



THE ROAD TO SINGAPORE'S FUTURE ECONOMY

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Summary

Looking into the future, it is hard to ignore the rise of new superpowers and neighbouring emerging economies, along with the sweeping digital revolution that are changing our economic landscape. Pushing Singapore's status and value higher up in the global production chain requires us to embrace the "known unknowns" and explore the "unknown unknowns".

Here, the proposed framework involves a four-prong approach that addresses the challenges and policies

towards an enterprising future economy. Firstly, *transforming the infrastructure* domestically lays the foundation for booming industries through interdisciplinary collaborative clusters; and leverages on pioneering cyber-systems of industrial revolution 4.0 for sustainable urban development as a world-class smart nation. Secondly, *transforming the workforce* is at the heart of a knowledge-based economy, through strengthening corporate capabilities and better job-skill matching by the creation of an internship culture in the education system. Building infocomm expertise and senior-junior sharing hubs will continue to advance the competencies of our workforce. Thirdly, *transforming innovative industries* revitalises "sunset" maritime

and electronics industries rivalled by neighbouring economies or global changes; specialize and expand emerging aviation, healthcare and environmental industries; and forge novel future growth industries of robotics, big data analytics and space technology.

Lastly, *enhancing connectivity and internationalisation* bring the expertise and products of local corporations to future growth economies, simultaneously attracting global market leaders in establishing the aforementioned new creative clusters. The move from value-adding to value-creation is a hallmark of Singapore's future economy, a vision that extends beyond the conventional, constantly adapting against the headwinds of financial recessions and industrial slump. It is one that involves the tripartite synergy of government, corporations and employees. It is one that realizes the seemingly utopian fantasy of a sustainable, exceptional and equitable economy.

Introduction

The vicissitudes of the global economy is the only constant, and those comfortable with the status quo will only regress. Heading into the next 50 years, shifting global powers and the advent of a technological era are inevitable. Singapore as a maritime nation may be undermined by the plausibility of the Kra Canal and opening of the arctic sea route; while existing manufacturing industries could be displaced by cheaper alternatives in emerging economies. The future quandary of carving an eminent position for Singapore on the world stage must be tackled henceforth with a far-sighted vision and perceptive policies. It is exigent to set in motion a radical transformation of Singapore's domestic infrastructure, workforce and innovative industries, complementing the enhancement of connectivity and internationalisation.

Transforming the Infrastructure

(Industrial and Urban Development)

Investments in infrastructure is not just an economic stimulant but rather a strategy, a cornerstone for scaling long-term growth. It encompasses both the physical aspects of industrial parks and commercial clusters,



Fig. 1 Urban Redevelopment Authority's projection of commercial and industrial clusters by 2030

and a digitally smart nation using cyber-systems to drive efficiency and sustainability.

Highly concentrated industrial parks and commercial clusters need to facilitate multidisciplinary approaches in the development of new products and services. Past projects provide external economies of scale, such as the Jurong Island¹ and One-North cluster², which till today attract much committed foreign direct investments.

As Singapore continues to inch up the value chain of production and

enhance existing industries through new infrastructure programs, economies of scale reaped will focus on the exchange of information and ideas rather than the prevailing logistics, production, transportation or financial services. The paradigm shift to a value-creating economy³ will emphasise on creating ecosystems conducive for interaction and innovation to further our knowledge-based economy. "Cooperative platforms' for different business clusters can collaborate with one

¹ Jurong Islands is a model of industry integration. Companies share common facilities and infrastructure and can buy and sell feedstocks and products literally "off the fence"
² Developments such as the JTC Surface Engineering Hub and JTC nanoSpace @ Tampines, which come with shared facilities and services that have helped our customers reduce upfront capital investments and also tap economies of scale to save up to 20% of operating costs
³ A value-creating economy focuses more on new possibilities and opportunities, and on innovation and differentiation. It competes on the basis of special capabilities. To do so, we have to build deep capabilities and linkages, in our companies, in our industries and in our economy, to create new products and deliver better solutions, in cost-effective, innovative ways



Fig. 2 Infocomm Development Authority's framework of a Smart Nation

another and maximise capabilities,” said Finance Minister Heng⁴. The upcoming Jurong Innovation District marks the onset of these platforms, but our future cluster hubs will ride on becoming ever more interdisciplinary and cross-industry⁵. Catalysts of innovation will be seen with the proximity of Biopolis, Fusionopolis and Mediapolis; thereafter inspiring more cross-industry programmes for instance between the Punggol Creative Cluster and Tuas Biomedical Park⁶.

Convergence of lateral arts thinking and cognitive scientific rigour opens up multifarious innovations. Finding the right combination of talent for innovation to take place is an enigma, but having the right facilities at the right places are nonetheless important catalysts for creativity and collaboration.

The success of Singapore is owed to far-sighted policies which avoid instant gratification of popular vote or mediocre standards; and being

the world's first smart nation tackles future global challenges, having far-reaching impacts on the economy and our lifestyle.

Liberalisation of the retail electricity market and user-friendly analysis of energy usage enables households to manage consumption efficiently, coupled with renewable energy generation atop every housing block to achieve greater sustainability. Making driverless cars mainstream and having smarter tracking and communication systems along roads and public transport lines enhance mobility in areas of high urban densities. With an ageing population, fall sensors and calibrated medicine dispensers ensure the safety of senior citizens at home, while fostering the maturity of precision medicine with big data analytics increase the efficacy of therapy and treatments in healthcare institutes.

The move to a smart nation equally involves political and social efforts for success. Public-private partnerships amongst statutory boards, research institutes, MNCs and GCCs⁷ must be deepened to ensure a robust talent pool and seamless information sharing, deploying technologies⁸ that can be readily adopted to ensure broad impact. A strong focus on inclusivity

⁴ M. L. (2015, October 29). Five future challenges for Singapore economy. The Straits Times. Retrieved March 10, 2016.

⁵ Besides hosting the entire value chain for global companies in the manufacturing sector, including R&D, design, prototyping, production and supply chain management, JID will also bring together talent from academia, R&D, industry and enterprises from within the District and the vicinity within a conducive environment that facilitates innovation. Spring Singapore. (n.d.). Collaborative Industry Projects (CIP).

⁶ The network of A*STAR's research institutes and other public and private research bodies at Fusionopolis, as well as the robust biomedical sciences expertise built up at Biopolis, are emblematic of the Government's commitment to transform Singapore into a knowledge-based, innovation-driven economy

⁷ Multinational Corporations (MNC) and local Globally Competitive Corporations (GCC). For instance, the I2R – McLaren Applied Technologies Joint Laboratory partnership will explore predictive analytics, modelling and simulation for the transportation, energy, healthcare and wellness industries. Institute for Infocomm Research (I2R)

⁸ Fosta, a vibration and noise monitoring company for the building and construction industries, installed a new remote vibration monitoring system that was jointly developed with I2R that will increase productivity by 50%.

and equity⁹ also wins the hearts of Singaporeans as smart consumers who play a key role in the interaction and testing of projects.

Transforming the Workforce

(Jobs, Skills and Corporate Capabilities)

The changing demographic landscape warrants an avant-garde approach towards our future labour force, invariably shaped by the imminent silver tsunami¹⁰. While a continual push of the retirement age has its limits, leveraging on the expertise and experience of senior retirees allows for greater productivity and achieving a mastery of skills. Sharing hubs together with ad hoc workshops can be effectively facilitated on industry cluster platforms, enhancing the learning curve of juniors in the workforce.

A sized-down yet knowledge-centred workforce with a Singaporean core is the penultimate goal down the road. With increasing automation in manufacturing, construction and almost every other sector, production capacity increases with higher capital intensity¹¹. Manpower can be further

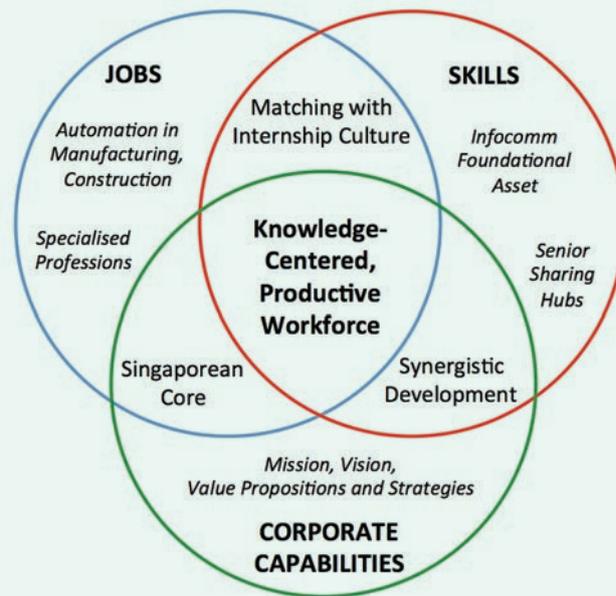


Fig. 3 Proposed framework for the transformation to a knowledge-centred, productive workforce

allocated to service sectors where more specialized skills are required. On a whole, infocomm expertise should be a foundational asset all should have in order to boost productivity. Apart from occupational restructuring, a bottom-up approach should be taken, adapting the educational system to more technical and digital skill applications, fuelling a new wave of emerging digital champions¹² paramount for an adaptable workforce to the ever-changing global economic

winds. Forging an internship culture amongst youths will be a stable stepping stone towards a more effective match of jobs and skills, unlocking a virtuous cycle between demand and supply. Education is the forerunner of economic growth, bridging the eminent and prevalent inequalities across developed economies.

Moreover, the synergy between corporate capabilities¹³ and skills development must be sought after and

⁹ Minister for Communications and Information and Minister-in-charge of Cyber Security and Muslim Affairs, Dr Yaacob Ibrahim, shared that, "Through this concerted effort, we seek to enable more seniors to do things they never imagine they could do, in making their daily lives more convenient through technology. More importantly, to empower communities to look out for and help one another."

¹⁰ Wen, W. K. (2013). Futures of Ageing in Singapore. *Journal of Future Studies*, 17(3)-A051, 81-102. Retrieved from <http://www.jfs.tku.edu.tw/wp-content/uploads/2013/10/173-A051.pdf>

¹¹ Capital intensity (i.e. capital per worker) and labour quality improvements supported productivity growth from 2009 to 2013. Wei, G. T., & Li, F. S. (n.d.). Drivers of labour productivity growth trends in Singapore. *Economic Survey of Singapore 2014*, 78-86. Retrieved from https://www.mti.gov.sg/ResearchRoom/SiteAssets/Pages/Economic-Survey-of-Singapore-2014/FA_AES2014.pdf

¹² C. C., & Rong, T. Z. (2015). ASEAN surprises. *Future Tense 3rd Edition*. Retrieved from [https://www.mti.gov.sg/ResearchRoom/SiteAssets/Pages/Future-Tense-\(Third-Edition\)/Future-Tense-3rd-Edition.pdf](https://www.mti.gov.sg/ResearchRoom/SiteAssets/Pages/Future-Tense-(Third-Edition)/Future-Tense-3rd-Edition.pdf).

¹³ As business seeks to create value, developing both corporate capabilities and people strengths must go hand-in-hand, said Finance Minister Heng Swee Keat.

recognized by all as a plausible panacea to stagnating productivity levels. Employees should be imbued with the corporate vision and mission statements, even to the finest form of collective conception with the leadership team. A value-creating economy also requires a less controllable attribute — creativity. The government must encourage risk taking and innovation as corporate culture, not policy. This can be achieved through encouraging innovative risk taking by rewarding employees suitably and engaging in multiple test projects simultaneously¹⁴. Only then can a workforce with a passionate drive to progress and contribute effectively be built.

Transforming Innovative Industries

(Building Future Growth Industries through Innovation)

With traditional economic powerhouses of the maritime¹⁵ and manufacturing¹⁶ industries amongst others facing strong headwinds ahead, it is imperative to look into expanding emerging growth industries and creating new clusters. Nevertheless,



Fig. 4 Establishing port hubs along the Northern and Southern maritime routes

a “there are no sunset industries, only sunset thinking”¹⁷ approach will send Singapore materializing measures that revitalize industries with unsatisfactory progress. Our expertise in maritime trade can be further extended to establishing port hubs along the Suez Route and even the Northern Sea Route, providing leadership and management services to arctic council member states. The city will also become a centre of maritime architecture¹⁸ and green maritime technology to complement its lead in the legal and financial aspects. The numerous electronics manufacturing factories for semiconductors and wafers are advantageous platforms for

home-grown innovators of Singapore-designed-and-made smartphones and its likes to easily overcome the high initial capital cost and punch above our weight.

Moving to the various emerging industries¹⁹, Singapore’s geographical advantage and edge in technological advancements has placed her aviation industry on a springboard to global status. New terminals and superior control tower facilities can be laid to accommodate tighter air traffic; specialized logistic capabilities explored from the current cold chain niche to chemicals and reactive materials; aerospace engineering moving into innovative technologies from maintenance, repair and overhaul.

¹⁴ There needs to be an open market for talent, ideas and capital. This ensures that employees can test their ideas and be rewarded for it according to merit and market viability. The greater the number of such projects, the higher the chances of innovative breakthroughs.

¹⁵ Emerging new sea routes such as the Arctic passage and possible new developments such as the Kra Canal are unlikely to supplant existing trade routes any time soon. But these mean port cities have to look carefully at the potential implications for them, said chief executive officer of Maritime and Port Authority of Singapore (MPA) Andrew Tan.

¹⁶ Singapore faces high costs, stagnant productivity and an ageing workforce in a slowing global economy. And it’s likely to get tougher for manufacturers to survive in a “business as usual” mode.

¹⁷ Singapore Budget 2016. (2016, March 24). Budget Speech. Retrieved from http://www.singaporebudget.gov.sg/budget_2016/pb.aspx

¹⁸ Maersk, for instance, the world’s biggest container operator, might have moved most of its regional container operations to the cheaper Tanjung Pelepas. But it has set up its biggest ship design office in Singapore, from where its “global stowage centre” directs the movements of all its containers throughout the world. R. (2011, July 31). Asian Ports: Containing the competition. *The Economist*. Retrieved from <http://www.economist.com/blogs/schumpeter/2011/07/asian-ports>

¹⁹ Refer to Appendix A for a study with information and statistics done on industries in Singapore

Embracing the newfound mantra of value-creation over value-adding marks the new phase of economic growth. In the healthcare industry, medical tourism should continue to boost from continually advancing state-of-the-art healthcare facilities, while the pharmaceuticals and biotechnology sectors hold closer collaboration with research institutes to design novel and efficacious treatments. The impetus of lacking a hinterland and striving for a “City in a Garden” has delivered world-class technologies in the environmental and water industry. Our more robust and dynamic techniques for water purifications and harnessing the renewable energy will indubitably lead the world in a time of an environmental conundrum. Moreover, embracing corporate social responsibility in the economic ethics by alleviating the water and energy needs of underdeveloped nations will only serve to enumerate greater economic value²⁰.

Heading towards the fourth industrial revolution, creating new clusters is fundamental to proliferating the economic value of Singapore internationally. Cyber-

physical systems²¹ will be pioneered in our smart nation projects, ranging from traffic control and energy usage that revolutionizes the future of cities. Applications into the manufacturing factories also brings greater prospect and optimism to the current productivity slump. Building upon the ingenuity of our research institutes, creating economic growth from the robotics cluster adds another boost to productivity and innovation, where Singaporean versions of Watson²² and AlphaGo²³ transform the landscape of the man-machine mutuality. Apart from hardware, honing the infocomm expertise is key to facilitating a “silicon valley” type entrepreneurship base in Singapore, innovating disruptive technology such as artificial intelligence and services in the sharing economy. Furthermore, delving deeper into the big data analytics industry complements and provides an acute understanding of the economic value added by the aforementioned industries, notably supporting the growth of our financial services sector. Looking at the potential and development of space technology in the superpowers,

Singapore should strengthen the research capabilities from NTU to A*STAR and NUS, accommodating designing and launching of satellites that have a plethora of applications in communications, geological and space exploration and asteroid materials.

Enhancing Connectivity and Internationalisation

(Investing in Future Growth Markets)

Connectivity has been and will continue to be the bedrock of Singapore’s economy, being inextricably linked to globalisation, regional economic development, tourism and national competitiveness. Being import-reliant and export-oriented, integration with the global economy as a maritime and aviation hub provides access to the international flow of goods and services, talent, technology and ideas²⁴. Developing the aviation industry with new upcoming terminals is an irresistible platform to meet new market demand, having air cargo as a reliable and efficient transportation of high-value and time-critical goods²⁵. Both manufacturing exports and the

²⁰ Corporate social responsibility has been shown to have a positive correlation with economic growth, as concluded by a study from the Journal of Policy Modelling

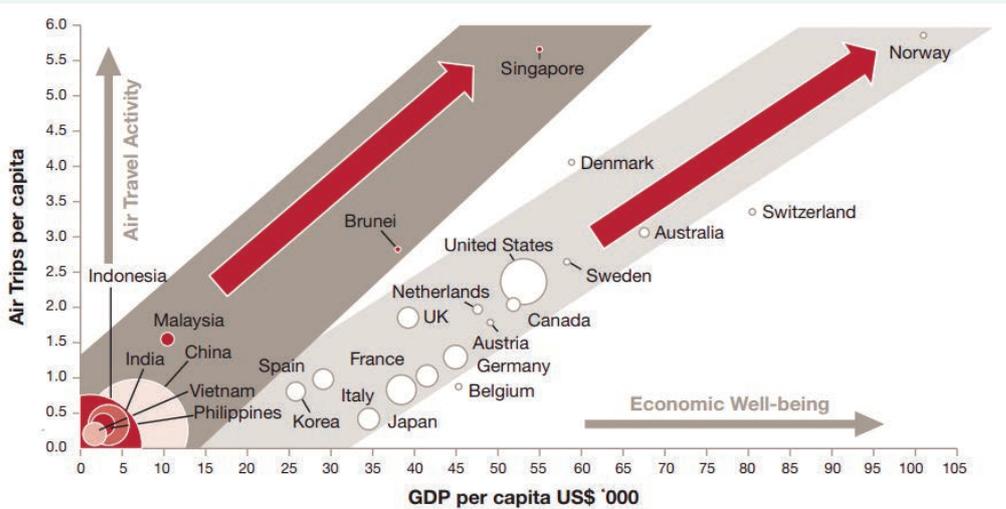
²¹ Cyber-physical systems are defined as an integration of networking, computation and physical processes where collection of data and feedback loops provide vital information for the particular system

²² IBM’s Watson is a cognitive system that transforms the partnership between man and machine, having applications in medical diagnosis and pharmaceutical dispensation

²³ Google’s cognitive system which beat world’s best professional player in the game of Go as part of Google’s Deep Mind Challenge, marking the progression into a new stage of artificial intelligence

²⁴ Economic Performance of the Airline Industry. (n.d.). *IATA-Economic-Performance-of-the-Industry-mid-year-2015-report*. Retrieved from <http://www.iata.org/whatwedo/Documents/economics/IATA-Economic-Performance-of-the-Industry-mid-year-2015-report.pdf>

²⁵ In relation to trade in goods, air cargo is a quick and efficient means of transporting goods around the world, which makes economic sense in relation to the transport of many goods, primarily those that are high-value, low weight or time critical. As the Discussion Paper notes over 75% of the UK’s non-EU exports of optical photographic, medical and surgical equipment are exported by air. As a consequence every single flight to India and China from Heathrow has a very high export value



Note: Air Trips per capita is calculated as number of departing passengers divided by total population.
 Source: The World Bank, Strategy & analysis

Fig. 5 Relationship between connectivity (air trips per capita) and economic well-being (GDP per capita)

booming MICE industry²⁶ will be given a boost. Transport can alter the accessibility of firms in an area to other firms and workers, thereby affecting the level of agglomeration²⁷. The expansion of airport and associated increase in connectivity (for example, through long-haul flights) would fundamentally change the ability of businesses to connect globally with countries such as China²⁸. Leveraging on the global

‘pivot to Asia’, Singapore will act as the gateway to the emerging Southeast Asia economic prowess, shaping regional and global trade routes²⁹. Apart from the physical aspect, digital connectivity with infocomm capabilities also positions Singapore as an innovation hub that positively influences long-run productivity, facilitating business interactions and global occupational matching.

As globalization presents

its double-edged ramifications in recurring financial crises, diversification and forging international partnerships is vital for the progress of Singapore. Amongst the developed nations fraternity, new clusters can be created under the guidance and research collaboration with the respective strongholds: space exploration expertise of the United States, automation and artificial intelligence industry from Japan as the robotic powerhouse and South Korean biotechnology and technopreneurship. Strengthening trade relations with the rising Chinese superpower by being part of the “One Belt, One Road” initiative and AIIB³⁰ further allows expansion of exports to the transforming consumer-driven economy. The ubiquity of “designed in Singapore” goods in the global market becomes the hallmark of a knowledge-based innovative economy.

By the same token, investments in developing nations facilitates the internationalization of our local SMEs, together with the export of Singaporean expertise in urban planning and environmental water technologies. Borrowing the success

²⁶ MICE is an acronym for the Meetings, Incentives, Conventions and Exhibitions tourism segment. This is therefore a business-oriented segment, involving obligatory (or non-discretionary) travel.

²⁷ The term “agglomeration” refers to the concentration of economic activity over an area. Agglomeration impacts arise because firms derive productivity benefits from being close to one another and from being located in large labour markets.

²⁸ Airports Commission. (2015, July). Economy: Wider Economic Impacts Assessment. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/439681/economy-wider-economic-impacts-assessment.pdf.

²⁹ The ‘pivot to Asia’ continues in the aviation industry, following strong economic and population growth patterns — not only increasing the Asian links to the world but, significantly, building connectivity throughout regional and domestic markets.

³⁰ “One Belt, One Road” is a 21st century maritime Silk Road trading route while the Asian Infrastructure Investment Bank is a multilateral development bank that aims to develop the infrastructure in Asia.



Fig. 6 Artist impression of Singapore's urban planning master plan for Andhra Pradesh, envisaged to be replicated in various other developing nations around the globe

Integrated Infographic

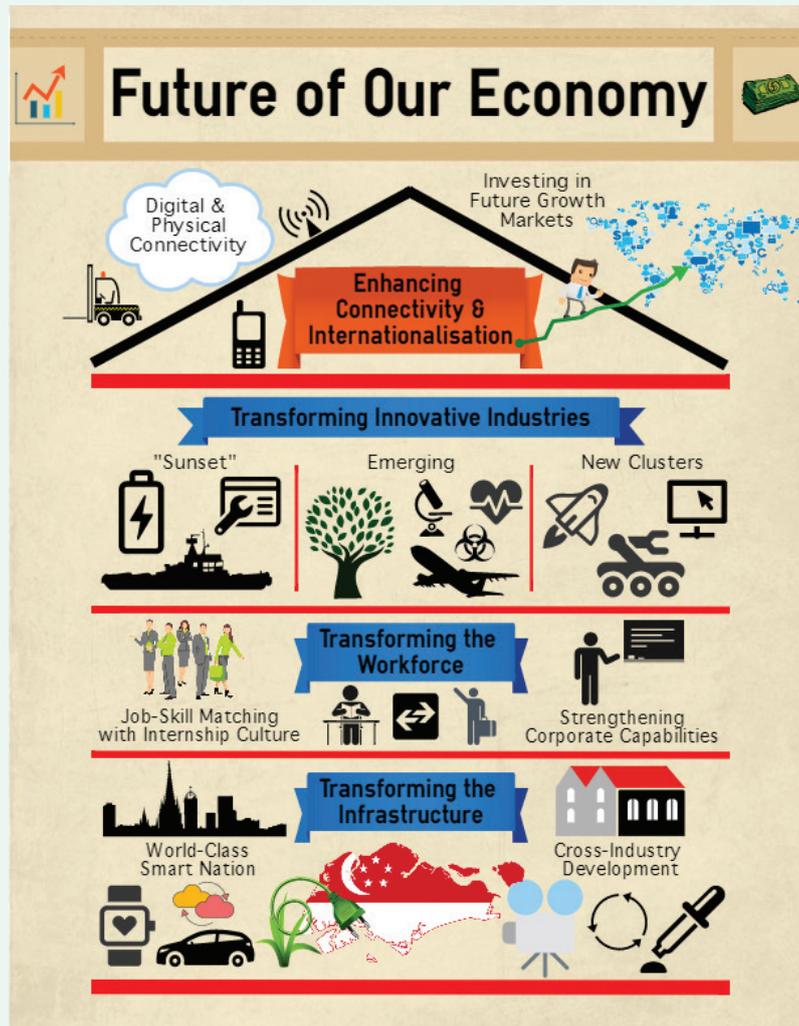


Fig. 7 Proposed framework for the transformation of Singapore's future economy

of the Tianjin Eco-city, Suzhou³¹ and Bangalore industrial parks and the coming development of Andhra Pradesh, Singapore can look forward to seeing sprouting cities in Myanmar, Brazil, and even Africa with the flavour of local infrastructure. Moreover, Singapore's smart nation technologies serve to corroborate and enhance her value and position in the global economic arena.

Conclusion

As with every spate of restructuring, the tripartite of government, corporations and workers plays a pivotal role in crystallising and realising the economic vision for Singapore. Public-private partnerships will be the key driver of inter-disciplinary and cross-

industry spaces, pushing towards a world-class smart nation and transforming infrastructure. Moulding a knowledge-based productive workforce hinges on communicating corporate capabilities to employees and matching skills to jobs. Risk-sharing by the government coupled with closer research collaborations will also ameliorate the innovation climate. With exceptional physical and digital connectivity, internationalizing emerging industry expertise and collaborating with global market leaders for new industrial cluster creation become a new norm for economic development. Ultimately, the future economy must embrace progressivism, social mobility and equity for posterity to relish.

³¹ Government-to-government projects towards sustainable development, innovation and entrepreneurship. Notably, the Singapore-Suzhou industrial park established in 1994 has reaped enormous economic benefits and success including being home to 91 of the Fortune 500 companies. The Tianjin-Eco City also acts as a platform for Singaporean GCCs to expand and internationalise their operations, showcasing their innovations to the world.

Appendix A

Table 1 Information and Statistics study of industries in Singapore

| Industry | Information and Statistics |
|---|---|
| Aerospace Engineering | <ul style="list-style-type: none"> • No.1 in Asia for Maintenance, Repair and Overhaul (MRO) • Host for leading international airshow • ST Aerospace and Goodrich; Rolls Royce; Pratt and Whitney (Seletar Aerospace Park) • \$8.7b output and 19,900 employment (90% skilled) in 2012 |
| Chemicals | <ul style="list-style-type: none"> • \$38b contribution to manufacturing • Trusted base for high-tech manufacturing, R&D and specialty chemicals • Jurong Island 2.0 as model for sustainable development (LPG terminal, multi-user power grid, gasification plant) |
| Cities, Infrastructure and Industrial (CII) Solutions | <ul style="list-style-type: none"> • 3 subclusters: Engineering services (37,000 employment and 1.2% of GDP), Controls & automation, Building solutions |
| Clean Energy | <ul style="list-style-type: none"> • Strong R&D with Solar Energy Research Institute of Singapore (SERIS) and Energy Research Institute @ NTU • NTU EcoCampus (with CleanTech Park) and Singapore Power Living Lab Platform • Renewable Energy Integration Demonstrator (REID), SolarNova, Floating Photovoltaic Systems (EDB & PUB), Punggol Eco-Town |
| Consumer Business | <ul style="list-style-type: none"> • Tapping into Singapore's consumer insights capabilities (Institute of Asian Consumer Insights); Innovate consumer goods for Asia, Protection of Intellectual Property |
| Electronics | <ul style="list-style-type: none"> • Bedrock of manufacturing sector, 5.3% of GDP in 2013, 28% of manufacturing output and 79,000 employment • Home to 9 of world's top 15 fabless semiconductor companies; silicon integrated circuit wafer fabrication plants; electronic manufacturing services (EMS) providers etc |

| | |
|--|---|
| Energy | <ul style="list-style-type: none"> • One of world's top 3 export refinery centres & Asia's premier hub for oil and gas, contributing almost 5% of GDP in 2007 • Grow refinery capacity (1.3m barrels/day), Fueling innovation with R&D, Solid Infrastructure (Jurong Rock Caverns) |
| Environment and Water | <ul style="list-style-type: none"> • 4 National Water Taps: Local catchment areas, Imported, reclaimed NEWater and Desalinated • Global Hydrohub with 180 companies • Local global players like Hyflux, Sembcorp Industries, United Envirotech, Boustead Salcon |
| Healthcare | <ul style="list-style-type: none"> • 4th best healthcare infrastructure • one-North Biopolis Medical Technology; Health and Wellness Programme Office (HWPO) with Healthcare Innovators Forum, Silver Community Test-bed Programme, National Grand Challenge (for obesity and prediabetes), Super-platforms • IHH Healthcare/Parkway, Fortis Healthcare International, International SOS |
| International Non-Profit Organizations | <ul style="list-style-type: none"> • Home to 140 INPOs, growing centre for philanthropic intermediaries and innovation, convenient point of assistance |
| Infocomm Products | <ul style="list-style-type: none"> • High-end manufacturing like high-end servers, ATMs, point-of-sale systems, networking equipment and smart cards • HP, Samsung Electronics, Alcatel Lucent, Bubble Motion |
| Infocomm Services | <ul style="list-style-type: none"> • More than 143,000 professionals; Global data management hub connected to 15 submarine cable systems; Home to more than 80 of top 100 software and services companies |
| Logistics and Supply Chain Management | <ul style="list-style-type: none"> • Global connectivity, secure and trusted logistic hubs, specialised logistic capabilities (Airport logistic park, Changi International LogisPark, Banyan LogisPark for chemicals), healthcare and cold chain logistics (Coolport@Changi) |

| | |
|-----------------------------------|---|
| Marine and Offshore Engineering | <ul style="list-style-type: none"> • \$12.9b output and 75,000 employment in 2011 • 70% of world's jack-up rigs and conversion of Floating Production Storage Offloading Units |
| Media and Entertainment | <ul style="list-style-type: none"> • \$23.9b revenue and 66,000 employment in 2009, Broadcast hub of Asia, Stable publishing and printing industries, Film-making industry • LucasFilm, Electronic Arts Inc, Sony Pictures Entertainment, Thomson Reuters |
| Medical Technology | <ul style="list-style-type: none"> • \$4.3b output and 9,000 employment in 2011 • Global Medical Technology Hub (Biotronik, Siemens Medical instruments), Manufacturing base (Life technologies), Industry-Ready • Workforce (Singapore-Stanford Biodesign Programme), Innovation Ecosystem (Bio*One Capital) • Moving ahead for ageing population and chronic diseases |
| Pharmaceuticals and Biotechnology | <ul style="list-style-type: none"> • Government initiatives like Translational & Clinical Research, Competitive Research Programme, Health Services Research Competitive Research Grants • GlaxoSmithKline, Lonza, Abbott, Novartis, Takeda • Tuas Biomedical Park and Biopolis |
| Precision Engineering | <ul style="list-style-type: none"> • \$18.3b output and 91,300 employed in 2009 • 2,700 companies including home-grown success Meiban Group Ltd |
| Professional Services | <ul style="list-style-type: none"> • World's easiest place to do business based on Global Competitiveness report • KPMG, Boston Consulting Group, Allen & Overy |

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