace. "Hard disk sector feels painful byte", The Straits Times, July 30, 2006

⁵ Ibid

⁶ Wu, Friedrich and Thia, Jang Ping. Singapore's changing growth engines since 1965: An economic history of nimble adaptability, http://app.mti.gov.sg/data/article/358/doc/ESS_2002Q2_EnginesGrowth.pdf, 2002

universities suddenly found themselves unable to find jobs as MNCs took their plants to low-cost China and India.

Worse, those who were in the 40s – too old to learn new skills but too young to retire – were caught in a bind. Their salaries were also too high to compete with their Chinese and Indian counterparts.

Some hard disk engineers did retrain to get jobs in the fast-expanding flash memory market – the storage technology used increasingly in cameras and MP3 players. But many found themselves left out of an increasingly globalised talent pool.

Despite the problems, the economy has been growing, with unemployment rate at a manageable 4.5 per cent in June 2006.⁷ But this does not show how some highly-trained engineers have, for example, turned to jobs like taxi cab drivers to stay employed at lower wages.

The structural unemployment has forced the country – government, industry and public – into the biggest rethink of its attitude towards innovation.

Up until a few years ago, a student's "science-maths" score was the most important number because it got him into a popular engineer course in a polytechnic or university. "Why study the arts" was the oft-heard refrain from parents wanting a secure future for their kids.

Today, however, polytechnics are increasingly signing up more students interested in film, game and animation design. University engineering courses now teach students game design, as well.

Last year, the Singapore government said it was forking out a considerable \$13 billion in R&D funds to develop water technologies (like desalination), biochemical sciences (like cures for cancer) and interactive digital media (like games and animation projects) in five years.

Of particular importance was interactive digital media, because it heralded a sea change in the country's economic strategy. No longer was the science of engineering the only priority in education.

The "software" – creative skills in drawing, music and the arts – were as important in creating computer games and animation. The attraction? A booming worldwide market worth US\$2.5 trillion in 2015, according to a survey by PriceWaterhouseCoopers.⁸

To drive its three R&D areas, Singapore's policy makers turned to Dr Curtis Carlson, the head of Stanford Research Institute, to head the scientific advisory board in the country's National Research Foundation.

⁷ Singapore Ministry of Manpower, Report on Labour Force in Singapore, Jan 2007

⁸ Siew, Alfred. "Wanted: Geeks and artists", The Straits Times, Nov 4, 2006

But criticism has already come Singapore's way before much of the grants have been given out. For example, Dr Carlson has said that Singapore is in the right direction but far from having three "top-10" universities, like those churning out innovative and entrepreneurial talent in Silicon Valley.⁹

And the top-down approach from the government, which was ideal in the old strategy of churning out skilled workers to fill the assembly floors of Western MNCs here, is now being criticised for holding back innovation.

The Singapore government is using the same concept of skills transfer of old, that is, bringing in the experts to grow a nascent industry. The country is attractive because it has a stable political environment, respect for intellectual property and excellent infocomm infrastructure.

So far, brand names like Electronic Arts, the biggest computer game publisher, and LucasArts, the animation specialists, have opened offices in Singapore.

But while they created jobs in a nascent industry, many are not innovation-based. For example, EA only hired Singapore staff to "localise" video games, for example, to regional languages, instead of creating a blockbuster triple-A game here that cost millions of dollars each.¹⁰

Another problem for Singapore is India. With no shortage of skilled and competitive-priced labour, India too has ambitions to be a place for companies to outsource animation projects (often the grunt work of animating a character, for example). The country is also home to Bollywood, where creative talent is abundant.

Singapore's response? It wants to play in the high-end space, where it can have an edge. It wants local companies to create games, not just do the grunt work, for big MNCs.

The problem is, this could happen only if companies here had what it took to come up with a triple-A game or animated series. Or at least the R&D necessary to do the grunt work in producing a game or cartoon effortlessly.

Otherwise, as in electronics manufacturing, Singapore will find it hard to compete with giants like India in terms of cost.

In some areas, the talent is not available in Singapore as well. The country is desperately short of quality character animators, texture and lighting artists and crucially, animation directors.¹¹

⁹ Siew, Alfred. "Varsities need to beef up research status", The Straits Times, Apr 28, 2006

¹⁰ Leung, Wai-leng. "Playing to win", Digital Life, July 4, 2006

¹¹ Sealy, Tony. "Crunch time for animation", Business Times, June 19, 2006

More people are getting trained to overcome this. In a deal with the Massachusetts Institute of Technology (MIT), Singapore is sending the first batch of 300 game experts to the United States to soak up the latest ideas and technologies from this year.¹²

Some researchers based here are also taking small, but important steps. For example, a five-man Nanyang Technological University team came up with software last year that could make animation easier.

Instead of drawing each frame, the software takes the first and last frame and automatically churns out those in between using a technology known as Computer-assisted Cel Animation.

Though still some way off the innovation that comes out of Silicon Valley, such breakthroughs are a sign of the new focus on innovation.

One reason why this is different from past efforts is that ordinary Singaporeans now feel the global economic competition. Structural unemployment owing to decades of reliance on electronics manufacturing means that this small country's survival is once more put on the drawing board.

The big bet is on innovation to provide an edge over its regional rivals. Singaporeans need no reminding that they have no domestic market or natural resources to bank on. But where the answer previously was to provide low-cost labour to Western MNCs, the challenge now is to innovate. It is something that Singapore is still learning the ropes in.

¹² Siew, Alfred. "Game creators go for stint at MIT lab", The Straits Times, Oct 11, 2006