# *Singapore: An Entrepreneurial Entrepôt?*

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> "*Singaporeans sense correctly that the country is at a turning point…We will find a new way to thrive in this environment…We must now make a strategic shift in our approach to nation-building.*
>
> *Our new strategic direction will take us down a different road from the one that has brought us here so far. There is no turning back. I believe this is the right thing to do given the changes in Singapore, given the major shifts in the world."*
>
> - Prime Minister Lee Hsien Loong, 2013[1]

Nine years after accepting his role as Singapore's Prime Minister (PM), Lee Hsien Loong spoke these words to an audience at the National Day Rally of 2013 at the Institute of Technical Education's (ITE) College Central, commemorating his country's 48th year of independence. PM Lee Hsien succeeded his predecessor Goh Chok Tong in 2004, a time when his nation was reconsidering its economic strategy in a world still recovering from the financial crises of the late 1990's and the recession of 2001. Nearly a decade later, PM Lee Hsien was still faced with similar challenges: ensuring continued growth for a small nation in an increasingly competitive global economy.

Modern Singapore, which was founded in 1819 as a port for Britain's East India Company, became a significant '*entrepôt*' (or 'trading post') over the next 150 years thanks to its strategic position on the India-to-China trade route. Since independence in 1965 through the 1990's, Singapore had charted its own economic path to become one of the world's most vibrant economies, primarily through attracting foreign direct investment (FDI). But the economic tides were turning. Singapore would need to generate its own value from within rather than rely on ideas from foreign multi-national corporations. With few natural resources at its disposal, a deep-water port that was pushing the limits of its capacity, and a population that looked to its government for guidance in every aspect of life, what options did Singapore have?

After the release of the 2003 report by the Economic Review Committee, formed under Singapore's Ministry of Trade and Industry to provide the answer to

[1]http://www.pmo.gov.sg/mediacentre/prime-minister-lee-hsien-loongs-national-day-rally-2013-speech-english

this exact question, the strategy seemed clear: Singapore needed to shift its focus to an innovation-driven economy. The government devoted itself to the cause and poured money into innovation-based projects in Singapore. These included the research and development park for biomedical sciences known as "Biopolis," the creation of the National Research Foundation, and the formation of the CREATE campus to attract global research universities to Singapore to provide the innovative talent necessary to generate new ideas.

By the time of PM Lee Hsien's speech in 2013, he and the rest of Singapore's leadership were reflecting upon the impact of these initiatives and making decisions about Singapore's path forward. Had investment in new innovation infrastructure, facilities and partnerships been enough to spark the innovation-driven enterprise (IDE) economy that Singapore needed to retain its leadership position? Many were concerned that Singapore continued to face barriers to new business generation. What more ought Singapore's government do to provide the necessary circumstances to foster an IDE economy? What might other key stakeholders – large corporations, entrepreneurs and others – do to support or drive these efforts? How should PM Lee Hsien define the "new strategic direction" for the country?

**Singapore: from its 'founding' to modern economic giant**

By the end of 2013, Singapore had become a top competitor in the world economy with a gross domestic product (GDP) PPP[2] per capita ranked third globally at 82,762 international dollars (Int$), according to the International Monetary Fund.[3] But the road to this mountaintop was not always straight upwards: from its founding in 1819 to the present day, Singapore has faced challenges in its attempts to develop and compete with others for its place as a first-world state, and it has accomplished th3se goals through its ability to adapt to circumstances often far outside of its control.

*Geography and the founding of Singapore*

Formally titled the 'Republic of Singapore', this small city-state is composed of a main island and an additional 61 smaller islands (both natural and manmade)

[2] Purchasing Power Parity
[3] World Economic Outlook Database, International Monetary Fund. April 2015.

totaling approximately 277 square miles (718 square kilometers) in area.[4] The territories sit at the southern tip of Malaysia's peninsula separated by the narrow Straits of Johor, and across the wider Malacca Straits from Indonesia. With 5,469,700 residents, Singapore represents a diverse population with an ethnic makeup in 2014 of 74.3% Chinese, 13.3% Malays, 9.1% Indians and 3.3% other ethnicities.[5] Of this 5.5 million, only 3,343,000 are Singaporean citizens.[6]

The founding of Singapore dates back to 1819 when British explorer Sir Thomas Stamford Raffles negotiated a treaty with chiefs of the local fishing village on the main island of '*Singapura*' (Malay for 'Lion City') to establish a trading post for the East India Company. Aside from the presence of deep waters suitable for a port, there were few other particular natural resources on the island. Rather, Raffles' choice was the result of the main maritime trade flows of the time, which included significant traffic between India and China (see Exhibit 1). The shortest distance between these two countries by ship was achieved via the Strait of Malacca, a water passageway separating Malaysia and the western mainland of Indonesia, which positioned Singapore to be a natural node in this global logistics system (see Exhibit 2). Indeed, it was Singapore's ideal station as a trade center – with its security assured by the British Empire and its trade routes by the Royal Navy - that fostered a successful *entrepôt* economy on the island (see Exhibit 3).

*The path to Singapore's independence*

From Raffles' founding of modern Singapore until the 1960's (aside from a brief occupation by Japanese imperial forces during World War II), Singapore remained a British colony. While some states might be inclined to look back upon this historical period with a less favorable viewpoint, Singaporeans take an alternative opinion of their past. When Britain ran Singapore, it did not exploit the territory; there were few natural resources nor mass labor to take advantage of. (Even today Singapore has to import critical items like fresh water for its citizens

[4] http://www.singstat.gov.sg/statistics/latest-data#14
[5] http://www.singstat.gov.sg/docs/default-source/default-document-library/publications/publications_and_papers/population_and_population_structure/population2014.pdf
[6] http://www.singstat.gov.sg/statistics/latest-data#14

due to a lack of natural resources.[7]) Rather, Britain invested in Singapore to create the trading post it needed in Southeast Asia, building infrastructure and importing goods and services to an otherwise undeveloped region. Other assets which Britain brought to Singapore, and with which it left their mark when it handed over control, were fundamental institutions which situated Singapore for success in a modern society, including rule of law, elections,[8] property rights, and business. Thus, in 1959, Singapore was able to establish a functioning, internal self-government (while still part of the British Commonwealth), voting Lee Kuan Yew, the first Prime Minister of Singapore (and father of Lee Hsien Loong), into power as the head of the People's Action Party (PAP).

Recognizing that Singapore had strong economic ties to Malaya (occupying the southern tip of the peninsula of modern day Malaysia), which it relied upon for natural resources, the new government of Singapore felt it should merge with its northern neighbor to join a strong state which would create future opportunities for market growth. Though there was significant opposition in the party from the pro-communist members, Singapore voted to become a part of the Federation of Malaya in 1963. However, it was soon evident that the governments of Singapore and Malaysia (as it became known at this time) were not well-aligned, and nor were their peoples. Singapore's population of under 2 million was over 75% ethnic Chinese, with under 15% native Malay, whereas Muslim-majority Malaysia was over 10 million. Just under two years later, Malaysia voted to end the partnership – without Singaporean representatives to voice their opinion.[9]

Having no other choice, PM Lee Kuan Yew declared Singapore an independent nation on August 9, 1965.[10] Lee himself was devastated by this development, reporting the news to his countrymen in the following way: "For me, it is a moment of anguish. All my life, my whole adult life, I have believed in

[7]https://www.edb.gov.sg/content/edb/en/news-and-events/news/singapore-business/news/Feature/Singapores-four-solutions-for-water-scarcity.html

[8] Decades later in 1994, Lee would say the following regarding British institutions passed to Singapore: "I'm not intellectually convinced that one-man-one-vote is the best. We practice it because that's what the British bequeathed us.", http://leewatch.info/quotes/

[9] Library of Congress, *Singapore*, 1990.

[10] Library of Congress, *Singapore*, 1990.

merger and unity of the two territories.[11]" Truly it seemed that PM Lee had been handed an almost impossible situation. Singapore was a micro-state in the region and feared threats to its security, including potential invasion by Indonesia. Its lack of natural resources posed a large problem for its future prosperity, and undesirable welfare conditions such as high illiteracy and rising unemployment were rampant.

*Post-Independence: a statist approach to life in Singapore*

After Singapore declared its independence in 1965, Lee Kuan Yew remained in his role as Prime Minister. This was the beginning of PAP's uninterrupted 50-year control (as of 2015) of the government (with only 3 Prime Ministers to date). PM Lee, being the first and longest-running of these leaders, undoubtedly set the tone for the future path of his country in the early decades of Singapore's status as an independent state. He firmly believed it was the power retained by the government that held the greatest capacity for enacting much needed change. Indeed, many of the policies, agencies and programs that he started are still in existence, shaping the lives of Singapore's people today. Perhaps no other words spoken by the beloved Singaporean leader better exemplify this life-long attitude about the role of government from Lee's perspective than the following, from a speech in 1990:

> "With few exceptions, democracy has not brought good government to new developing countries... Westerners value the freedoms and liberties of the individual. As an Asian of Chinese cultural background, my values are for a government which is honest, effective and efficient.[12]"

Singapore is a parliamentary democracy in which the political party that wins the simple majority takes control of the cabinet, led by the Prime Minister. Under Lee's leadership, this led to the concentration of power into the hands of a few hundred elite. In fact, it was Lee himself who said in 1975, "If all the 300 [top civil servants and political elite] were to crash in one jumbo jet, then Singapore will disintegrate.[13]" However, within this group existed a strict meritocracy, where those who scored highest on educational tests and had academic achievements of which

[11] Library of Congress, *Singapore*, 1990, p. 57.
[12]http://www.thenational.ae/opinion/comment/lee-kuan-yews-place-in-history-is-guaranteed
[13] Bell, Daniel A. and Chenyang Li. *The East Asian Challenge for Democracy*, 2013. page 322.

to boast were provided opportunities for advancement. For their educational merits and earned position, Lee also felt that they should be well-compensated, believing that politicians paid well would be less prone to corruption:

> "Ministers who deal with billions of dollars cannot be paid low salaries without risking a system malfunction. Low salaries will not attract able men who are or can be successful in their professions or business. Low salaries will draw in hypocrites who sweet talk their way into power in the name of public services, but once in charge will show their true color, and ruin the country. This has happened in many countries.[14]"

Lee and his cabinet worked to craft national policies intended to reflect these ideals of organization, discipline, and reward that followed hard work. They enacted new restrictions on citizen behavior, raising taxes on cars (to cut down on traffic and pollution), initiating high fines for littering and smoking in public areas, and prohibiting men from wearing long hair if they worked for the government.[15] Lee had a vision for an orderly and clean Singapore, and he felt that the government had the right to interfere with citizens' lives in order to achieve the environment necessary for economic prosperity:

> "I am often accused of interfering in the private lives of citizens. Yes, if I did not, had I not done that, we wouldn't be here today. And I say without the slightest remorse, that we wouldn't be here, we would not have made economic progress if we had not intervened on very personal matters – who your neighbor is, how you live, the noise you make, how you spit, or what language you use. We decide what is right. Never mind what the people think.[16]"

Despite these new policies, the government was quite aware of the real needs that its people had, including housing and employment. Lee founded two boards within the government that had the power to act autonomously outside of the ministries to serve these needs: the Housing Development Board (HDB) and the Economic Development Board (EDB). The primary job of the HDB was to build and

[14] https://fcpp.org/pdf/SPEECH%20BY%20MR%20LEE%20KUAN%20YEW%202004.pdf
[15] Porter, Neo, and Ketels. *Remaking Singapore*, Harvard Business School, 2013.
[16] Straits Times, April 20, 1987.

manage housing for the residents of Singapore. The goal of 10,000 new housing units for low- and middle-income families in the early 1960's was reached quickly, which gave rise to new small towns in previously undeveloped parts of the Singapore.[17] By the end of 2013, approximately 82% of Singapore's residents lived in HDB-owned housing.[18]

According to the government of Singapore, 90.3% of residents in Singapore "own" their home (HDB and non-HDB), but in Singapore, to own a HDB housing unit means to lease it from the government for 99 years.[19] Any married couple or person involved in a "family nucleus" has the opportunity purchase a newly constructed flat sold at "below market rates" at any age, but singles are required to purchase from the resale market "at market rates" until the age of 35.[20] Still, purchasing a new flat was quite a challenge for many given the overall costs and 5% deposit required by the government (to ensure there will be minimum occupancy before the project is constructed).[21] To help with this situation, the government permits the deposit to be paid for a person's state-mandated savings account known as the Central Provident Fund (CPF).[22]

*After Independence: a shift to a multinational-based economy*

The primary job of the Economic Development Board (EDB) was to grow the economy of Singapore and manage unemployment, ensuring that there were enough businesses in Singapore to provide jobs for all the residents. At the time of Singapore's independence, though, its export-based economy did little to foster the prosperity of local companies on the ground in Singapore. Therefore the PAP enacted a number of policies to encourage FDI inflows to Singapore, creating a more friendly government context in which multinational corporations could do business.

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[17] Porter, Neo, and Ketels. *Remaking Singapore*, Harvard Business School, 2013.
[18]http://www.singstat.gov.sg/docs/default-source/default-document-library/publications/publications_and_papers/population_and_population_structure/population2014.pdf
[19] http://www.singstat.gov.sg/statistics/latest-data#20, Interview with Shirlene Lew, April 22, 2015.
[20]https://www.hdb.gov.sg/fi10/fi10321p.nsf/w/BuyingNewFlatEligibilitytobuynewHDBflat?OpenDocument#FamilyNucleus
[21]https://www.hdb.gov.sg/fi10/fi10321p.nsf/w/BuyingNewFlatEligibilitytobuynewHDBflat?OpenDocument#FamilyNucleus
[22]https://www.hdb.gov.sg/fi10/fi10321p.nsf/w/BuyingNewFlatEligibilitytobuynewHDBflat?OpenDocument#FamilyNucleus

In the late 1960's, the EDB began to establish foreign offices to help the pursuit of these multinationals, many of which came to set up factories in industrial parts of Singapore like Jurong. Many large corporations established factories or headquarters in Singapore (such as National Semiconductor in 1969) as a first step on their expansion into a large Asian market. From Singapore, expansion to nearby countries like Malaysia and the Philippines, for example, was a next logical step. Indeed, National Semiconductor went on to establish manufacturing, assembly and test operations in Malaysia (1972), Thailand and Indonesia (1975), and then the Philippines (1976), building out from its Singapore base.

Additionally, Singapore's Ministry of Finance invested in and took part-ownership of some local corporations, creating "government-linked companies" (GLCs) with interests in the shipbuilding and manufacturing industries. Eventually the government created Temasek Holdings in 1974, a legally independent holding company to oversee the government's equity in the GLCs. Today, these GLCs include many of Singapore's largest corporations, including Singapore Airlines and Singapore Telecommunications Limited (Singtel).

By 1990, Singapore had achieved a level of financial stability and success, that perhaps no one but PM Lee had dreamed possible in 1965. In 1991, Singapore's foreign currency reserves were approximately S$59 billion, and unemployment rates had dropped from about 13.5% in 1959[23] to 1.4% in 1990.[24] By 2013, Singapore had achieved an unemployment rate of only 1.9% of the population (see Exhibit 4) and those changing employment in 2014 totaled only 129,000.[25]

The continued levels of growth Singapore has experienced since the EDB strategies enacted in the 1960's can be seen in the table below which details average annual percent GDP per capita growth. The rapid development in the second half of the 20th century of this advanced, high-performing economy is why Singapore was often referred to as one of the "Four Asian Tigers," along with Hong

[23] Porter, Neo, and Ketels. *Remaking Singapore*, Harvard Business School, 2013.
[24] http://www.tradingeconomics.com/singapore/unemployment-rate
[25] http://www.singstat.gov.sg/statistics/latest-data#4, Statistics did not indicate whether this was inclusive of all residents or only citizens.

Kong, South Korea and Taiwan. (For a comparison of Singapore's annual GDP per capita growth with other states, see Exhibits 5 and 6).

By 2013, Singapore had become one of the world's international financial centers, ranked fourth largest (behind New York City, London and Hong Kong) with a rating of 746 according to the Global Financial Centres Index.[26] This was due largely to the volume of FDI inflows which Singapore continues to attract (see Exhibit 7). In 2013, the FDI stock in Singapore was S$848.9 billion Singapore dollars, or US$636.2 (based on 2015 rates).[27]

**Table I. Five Year Averages of GDP Per Capita Growth (Annual %)[28]**

| | 1961-1965 | 1966-1970 | 1971-1975 | 1976-1980 | 1981-1985 | 1986-1990 |
|---|---|---|---|---|---|---|
| Singapore | 2.98 | 10.76 | 7.67 | 7.22 | 4.23 | 6.34 |
| | 1991-1995 | 1996-2000 | 2001-2005 | 2006-2010 | 2010-2013 | 2014 |
| Singapore | 5.54 | 2.95 | 3.77 | 3.27 | 2.02 | Not available |

## Investing in Singaporean innovation

*Early 2000's: a shift to innovation*

In December 2001, Deputy PM and Finance Minister, Lee Hsien Loong (Lee Kuan Yew's son), headed the newly formed Economic Review Committee (ERC). The ERC was tasked with determining whether the structure of Singapore's economy on which it had relied over the past several decades would be sufficient to lead the nation out of the period that had engulfed the four 'Asian tigers' since 1997 and the 2001 crisis, as well as to continue growing prosperity for the next several decades.

By 2003, the committee had its answer: in order to remain economically and financially competitive, Singapore could no longer simply rely upon foreign dollars or on a financial system that operated outside of Singapore's control. Singapore would need to create a new economy with a focus on investment in Singapore's

[26] http://www.longfinance.net/images/GFCI16_22September2014.pdf
[27] http://www.singstat.gov.sg/statistics/latest-data#13
[28] http://data.worldbank.org/indicator/NY.GDP/PCAP.KD.ZG/countries, Author's calculations

own infrastructure and businesses, including supporting greater innovation and entrepreneurship within its own borders. Singapore needed to create its own wealth and value from within.

The ERC Report from February 2003, titled "New Challenges, Fresh Goals – Towards a Dynamic Global City," states the following about this new direction:

> "Singapore is at a turning point… Competition for talent and investment is intense… In this fundamentally altered environment, Singapore cannot fall back on tried and tested strategies… By remaking and upgrading ourselves, we will make Singapore a leading global city, a hub of talent, enterprise and innovation.[29]"

The responsibility for implementing this new strategy was spread across the various government agencies. The Ministry of Trade & Industry (MTI), one of 15 Singaporean ministries, would address "regulatory issues and remove policy impediments if possible… to allow maximum freedom for the exportable component [of the Singaporean economy] to grow and compete internationally."[30] The Economic Development Board, one of Singapore's statutory boards, was tasked with maintaining "manufacturing as a growth engine",[31] and the Agency for Science, Technology and Research (A*STAR) would "drive the overall development of the public R&D infrastructure".[32]

Immediately following the 2003 ERC report, these agencies made several changes within Singapore: the government reduced the percentage contribution required by businesses into the CPF.[33] The Marina Bay area was targeted for re-invention, including new museums, hotels and retail shops. Tax rates across the board, including those for corporations, were lowered.

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[29]http://www.mti.gov.sg/ResearchRoom/Documents/app.mti.gov.sg/data/pages/507/doc/1%20ERC_Main_Committee.pdf

[30]http://www.mti.gov.sg/ResearchRoom/Documents/app.mti.gov.sg/data/pages/507/doc/1%20ERC_Main_Committee.pdf

[31]http://www.mti.gov.sg/ResearchRoom/Documents/app.mti.gov.sg/data/pages/507/doc/1%20ERC_Main_Committee.pdf

[32]http://www.mti.gov.sg/ResearchRoom/Documents/app.mti.gov.sg/data/pages/507/doc/1%20ERC_Main_Committee.pdf

[33] Similar to a U.S. 401k program, Singaporean businesses are required to match employee contributions to a certain dollar amount.

The government also desired to increase the local talent pool of Singaporean citizens qualified for innovation-related jobs in healthcare, finance and related industries that had previously been filled by immigrant workers hired by multinationals. Scholarship funding was made available for citizens to pursue their undergraduate or graduate degrees overseas for usually 3 or 4 years in return for a 6 year 'bond', or commitment to return to Singapore and work for the sponsoring government agency who funded their education. Study at a local university was also an option, which only had a 'bond' of 4 years. These are known as "Public Service Commission Scholarships" and are run by a single body through which all the ministries' opportunities are made available.[34]

Perhaps more significant was the government's decision to start pouring substantial amounts of public money into innovation-based projects within Singapore. While electronics, chemicals and engineering had dominated the economy immediately post-independence, Singapore saw the potential for a strong cluster in biomedical sciences (see Exhibits 8 and 9 for a detailed look at Singapore's clusters). In a blueprint called the "Industry 21 Master Plan" drafted by the EDB to help Singapore realize its vision as a global hub for business and investment, the biomedical industry was named the "fourth pillar" with the three aforementioned sectors. This industry was considered inclusive of "pharmaceutical biotechnology and medical technology."[35] The time was ripe in the early 2000's for Singapore to realize its vision for the sector by creating world-class capabilities across an entire value chain within the biomedical sciences: from research and prototyping to manufacturing and sales. Singapore had set a goal for itself: by 2010, it would be home to world-class pharmaceutical companies and a regional center for clinical trials and drug development (see Exhibit 10 for a timeline of milestones in the Singapore biotechnology cluster).

To realize this goal, the government's Agency for Science, Technology and Research (A*STAR) formed the Bio-Medical Sciences (BMS) Initiative.[36] This was heavily subsidized by the government, including over US$1 billion dedicated to the construction of a new research complex known as "Biopolis." Completed in two

[34] http://www.pscscholarships.gov.sg/about-the-psc/history
[35]https://www.edb.gov.sg/content/edb/en/why-singapore/about-singapore/our-history/1990s.html
[36]http://www.a-star.edu.sg/About-A-STAR/Biomedical-Research-Council/BMS-Initiative.aspx

phases (in 2003 and 2006), "Biopolis" spans a total of 222,000 square meters in area and houses both publically-funded biomedical research institutes as well as biotechnology companies and research laboratories (see Exhibit 11 for an aerial view of "Biopolis").

On January 1, 2006, the Prime Minister's office also established the National Research Foundation (NRF), which "sets the national direction for research and development (R&D) by developing policies, plans and strategies for research, innovation and enterprise."[37] Officially still under control of the Prime Minister's office, the NRF has the ability to fund R&D programs which contribute "significantly to a knowledge-intensive, innovative and entrepreneurial economy."[38] According to a 2011 A*STAR R&D survey, combined business enterprise and public expenditure on R&D per GDP climbed to over 5% by 2008[39] (see Exhibit 12).

*From 2009 to the present*

In 2009, Singapore's public expenditure on R&D increased 15.4% from 2008, totaling S$2.3 billion,[40] with a significant portion of this directed towards life sciences. (By 2011, biomedical science accounted for 33.4% of public R&D expenditures.[41]) The growing number of patents that Singapore was producing was certainly one indicator of the success that the R&D spending helped to create (see Exhibit 13), but the expected increase in business activity as a result of the research being done in its new facilities and through its new programs had yet to be realized. By 2009, not even one life sciences company had been listed in Singapore, despite the fact that both researchers and government officials alike felt that "Biopolis" and other biomed initiatives were on par with the expected turnout of patents and technologies. Existing doubts about whether or not Singapore's investments and redirected economic strategy in the early 2000's had been working were strengthened in 2008 when the great recession hit Asia, and Singapore was the first to enter it.[42] Singapore was still too dependent on the sale of its exports,

[37]http://www.nrf.gov.sg/about-nrf/national-research-foundation-singapore/corporate-profile
[38]http://www.nrf.gov.sg/about-nrf/national-research-foundation-singapore/corporate-profile
[39] http://www.nrf.gov.sg/research/r-d-ecosystem/r-d-investments
[40]http://www.a-star.edu.sg/Media/News/Press-Releases/ID/1410/Singapore-Reported-Strong-Public-Sector-Commitment-to-RD-despite-Global-Economic-Crisis-In-2009.aspx
[41]http://www.nrf.gov.sg/research/r-d-ecosystem/r-d-investments
[42] Porter, Neo, and Ketels. *Remaking Singapore*, Harvard Business School, 2013.

primarily to the United States that was itself reeling from the effects of the global financial crisis (2007-2008). "February manufacturing was off a staggering 22% year-on-year. Traffic flow through [Singapore's] container port, the world's largest, was down 20%, and the island-state's prime property market valuations plunged 15% last year",[43] reported *Forbes* in April 2009.

As a result, PM Lee Hsien formed the Economic Strategies Committee (ESC) in May 2009 that, like the ERC, was meant to provide recommendations on how to ensure Singapore's future economic growth. In January 2010, the ESC provided its report to the Prime Minster with three major endorsements: (1) re-train the work force to increase skills in every worker that will lead to greater "proficiency, knowledge and expertise";[44] (2) increase the capabilities of companies in Singapore to grow into industry leaders within Asia; and (3) grow Singapore into a global city by creating a population of "highly capable and entrepreneurial people".[45] Key strategies identified within the report to make the recommendations into realities included "growing through skills and innovation," and making "innovation pervasive, and strengthen commercialization of R&D".[46] In practice, these key strategies came in the form of a new R&D initiative called the "Research, Innovation & Enterprise Plan 2015" which would shift the focus of government research investments from being primarily academic in nature to more industry-oriented efforts.[47] Said PM Lee Hsien of this new plan:

> "The budget for this five-year plan, 2011 to 2015, is S$16 billion and that is 20 percent more than the previous five-year budget despite the economic slowdown. But it is necessary because R&D is a long and uncertain process, and we must invest resolutely, consistently and, we hope, wisely and judiciously so as eventually to get the results which we want… What matters is not just the resources which we invest in

[43]http://www.forbes.com/global/2009/0413/026-biomedical-biopolis-hurry-up-wait.html
[44] Singapore Economic Strategies Committee, *Key Recommendations*, January 30, 2010.
[45] Singapore Economic Strategies Committee, *Key Recommendations*, January 30, 2010.
[46] Singapore Economic Strategies Committee, *Key Recommendations*, January 30, 2010.
[47]http://www.mti.gov.sg/ResearchRoom/Documents/app.mti.gov.sg/data/pages/885/doc/RIE2015.pdf

R&D but also how the research grows our economy and improves our lives. Ultimately, it is the output which counts."[48]

Of this S$16 billion budget, scientists who wish to answer research questions that "may potentially seed the new industries of the future," according to the Minister for Trade and Industry Lim Hng Kiang, would only have access to 19% whereas efforts which could generate "dollar value returns" would be granted 70%.[49] Six percent of the new budget would be dedicated to helping "scientists realize the commercial value of their discoveries" through "technology transfer offices, translational and innovation centres and enterprise incubators and accelerators," and the remaining 5% of the budget would be allotted to scholarships "to ensure Singapore's pipeline of young scientific talent does not dry up."[50]

Additionally, scientists reported that they were only informed about this switch in funding priority a few months before new grant deadlines were due, and the competition would be greater than in years past. Before the Research, Innovation & Enterprise Plan, funding was allocated to the research institutes individually but, under the new statutes, the funds would be held under the Industry Alignment Fund (IAF).[51]

A significant part of the new plan included increased commitments to partnerships among major Singaporean universities and the NRF on one hand, and world-class academic institutions from outside Singapore, such as the Massachusetts Institute of Technology (MIT), on the other. MIT has a long-standing relationship with Singapore that began well before the Research, Innovation & Enterprise Plan. Indeed, MIT alumni are even found among Singapore's top leadership, including its current - President Tony Tan - who completed his Master of Science (MSc) degree in operations research at MIT.

A prime example of such collaboration with foreign universities is CREATE: the Campus for Research Excellence and Technological Enterprise, opened in

[48]http://www.pmo.gov.sg/mediacentre/speech-prime-minister-lee-hsien-loong-opening-campus-research-excellence-and
[49] The Shi Ning, "R&D Investments to Emphasise Economic Return." *The Business Times*, October 1, 2010.
[50] The Shi Ning, "R&D Investments to Emphasise Economic Return." *The Business Times*, October 1, 2010.
[51] "Scientists' main grouses." *The Straits Times*, September 9, 2011.

November 2012. Conveniently located adjacent to the National University of Singapore (NUS) and providing access to those campus resources, CREATE is intended to be an "innovation hub" which houses researchers and research groups from the NRF and many foreign universities.[52] In 2013 the US magazine *R&D* awarded CREATE the "Laboratory of the Year" award "for its excellence in research laboratory design, planning and construction."[53]

CREATE is home to the joint MIT and Singapore research initiative called the 'Singapore-MIT Alliance for Research and Technology' (SMART). Considered MIT's largest international research enterprise and first ever research location outside of Cambridge, MA, SMART provides an opportunity for multinational research groups headed by MIT faculty to tackle a wide variety of topics including biosystems, environmental modeling, infectious diseases and urban mobility.[54]

Another MIT collaboration is the Singapore University of Technology and Design (SUTD). SUTD is Singapore's fourth autonomous university "established in collaboration with MIT to advance knowledge and nurture technically-grounded leaders and innovators to serve societal needs."[55] As current SUTD President (also an MIT Institute Professor and former MIT Dean of Engineering) Thomas Magnanti explained, SUTD seeks to tap into MIT's talent for entrepreneurship and help SUTD's students "experience the full value chain from conception through development, prototyping, manufacturing, operations and maintenance."[56]

MIT is not the only international university with a significant presence: Yale has established Yale-NUS College, a residential liberal arts college in Singapore with a focus on undergraduate education that leverages faculty from both institutions.

Singapore's missing element?

With sustained commitment to boosting Singapore's 'innovation capacity', the city-state expected to reap the benefits of a burgeoning 'innovation ecosystem'.

[52] http://utown.nus.edu.sg/about-university-town/create-2/
[53] http://www.nrf.gov.sg/media-resources/awards
[54] http://smart.mit.edu/about-smart/about-smart.html
[55] http://www.sutd.edu.sg/mission_values.aspx
[56] http://www.sutd.edu.sg/mit_collaboration.aspx

But for some reason it was neither producing the wealth of new enterprises nor the number of entrepreneurs the government had hoped for.

On the surface there seemed few barriers to entrepreneurship. Rated as having the second freest economy in the world by the Heritage Foundation's 2015 Index of Economic Freedom, just behind Hong Kong by a mere 0.2 points (of 100 total),[57] Singapore enjoys a free market economy that is remarkably free of corruption. Transparency International ranked Singapore the 7th least corrupt country in the world, and the least corrupt in Asia, in 2014.[58] In the same year, Singapore's gross domestic product (GDP) PPP[59] per capita was ranked third in the world at Int$82,762 international dollars, according to the International Monetary Fund.[60] The United States, for comparison, is ranked 10th on the list at Int$54,597.[61] Even when comparing nominal GDP per capita in 2014, Singapore's ranking of 8th in the world at US$56,319 just outdoes the United States' 9th place rank at US$54,596.[62]

Singapore has also achieved a level of competitiveness on par with other first-world countries – even outranking them in many capacities. Singapore placed 3rd in the 2014 World Competitiveness Ranking by the International Institute for Management Development (IMD) with a score of 90.966/100[63] and 2nd in the 2014-2015 World Economic Forum Global Competiveness report.[64] In both 2014 and 2015, the World Bank Group rated Singapore as number 1 in the world for ease of doing business.

Though Singapore was number 6 for ease of starting a business, few Singaporeans seemed interesting in starting new enterprises.[65] Other elements of the 'ecosystem' seemed to hamper such efforts anyway. Venture capital in Singapore for startups in the technology sector, for example, totaled only US$1.71

[57] http://www.heritage.org/index/country/singapore
[58] http://www.transparency.org/cpi2014/results
[59] Purchasing Power Parity
[60] World Economic Outlook Database, International Monetary Fund. April 2015.
[61] World Economic Outlook Database, International Monetary Fund. April 2015.
[62] World Economic Outlook Database, International Monetary Fund. April 2015.
[63] http://www.imd.org/uupload/IMD.WebSite/wcc/WCYResults/1/scoreboard_2014.pdf
[64] http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf
[65] http://www.doingbusiness.org/data/exploreeconomies/singapore

billion in 2013 compared to China's approximately US$5.5 billion.[66] (For a comparison of national venture capital investments versus R&D spending for select countries, see Exhibit 14.)

According to 2013-2014 statistics from the Global Entrepreneurship Monitor (GEM) as outlined in the table below, Singapore falls behind its competitors in the realm of entrepreneurship. A recent article in the Wall Street Journal reports that there is "insufficient entrepreneurial spirit among young Singaporeans,"[67] and the Global Entrepreneurship Monitor reports in their 2013 Singapore Report that "only 19.6% of Singapore respondents reported having received some form of entrepreneurship training at some point in their lives."[68]

Indeed, the number of entrepreneurs in Singapore is quite small and most are to be found in one of the 21 accelerators or incubators funded by the NRF through seed programs like the Technology Incubation Scheme or Early Stage Venture Fund. This includes NUS Enterprise's 'Plug-In@Blk71', an incubator run by the arm of NUS dedicated to entrepreneurial education.

**Table.II: Key Indicators, Global Entrepreneurship Monitor**[69]

| | Singapore | | | United States | |
|---|---|---|---|---|---|
| **Indicator** | 2013 | 2014 | | 2013 | 2014 |
| Established Business Ownership Rate | 4.2 | 2.9 | | 7.5 | 7.0 |
| Total early-stage Entrepreneurial Activity (TEA) | 10.7 | 11.0 | | 12.7 | 13.8 |
| Nascent Entrepreneurship Rate | 6.4 | 6.4 | | 9.2 | 9.7 |
| Entrepreneurial Intention | 15.1 | 9.4 | | 12.2 | 12.1 |

To tackle the limited rate of entrepreneurial activity, the Singaporean government has recognized the need to fill some of the financial investment gaps present in the startup sector and has started implementing programs to facilitate funding. In the 2015 government budget, a large section on "Investing in Innovation and Internationalisation" describes "Productivity and Innovation Credits"

[66] http://www.wsj.com/articles/SB10001424052702304071004579406393779804868
[67] http://www.wsj.com/articles/SB10001424052702304071004579406393779804868
[68] Global Entrepreneurship 2013 Singapore Report, page 13.
[69] http://www.gemconsortium.org/key-indicators

(PICs) which make it easier for small- and medium-sized enterprises (SMEs) to apply for R&D tax credits and "Capability Development Grants" which allows those SMEs to apply for funding for innovation projects[70].

In addition, the budget details increasing the "co-investment cap for Startup Enterprise Development Scheme (SEEDS)".[71] Founded in 2001, SEEDS is a startup investment fund run by SPRING, an enterprise development agency under Singapore's Ministry of Trade and Industry.[72] Startups can receive matching funds through SEEDS "dollar-for-dollar up to a maximum of $2 million"[73] to complement private investments they have already raised. Also, Singapore has established the Global Investor Programme, an arrangement under which million-dollar investors may earn themselves status as a permanent resident if they plan to start a business or invest substantially in Singapore.[74]

The Global Investor Programme is not the only visa program that Singapore has established to help itself become an innovation-driven ecosystem. The government is also purposely attempting to attract talented international entrepreneurs who have the potential to generate IDEs: to that end, they have set certain requirements that must be met in order for foreigners to prove their intentions and capabilities. For example, the "EntrePass," launched in 2004,[75] is a one-year renewable work visa which immigrants may apply for only if their company is under six years old, has at least $50,000 in capital, and meets one of the four following criteria: 1) has funding from a government-accredited venture capital firm, 2) holds intellectual property, 3) has research ties with A-STAR or a university, and 4) is located at a government-supported incubator.[76]

As Singapore sits now as one of the most competitive and prosperous states in the world in 2015, where should it begin to invest to bring out the entrepreneurial spirit in its citizens? With the passing of its founder, Lee Kuan Yew,

[70] http://www.singaporebudget.gov.sg/budget_2015/pd.aspx
[71] http://www.singaporebudget.gov.sg/budget_2015/pd.aspx
[72] http://www.spring.gov.sg/About-Us/Pages/spring-singapore.aspx
[73]http://www.spring.gov.sg/Nurturing-Startups/SEEDS/Pages/spring-start-up-enterprise-development-scheme.aspx
[74] http://www.edb.gov.sg/content/dam/edb/en/why%20singapore/entering-singapore/GIP-Global-Investor-Programme-Factsheet-EN.pdf
[75] http://www.guidemesingapore.com/relocation/work-pass/singapore-entrepreneur-pass-guide
[76] http://beta.mom.gov.sg/passes-and-permits/entrepass/eligibility

and its 50th anniversary of independence, both in 2015, Singapore was clearly at a turning point. What sustained investment or additional programs can the government, or other stakeholders, implement to aid the IDE growth that Singapore has begun to see? Singapore is a world-class example of driving innovation; how can it use this comparative advantage to leverage stronger, sustained entrepreneurial activity?

## EXHIBITS

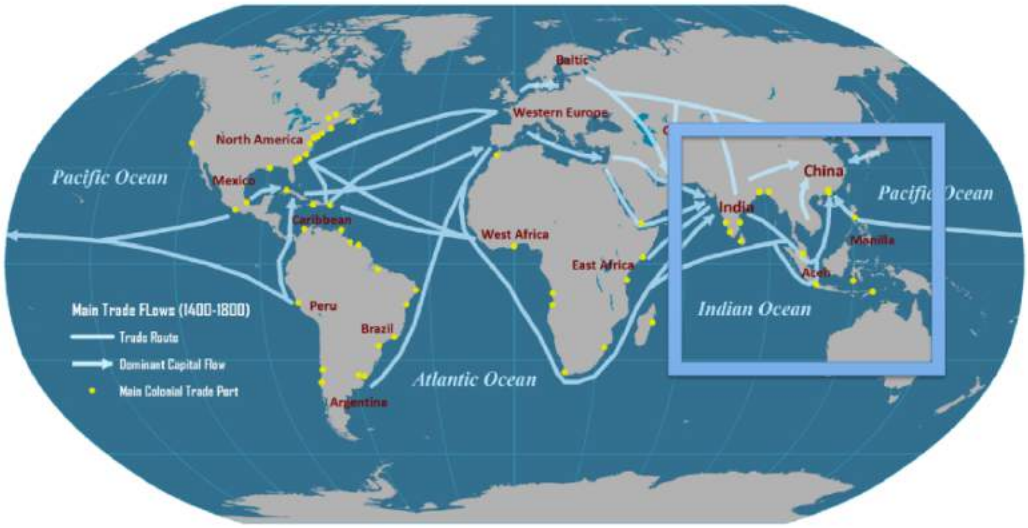


Exhibit 1: Major World Trade Flows, 1400-1800 (Emphasis: Southeast Asia)

(Source: http://people.hofstra.edu/geotrans/eng/ch5en/conc5en/tradeflows14001800.html)


Exhibit 2: Southeast Asia showing Strait of Malacca (Inset from Exhibit 1)

(Source: https://theworldismysterious.wordpress.com/2013/10/02/the-legend-of-the-s-s-ourang-medan/)


Exhibit 3: Singapore's Location Relative to Malaysia and Indonesia

(Source: http://www.ed-u.com/sn.html)

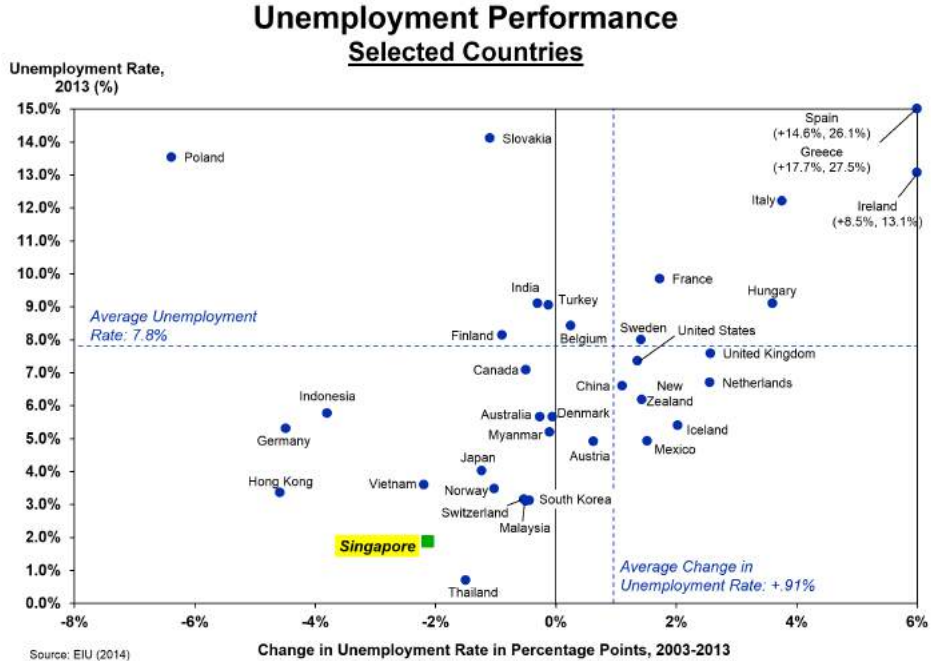


Exhibit 4: Unemployment Performance, Selected Developing Countries

(Source: EIU, 2014)

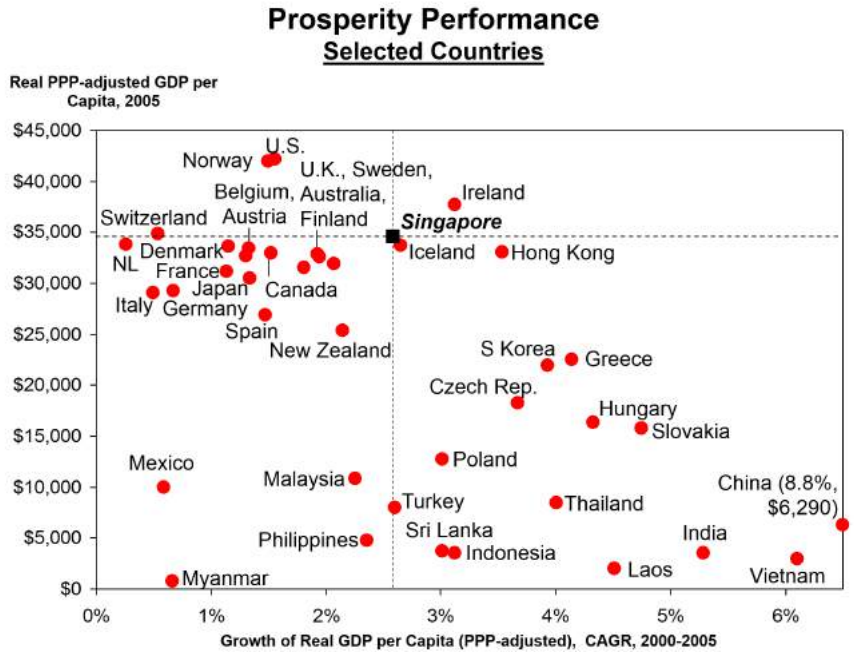


Exhibit 5: Prosperity Performance, Selected Countries, 2000-2005 (Source: Michael Porter, 2006.)

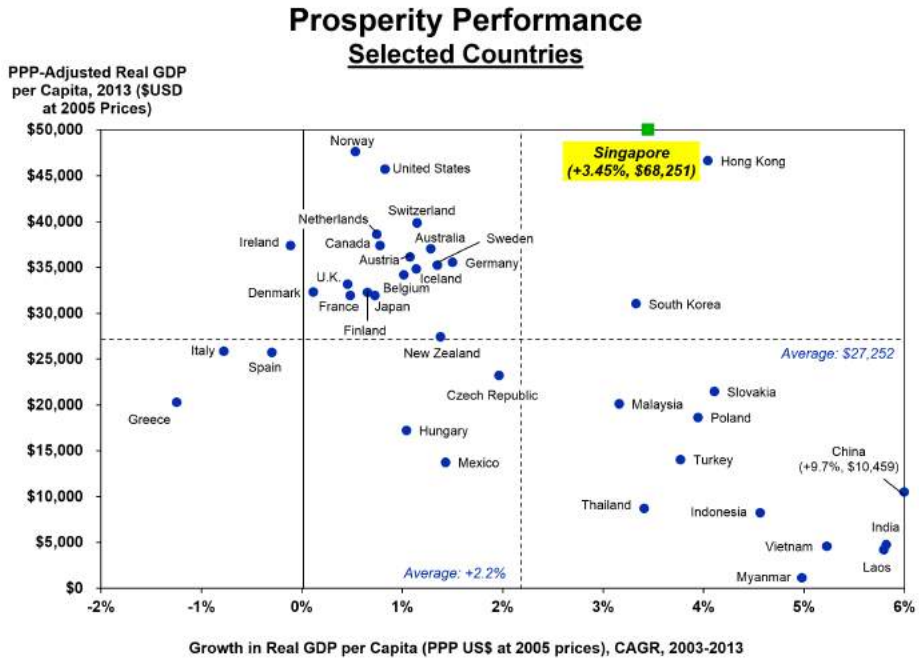


Exhibit 6: Prosperity Performance, Selected Countries, 2003-2013 (Source: Michael Porter, 2015.)

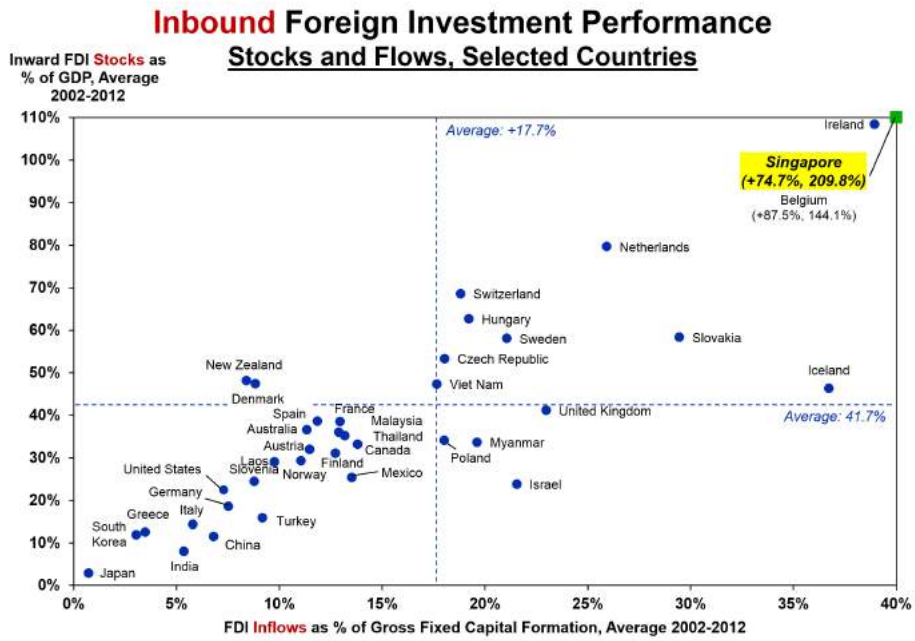


Exhibit 7: Foreign Investment Stocks and Flows, Selected Countries (Source: UNCTAD, World Investment Report 2013)

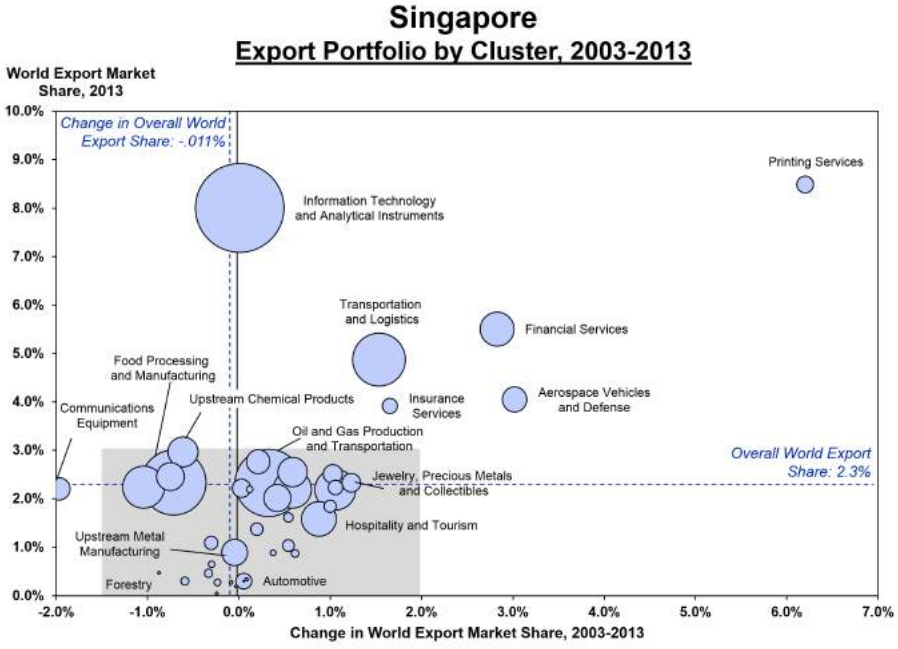


Exhibit 8: Singapore Export Portfolio by Cluster, 2003-2013 (Source: Michael Porter, International Cluster Competitiveness Project)

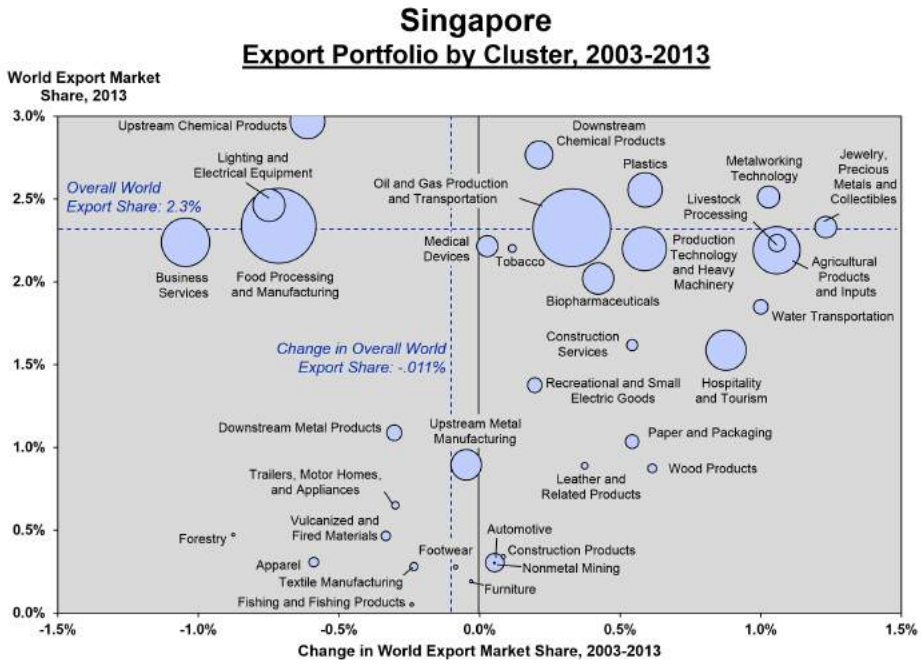


Exhibit 9: Singapore Export Portfolio by Cluster, 2003-2013 (continued) (Source: Michael Porter, International Cluster Competitiveness Project)

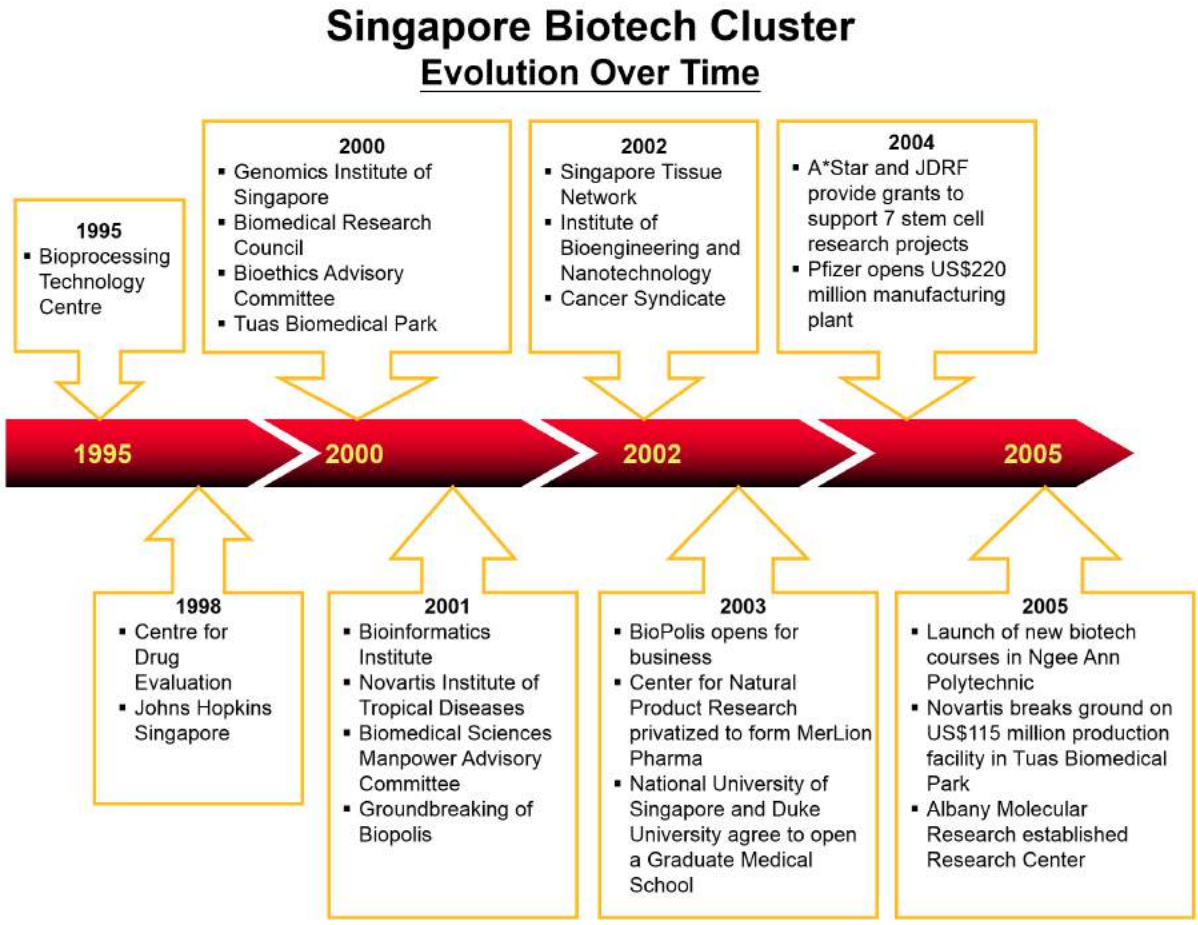


Exhibit 10: Singapore Biotech Cluster Timeline (Source: Research by HBS student teams – Li-Mei Chee, Kola Luu, Gopal Raman, Hwee Yee Yong, 2005.)

Exhibit 11: view of "Biopolis"
(Source: http://www.a-star.edu.sg/Biopolis-Fusionopolis/A-Great-Place-to-Work-Live-Play/Biopolis.aspx)

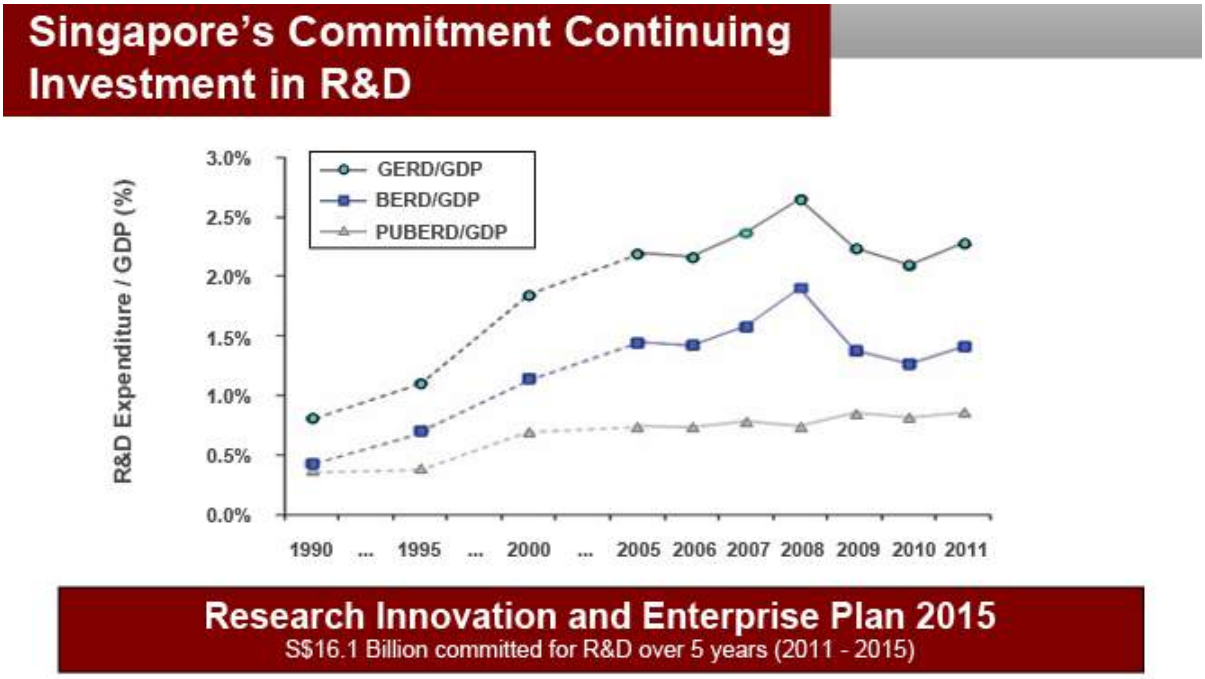


Exhibit 12: Singapore's Commitment: Continuing Investment in R&D

(Source: http://www.nrf.gov.sg/research/r-d-ecosystem/r-d-investments)

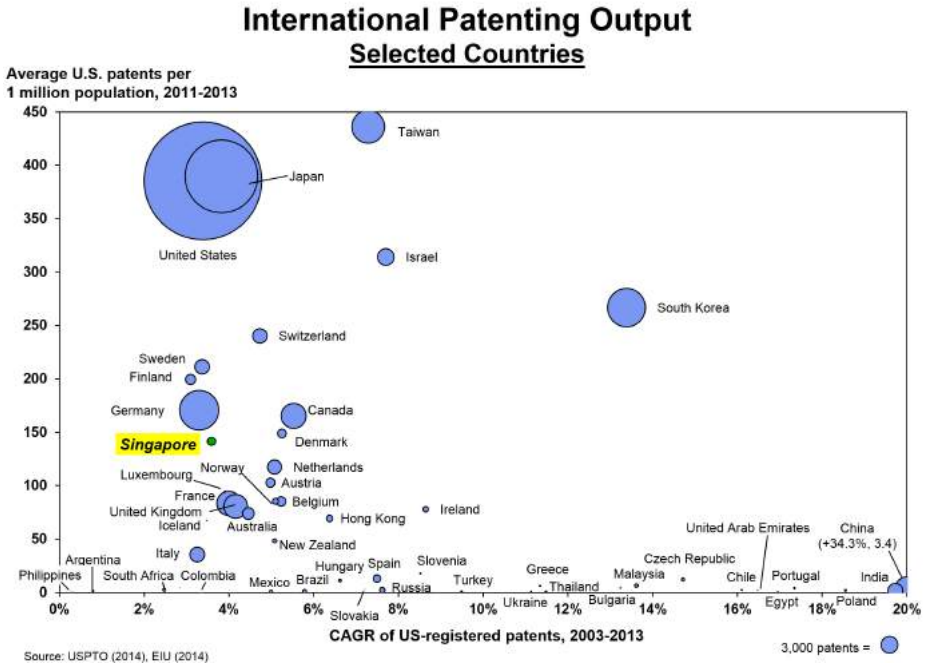


Exhibit 13: International Patenting Output Selected Developing Countries

(Source: USPTO and EIU, 2014)

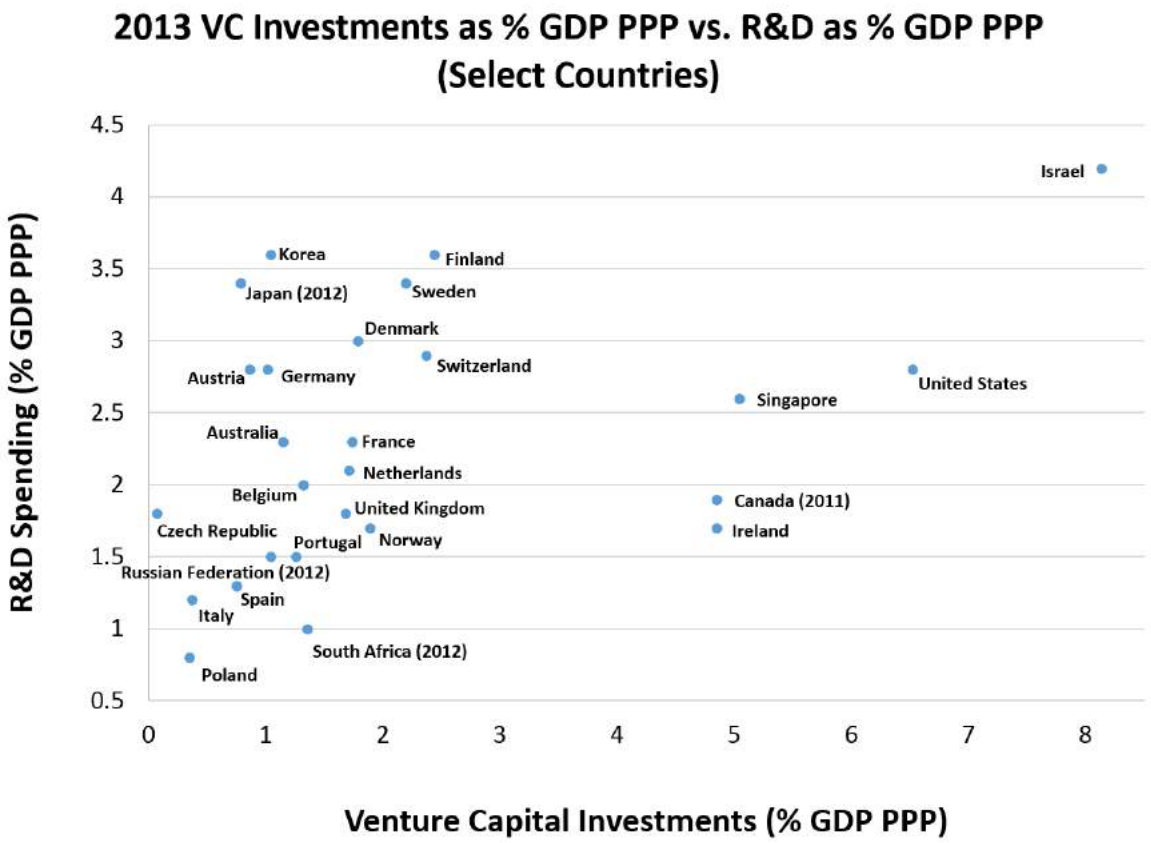


Exhibit 14: 2013 Venture Capital Investments as % GDP vs. R&D Spending as % GDP, Selected Countries

(Sources: OECD. Venture Capital Investments, 2013. http://www.oecd-ilibrary.org/industry-and-services/entrepreneurship-at-a-glance-2014/venture-capital-investments_entrepreneur_aag-2014-table90-en
Battelle. 2014 Global R&D Funding Forecast. http://www.battelle.org/docs/tpp/2014_global_rd_funding_forecast.pdf
SVCA. Preqin and SVCA Special Report: Singapore and ASEAN Private Equity. http://svca.org.sg/wp-content/uploads/2014/04/Preqin_SVCA_Special_Report_Singapore_ASEAN_Private_Equity_April_2014.pdf)

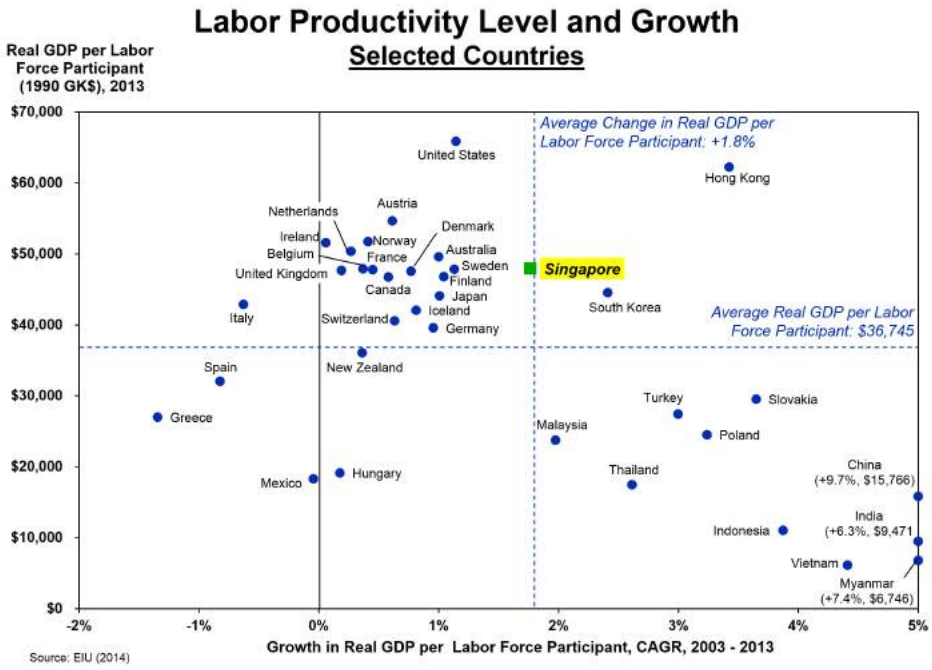


Exhibit 15: Labor Productivity Level and Growth, Selected Countries (Source: EIU, 2014)