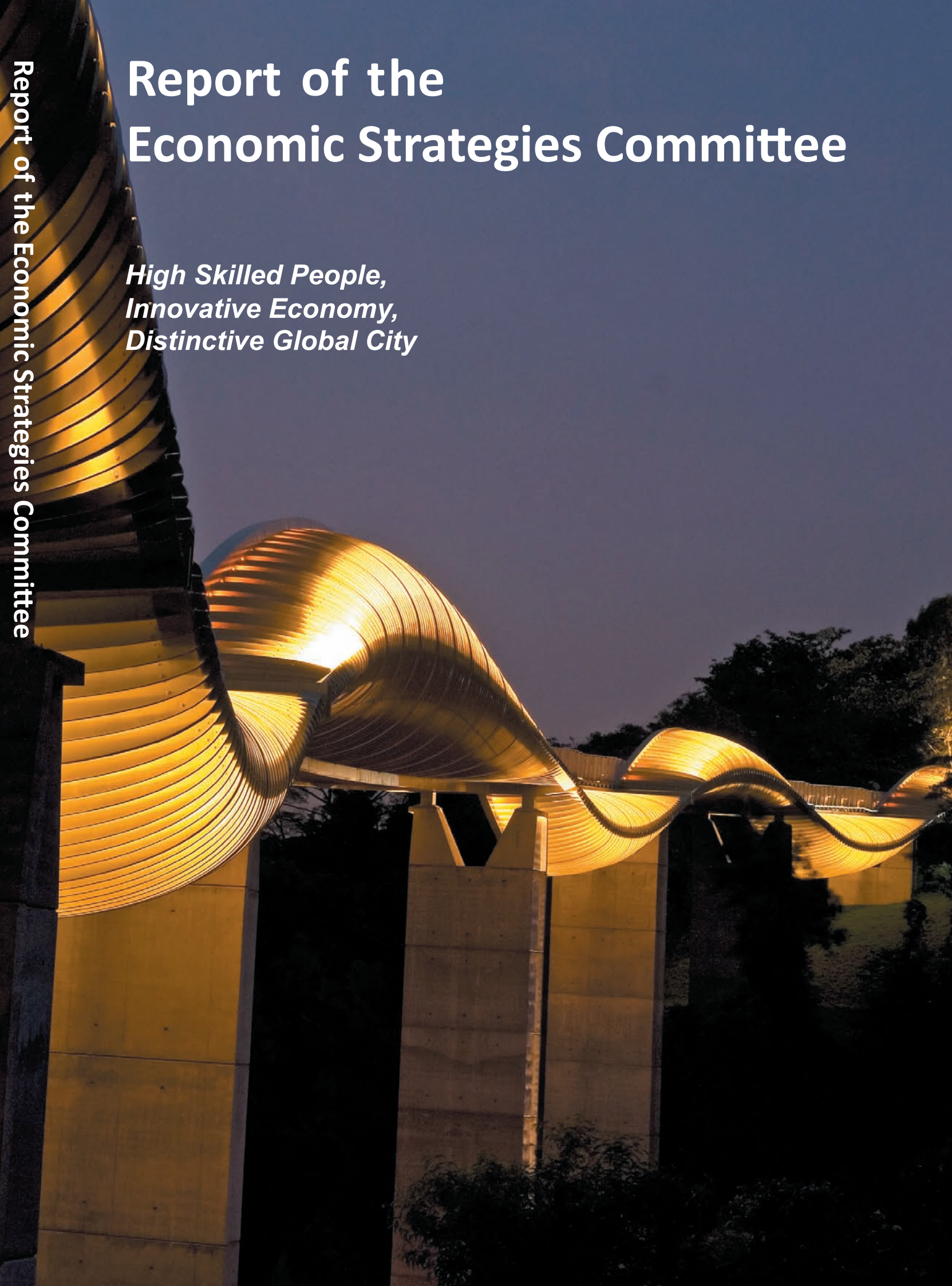


Report of the Economic Strategies Committee

*High Skilled People,
Innovative Economy,
Distinctive Global City*



REPORT OF THE ECONOMIC STRATEGIES COMMITTEE

*High Skilled People,
Innovative Economy,
Distinctive Global City*

February 2010

Published February 2010

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30 January 2010

Prime Minister

1. You established the Economic Strategies Committee (ESC) in May 2009 to develop strategies for Singapore to maximise our opportunities in a new world environment, by building our capabilities and making the best use of our resources, with the aim of achieving sustained and inclusive growth. Members of the ESC were drawn from government, the labour movement, the private sector and academia. We formed eight sub-committees and several working-groups to study the issues comprehensively.
2. The ESC has completed its work and now submits its key recommendations for the Government's consideration. The Committee has engaged widely and benefited from diverse views and suggestions from companies, business chambers and associations, universities and think-tanks, unionists, professionals, entrepreneurs and members of the public. In total, more than 1,000 people participated in generating the ideas leading to the ESC's proposals.
3. The ESC believes that the strengths that Singapore has built up in the past will give it advantage in the decade to come, especially with the rapid expansion of urban demand in Asia. However, we must go beyond what we have developed, and do things differently. We have to grow deeper capabilities and expertise to make the most of the opportunities ahead, as well as to stay relevant as new players internationally gain competitive strength. Further, to sustain economic growth despite a more slowly expanding workforce, we have to make a clear shift: to grow based on skills, innovation and productivity.
4. Singapore should aim to sustain productivity growth of 2 to 3 percent per year, more than double the 1 percent we achieved over the last ten years. This will raise productivity by one-third over a decade. It is a challenging goal, involving major changes in every sector and sustained over a full decade, and will require a comprehensive national effort. But raising skills and productivity is the only viable way to improve the real wages of workers, and is the best way we can help citizens with lower incomes.

5. To shift to productivity-driven growth calls for a qualitative transformation of our economy. Our companies must compete by innovating, investing in their people, and creating higher value jobs. We must allow market forces to restructure our economy, providing more room for efficient enterprises to grow, and pushing less efficient activities either to upgrade or phase out. The move to higher value activities will also be supported as businesses internationalise their operations, whether to shift lower-value activities abroad or to capture new revenues and expand, creating demand for management, design, marketing and business services in Singapore.

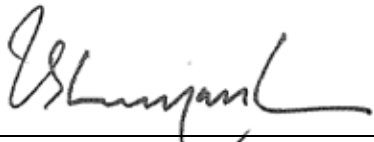
6. Our specific recommendations are summarised under three broad priorities. *First, we have to boost skills in every job.* We should develop an outstanding nation-wide system of continuing education and training, to give everyone the opportunity to acquire greater proficiency, knowledge and expertise, from the most basic jobs to the most complex. Employers and industry associations, unions and government will also have to work together to redesign and create better jobs. We recommend a progressive increase in foreign worker levies to incentivise companies to improve productivity.

7. *Second, we have to deepen capabilities among Singapore companies to seize opportunities in Asia.* Our MNC strategy remains important, but there is also considerable opportunity in the next 5 to 10 years to attract global mid-sized companies, and to facilitate local companies to grow into industry leaders in Asia. We recommend measures to develop the market for cross-border financing to help companies expand abroad. We also propose a significant push to reap the commercial potential of our science and technology base.

8. *Third, we must make Singapore a distinctive global city.* The ESC is convinced that Singapore's future rests on growing a deep pool of highly capable and entrepreneurial people. Our open and multicultural society will be an increasing advantage. We must continue to attract top quality people from around the world, while investing further to provide the best opportunities for Singaporean talents to grow and develop, to the highest levels of expertise in a range of fields. The ESC also recommends support for the growing creative and arts clusters, which will add to the character of the city, and nurture new talents. Our programmes to rejuvenate our mature housing estates, develop eco-towns and regions with diverse lifestyle options, and make major improvements in transport connectivity will ensure that Singapore remains a highly liveable place even as the economy grows.

9. We believe the strategies we propose will help transform Singapore's economy once again, raise our citizens' living standards, and enable us to take full advantage together of the new opportunities emerging in the world around us.

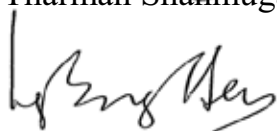
10. We thank you for the privilege of serving on the ESC.



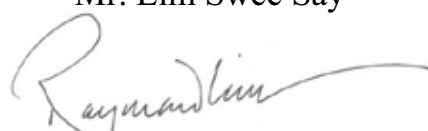
Mr Tharman Shanmugaratnam



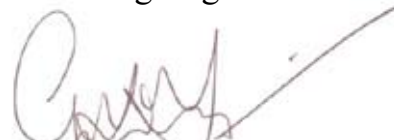
Mr. Lim Swee Say



Dr. Ng Eng Hen




Mr. Raymond Lim



Mr. Gan Kim Yong



Mrs. Lim Hwee Hua



RAdm(NS) Lui Tuck Yew



Mr. S Iswaran



Ms. Grace Fu



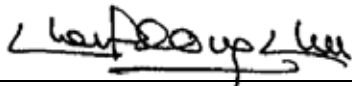
Mr. Heng Swee Keat




Mrs. Josephine Teo



Mr. Gautam Banerjee



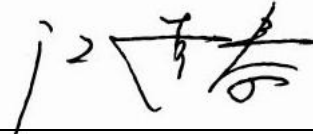
Mr Tony Chew



Ms. Deborah Henretta



Mr. Lothar Herrmann



Mr. Jason Jiang Nan Chun



Dr. Jan-Anders Karlsson



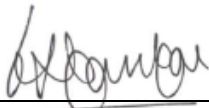
Mr. James Koh



Mr. Lim Ming Yan



Ms. Shirlene Noordine



Mr. Viswanathan Shankar



Dr. Ricky Souw



Mr. Tan Mok Koon



Mr. Wong Fong Fui



Prof. Bernard Yeung

*Prime Minister
Singapore*

1 February 2010

Mr Tharman Shanmugaratnam
Minister for Finance
Chairman, Economic Strategies Committee

Dear *Minister,*

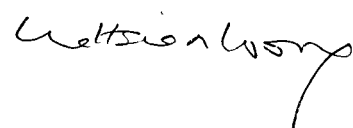
Thank you for your letter of 30 January 2010 submitting the key recommendations of the Economic Strategies Committee (ESC).

The ESC has studied the challenges facing Singapore comprehensively, and its proposals are realistic and achievable. The Government accepts the key thrusts of the ESC report, and will provide its specific responses in the 2010 Budget Speech and the Committee of Supply (COS) Debate.

I agree that for the next phase of Singapore's development, we must shift decisively to foster growth through skills and innovation. This requires a major and sustained national effort. The Government will strongly support the transformation, but cannot do it alone. Businesses have to change their mindsets, moving from doing more of the same or making incremental improvements to seeking new and innovative ways to create value. They must do this continually, and not imagine that a one-off effort will suffice. Our people must continue to upgrade their skills and deepen their expertise. This too must be relentless, as it is our only way to sustain growth and raise incomes. We must invest in our people, and provide them with the skills and wherewithal to become more productive and give better value.

On behalf of the Government, I would like to thank the members of the ESC, its sub-committees and working-groups for your hard work. You have made a valuable contribution in charting the course for Singapore's economic development over the next decade.

Yours sincerely

A handwritten signature in black ink, appearing to read "Lee Sian Wong". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

REPORT OF THE ECONOMIC STRATEGIES COMMITTEE

GOAL

HIGH-SKILLED PEOPLE, INNOVATIVE ECONOMY, DISTINCTIVE GLOBAL CITY

We must make skills, innovation and productivity the basis for sustaining Singapore's economic growth. This will also provide for inclusive growth, with a broad-based increase in the incomes of our citizens.

We must also be a vibrant and distinctive global city – open and diverse, the best place to grow and reach out to a rising Asia, and a home that provides an outstanding quality of life for our people.

PART I: OVERVIEW

WHERE WE STAND

1. The Singapore economy has fared well amidst the challenges of the last decade. Growth averaged 5 percent per year during the period, even with the deep recession of the last two years. The majority of households have seen significantly higher real incomes over the decade, with median incomes rising by over 20 percent¹.
2. Our economy has become more diversified and globalised. We have an increasingly vibrant international services sector, and are one of the leading business and financial hubs in Asia. We have moved up the value chain in manufacturing, with new strengths in areas such as the biomedical sciences and aerospace engineering. We made good progress in developing entrepreneurship, with many more start-up enterprises and larger numbers seeking to expand abroad. We have strengthened trade and investment links within the region and with our global partners, and we are an emerging hub for global talent.
3. Our economy and people have shown resilience during the recent crisis. However, the next decade will be different. There will be new challenges and opportunities for Singapore, and we will have to update our strategies and develop new capabilities.

Opportunities in a New Landscape

4. Singapore is well placed to succeed in the emerging post-crisis world. The global crisis has reinforced the shift of markets to Asia. Growing urbanisation, infrastructural development and increasing demand for services in China, India and ASEAN will play to the strengths of many Singapore-based companies.

¹ Increases have also been seen at the lower end of the income ladder. At the 20th percentile of employed households, real incomes per capita have grown by about 10 percent over the last decade. This does not include the benefits derived from Government transfers (net of taxes), such as the Workfare Income Supplement and enhanced housing grants for lower income households.

5. Our companies have an important **window of opportunity to create a strong presence in Asia over the next 5 to 10 years**, while their skill-sets are in high demand. Over time, other players in Asia will catch up and deploy the best human capital to compete. We must establish leading positions in key market niches in this next decade, which we can build upon to establish new ways of adding value over the longer term.
6. The G3 economies, while growing more slowly because of reductions in household wealth and continued deleveraging, will remain large and sophisticated markets. Singapore should stay engaged in these markets, and grow its role over the next decade as a key global centre for high value manufacturing and services. We will also benefit from the increased premium that global companies are placing on jurisdictions that provide safety and stability, post-crisis.
7. The crisis has also altered global finance. There has been a reduction in the capacity to finance cross-border and emerging market risks that could persist for some years. We should further develop our financial markets and plug current gaps in funding for Singapore enterprises venturing abroad.
8. There is therefore no lack of opportunities for Singapore in the decade ahead. We must build deeper capabilities and expertise to make the most of this window for growth. But to sustain growth, we must make better and more productive use of our resources, and especially by growing the skills and talents of our people.
9. The size of our workforce will be a major constraint. A large part of our GDP growth of 5 percent per year in the last decade was achieved through the expansion of our workforce – both among residents and the foreign workforce. Our resident labour force will experience much slower growth in the next decade².
10. At the same time, we have to moderate the future growth of the foreign workforce. The rapid increase in foreign workers in recent years has enabled us to seize opportunities, grow our economy and in so doing, create jobs and raise the incomes of Singaporeans³. However, we have become more dependent on foreign workers, who now make up almost one-third of the total workforce⁴. Whilst this is comparable or slightly lower than what is seen in several other global cities, we have to manage this dependence and not let it increase indefinitely.
11. While not as pressing as our workforce constraints, we must begin taking active steps to use land and energy more efficiently. There is some scope for further reclamation of land, but there will be limits on how far this can go. Likewise, we have to play our part in reducing carbon emissions as a responsible member of the global community. We must also develop a strategy to diversify our sources of energy so as to insure ourselves against future spikes in fuel prices.

² Our resident labour force grew by 3 percent per year in the last 10 years. It is expected to grow only half as fast over the next decade.

³ Household incomes went up fastest between 2006 to 2008, coinciding with the period when the foreign workforce was growing most rapidly.

⁴ Non-residents comprise one-quarter of the total population.

OUR KEY CHALLENGE: GROWING THROUGH SKILLS AND INNOVATION

12. We must shift to achieving GDP growth by expanding productivity rather than the labour force. We must boost productivity in order to stay competitive, upgrade the quality of jobs, and raise our people's incomes. A slower growing workforce makes it all the more important for every enterprise to innovate to create more value, and to maximise the potential and performance of every worker.

13. This shift to productivity-driven growth will require **major new investments in the skills, expertise and innovative capabilities of our people and businesses over the next decade.**

14. We have **significant room to improve productivity in every sector** of our economy. In absolute levels, Singapore's productivity in manufacturing and services are only 55 to 65 percent of those in the US and Japan (see [Figure 1](#)). In the retail sector for example, our average level of productivity is about 75 percent of that in Hong Kong and one-third that of the US. In construction, productivity levels are half that of the US and one-third that of Japan.

15. Other advanced economies have succeeded in raising productivity substantially within individual sectors, over a decade:

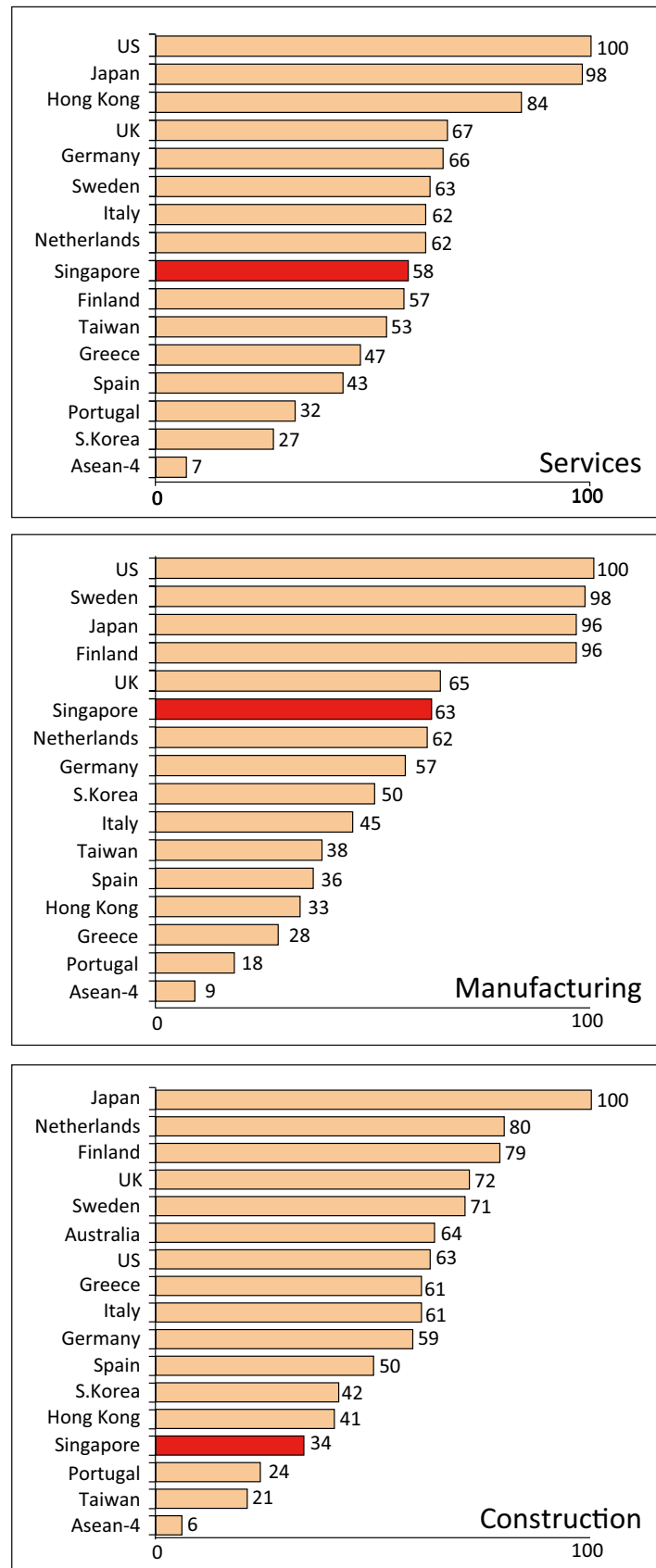
a. Hong Kong's services sector saw productivity grow by 3.1 percent per year over 1999 to 2008. A more knowledgeable and experienced workforce, coupled with a steady expansion in business investments (especially IT-related), helped boost worker efficiency. Service quality in the hospitality and retail sectors improved significantly. There has also been a shift within the services sector towards higher value-added activities, such as the financial services sector.

b. Finland's manufacturing productivity grew by 5.8 percent per year from 2000 to 2008. This partly reflected the restructuring at the factory level that began earlier. Inefficient plants were phased out, while more competitive plants invested in technology and created high skilled jobs. Many small companies also benefited from supply-chain relationships with industry leaders like Nokia. This was coupled with a strong national focus on upgrading of the workforce.

c. In Denmark's manufacturing sector, productivity grew by 2.7 percent per year over 2000 to 2008. The improvements reflected industrial restructuring and the growth of high-value niche areas, such as within the furniture industry. R&D investments have also paid off in increased productivity.

d. Australia's construction sector saw a significant improvement in productivity earlier this decade, following two decades of stagnant productivity growth. It was achieved through industry reforms and incentives for contractors to substitute technology for labour. The localised and experienced workforce in Australia's construction sector also contributes to higher productivity, and contractors are generally willing to invest in the training and career development of their workers.

Figure 1: Cross Country Productivity Comparisons⁵



⁵ The comparisons are for average productivity levels from 2006 to 2008. (Based on real GDP data at constant 2000 prices; converted to common currency based on average exchange rates from 1999 to 2001.)

How Fast can we Grow?

16. We can achieve **productivity growth of 2 to 3 percent per year over the next 10 years**, more than double the 1 percent rate achieved over the last decade⁶. This is a challenging target, particularly applied across the economy and not just within a single sector. Attaining it will require a comprehensive national effort.

17. Achieving this higher rate of productivity growth will, even with the slower growth in the labour force, allow us to **grow our GDP by 3 to 5 percent per year. Productivity improvements will therefore account for about two-thirds of our GDP growth, compared to just one-fifth in the last decade.**

18. GDP growth at 3 to 5 percent per year will be healthy for an economy at our stage of development – it exceeds that of most advanced countries, which typically grow by 2 to 3 percent. Growth in some years will be higher, reflecting the global economic cycle. Realistically, however, on average and taken over the ups and downs over the next decade, GDP growth is not likely to match the 5 percent achieved over the last decade. But it will generate the resources needed for social investments in health, education and schemes to help lower income citizens move up, and to safeguard our security.

19. **What matters most is the growth of incomes of our people.** We can only raise wages and incomes on a sustained basis if productivity rises. With the shift to productivity-based growth, we will be able to get higher growth in wages and incomes.

Making the Move Now

20. Achieving 2 to 3 percent growth per year in productivity – which will raise our **productivity by one-third over the next 10 years** – will require a major, qualitative transformation of our economy. It cannot be done in one move, and the results will take time to materialise, but we have to start now and vigorously pursue changes in the following key areas.

21. First, we have to **deepen skills and expertise within every sector of our economy.** Higher productivity does not mean that Singaporeans have to work longer on the job. It will mean working smarter. We must equip everyone with more skills so that we can do higher quality jobs – such as by handling more complex tasks or by providing better service. We must make a collective and sustained effort to upskill our workforce through Continuing Education and Training (CET). Equally, our enterprises must innovate. They must make greater use of technology and reorganise work to create better and higher paying jobs. Every employer must see this as their responsibility.

⁶ The main sources of weak productivity growth in the last 10 years were in service industries such as restaurants and real estate services, and in construction. Overall manufacturing productivity also grew slowly at about 1.4 percent, although performance has varied widely within the sector. The electronics, pharmaceuticals, and transport engineering industries registered strong productivity growth.

22. Second, we must **restructure our economy, to provide more room for rapidly growing and more efficient enterprises**. We have to allow market forces to work, so that expanding businesses can obtain the space and resources they need, and less efficient activities can either upgrade or phase out over time. Our companies must therefore be nimble. They must constantly look out for new opportunities, consolidate or acquire other players where necessary to build up scale and efficiency, and exit from less productive businesses and activities. This dynamic of restructuring is critical to achieving a more productive economy.

23. Third, businesses must **expand abroad and capture new growth opportunities in order to grow high-value activities in Singapore**. Expanding abroad will often mean relocating lower cost activities overseas. But it creates and retains more good jobs in Singapore – in higher value production, regional management and marketing operations, product development and design, and in trade, finance and business services.

Managing our Foreign Worker Dependence

24. We should avoid becoming overly dependent on foreign workers, and continue to increase their proportion of the total workforce over the long term. Foreign workers will remain valuable to Singapore, especially those with skills. They fill many jobs for which there is a shortage of Singaporean workers, including in the construction and marine sectors, in manufacturing industries, and in important parts of the service sector, such as tourism-related businesses.

25. However, we cannot increase the number of foreign workers as liberally as we did over the last decade, or else we will run up against real physical and social limits. Further, if access to labour is too easy, companies will have little incentive to invest in productivity improvements, which will affect our efforts to upgrade the skills and wages of lower-income Singaporean workers.

26. The best way to manage this dependence is to rely on the price mechanism. **We need to raise the foreign worker levies progressively**, giving companies time to adjust and to invest for productivity. This approach will allow flexibility for employment of foreign workers to fluctuate in response to business cycles. The levy mechanism will enable competitive and dynamic businesses which run short of workers to seize opportunities and grow, without being hamstrung by rigid quotas.

27. **Our companies have to change the way they work**. They have to rely more on technology and innovation, and improve skills among both their local and foreign employees as a basis for competitiveness and growth. With the recovery from the crisis, the time is right to shift gears. If we leave this till later, the pain of adjustments required will be greater.

28. However, even as we moderate the growth of the total foreign workforce, it remains critical for Singapore to continue attracting highly capable and entrepreneurial people from around the world to work here. They will complement our home-grown talents, and **add to the critical mass of talent in science and engineering, design, finance and start-ups that Singapore needs to be a serious player in the knowledge-based economy**. Keeping our society open to top talent will help to create many more opportunities for Singaporeans.

THREE PRIORITIES FOR THE NEXT DECADE

29. The ESC is recommending seven strategies for the next decade, which are set out in Part II of this Report. They aim to make skills, innovation and productivity the basis for our economic growth and for a broad-based increase in the incomes of our people. They also aim to make Singapore a distinctive global city and an endearing home.

30. Our recommendations can be summarised in three broad priorities:

a. **BOOST SKILLS IN EVERY JOB**

We must undertake a comprehensive national effort to boost productivity, involving a **partnership of enterprises, people, unions and government**.

- A **high-level national council** should be established to oversee and drive efforts to boost productivity and expand CET. This will serve to coordinate the work of different government agencies and enable close collaboration between the private and public sectors.
- We need to upskill our people at all levels, **from basic jobs to the most complex**. We have built a strong pre-employment education system, and are making new investments to open up more opportunities at the tertiary level. Our next major investment in our people must be to develop **an outstanding, comprehensive, nation-wide CET system**. Learning and acquiring new skills throughout life will become the norm for every Singaporean.
- We must **make enterprise innovation pervasive**, and support this through both **broad-based and targeted sectoral programmes**. Companies must find every way to create better jobs – producing more or delivering better value for every person that they employ – and thereby justify higher wages. Industry associations, unions, and the Government should work together to promote enterprise innovation.
- The Government should **enhance fiscal incentives** for companies to innovate and improve efficiency. It should also provide substantial support for efforts to upgrade worker skills. This should also include greater support for low-wage workers – by enhancing the Workfare Income Supplement (WIS) scheme to encourage continued employment, and by giving them further support for participating in training to raise their skills.
- We must also **progressively raise foreign worker levies**, to incentivise companies to invest in improving productivity. This will also ensure that our economy's dependence on the foreign workforce over the long term does not grow significantly beyond current levels, of about one-third of the total workforce. We must at the same time **raise the quality of the foreign workforce**, and give employers incentive to retain experienced and skilled foreign workers.

b. **DEEPEN CORPORATE CAPABILITIES TO SEIZE OPPORTUNITIES IN ASIA**

We must grow a diverse and resilient ecosystem of companies, including a stronger base of local companies with the potential to be leaders in Asia. We must also entrench Singapore as the essential base in Asia for both MNCs and global SMEs. MNCs remain a critical part of our economy – they allow Singapore to stay plugged into the developed country markets, which will remain sizable for the foreseeable future. They also play a key role in developing Singapore as a hub for pan-Asian management operations.

Three main areas require special focus:

- First, we have to make a significant push to **derive commercial value from R&D**. Businesses can make much greater use of our science and technology base, through both product and process innovation in areas ranging from biomedical technology to clean energy solutions.

Our total R&D expenditure has to grow over the long term to secure our future as a knowledge-based economy. Over the next five years, we should target to raise Singapore's total expenditure on R&D to 3.5 percent of GDP – compared to our current expenditure of slightly below 3 percent. This should be achieved through increased private sector R&D expenditure⁷. We should also maintain our commitment to public sector R&D, so as to catalyse private sector research and commercialisation.

- Second, we have to develop the **financing capabilities to take advantage of the opportunities in Asia**, and manage the inherently higher risks of these markets. Demand is growing rapidly in fields where Singapore-based companies have significant strengths, such as in urban infrastructure and services, waste and water management, and healthcare. But there are some gaps in cross-border financing capabilities in Singapore, including in trade and project finance. The Government should help the market plug these gaps through market-based solutions and institutions, to provide the credit insurance, guarantees and other instruments needed to facilitate commercial bank financing. This will also build up Singapore's role as a hub for Asian finance.
- Third, we should develop stronger alliances between large and small players to promote technology transfer, test-bedding and commercialisation. The alliances will help SMEs develop capabilities in the local market which they can then deploy abroad. This network of supply chain relationships will also benefit the larger foreign players and help root them in Singapore.

⁷ This will bring us to the current levels of Gross Expenditure on R&D (GERD) of countries such as Finland (3.5 percent), Sweden (3.6 percent) and Japan (3.4 percent).

c. **MAKE SINGAPORE A DISTINCTIVE GLOBAL CITY AND AN ENDEARING HOME**

Singapore's future must rest on being a global city. New York and London are what they are, not because of the specific economic activities they conduct, but because people want to be there. That too, has to be Singapore's key advantage in the future. Being a global city and a meeting point in Asia for enterprise, talent, cultures and ideas, will be **a source of competitiveness and growth in its own right.**

We must continue to attract top quality people from around the world, even as we restrain our overall dependence on foreign workers. New competitor cities are already staking their claims in the global knowledge-based economy. The largest Chinese and Indian cities gather deep pools of talent from their respective hinterlands. But our advantage lies in our ability to attract **diverse and high quality talent from Asia and around the world, who work alongside their Singaporean peers and add to our capabilities.** This must remain an enduring advantage.

As a global city, we will also see enterprising Singaporeans venturing overseas for part of their careers, as our companies expand abroad and as demand for their skills grows. But Singapore must remain their home, the country they feel emotionally rooted to.

Wherever they may be, in Singapore or abroad, we need to engage our people. Their commitment, ideas, skills and hard work will continue to be our greatest strength.

To realise our potential as a global city, we should focus more in two main areas:

- First, we must grow the **software** that will make Singapore a distinctive global city.

We must develop thriving **creative and arts clusters** – distinguished for both their development of Asian content and appeal to an international audience. We should also aim to host more pinnacle global events, building on the new vibrancy of the city and Marina Bay.

We must provide the best opportunities in Singapore for **diverse talents** to grow and develop. Our workforce will become significantly better educated over the next decade. By 2020, 50 percent of our resident workforce is projected to possess at least a diploma, including 35 percent holding degrees⁸. This is comparable to the leading global cities today. However, we have to complement these academic routes of advancement with a range of **new, practice-based pathways to excellence.**

⁸ This compares with 39 percent of our resident workforce currently (in 2009) having at least a diploma qualification, including 27 percent having a degree. Among our younger workforce (those aged 25 to 44 years), about 50 percent are projected to have degrees compared to 40 percent today.

We have to build **deeper expertise across the board**, whether amongst our machinists and R&D engineers in manufacturing, or our finance professionals, designers, chefs and animation artists. Singapore must also be a centre for **thought and practice leadership**, in our key areas of specialisation.

- Second, we must develop the infrastructure necessary to provide the highest quality of life in Asia.

We must continue to rejuvenate our mature HDB towns, as we are doing in Dawson Estate. We should also expand the range of lifestyle options, develop new regions with individual characters like Marina Bay, Jurong Lake District and Punggol.

We should **plan ahead for a city that remains extremely liveable even as we grow**. We have to make more efficient use of our land, to optimise its economic value and preserve a sense of space in our residential neighbourhoods. This will call for bold and imaginative urban planning and redevelopment.

We must develop a masterplan for the progressive development of a new waterfront city at Tanjong Pagar once the port's lease expires in 2027. We must also expand our 'land bank' by investing in the creation of underground space, especially around our transport nodes.

We should also develop distinct **eco-towns and residential precincts**, as well as new models for resource-efficient industrial clusters, e.g. on Jurong Island – where desalination and recycling of energy can be part of an integrated and cost efficient system.

AN ENABLING ROLE FOR GOVERNMENT

31. Achieving these priorities will require a strategic combination of government and private initiatives over the next decade. We have the advantage of sound government finances, unlike many other developed countries which face the prospect of deep cuts in expenditure or higher taxes following the crisis. The Government must **invest ahead in the fundamentals that will drive Singapore's success**: the best quality education, advanced skills, research capabilities, and the infrastructure and connectivity of a global city.

32. The Government can help to catalyse economic restructuring. Raising productivity, and shifting to more efficient use of labour, land and energy will require changes in our economic structure. However, the Government cannot prescribe which companies and sectors should grow. It should instead **provide the right price signals (e.g. foreign worker levies) and enable market forces to reallocate scarce resources to where they can be most productively used**.

33. The Government must also **ensure that growth remains inclusive**, benefiting all members of society, while encouraging a spirit of self-reliance. Like many other countries, we will face

the continuing challenge of helping lower-skilled workers to stay employed and improve their wages, in an environment of intense global competition. The best way to do this is for the Government to provide strong support for low-wage workers to upskill, and for community programmes to help them raise their aspirations. The Government must also continue to help low-income families by ensuring their children have full education opportunities, in school and beyond. This depends on sustained economic growth and effective programmes to share the fruits of growth with all citizens.

34. Overall, government expenditures will grow. But they must remain fiscally sustainable so that the overall burden of taxation on individuals and enterprises remains low. **Our success ultimately depends on the abilities and drive of our people and businesses.** The Government cannot substitute for the dynamism created by the skills, talent and ingenuity of our workforce, or by entrepreneurs imagining new products and finding new market niches.

OUR FUTURE

High-Skilled People, Innovative Economy, Distinctive Global City

35. The economic strategies that we have laid out will strengthen Singapore and enable our people to make the most of new opportunities emerging in the world around us.

36. Ten years from now, Singapore will be different.

37. Our people will have the skills, expertise and flair to take on higher quality and higher level jobs, across the whole range of occupations. It will put us in a **virtuous cycle of better skills, better jobs and higher wages.**

38. We will be a nation that recognises and rewards **many routes to success** – through mastery of skills on the job, advanced academic and professional training, entrepreneurship or creative flair. There will be opportunities for every Singaporean to learn and develop throughout their careers, through an affordable and top-quality system of continuing education and training. This is on top of a first-rate education system that provides a broader range of tertiary options for our young.

39. We will have a **deeper base of globally-competitive Singapore companies**, who will be leaders in market niches across Asia. We will also be a key base for global companies to grow and manage their pan-Asian operations, and for Asian enterprises which are expanding internationally. Nearer home, ASEAN will provide an integrated market, allowing businesses to operate seamlessly across the region.

40. We will have a **vibrant climate of innovation**, with both new and established businesses seeking commercial success through design, new products and services, and tapping on knowledge from a broader base of public and private sector R&D.

41. Our economic growth would thereby be sustainable, driven by productivity rather than by expanding the labour force. It will also be **inclusive, allowing all Singaporeans to share in increased prosperity**. Sustained growth will give us the resources to help our lower income citizens gain the skills they need for a better future, while providing them with additional support through the Workfare Income Supplement scheme, housing and other government initiatives. It will also help individual and corporate philanthropy to flourish, and encourage the many initiatives that build an inclusive society.

42. We would have refreshed and enhanced our infrastructure. By revitalising mature residential estates, developing eco-towns, decentralising commercial activity and connecting the island with convenient rail and road networks, Singapore would be a highly liveable place even as we grow. We would have recycled existing industrial land to support new, higher value activities, and established new models of resource-efficient industrial clusters. We would also have mapped out a whole new waterfront city at Tanjong Pagar, comparable in size to Marina Bay, and planned for the creative use of new underground space, especially around the island's transport nodes.

43. Singapore will be a **leading global city, with a character of its own**. It will be distinctive for being the most open and multicultural city in Asia, for its clusters of artistic and creative energy, and for the high quality of life it provides its people.

44. We must make a major push over the coming decade to upgrade our productivity and deepen our capabilities. We must **keep rejuvenating and enlivening our city, and empowering our people to be the best that they can be**. We can transform our economy once again and raise living standards for all our citizens.

PART II: KEY STRATEGIES

In line with the three broad priorities set out in Part I of our Report, the ESC recommends seven strategies over the next 10 years to sustain economic growth and enable broad-based improvement in Singaporeans' living standards.



1. Growing Through Skills and Innovation

I Growing Through Skills and Innovation

1. We must achieve higher productivity growth of 2 to 3 percent per year, enabling our GDP to grow on average by 3 to 5 percent per year over the next decade.
2. Increased productivity is not achieved merely through increased efficiency, but through continually growing the value of our economy by adopting new ideas and seizing new opportunities.
3. The ESC recommends the following:
 - Establish a **high-level national council to oversee and drive efforts to boost productivity and expand CET**. This will ensure national level coordination of government agencies and close collaboration between public and private sectors.
 - Encourage **enterprise innovation** and investments in technology and training, both through broad-based and targeted sectoral approaches (see [Box 1](#) for examples of enterprise innovation).
 - Introduce strong economy-wide **fiscal incentives** for companies to invest in productivity enhancement and innovation.
 - Set up a **National Productivity Fund** to provide grants to support industry-focused and enterprise-level productivity initiatives at the sectoral level.
 - Develop a national productivity knowledge base by establishing a **Productivity and Innovation Centre** for enterprises to tap on.
 - This should include a **comprehensive approach to spur innovation and quality in the services**, from adoption of technologies to better manage their supply chains, to optimisation of workflow processes.

Box 1: Examples of Enterprise Innovation

Boncafé International Pte Ltd

Boncafé produces its own line of gourmet coffee products, and is also one of the best known coffee brands in Southeast Asia. To improve productivity, Boncafé made significant investments to automate its production line, including the loading of coffee beans, roasting, packing and sealing processes. Through these measures, it has increased the quality as well as quantity of its output, and reduced wastage due to human errors. Previously highly labour-intensive tasks, such as the loading of coffee beans, have also been made easier and faster. For example, with the help of a coffee packaging machine, the number of pouches of ground coffee an employee can pack in an hour has increased from 12 to 360. This also resulted in a more satisfied workforce.

Muthu's Curry

Aisvayam's Fiine Foods Pte Ltd is a food and beverage company best known for Muthu's Curry and Muthu's Flavours. The company has adopted several best practices in raising productivity. For example, they implemented a wireless ordering system, where the orders are directed to the kitchen and point of sale. The new system has resulted in higher customer satisfaction and shorter waiting times. It also helped reduce errors, speed up workflow, and consolidated data for review and enhancement of operations. With strong standard operating procedures and training, they are able to better recruit and integrate new staff. Finally, they have achieved HAACP⁹ certification, giving them a competitive edge in overseas expansion.

Atlas Sound & Vision Pte Ltd

Atlas Sound & Vision carries a diverse portfolio of mid to premium AV brands and is Singapore's sole retailer of Bose audio systems. Atlas places great importance on developing manpower capabilities, and has sponsored employees for post-graduate management courses and diploma retail courses. To deliver more value to its customers, Atlas also conducts personalised and structured demonstrations of its sound system for customers – termed the "Atlas Experience" – and keeps a detailed and computerised record of customer and sales history. Atlas also uses an Enterprise Resource Planning (ERP) system that provides real-time data on its sales and inventories to optimise the replacement of inventory stock.

⁹ Certification for food and pharmaceutical safety.

- **Upskill our people at all levels.** To complement the efforts of our Institutes of Higher Learning, we must create more opportunities for individuals to progress through a first-class CET system – with at least 240,000 undertaking CET each year by 2015. Lifelong learning must become an integral part of our society.
 - **Provide more opportunities and multiple skills-based progression pathways** to complement the academic route, through our schools and CET system.
 - **Further build up a first-class CET system** by attracting best-in-class foreign institutes to Singapore along with continued investment in local CET institutions, to provide a wider range of qualifications.
 - **Provide stronger linkages and clarity between our academic and skills qualifications.** This will facilitate upward mobility for workers and provide employers with clarity on how different qualifications relate to one another (e.g. how Workforce Skills Qualifications (WSQ) relate to National ITE Certificates (Nitec), polytechnic diplomas and university degrees).
 - **Reach out to more PMETs (Professionals, Managers, Executives and Technicians).** We should develop people with “T-shaped” competencies – possessing both deep skills in their area of expertise and broad knowledge of horizontal skills (e.g. business operations, project management, HR, sales or finance and management). Development of professional continuous development courses will inject new specialised expertise, thereby ensuring their lifelong employability.
- **Strengthen support for low-wage workers.**
 - **Enhance the Workfare Income Supplement (WIS) scheme to encourage continued employment and support incomes.** The WIS, introduced in 2007, has succeeded in raising incomes and encouraging low wage workers (LWWs) to work. Our next step should be to enhance the WIS scheme by providing stronger incentives for older workers in particular to stay in the workforce.
 - **Provide additional support for training LWWs.** While WIS relieves wage stagnation, it does not directly lift LWWs out of their low-wage condition. WIS should be complemented with incentives to encourage LWWs to upskill and upgrade to better jobs that allow them to earn more.

- **Manage our dependence on the foreign workforce.**
 - **Raise foreign worker levies in a gradual and phased manner.** This is the most efficient and flexible way of ensuring that our economy's dependence on the foreign workforce does not grow excessively. It will allow for fluctuations in the foreign workforce to cater to business cycles – for example, in the construction sector. The levy system will also allow competitive and dynamic businesses and industries to seize immediate opportunities and grow, and not be constrained by rigid quotas or fixed allocations of foreign workers.
 - **At the same time, the quality of the foreign workforce must improve. We should set effective quality benchmarks that leverage on WSQ and other skills recognition frameworks. We should also encourage employers to bring in and retain skilled foreign workers** by increasing the skilled levy differential and promoting good management of foreign workers.

2. Anchor Singapore as a Global-Asia Hub

II Anchor Singapore as a Global-Asia Hub

1. We must enhance our position as a Global-Asia hub. We must be the key base for global players seeking to tap into opportunities offered by a rising Asia, and for Asian enterprises looking to expand beyond their home markets. We must also be a key global centre for high value manufacturing and services.
2. We can do this by building on our physical and cultural connectivity to Asia and the world. Our market neutrality also offers global businesses a strategic base to **manage and integrate their pan-Asian operations**, without being tied down by in-market challenges and constraints.
3. We should also **grow opportunities in ASEAN**, working together with our regional partners to realise the vision of a single market under the ASEAN Economic Community by 2015. Together with enhanced transport connectivity, this will encourage businesses to deploy a whole value chain of activities across the region, building on the complementary strengths of the respective economies.
4. We should build on our unique position as a city that can grow both high-value complex manufacturing and international services. The ESC recommends the following:
 - **Retain a globally competitive manufacturing sector at between 20 to 25 percent of the economy.** High value and complex manufacturing generates good jobs with diverse skill requirements, provides opportunities for constant upgrading, and stimulates demand for sophisticated services. To do so, we should:
 - Continue the shift into complex manufacturing – areas where know-how and intellectual property are crucial such as nutraceuticals; the design and production of “mission-critical” components such as those in medical devices; and cross-disciplinary areas like bioelectronics.
 - Grow manufacturing-related services such as headquarter-related activities, R&D, Intellectual Property (IP) management and product lifecycle management by capitalising on the convergence of manufacturing with services.
 - **Strengthen our position as a leading Global-Asia financial and business hub** that connects the global and Asian business community. To do so, we should:
 - Build on our strengths in risk management and trading; asset management and private banking; loan syndication; project and infrastructural financing; and capital-raising. Together with the growth of other modern services, such as info-comms technology (ICT), accounting, legal and consulting services, we will establish Singapore as the leading business hub in Asia.

➤ Seek to seamlessly integrate physical trade with related services such as trade finance, risk management, supply chain management, certification and distribution. In the aviation and maritime areas, we will enhance activities in the insurance, financing, legal and arbitration services. We will strengthen our trade linkages and enhance our connectivity to harness the new patterns of trade and people flows to Asia.

- **Develop Singapore as a leading consumer business centre.** We must build up a cluster of key companies in the consumer-centric fields such as marketing, branding, consumer research and market intelligence. We should capitalise on our cultural affinity with the region, and develop Singapore into the pan-Asian location of choice – from which consumer insights are developed, consumer-centric businesses are grown and managed, products and services developed, tested and launched, and intellectual property (IP) and trademarks owned and anchored.

- **Establish Singapore as the location for “future-ready” urban solutions.** We should leverage on Singapore’s own future urban needs and track record in urban planning to help catalyse the innovation of ‘future-ready’ solutions. In particular, Singapore should focus on the areas of urban mobility/smart transportation, energy efficiency and management, renewable energy, and water and waste management. Singapore is also well-placed to test-bed systems-level integration in these areas. Such initiatives can also foster collaboration amongst Singapore-based companies to provide solutions which could be scaled up and exported.

3. Build a Vibrant and Diverse Corporate Ecosystem

III Build a Vibrant and Diverse Corporate Ecosystem

1. A diverse corporate landscape – one that comprises a mix of large and small companies; local, Asian and global – will be a key strength for Singapore. We must create multiplier effects through strong partnerships and networks between these companies. These synergies will enable our companies, including local SMEs, to better capture emerging opportunities, particularly in Asia.
2. Singapore should entrench its position as a location of choice for the world's leading companies, including MNCs, global mid-sized industry leaders, and Asian enterprises seeking to internationalise. **MNCs must remain key players in our economy.** They are a major source of new technologies, and allow Singapore to stay plugged into the developed country markets – which although slow growing, will remain sizeable sources of sophisticated demand. Many **global mid-sized companies** who serve niche markets will also be looking at Asia for their next stage of growth. In addition, we are seeing the rise of many innovative and globally competitive Asian enterprises.
3. We must also grow a **deeper base of globally-competitive Singapore enterprises.** Many of our companies are now strengthening their capabilities and internationalising. They are expanding in new markets, especially in Asia and the emerging world, with revenues from China and India more than tripling since 2005 for our top 100 international companies¹⁰ (see [Box 2](#) for examples of local enterprises expanding into new markets).

Box 2: Examples of local SMEs expanding internationally

IPS Group Pte Ltd

IPS Group (IPS) (Revenue: S\$100 million) designs and builds infrastructure equipment and distributes engines, generators, security and aviation equipment in Asia. In the early 1990s, IPS tied up with a German company, Lintec GmbH, to manufacture infrastructure equipment in China. Through this joint venture, IPS gained invaluable technology and technical know-how. IPS formed strong relationships in China, and also made inroads into India through acquisition. Today, IPS Group generates more than 90 percent of its sales from the regional markets in Asia.

Telesensory (Singapore)

Telesensory (Revenue: S\$3.02 million), a young company, manufactures low vision equipment to assist visually impaired people. The US market accounts for about 60 percent of its turnover and the firm is diversifying into Asian markets such as Japan and India. Sales in Asia-Pacific have increased from 20 to 40 percent of the company's revenue over the past 2 years, and it hopes to base half of its business in the region within the next 3 years. The company is investing in new capabilities to develop new products catering to the ASEAN markets.

¹⁰ This refers to a list of Singapore's top 100 companies ranked by their sales revenue from overseas markets, ranked by DP Information Group.

Ezra Holdings Ltd

Ezra Holdings (Revenue: S\$462 million) is an offshore engineering and services company which offers integrated solutions over the life cycle of an oilfield – from construction and maintenance to marine and offshore engineering services. Ezra has been investing in equipment and technology – including state of the art energy services equipment – and its people, posting them overseas for training and to different markets for international exposure. The group has recently secured a major contract in the fast-growing African offshore oil and gas market. Over the past two years, it has doubled its revenue by expanding in markets such as West Africa, India, South East Asia and Australia.

Spy Apparel Pte Ltd

Spy Apparel (Revenue: S\$2.9 million), a young company, is a specialist in the product development, retailing and wholesaling of contemporary women's wear. With high-quality and well-designed pieces regularly displayed in Hong Kong Fashion Week, Spy Apparel secured regular buyers from America, Spain, Turkey, France, UK and Japan. The company actively re-defines its collections for various markets, and recently won a valuable project from a renowned Japanese retailer. Over the past two years, Spy Apparel has doubled its revenues by expanding abroad.

4. More companies are also developing the critical mass required to compete globally. The number of Singapore enterprises with **revenues over S\$100 million** has approximately doubled over the last decade, from about 280 in 1998 to 530 as of 2007. By implementing the following key strategies, the ESC believes that we can raise this number significantly, to reach **1,000 such enterprises** over the next ten years.

5. The ESC recommends the following:

- Entrench Singapore as a **premier location in Asia for MNCs** by developing deeper market knowledge and expertise with a pan-Asian focus.
 - **Promote Pan-Asian market research** to build deep Asian market intelligence in the areas of business services, analytics, branding and regulatory knowledge.
 - **Develop professional services and grow a pool of Asia-ready managers, professionals, and leaders** to helm global MNC and mid-sized companies' operations in Asia and to drive the internationalisation efforts of Asian enterprises.
 - **Facilitate the talent recruitment, management and development needs of large and small Singapore-based enterprises** out of Singapore, especially for the pan-Asian region.
- Establish Singapore as the **essential base for global mid-sized companies** who are industry leaders seeking to expand in Asia, and for **Asian enterprises** to internationalise.

- Facilitate their quick start-up and expansion through **shared resource centres, and ready access to knowledge and networks**. Our development of deeper market knowledge with a pan-Asian focus will be a critical factor that will attract these businesses here and help them expand in the region.
- Develop a deeper base of **globally-competitive Singapore enterprises**, so as to grow the external wing of the economy.
- **Catalyse cross-border financing capacity.** Local companies' international expansion in the years ahead must be accompanied by stronger bank financing and insurance capacity. There are current market gaps in three major areas: **trade finance**, where there is an undersupply of credit insurance and the need for an aggregator; **internationalisation finance** (funding of overseas plants and operations); and **project finance**, where there is limited capacity among local banks and where global players have cut back on long-tenor loans.
 - The Government should help **plug these gaps in financing capacity through market-based solutions and institutions**. Specialist financial institutions like ECAs (Export Credit Agencies) and EXIM (Export-Import) banks have helped complement private financial institutions in several other markets, and have gained importance since the crisis. They are also an integral part of the Asian project finance market.
 - A specialised institution along similar lines in Singapore could support the market by performing the following functions:
 - Risk and credit insurance for trade finance;
 - Guarantees for loans by commercial banks for overseas investments; and
 - Guarantees for project finance and where necessary, co-financing with commercial banks.
 - An institution of this nature should be run on a commercial basis, even if it is funded with government equity. It should also partner with financial institutions to develop the market for cross-border finance, and not crowd out other market participants. It should **attract and develop specialist market expertise and capabilities**, with a focus on key sectors and geographies that Singapore-based companies have strengths in.
- Catalyse the supply of growth capital for growth-oriented SMEs based in Singapore, **through seeding public-private co-investment funds**.

- We should make provisions for funding of new capital up to **S\$1.5 billion in the next 10 years, with the Government contributing about half this amount**. The Government, as co-funder, should rely principally on the private sector fund managers to assess investment worthiness, so as to avoid eroding commercial discipline in investment decisions.
- **Empower our local trade organisations to drive growth and internationalisation.** Trade organisations are valuable strategic platforms to champion productivity, capability and talent development programmes, and aggregate demand for the outsourcing of non-core corporate functions for their members. Trade organisations have the potential to explore and facilitate overseas market access, particularly in the immediate region. The Government should thus further strengthen the institutional capabilities of the trade organisations to empower them to serve as industry champions and market facilitators.
- **Facilitate corporate restructuring through conducting mergers and acquisitions (M&As)** so that companies can take advantage of post-crisis opportunities to grow inorganically.
- **Enhance access to human capital for SMEs**, which usually face more difficulties in attracting and retaining talent, through broadening the scope of internship programmes and facilitating a ready network of mentors to provide strategic and expert advice.
- **Set up a platform and provide grants for businesses to co-develop innovative solutions with government.** By tapping on the government's sophisticated demand and larger purchasing power, such a platform can provide more opportunities for businesses in Singapore to build exportable capabilities and thereby establish track records.
- **Support stronger alliances between Singapore-based businesses** – both foreign and local – in technology development, test-bedding, commercialisation, and in scaling up into international markets. This should build on existing Local Industry Upgrading Programme (LIUP) and International Partners (iPartners) schemes, to strengthen support for technology transfer and market access.
 - **Provide incentives for MNCs to co-develop innovative products and services with SMEs**, helping Singapore-based companies build credible track records, enhance innovation and accumulate knowledge capital.
 - **Support upgrading of local suppliers** to meet the qualifying criteria of top MNCs/global SMEs.

4. Make Innovation Pervasive, and Strengthen Commercialisation of R&D

IV *Make Innovation Pervasive, and Strengthen Commercialisation of R&D*

1. Over the past decade, we have established a strong base of research capabilities. We should build on this good foundation to further deepen knowledge creation, and at the same time seek to reap greater economic benefits from our investments in R&D. In particular, we must strengthen emphasis on **business innovation and commercialisation of R&D**. We should also leverage on design to come up with new products, services and business models. We can establish Singapore as **Asia's Innovation Capital** – a hub for innovation and enterprise, and a location of choice for commercialisation, even for ideas not invented here.

2. The ESC recommends the following:

- Raise Singapore's Gross Expenditure on R&D (GERD) to **3.5 percent of GDP by 2015** through increased private sector R&D expenditure.
 - We should **sustain our commitment to public sector basic and mission-oriented research and the development of an R&D talent pool**. This will create a strong value proposition for the private sector, especially those involved in long-term research in areas such as the biomedical sciences.
 - We can go beyond 3.5 percent in the longer term.
- **Strengthen emphasis on innovation and the commercialisation of R&D.**
 - **Further leverage on public sector R&D institutions and facilities to drive commercialisation**. This includes facilitating private sector access to public sector IP, and infrastructure for piloting and test-bedding of innovative solutions.
 - Create **customised platforms to facilitate the integration of capabilities of research institutions, companies and public sector agencies to deliver innovative solutions**. This could include consortia-type cooperation between companies in the same sector to develop a common agenda for research.
 - Set up **use-driven innovation platforms to link practitioners and researchers to undertake applications based research**. More use-driven platforms like the existing collaboration between A*STAR and the Boston-based Centre for Integration of Medicine and Innovative Technology (CIMIT)¹¹ should be adopted here.
 - **Provide ease of access to a range of ideas and IP from both public and private sectors**. This should also include knowledge capital from abroad as part of the strategy of “not invented here but commercialised here”. One way to do this is to

¹¹ CIMIT has clinicians define problems to engineers and researchers, who in turn develop the solutions that, in many cases, have led to new technologies and successful start-ups.

attract fully-managed premier-service incubators¹² to bring about a step change in how we incubate start-ups.

- **Expand Centres of Innovation in polytechnics** to provide technological help to locally-based enterprises to enter new, innovative growth areas such as Medical Technology and Clean Energy.
- **Attract and develop talent for commercialisation.** This includes not just research talent but also innovators, technology transfer professionals, patent agents, and start-up mentors¹³. In particular, we should enhance the role of universities in cultivating and training entrepreneurs through seed funding, supporting small-scale innovators and recruiting faculty with entrepreneurial skills as role models.
- **Emphasise design-driven innovation.**
 - **Instil design thinking in our workforce** by accelerating the introduction of design thinking programmes and modules at local educational institutions and leading foreign design institutions. This can also be supported by incentives to help local enterprises grow their capabilities in areas such as product and industrial design.
 - **Intensify industry collaboration on design innovation.** Stronger linkages between enterprises and design practitioners will encourage the development of innovative products and services that are designed fundamentally with people's desires and needs in mind as well as cater to the different taste cultures in Asia.
 - **Establish an accreditation system to raise professional design standards** through a 'Designed in Singapore' certification mark for enterprises to enhance Singapore's position as a promising and distinctive design capital in Asia.
- Step up efforts in the education system to **inculcate a mindset for innovation amongst young Singaporeans.**
 - Singapore must continue to develop our school curricula and assessment at the primary and secondary level to allow our students to develop the skills that can be practically applied in the real world. The establishment of the Singapore Institute of Technology and the Singapore University of Technology and Design will provide more opportunities for tertiary students to develop innovative capabilities through cross-disciplinary and practice-based learning.

¹² An example includes Seattle-based Accelerator Corp, a privately-held company formed for investing in and management of emerging biotechnology opportunities.

¹³ For example, Stanford Biodesign offers innovative, hands-on courses that provide students with first hand experiences in innovation at Stanford University. It encourages a multi-disciplinary approach towards innovation in medical devices with fellowship teams comprising graduate students from medicine, business and engineering.

5. Become a Smart Energy Economy

V *Become a Smart Energy Economy*

1. As a small, resource-constrained country, we have to ensure that energy does not become a limiting barrier for Singapore's economic competitiveness and growth. We also have to play our part in reducing carbon emissions as a responsible member of the global community.

2. We must become a smart energy economy – resilient, sustainable, and innovative in our energy use. The ESC recommends the following:

- **Diversify our energy sources.**
 - In the medium term, Singapore should **explore coal and electricity imports** to diversify both the fuel types and fuel source countries in our energy portfolio. The import of electricity is an option which can free up valuable land in Singapore. It could also allow us to tap on the significant renewable energy potential in our region, such as in the form of hydro-electricity or geothermal power.
 - For the long-term, we must continue supporting innovation and investing in the infrastructure necessary to develop renewable energy. We should also **study the feasibility of nuclear energy**, a possible option in the long-run to meet baseload electricity demand, as well as energy security and sustainability imperatives. Advances in nuclear technology will make it much safer than earlier designs, and we should carefully study its viability for a small city-state like Singapore.
- **Invest early in critical energy infrastructure.**
 - Push ahead to **establish Intelligent Energy Systems (IES)** as the centrepiece of a smart energy economy. The IES will promote greater competition among retailers and enable households to make informed choices on their electricity consumption. At the same time, the IES will incorporate devices such as smart meters and home automation networks to programme appliances to function during off-peak hours when electricity prices are lowest.
 - Make early investments in public goods such as **energy infrastructure to improve national energy security and efficiency**. One example is the liquefied natural gas (LNG) terminal which will allow Singapore to gain access to global gas markets. Investing in the extension of the gas pipeline infrastructure can also potentially reduce the cost of electricity and open up new economic clusters in Singapore.

- **Develop Jurong Island as an energy-optimised industrial cluster.** We should harness innovative systems-level solutions, to provide integrated, low-cost and low-carbon solutions for the industry clusters on the island. For example, waste heat from industry could be recycled for desalinating sea water; the desalinated water would then be channelled back to industry for cooling industrial processes, forming a virtuous cycle. With government planning and infrastructure investment to enable such 'exchanges', we can significantly improve resource efficiency.
- **Increase energy efficiency.**
 - Step up measures to **promote energy efficiency for buildings, industry and in homes.** We should enhance incentives, education and adopt essential legislation such as mandatory energy audits which will help build energy conservation know-how and internalise energy management practices.
 - **Support low-carbon solutions in transportation.** We should continue the shift of commuter load to public transport and support the introduction of clean and efficient technologies for public buses. This will ensure that energy-efficient public transport can be realised without higher prices for commuters. We should set the appropriate incentives for the adoption of clean vehicle technologies for private vehicles by awarding the Green Vehicle Rebate (GVR) based on fuel efficiency or carbon emissions of the vehicle.
- **Price energy to reflect real costs and constraints.**
 - Price energy to reflect its total cost, taking into account various externalities and constraints, such as energy security and environmental sustainability. **Appropriate price signals could both promote the use of, as well as encourage investments, in energy-efficient and low-carbon solutions.**
 - The Government should study how best to implement a carbon pricing scheme in anticipation of future carbon constraints, should there be a global agreement on climate change. It can also insure us against future spikes in energy prices. This should be carefully calibrated and introduced gradually, with offsets for specific groups like low income households to buffer the transition.

6 Enhance Land Productivity to Secure Future Growth

VI Enhance Land Productivity to Secure Future Growth

1. As Singapore grows, there will be greater demands on our limited land resources. We have to take bold steps to enhance land productivity, so as to gain the greatest economic benefits from land, and ensure Singapore remains an extremely liveable city. Our land policies must also support activities in which Singapore has sustained competitive advantages.
2. Over the next decade, the ESC recommends the following:
 - **Accelerate the shift towards higher value-added and more land-efficient activities.** We should support the intensification of industrial land use, and progressively step up the comprehensive rejuvenation of mature industrial estates towards more land-efficient and higher value-added activities. Examples include Kallang and Tukang which are today attracting new higher value-added companies such as Hyflux and Caterpillar. We should enhance the master-planning of industrial and business parks to allow more efficient use of land, and incentivise the implementation of innovative intensified industrial plant layouts.
 - **Study ways to inject greater land use flexibility.** The Government should study targeted ways to make land use more flexible where needed, in order to allow land resources to flow to higher value added activities over time.
 - **Enhance diversity of business locations to support a range of enterprise needs.** We must provide the choice and diversity of business locations to support whole value chain activities and cater to the different needs of both MNCs as well as mid-sized companies. The Government should introduce new locations for headquarter functions and new industries, as well as incubator spaces for creative industries and start-ups.
3. In the long term, the ESC recommends the following:
 - **Undertake a masterplan for the progressive development of a new waterfront city at Tanjong Pagar.** Making a strategic shift to a productivity-driven economy requires us to make bold moves to re-plan our city and recycle land to support new economic activities. A key example is the port land at Tanjong Pagar, Keppel and Pulau Brani. The port's lease at these terminals will expire in 2027. The Government should plan ahead with a view to optimise the value and comprehensively re-plan the prime waterfront land that is freed up. With a land area comparable in size to Marina Bay, this area can be comprehensively master-planned and progressively redeveloped as a new waterfront city with the potential to capture international attention. This will potentially allow for a substantial expansion of the business district, integrated with waterfront housing, hotels, lifestyle and tourism uses.

- **To study, under the Concept Plan 2011, the feasibility of a consolidated port at Tuas in the long term, with adequate handling capacity to ensure continued competitiveness.**

If feasible, it will increase port efficiency by allowing the port to achieve greater economies of scale in terms of land and operations, and free up existing port land to support new economic activities in the future.

- **Adopt a long term perspective and invest ahead to create new land and space.**

While we can expand our land mass through reclamation as we have done for Marina Bay, there will be limits in the long-run. In the next 10 years, the Government should seek to catalyse the development of underground space as a means to intensify land use. We should put in place enablers for underground development such as by developing a subterranean land rights and valuation framework, and by establishing a national geology office. We must also develop an underground masterplan to ensure that underground and aboveground spaces are synergised, and invest in the creation of basement spaces in conjunction with new underground infrastructural projects (e.g. rail), so as to add to our “land bank”.

7 Build a Distinctive Global City and an Endearing Home

VII Build a Distinctive Global City and an Endearing Home

1. Our ability to grow and succeed will ultimately depend on the talent and drive of our people. Talented people, both home-grown and from around the world, must see this as a place where they can develop skills, expertise and the creative imagination, achieve their aspirations and contribute meaningfully to a society that is on the move. They must see it as providing an excellent quality of life.
2. Singapore is already investing significantly in the ‘hard’ infrastructure to make this happen, e.g. the Land Transport Masterplan, the Gardens by the Bay, and the new National Art Gallery. We need to make major investments in the software of a global city.
3. The ESC recommends the following:
 - **Attract and nurture diverse pools of talent**, both home-grown and global. We must develop the next generation of corporate and professional leaders, and also make Singapore a hub in Asia for **thought and practice leadership**.
 - Build up a talent ecosystem of top jobs, personal and professional networks that will provide Singaporeans with opportunities to stretch their potential and reach the apex in their careers, as well as connect with international talent.
 - Provide economic agencies some flexibility to adopt a **talent-centric approach** to attracting top-quality people, beyond a firm-centric approach.
 - Develop **professional associations and marquee industry events**. For example, the Singapore Leadership Initiative for building Networks and Knowledge (LINK) will bring together business schools, universities and firms offering professional services in a single campus devoted to leadership and talent development.
 - Expand and deepen opportunities to **develop professional expertise and thought leadership**.
 - **Develop new peaks of excellence for Singaporeans in diverse fields**. We should aim to attract or develop at least 5 world-class institutions or programmes by 2020 to provide talent development pathways in a wider range of new disciplines, e.g. arts, design, fashion and sports science. These are areas with the potential to attract students from across the region. Our economic agencies could also support these new niche institutions through calibrated grants to make these opportunities accessible for a designated number of Singaporeans.

- Bring in top-quality post graduate institutions and major corporate universities to **groom the next generation of corporate and professional leaders**. We should accelerate the development of critical soft skills and deep specialist market knowledge, so as to position Singapore as the focal point where business leaders develop. For instance, the Human Capital Leadership Institute aims to be the premier institution for raising strategic human capital capabilities in Asia.
- **Develop thought and practice leadership** in key areas of Singapore's capabilities – such as urban planning solutions, legal and accountancy services, risk management and supply chain management.
- Step up efforts to **engage and connect with our talent** through seeding community-based one-stop welcome centres to provide support for newcomers and Singaporean returnees and their families. A more systematic programme will also be established to connect with both Singaporean and foreign talent who are located overseas.
- **Make Singapore a leading cultural capital.**
 - **Rejuvenate and reposition the Singapore Civic District as a premier arts and culture destination** by strengthening programming, marketing, and linkages between cultural institutions in the district. This will build on the opening of the new National Art Gallery at the former Supreme Court and City Hall buildings.
 - **Strengthen our competitiveness as a hub for the arts** by creating new, original and innovative art forms and entertainment content, and enhancing the collections of our major cultural institutions.
 - **Develop artistic, professional, scholastic and technical capabilities in the arts**, including the development of reputable degree and research programmes. These programmes will extend beyond performance and fine arts to arts management, conservation, curation and research.
 - **Provide affordable spaces and incentives for the creative industries**. We should consider re-designating vacant state-owned properties as affordable creative incubators where talents and budding enterprises network, collaborate and innovate. This will support the growth of sustainable arts and creative industry clusters.
 - **Grow a thriving arts and entertainment marketplace and boost the trading of art and collectibles** by appropriate incentives.

- Provide the **best quality of life in Asia**.
 - **Develop economically and socially vibrant districts** through place management in Bras Basah-Bugis, Orchard Road, Singapore River and conserved historic areas. Authentic and memorable experiences can be created through active stakeholder coordination, government funding, and the development of place management expertise. This will generate more economic activity and raise Singapore's status as an exciting cultural destination, while preserving the identity and heritage of local communities.
 - **Make Singapore a leading location for pinnacle international events, and diversify our lifestyle offerings and destinations.** We can become the leading city in Asia to attract and grow signature lifestyle events and businesses in sports, arts, music, entertainment, cuisine, and fashion. For example, we could take advantage of our diverse range of lifestyle offerings and multi-cultural content to develop an exciting calendar of international and local events. We could develop Bras Basah-Bugis into a new concept retail and creative precinct of weekend markets and community activities, and build an extensive network of cycling facilities in Marina Bay.
 - **Invest in cutting-edge sustainable development strategies, technologies and R&D projects to create distinct eco-precincts. We should also develop new urban planning solutions** to expand the range of districts offering different lifestyle options – as with Punggol, Jurong Lake District and Marina Bay. Such strategies could be carried out collaboratively with private sector players to develop new expertise in architecture, engineering and building design that can become a competitive advantage for our companies bidding for the development of new cities in Asia.
 - Provide an expanded and well integrated public transport system through the **Land Transport Masterplan**. This is a major investment that will improve Singapore's convenience and connectivity.
 - **Decentralise economic activity across the island** through the creation of new commercial nodes outside the Central Area, such as the Jurong Lake District and Paya Lebar, to ease congestion in the CBD and bring jobs closer to homes.

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ESC Subcommittee on Seizing Growth Opportunities

SUBCOMMITTEE CO-CHAired BY:

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INTRODUCTION

1. Globalisation, technological and demographic changes, along with changing consumer preferences, are continuing to shape the development of the global economy. New avenues for competition, collaboration and innovation are opening up. Rapid urbanisation is taking place amid rising concerns over the environment and resource constraints. The UN expects the urban population globally to nearly double from 3.3 billion (2007) to 6.4 billion (2050) with more than half of this increase to take place in Asia¹⁴.
2. The economic and financial crisis of 2008 could also lead to a number of near-term challenges. The deleveraging of financial systems could cause credit constraints for companies in the recovery phase. Greater government intervention in the financial system and rising unemployment may trigger trade and financial protectionism. At the same time, rising government spending in advanced economies is raising concerns over the sustainability of public sector deficits and growing debt levels. In comparison, the balance sheets of households, corporations and governments in emerging economies are generally healthier.
3. Amid these changes, a re-balancing of the global economy is taking place, though the pace of progress may be uneven. Emerging economies, especially those in Asia, are expected to grow in terms of their share of global production and consumption. Asia will be both a significant production base as well as a growing market for goods and services. Nevertheless, advanced economies will still remain important given their technological edge and large global share of GDP today.
4. As a global city in the heart of Asia, Singapore is well positioned to appreciate the implications of these challenges, and to seize the new growth opportunities that may arise. Singapore must continue to maintain and enhance our business-friendly environment, open economy, trusted brand, and strong rule of law. In addition, we need to be swift and nimble in building new capabilities, both in existing clusters, as well as in new areas. The continual upgrading of the Singapore economy over the past four decades has given us a strong foundation to make the next transformation, and to build strategic flexibility as future opportunities become clearer.

¹⁴ UN World Urbanisation Prospects: The 2007 Revision.

CRITERIA USED IN THINKING ABOUT GROWTH

5. In identifying future growth areas, this subcommittee is guided by the need to strike a balance between leveraging Singapore's core strengths – manufacturing, trade-related services, modern services including ICT, finance, professional and other business services, while simultaneously extending ourselves into new areas. In addition, although specific growth sectors have been identified, there is also the need to allow for new, unexpected growth opportunities to surface. In general, the areas identified must be those in which Singapore has distinctive capabilities that can differentiate us from other economies; while also allowing us to optimise limited resources and provide diversification of markets and activities. At the same time, the range of activities must allow us to tap the three overlapping geographical areas that constitute our hinterland: ASEAN, Asia and the global economy.

6. Many of the activities identified would require enhanced capabilities and new skills. A successful transformation of the economy would thereby create quality jobs with real wage growth for a broad base of Singapore's population.

SEIZING NEW OPPORTUNITIES, GROWING EXISTING STRENGTHS

7. This subcommittee has identified the following five strategic thrusts:

- a. A Location to Pioneer, Testbed and Export "Future-Ready" Green Urban Solutions;
- b. A Leading Consumer Business Centre;
- c. A Global Base for Complex Manufacturing and Manufacturing-Related Services;
- d. A Leading Global-Asia Financial and Business Hub; and
- e. A Global Node for Commercialisation and Innovation.

A Location to Pioneer, Test-bed and Export "Future Ready" Green Urban Solutions

8. Rapid urbanisation and climate change pose both opportunities and challenges in the management of cities worldwide. As a city, Singapore needs to continually upgrade its urban infrastructure, as we adopt models of sustainable development. In Asia, many countries will also be embarking on urbanisation. We should **leverage on our own needs and track record as a well-planned city to pioneer and export urban and green solutions**. To achieve this, we should:

- a. Focus on the core areas of urban mobility/smart transportation, energy efficiency and management, renewable energy, and water and waste management;
- b. Focus on systems-level R&D. Significant funds have been committed to public R&D in the areas above, and they need to be more strongly aligned with industry development

in the coming years. Resources should also be channelled to systems-level R&D that builds on strong Public-Private Sector Partnerships, focusing on areas that are relevant to Singapore's needs, as well as areas where integration is complex. We should grow a vibrant cluster of innovative leading international and local companies in the selected areas of green urban solutions;

c. Focus on using ICT to differentiate our "future-ready" green urban solutions. We should build smart system solutions that can provide the intelligence and insights to achieve more optimal use of scarce resources. Such "smart", differentiated and exportable modular solutions may be deployed in export markets that are in various stages of development; and

d. Focus on positioning Singapore as a reference site for exportable green urban solutions. Singapore can develop test-beds for systems-level integration and innovation, leveraging our extensive infrastructure such as the Next Generation Nationwide Broadband Network. The public sector can serve as a lead user to define Singapore's future urban needs.

A Leading Consumer Business Centre

9. With rising affluence, Asian consumers will increasingly drive global demand. Businesses will need to cater and adapt to a diverse range of tastes and preferences across Asia. Singapore's cultural affinity and connectivity with the region positions it well to be the leading base to gather and analyse consumer insights, as well as to develop products for Asian consumers. We should seek to **develop Singapore into the location of choice from which consumer insights are developed; consumer-centric businesses are managed and grown; products and services developed, tested and launched; and IP/trademarks owned and anchored.**

10. For personal services such as education, healthcare and wellness, lifestyle and tourism, Singapore should develop targeted and segmented offerings for the region. Specialised areas such as performing and visual arts, digital media, sports and other forms of entertainment are already being developed in Singapore, and this should be continued.

11. We are home to many MNCs and SMEs that use Singapore as a base to manage and control their regional and global operations. To understand key markets, companies need to deepen local knowledge. There is therefore a need to appreciate the similarities and differences across markets in Asia and build scale in their marketing and distribution. Singapore can serve these needs by developing new infrastructure and capabilities. These include:

a. Attracting and building a cluster of companies in consumer-related fields such as marketing, branding, design, consumer research, market intelligence and analytics;

b. Setting up an Institute for Asian Consumer Insights to provide a focal point for research on consumer insight methodologies and Asian consumer preferences; incentivising private sector research in this area; and promoting IT-enabled data analytics;

- c. Developing consumer testing and rapid prototyping infrastructure to tap on Singapore's large and globally-diverse tourist population. One example could be at Changi Airport;
- d. Leveraging e-Commerce as a platform to benefit Singapore-based businesses to overcome the disadvantage of a small local consumer base and tap the potential of our hinterland;
- e. Developing a critical mass of talent in consumer marketing, advertising, analytics, branding, design and other creative fields; and setting aside incubators and physical spaces for those in the creative clusters to collaborate. In addition, a wider range of arts, music and creative events and festivals could be staged in Singapore, which would also enhance our attractiveness as a global city; and
- f. Leveraging Singapore's standing as a "trusted brand" to provide accreditation/certification for safety and quality for consumer products such as food supplements.

A Global Base for Complex Manufacturing and Manufacturing-related Services

12. **Manufacturing should remain a key pillar of the Singapore economy, accounting for 20-25 percent of GDP.** Over the years, manufacturing activities in Singapore have become more knowledge, technology and capital intensive, built upon deeper expertise in science and engineering, and been buttressed by research and development activities. The four key clusters are electronics, engineering, chemicals and biomedical sciences.

13. Leveraging this base, we should extend to adjacent and convergent areas of manufacturing which require the use of skills and knowledge that span different disciplines. For instance, our capabilities in electronics would enable us to move into plastic-electronics. Similarly, our precision engineering base would allow us to seize new opportunities in the aerospace and medical technology sectors.

14. In the next decade, we expect manufacturing activities in Singapore to continue evolving into areas where the generation, use and protection of know-how and intellectual property will be crucial – such as in the field of nutraceuticals; into the design and production of "mission-critical equipment or components", such as that for critical medical devices; and into cross-disciplinary sectors, such as the field of bioelectronics. For ease of reference, we will call this 'complex manufacturing'. Singapore would need to complement our existing capabilities with the growth of design, as well as multi-disciplinary and systems-integration capabilities, in order to bring solutions from concept to production. This evolution would enable manufacturing to continue providing highly-rewarding skilled jobs, and provide a platform for Singapore to build, sustain and deepen our engineering and technology base. In turn, this would help anchor a wider suite of activities, such as headquarter-related activities, R&D, IP management and product lifecycle management activities.

15. Indeed, significant opportunities exist to grow service activities that are closely tied to manufacturing. Singapore is well-placed to take advantage of these opportunities as we have developed capabilities in both manufacturing and services, and are thereby uniquely positioned to be able to develop manufacturing-related services. For example, aerospace companies not only produce high-end components and systems, but also generate significant value through services such as maintenance, repair and overhaul. Likewise, ship-building complements the growth of maritime-related services such as repair, logistics and maritime insurance.

A Leading Global-Asia Financial and Business Hub

16. The rise of Asia in the global economy will drive increasing trade in goods and services, as well as the flow of capital and ideas between the region and the world. As a well-connected global city in the heart of Asia, we would be well-positioned to facilitate these flows. We should aim to be the leading Global-Asia Financial and Business Hub. This would be underpinned by four key services-related activities.

17. First, we should strengthen our position as a trade and transport hub, and build related services. Today, we are a major trading, logistics, aviation and maritime centre. We should deepen our expertise in these areas, and enhance our connectivity to harness the new patterns of trade and people flows. As a trading hub, we should seek to seamlessly integrate physical trade with related services such as trade finance, risk management, supply chain management, certification and distribution. We can also strengthen sophisticated capabilities like price discovery and central clearing. In the aviation and maritime areas, we can enhance activities in the insurance, financing, legal and arbitration services related to trading.

18. Second, we should continue to grow Singapore as an international financial centre. To support Asia's growth, financial markets in Asia need to grow in size and sophistication to channel capital towards productive investments. Our strengths in trading, risk management and structured financing; asset management and private banking; loan syndication; project and infrastructural financing; and capital raising, coupled with our global connectivity, would enable Singapore to play an increasingly important role in these areas.

19. Third, we should grow modern business services, such as professional services, to support the range of activities of companies, large and small. Companies in the legal, arbitration, accounting, consulting and compliance sectors in Singapore would be able to grow the range and depth of their activities, thereby enhancing Singapore's value as a Global-Asia business hub.

20. Fourth, we should enhance the capability and vibrancy of the ICT sector, recognising that internet-based technologies can help companies achieve competitive breakthroughs. We should develop capabilities in cloud computing – where users procure computing services through a “pay-as-you-use” utility model, as well as capabilities in business analytics. Cloud computing can allow companies, both large and small, to reduce operating costs, while providing new capabilities for enterprises to work closely together across diverse geographies. Business analytics would enable companies to realise the full potential of data generated from business

processes, thus improving their speed in generating business insights. Business analytics can be applied across a wide-range of industry sectors, ranging from healthcare to financial and hospitality services.

A Global Node for Commercialisation and Innovation

21. Economic growth is driven by the successful commercialisation of innovative ideas, products and services. Hence, our ability to successfully execute the four key strategic thrusts identified above will depend critically on the ability of companies to commercialise and innovate. Concretely, this refers to the translation of good ideas into products, services and solutions that can meet the challenges of changing user needs, new technologies and new competition. Hence, a critical fifth thrust would be to develop Singapore as a key global node for commercialisation and innovation of products and services. This would allow us to extract greater value from existing and new clusters of activities, and provide strategic flexibility for Singapore to capitalise quickly on new and unexpected opportunities as they arise.

22. To achieve this, we suggest focusing on five key areas:

a. **Building on our steady investment in basic R&D, devote resources towards commercialisation and user-driven innovation.** This may entail sector-specific innovations, cross-cluster opportunities or even large-scale systems integration and innovation. Building on consumer insights and end-user needs, we should provide support to Singapore-based researchers and companies, including SMEs, in their efforts in commercialisation and user-driven innovation. We should also support our universities in embarking on cross-sector integrative R&D;

b. **Bridging the gap between research and commercialisation.** There should be an increased focus on translating research into real world deployment. End users and the industry expect innovation to be commercially deployable within six months to a year but researchers typically need a longer timeframe of three to five years. R&D efforts should also have early “line-of-sight” to end user demand, as this would increase the chances of commercialization success. Singapore can develop integrated test-beds for systems-level integration and innovation, and also for new technologies. Such platforms would foster more collaboration amongst Singapore-based companies to provide integrated solutions. To complement these efforts, we should also take a more active role in helping companies scale up to compete in global markets;

c. **Government as lead demand and sophisticated user for innovation and reference site for exportable capabilities.** The public sector should serve as a lead demand user to define Singapore’s future developmental needs and help catalyse innovation of ‘future-ready’ solutions. By leveraging lead demand projects from the public sector, we can provide opportunities for companies to innovate and commercialise IP in the fields of green urban solutions, ICT, finance, logistics, healthcare, education, and other sectors. Companies can also gain the necessary track record needed for the export market through implementing next generation innovations for the Singapore public sector;

d. Linkages to global innovation centres. At the same time, we should attract entrepreneurs and innovative companies from all over the world to test and commercialise their ideas here, both for the regional as well as the global markets. We should be linked to major centres of innovation, and this will help create a more vibrant landscape in Singapore; and

e. In addition to innovation in products, we need to also make a concerted push in **promoting innovation in services**. This would complement our effort to develop Singapore as a Global-Asia Financial and Business Hub, and as a leading Consumer Business Centre. In sectors such as the legal and financial services, this could mean improving the ability to manage complex transactions and to provide customised solutions. In other sectors such as education and healthcare, this could entail enhancing the quality and reliability of services offered. For sectors such as retail and F&B, innovation in the form of improvements in work processes, new business models and technology enablement would help to raise productivity and value.

CONCLUSION

23. The transformation of the Singapore economy will be a multi-year effort. The five strategic thrusts are intended to enable Singapore to build on current strengths, while shifting into more knowledge-intensive, sophisticated and innovative activities for both manufacturing and services. The new areas require new capabilities and skills, but a successful shift will enable Singapore to sustain growth with higher productivity while creating quality jobs with good wage growth for the majority of the population.

ESC Subcommittee on Developing a Vibrant SME Landscape and Globally Competitive Local Enterprises

COMMITTEE CO-CHAIR BY:

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1. Singapore is widely regarded as one of the best places in the world for doing business. With a deep pool of talent and expertise, strong connectivity to the world, and a reputation as a trusted hub, Singapore-based companies are well-positioned to seize global opportunities.
2. However, Singapore's small domestic market makes it necessary for local enterprises to internationalise, often at a relatively early stage of their growth. In particular, emerging markets, especially in Asia, represent a major opportunity for local enterprises in the next decade and beyond. These markets will increasingly demand solutions in areas which Singapore companies have strengths in – such as township and property development, water/waste solutions, urban transport and healthcare. Singapore-based companies which can seize these huge opportunities could potentially become globally competitive companies (GCCs).
3. To this end, the Government can do much more to help companies access capital, build capabilities, establish networks and nurture talent. This subcommittee recommends that the Government:
 - a. Develop an Export-Import bank-like institution to provide internationalisation finance;
 - b. Catalyse supply of growth capital;
 - c. Empower local trade organisations to drive growth and internationalisation;
 - d. Establish track record with significant consumers; and
 - e. Enhance access to human capital.
4. The local corporate ecosystem can be greatly strengthened and enhanced by these supporting enablers. By implementing the following strategies, the ESC believes that in the next 10 years, we can double the number of local enterprises with revenues of over S\$100 million to 1,000.

CATALYSE CROSS-BORDER FINANCING CAPACITY

Demand for Cross-Border Financing

5. As the overseas business opportunities for Singapore companies expand, the need for cross-border financing will increase. Singapore corporates require funding for three major purposes: (a) trade finance and credit insurance for exports and imports; (b) internationalisation finance (funding of overseas plants and operations); and (c) project finance. However, in each area, there exist structural constraints that limit the local market's capacity to lend. This has been accentuated by the global economic crisis, which has reduced banks' capacity for cross-border finance. Going forward, commercial banks will increasingly utilise specialist financial institutions like ECAs (Export Credit Agencies) and EXIM (Export-Import) banks to complement their activities¹⁵.

(a) Trade Finance

6. Global trade is moving away from financing through letters of credit to open accounts. This has raised exporters' need for insurance to mitigate default risk, while lending banks often request insurance before approving loans.

7. Currently, the Singapore market is significantly under-served, compared to other financial centres with regard to single-name and single-country credit insurance (as distinct from portfolio-based insurance). In other economies, the national ECA would act as an aggregator and can lay off the risks in global reinsurance markets. Furthermore, the penetration of factoring as an alternative risk mitigation method is also low relative to global levels.

(b) Internationalisation Finance

8. When Singapore-based corporates invest in operations abroad, they frequently require shorter tenor loans in relatively smaller amounts, for example as working capital.

9. However, there exists a mismatch as foreign banks are mainly interested in the larger loans, whereas local banks whom our SMEs principally rely on typically lend relatively low quanta and may lack underwriting expertise for emerging market risk. There is currently no aggregator able to pool risks and invest in deeper expertise.

(c) Project Finance

10. Globally and in Asia, project finance is characterised by long-tenor loans, with limited recourse to the project sponsor. Even in countries with mature financial markets, provision of project financing by commercial banks is typically facilitated by a supporting infrastructure which the risk can be transferred to or shared with. Due to the large loan sizes involved,

¹⁵ 28 out of 30 OECD countries have a specialist financial institution to address cross-border financing, whether EXIM or ECA.

guaranteeing against such risks commonly requires an independent credit assessment capability within an EXIM Bank or ECA.

11. Singapore's financial system faces additional constraints. Project finance here is significantly less developed than elsewhere, and capabilities of local banks in this area are relatively limited. Although most global project finance banks are represented in Singapore, cross-border deals accounted for only 20 percent of project finance deal volume in the last five years, well below that in other centres despite the relatively small size of our domestic project finance market. Foreign banks which are active in project finance globally, such as Standard Chartered and Deutsche Bank, have indicated the need for a government-linked facility to complement and support bank financing out of Singapore.

12. Both companies and banks have indicated that many major projects now require EXIM support at the pre-qualifying stage in order to ensure certainty of funding. As foreign EXIMs remain largely nationalistic, Singapore companies are currently disadvantaged in this space. They are also less likely to be accepted into consortiums for major projects, which in turn limits their ability to build a track record of working with globally-reputable partners.

Need for Market-based Solutions and Institutions

13. Given these structural limitations, this subcommittee has identified the need for Government to help plug these gaps in cross-border financing capacity through market-based solutions and institutions. Specialist financial institutions like ECAs and EXIM banks have helped complement private financial institutions in several other markets, and have gained importance since the crisis. They are also an integral part of the Asian project finance market.

14. A specialised institution along similar lines in Singapore could support the market by performing the following functions:

- a. Risk and credit insurance for trade finance;
- b. Guarantees for loans by commercial banks for overseas investments;
- c. Guarantees for project finance and where necessary, co-financing with commercial banks.

15. By aggregating demand for emerging market/sector lending, such an institution would be able to justify specialist risk assessment capabilities to complement commercial banks. Partnering such an entity will enable banks to engage in cross-border financing without having to carry the risk exposure and capital requirements in their balance sheets.

16. Such an institution must have a clearly-defined mandate, where the *raison d'être* is one of facilitating the supply of capital and not of subsidising loans. The Government should not be utilising the national balance sheet for this purpose, absorbing risk from the commercial banking system without financial discipline. As such, the institution would have to be commercially managed and obtain a fair return on its capital, even if it is funded with government equity.

17. The institution should attract and develop specialist market expertise and capabilities, with a focus on key sectors and geographies that Singapore companies have strengths in. It should also partner financial institutions to develop the market for cross-border finance, and not crowd out other market participants. To achieve this, it would have to take a proactive stance in searching for co-financing opportunities, and may have to offer a spectrum of financing instruments including guarantees and insurance.

This subcommittee recommends that the Government develop market-based solutions and institutions for cross-border financing, including a commercially-managed specialist institution. This institution would build new and enhanced capacity to provide risk insurance for trade finance and overseas investments. As it builds capabilities over time, the institution should also provide guarantees and – where necessary – co-financing with commercial banks for project finance.

CATALYSE SUPPLY OF GROWTH CAPITAL

Market Financing of SMEs

18. Feedback from both local companies and the financial sector suggests that there is room to develop and catalyse market financing for SMEs. SMEs with good capabilities, particularly those in non high-tech sectors, face challenges in raising patient¹⁶ growth capital as they are typically not large enough to interest private equity, nor able to provide sufficiently attractive returns in a relatively short time horizon for venture capital firms.

19. Globally too, venture capital firms have shifted their focus from growth-stage companies to those with better prospects of going public. Coupled with the deleveraging in the private equity industry since the global financial crisis, the shortage of growth capital will likely persist over the next few years.

Leverage on Private Sector Supply and Expertise

20. In this regard, this subcommittee has assessed it to be opportune for the Government to spur the expansion of SME financing over the next 5-10 years. A financial environment that is conducive and supportive of SME growth would also further enhance Singapore's value proposition as a base for global enterprises to anchor and internationalise. It can also help seed alliances among foreign and home-grown businesses anchored in Singapore.

21. Rather than supplant private capital, this subcommittee recommends that government intervention should create the incentive for private equity financing of Singapore-based SMEs through co-investment funds¹⁷. Government, as co-investor, should rely principally on private

¹⁶ Investments with a long-term horizon that allow sufficient time for expansion plans to come to fruition.

¹⁷ The US Small Business Investment Company (SBIC) programme and Israel Yozma initiative are two examples of government financing schemes that have shown some success at catalysing the flow of private capital to SMEs as well as the growth of the venture capital industry.

sector expertise to assess investment worthiness, so as not to erode commercial discipline in investment decisions.

22. Over the next 10 years, up to S\$1.5 billion of new capital could be catalysed to facilitate the growth of Singapore enterprises, with the Government contributing about half this amount, i.e., S\$750 million. This could be implemented in phases in tandem with the availability of pipeline of investible enterprises and supply of private capital. For a start, the Government can seed S\$250 million of funds to attract the interest of potential co-investors, bringing the total available funds to S\$500 million. Of this, it is estimated about S\$300 million could be channelled to SMEs below revenues of S\$100 million.

This subcommittee recommends that the Government catalyse supply of growth capital of up to S\$1.5bn to Singapore-based enterprises through co-investing with the private sector.

Facilitating Corporate Restructuring

23. As part of their growth and internationalisation strategy, Singapore-based enterprises may embark on mergers and acquisitions. Where opportunities arise especially post-crisis, such strategies can enable enterprises to sharpen their business models, acquire new capabilities and gain access to new markets, making them more globally competitive.

This subcommittee recommends that the Government provide incentives for mergers and acquisitions so that companies can take advantage of post-crisis opportunities to grow inorganically.

EMPOWER LOCAL TRADE ORGANISATIONS TO DRIVE GROWTH AND INTERNATIONALISATION

24. Local trade organisations, such as trade associations and chambers, can serve as strategic platforms that provide capability building support, networking opportunities, and business insights. Relying on their networks and expertise, trade organisations can potentially be an important pillar of support for corporates, complementing government support programmes by offering customised outreach and assistance that better target unique industry needs.

25. Currently, trade organisations are already involved in manpower development, networking and consultancy/information services. There is scope to empower them to take on greater responsibilities and roles, and encourage industry-led initiatives to foster a more cohesive and synergistic enterprise community. Specifically, this subcommittee has identified that trade organisations can:

- a. Champion productivity, capability and talent development programmes;

- b. Help member companies to focus on core business functions through demand aggregation of outsourcing non-core corporate functions; and
- c. Facilitate market access through brand development, promotion and overseas networks, particularly in the immediate region. To complement the trade organisations' efforts, the Government should also expand the scope of overseas business activities supported.

26. However, the level of competency across trade organisations varies substantially. Hence, there is a need to consolidate and strengthen institutional capabilities of trade organisations in order to better serve the community.

This subcommittee recommends that the Government strengthen trade organisations' institutional capabilities and empower trade organisations to serve as industry champions and market facilitators.

ESTABLISH TRACK RECORD WITH SIGNIFICANT CONSUMERS

27. The Singapore domestic market, though small, has significant consumers with sophisticated demand and large purchasing power. They offer good opportunities through which enterprises can build exportable capabilities and thereby establish track record.

28. One major source of significant consumers is our ecosystem of MNCs that anchor value-chains and capabilities in key economic clusters. While EDB's current Local Industry Upgrading Programme (LIUP) encourages MNCs to procure from our local suppliers by supporting the manpower cost of MNC procurement managers, MNCs often require goods and services that may not be found locally. The process of qualifying new suppliers, which may involve capability transfer and development, as well as the production of a prototype or sample, can often be a substantial expense.

This subcommittee recommends that the Government provide incentives to facilitate partnerships in which MNCs, including large local companies, assist local companies to develop new capabilities and navigate MNCs' qualification process, thereby building the foundation for deeper partnerships between large and small companies.

29. Another significant consumer with sophisticated demand is the Government. However, currently government agencies do not systematically co-develop innovative solutions with the private sector and tend to adopt existing solutions or rely on internal R&D efforts.

30. There is hence scope for government agencies to share their future innovation needs with companies and work with companies to co-develop innovative solutions for public sector needs. The Government could be a significant consumer and first-user of the innovative solutions developed if these solutions provide good value for money. In doing so, the Government could achieve the twin objectives of enhancing public service delivery and growing innovative

enterprises. Grants could also be provided to companies for R&D and test-bedding collaborations with the Government. In the medium term, government agencies could be mandated to set aside a portion of their budget for such collaborations with companies.

This subcommittee recommends setting up a platform whereby government agencies and companies can co-develop innovative solutions in partnership.

ENHANCE ACCESS TO HUMAN CAPITAL

31. Enterprises need talent, as well as requisite domain expertise and management capabilities to drive their growth. However, many local enterprises lack exposure and profile as employers. Hence, they face the perennial difficulty of attracting and retaining their fair share of talent.

32. In 2009, SPRING launched the Executive Training Programme as a short term recession measure to help SMEs acquire fresh talent and engage seasoned professionals. This has proven useful in matching SMEs to talent and advice. Going forward, this subcommittee has assessed a need for longer-term and enhanced programmes that build up a sustained pipeline of talent and a ready pool of professional advice and business expertise that SMEs can tap on.

This subcommittee recommends that the Government (i) formalise and broaden the scope of internship programmes at the polytechnic and undergraduate levels; and (ii) facilitate a ready network of advisors and mentors to provide strategic advice, functional and domain-specific expertise to local enterprises.

ESC Subcommittee on Attracting and Rooting MNCs, Asian Enterprises and Global Mid-Sized Companies

COMMITTEE CO-CHAIR BY:

MR LEO YIP

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DEVELOPMENT BOARD

MS DEBORAH HENRETTA

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The Next Phase of Growth – A Vibrant and Diverse Corporate Ecosystem: Singapore as an Essential Home for Businesses, Offering a Global-Asia Value Proposition

1. Singapore has over the years successfully attracted MNCs to invest and establish a wide range of business activities, bringing with them technology, know-how and market access. Many MNCs have also set up regional headquarters here. Singapore should build on this, to grow a more vibrant and diverse corporate ecosystem. We should aim to attract and root more MNCs here. We should also seek to diversify the base of global companies by enhancing Singapore's position for Asian enterprises to regionalise and internationalise from, and global mid-sized companies which are industry leaders, to seek forays into Asia.
2. As a global business city, Singapore has strong infrastructure, connectivity and a highly skilled workforce. It is also in the heart of a rising Asia, connected to the key regions of growth. This is a valuable position from which to create new growth opportunities. In our next phase of growth, Singapore should enhance our position as a Home for Businesses with this unique Global-Asia proposition – an essential location for MNCs, global mid-sized companies and Asian enterprises to create value and manage and integrate their Asian as well as global business activities. Four main considerations drive this opportunity:
 - a. The same factors that make Singapore a valuable host for off-shoring and outsourcing, production, regional headquarters viz pro-business environment, stability, highly skilled workforce, excellent infrastructure, connectivity, all continue to be relevant and valuable.
 - b. The pull of Asia. The rising affluence of Asia's fast growing middle class, increase in number of high net-worth individuals and ageing demographics present immense opportunities for businesses to grow consumer-centric activities. In addition, the size of markets and the increasing sophistication of Asian consumers, require global companies to customise products and services for Asia. This is the key driver as MNCs seek to expand their Asian reach, and global mid-sized companies seek forays into Asia, some of them for the first time. In the same way, fast growing Asian enterprises are looking to regionalise, as well as internationalise and seek out global markets.

c. The structural changes in G3 domestic markets. Structural shifts arising from the global recession, such as capital constraints, rising public debt and shifts in tax policies, are creating a more complex business environment. Many companies from the G3 countries are reviewing their corporate strategy and business models, as well as searching for new growth markets.

d. Technology and talent. For companies in knowledge and innovation intensive industries, the two imperatives of technology and talent will drive future growth. Singapore is building up our technology and innovation capacity. We are already an attractive talent destination and have the potential to become a global talent centre. The combination of these two factors will be a strong growth driver for businesses.

3. Harnessing our Global-Asia value offering, Singapore can build a differentiating proposition for global companies based on our existing strengths, finding new ways to leverage them and developing new capabilities.

We are Well-Positioned to be a Home for Businesses

4. Businesses are seeking a strategic location in Asia to manage their operations to harness opportunities, both in Asia and globally, arising from global trends, as well as to address challenges resulting from the structural shifts in the global economy especially in the aftermath of the recession.

5. These global trends and structural changes present huge growth opportunities in as well as shift of business interest towards Asia, necessitating global businesses to ***develop and enhance their Asia strategy***. With Asia as an increasingly significant market, global businesses need to be in Asia. Located in the heart of Asia, Singapore offers a vantage point for businesses to manage, integrate and control their activities, access and seize opportunities in key markets. Such businesses include both MNCs seeking a home in Asia, as well as global mid-sized companies seeking a first and essential base to grow from and leverage on Asia's market potential.

6. Singapore's value offering is pan-Asian, to be a base for such businesses to manage and control their business activities across the entire Asian region. It is well connected to all parts of Asia. It is close to, and understands the huge Asian markets of China, India and Southeast Asia. Singapore also has market neutrality. It offers global businesses a strategic base to locate senior management to manage and integrate their pan-Asian operations, without being weighed down by in-market challenges.

7. At the same time, fast growing Asian enterprises especially those from China and India, are seeking new markets outside their home countries, in other parts of Asia as well as globally. Some of them are seeking a location in Asia from which to launch their regional and also global strategies, and manage their operations.

8. As an essential location for businesses, Singapore can be the:
 - a. **MNCs' Home in Asia**;
 - b. **Launchpoint** for Asian enterprises to regionalise and internationalise; and
 - c. **First and Essential base in Asia** for global mid-sized companies.

Building on Singapore's Strengths

9. Singapore's strengths as a global business city include our pro-business environment governed by the rule of law, which marries trust, intellectual property protection, stability, knowledge infrastructure with physical connectivity to other regions of the world and an open and inclusive culture that is welcoming to talent.

10. By enhancing these strengths and finding new ways to leverage them, we will bolster Singapore's proposition as an **essential location for businesses to be in**. Capabilities in innovation, technology and talent are critical to enable **businesses to grow their top line and create value**. For example, we can leverage on Singapore's track record as a trusted hub with strong knowledge infrastructure to catalyse public-private partnerships. This will help to unlock the know-how and system innovation capabilities in government agencies, for co-creating, test-bedding and exporting innovative solutions.

11. Our existing strengths also form a foundation to build **new strengths** and grow **new differentiating capabilities**. For example, Singapore can build upon its strengths in data analytics, to develop capabilities in Asian market intelligence and consumer insights, as well as related professional services. These capabilities will be a rich resource for companies seeking to move into consumer-centric products and services for the Asian markets.

FIVE KEY STRATEGIES

I. Singapore as an essential location for businesses with a Global-Asia value proposition

12. The key to attracting, growing and rooting businesses here is to make Singapore a Home for Businesses in Asia – an essential location for MNCs in Asia, Asian enterprises regionalising and internationalising and global mid-sized companies to create value and grow top line. This means being a Home for Business Activities, Home for Innovation and Home for Talent – to which businesses will gravitate because of the compelling proposition of a holistic and integrated best-stop location in Asia for them to chart directions and implement growth strategies for their business and innovation activities, as well as talent development initiatives.

13. Central to this strategy is to enhance Singapore's position as a **pan-Asian integrator** and an essential location for businesses with a Global-Asia value proposition, which embodies all of the following elements:

- a. A neutral and best stop in Asia to manage Asian and Global business activities;
- b. Strong market and cultural connectivities within Asia, but yet globally-linked; and
- c. Leading location for applying technology and innovation for pan-Asian solutions, and managing global talent for Asia, as well as Asian talent for global activities.

14. It is therefore essential to strengthen Singapore's market connectivity, through initiatives to harness and deepen our market knowledge of Asia and global know-how, as well as enable Singapore-based businesses to access market opportunities. Key proposals are to:

- a. **Strengthen capabilities of professional services sector as key enabling factor for pan-Asian businesses** – We should deepen and broaden the professional services sector in Singapore as a key enabling capability for pan-Asian businesses. The government should consider initiatives to grow and deepen key market knowledge and cutting-edge expertise with a pan-Asian focus within the professional services sector in fields such as market intelligence, business services, analytics, regulatory knowledge, as well as marketing and branding services for Asia.
- b. **Develop Singapore as Asia's centre for consumer insights** – The government should consider establishing an Institute of Asian Consumer Insights in Singapore as an iconic receptacle for our capability in Asian consumer knowledge. This institute should conduct upstream research activities in fields such as sensory and psychoanalytical research, develop cutting-edge data gathering and analytics tools and methodologies, and innovative platforms to capture, analyse and draw insights from consumer insights data to create value for businesses.
- c. **Attract and engage Asian business chambers, industry and trade associations and business houses** – Many Asian business chambers, industry and trade associations, and business houses have established strong networks which could be tapped on to create platforms for Singapore-based businesses to access opportunities in Asian and global markets. Attracting a concentration of such players in Singapore will enhance market connectivity through their regional and global networks.

II. Establish Singapore as reference city for standard-setting and future-ready solutions

15. Singapore possesses a conducive environment to become a globally leading "living lab" for businesses to conceptualise, co-create, test-bed and commercialise **future-ready solutions for global and Asia markets**. Singapore is an ideal "living lab" grounded on the ability to pilot with speed, scale and integrity, with a compact urban environment for controlled experimentation, testing and lead adoption.

16. We should build on our position as a trusted location with strong industry competencies, coupled with close collaboration between the private and public sectors, to develop Singapore as the reference city for pan-Asian solutions, and also global markets, whereby product and process standards are developed and exported from Singapore. A key proposal is to:

- a. **Support development of standards in selected areas** such as urban & green solutions, health & wellness and consumer products & services. Singapore should make available platforms for the private sector to leverage on public sector initiatives as a reference for standards e.g. Building and Construction Authority's Green Mark, Electric Vehicles, Green IT Industry Development Initiative, and Ministry of Health's National Standards of Care. In addition, Singapore should put in place smart and flexible regulations to facilitate the development, validation and launch of standards.

III. Singapore as Global Talent Centre in Asia, developing thought and talent leadership

17. A vital ingredient of being an essential location for businesses must be a vibrant talent ecosystem, where businesses can find the requisite talent to helm and run operations in Asia. Recognising that talent is not just an input factor but more importantly, a driver of economic growth, we should build on our strengths to attract and develop talent, both local and foreign, to make Singapore a global talent centre in Asia. Key proposals are to:

- a. **Attract more world-class universities** – Building upon Singapore's infrastructure of strong public tertiary institutions, we should continue to attract more world-class universities to run programmes here. This will broaden and deepen capabilities that will help drive growth of key industry sectors. These world-class universities would provide new avenues for Singaporeans to pursue quality education, and also attract global talent.
- b. **Encourage the establishment of corporate universities and programmes to groom next-generation corporate leaders** – Many global leading companies have strong systems and programmes to identify, nurture and develop high-potential performers, managers and leaders. They run leadership development programmes, expose their talent to internal and external practice leaders, as well as create networks for talent development. Increasingly global companies need to develop more corporate leaders for their Asian businesses. Singapore should partner with global companies to stage their corporate talent development activities for Asia here.
- c. **Create talent centres of excellences** – Singapore should aim to bolster its competitive position in key industries by developing thought and practice leadership. Singapore should set up talent centres of excellence in key sectors, where top talent from around the world can create new knowledge and practices as well as train and develop peak and deep talent. An example could be establishing the Asian equivalent of the global leading Centre for Ships and Ocean Structures (CeSOS) at the Norwegian University of Science and Technology.

- d. **Attract and develop peak and deep talent** – Singapore should do more to attract and develop peak and deep talent who are business, research, thought and practice leaders in their specific fields. We should also do more to develop high-potential local talent for high level (C-suite) leadership positions.

IV. Singapore as long-term strategic partner in Asia for MNCs

18. The physical compactness of Singapore is a key strength for companies to exploit value within an industry ecosystem. We should build on this to attract key players to strengthen the value chain within industry sectors that Singapore seeks to win in. This will enhance the breadth and depth of the industry ecosystem as a key value differentiator. It will in turn bring new opportunities and benefits to existing Singapore-based companies. A key proposal is to:

- a. **Promote strategic linkages between MNCs, Asian enterprises, global mid-sized companies and other Singapore-based enterprises** – To strengthen the industry cluster ecosystem, the government should consider efforts to enhance strategic mutual dependencies between MNCs, Asian enterprises, global mid-sized companies and other Singapore-based enterprises. This will help to build stronger and more deeply-rooted industry capabilities across the ecosystem. Initiatives could include the expansion of EDB's Local Industry Upgrading Programme (LIUP) and IE Singapore's International Partners Programme to support alliances of Singapore-based businesses in capability development and technology transfer, test-bedding and commercialisation, as well as systems integration and scaling up for market access.

V. Establish Singapore as the first and essential base in Asia for global mid-sized companies and launch-point for Asian enterprises to regionalise and internationalise

19. Together with MNCs, global mid-sized companies and Asian enterprises would contribute to a more vibrant industry ecosystem in Singapore.

Global SMEs

20. **Singapore should do more to attract global mid-sized companies**, comprising "hidden champions" (owner-managed mid-cap businesses that are global leaders in their niches) and high capability/high growth global enterprises.

21. *Context for engagement of global mid-sized companies:* The niche capabilities of these global mid-sized companies and their strong emphasis on technology would strengthen specific industry clusters and drive more innovation in Singapore.

22. *Key Characteristics of global mid-sized companies:* While global mid-sized companies are keenly interested in accessing the growing Asian markets, compared to the MNCs they have less in-house resources (e.g. managerial talent) to drive their expansion efforts. They are therefore more likely to adopt a conservative and measured expansion strategy. For their first foray into Asia, most global mid-sized companies would set up a small outpost to become more familiar

with the region. However if this works for them, they are likely to grow this first stop over time into their Asian base. This is an opportunity that Singapore should seize.

23. *Opportunities for engagement of global mid-sized companies:* It would be timely to engage these global mid-sized companies as structural changes and slower growth in their home markets are pushing them to look towards higher growth markets such as those in Asia. Many of them are also re-evaluating how their businesses should be better managed as some of their pilot technologies are now ready for commercialisation in new markets like Asia.

24. Singapore should position itself as a centre for global mid-sized companies to grow in Asia – **a first and essential base in Asia for global mid-sized companies.**

Asian Enterprises

25. *Key Characteristics of Asian enterprises:* Asian enterprises refer to Asian MNCs and high capability/high growth Asian companies. The high capability/high growth Asian enterprises typically serve the domestic markets and only the Asian MNCs are likely to have an international footprint. Many of them have deep local market knowledge and connections but are less familiar with the international markets. Notwithstanding this, many Asian enterprises have strong ambitions to grow aggressively to become world-class global companies (e.g. Fortune 500 companies).

26. *Opportunities for engaging Asian enterprises:* To achieve their ambitions, many Asian enterprises seek a base outside their home markets to grow their reach to the rest of Asia and/or global markets. Singapore should position itself as a **strategic location for Asian enterprises**, leveraging on our **cultural familiarity** with Asia, **coupled with our global know-how from established linkages to external markets and the strong base of international businesses present here.**

27. **Singapore should establish itself as a global launchpoint in Asia for Asian enterprises to regionalise and internationalise from.**

28. Key proposals to help us attract global mid-sized companies and Asian enterprises are:

- a. **Develop “Asia-ready” managerial talent for global mid-sized companies and “Global-ready” managerial talent for Asian enterprises.** – The Government should attract and develop a stronger pool of multi-cultural, “Asia-ready” managers, professionals and leaders including Singaporeans to helm the global mid-sized companies’ operations in Asia, and a pool of globally-ready talent to drive the Asian enterprises’ regionalisation and internationalisation efforts.

- b. **Facilitate quick start-up of Asian operations of global mid-sized companies and Asian enterprises** – The Government should facilitate the quick start-up of the Asian operations of global mid-sized companies as well as Asian enterprises in Singapore, and help these companies better understand Asia/global markets and regulations.

CONCLUSION

29. Singapore stands in a good position to build on its strengths as a global business city with Asian attributes and business linkages across the region. Successfully attracting and rooting more MNCs, Asian enterprises and global mid-sized companies in Singapore, will make for a more vibrant and stronger corporate ecosystem. This will in turn develop even more globally competitive industry clusters and an overall better diversified, more competitive and stronger economic structure. This will create more jobs and exciting career opportunities for our workforce.

ESC Subcommittee on Growing Knowledge Capital

COMMITTEE CO-CHAIR BY:

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CHAIRMAN, AGENCY FOR SCIENCE,
TECHNOLOGY AND RESEARCH

DR JAN-ANDERS KARLSSON

CEO, S*BIO

INTRODUCTION

1. This Economic Strategies Sub-committee on Growing Knowledge Capital, co-chaired by Chairman A*STAR, Mr Lim Chuan Poh, and CEO S*BIO, Dr Jan-Anders Karlsson, was tasked to recommend strategies to enhance the impact of Singapore's Research-Innovation-Enterprise (RIE) framework by reviewing the knowledge creation, innovation and enterprise (I&E) value chain; identifying the key fields and areas in the value chain to focus our resources on; and proposing schemes to strengthen the commercialisation of R&D.

AIM

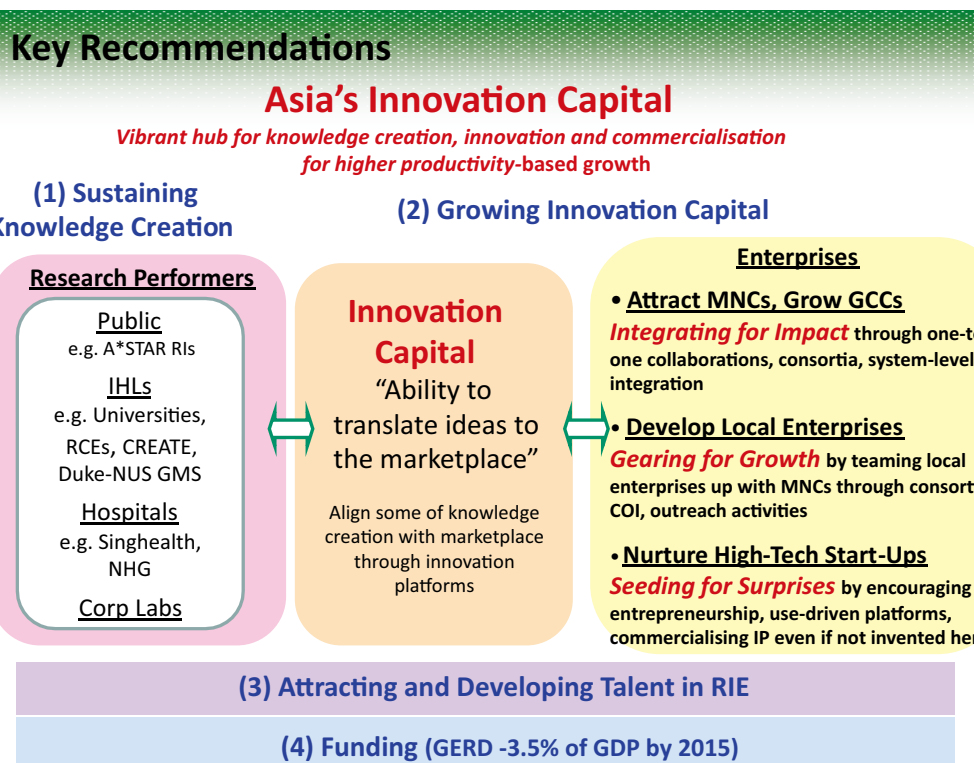
2. This submission presents this subcommittee's recommendations for ESC Main Committee's consideration.

Our Vision

Singapore is in an excellent position to become a key global R&D hub and an innovation capital of Asia. This subcommittee envisages Singapore to be the home for private sector R&D activities and innovation, in partnership and collaboration with world class public sector R&D institutes.

3. To achieve this vision, Singapore needs to:

- a. Nurture world-class research-intensive universities and institutions to attract and train top talent for the economy, develop excellent R&D capabilities and build international recognition for Singapore, so that we can continue to develop globally-competitive knowledge-intensive manufacturing sector; and
- b. Develop stronger partnerships between public sector and private sector research community. The public sector research institutes need to be mission-oriented and be active in engaging the private sector to drive innovations through a broad spectrum of capabilities, while adopting a flexible and responsive approach towards collaborations.



KNOWLEDGE CREATION

Singapore's R&D Landscape

4. In the last ten years, Singapore's R&D landscape has been transformed significantly. Starting with pockets of R&D capabilities residing in research institutes and the universities, Singapore has now established an emerging and vibrant R&D ecosystem comprising a greater diversity of research performers, including public sector research institutions (A*STAR RIs), institutes of higher learning¹⁸ (IHL), hospitals and academic medical centres, and corporate R&D laboratories. In the same period, we have also witnessed the transformation of our local universities into more research-intensive institutions.

The Role of Public Research Institutes (RI) and Institutes of Higher Learning (IHL)

5. As Singapore moves towards a knowledge-based innovation-driven economy, the sustained support for the wide spectrum of capabilities development in the universities and public sector research institutions over the years will become increasingly significant in translating knowledge into the marketplace and growing a competitive talent base to spearhead the I&E activities. The key drivers of these efforts are:

- World-class research-intensive universities** – Universities play a prominent role in a knowledge-based, innovation-driven economy by developing the talent for the economy. Recruiting and retaining eminent scientists and faculties will be key to establishing the good international standing of our universities, which in turn will attract high calibre undergraduate, post graduate and postdoctoral level talent. The presence of world-class research intensive universities will be crucial to achieve and sustain this outcome. In addition, universities will play an increasingly important role in training talent across

¹⁸ These include the universities, polytechnics, research centres of excellence (RCE) and international institutions under CREATE.

the I&E value chain, such as nurturing entrepreneurs by facilitating activities to support and incubate ideas, training students in various aspects of entrepreneurship, as well as providing mentorship at critical stages of a start up's development.

b. **Mission-oriented public sector research institutions** – Public sector R&D activities can help to attract and anchor high value-added knowledge-intensive manufacturing activities of MNCs and Globally Competitive Companies (GCCs), as well as to grow the latter's R&D activities in Singapore. Through various innovation platforms that are facilitated by the public sector RIs, we also create opportunities for the local SMEs to collaborate and engage the large enterprises to build business partnerships and network. Furthermore, the public sector RIs also attract and train R&D talent who are industry ready and will enable the private sector to grow their R&D activities over time.

6. Our universities and public sector research institutions are therefore the foundation that catalyses innovation-driven activities and high-value, knowledge intensive manufacturing. Their close alignment with industry interests and their ability to produce quality talent for both private and public sectors have enabled Singapore to attract high value-added R&D and manufacturing activities into the various sectors. Our manufacturing sector today employs about 600,000 people with a value add of S\$47 billion. These are 30 percent and 21 percent respectively more than what it was in 2000. In a similar way, the employment in the R&D sector has grown from 14,500 jobs in 2000 to 25,700 jobs in 2008, contributed in part by the corporate R&D laboratories that have been attracted to Singapore over the years, such as Novartis and Nikko Denko.

It is recommended that Singapore sustains its commitment to public sector basic research (to build important foundations for downstream research) and mission-oriented R&D (which is closely aligned to industry development opportunities) in order to continue to develop our public sector capabilities, step up the pace of I&E and contribute towards Singapore's goal to achieve higher productivity driven growth.

INNOVATION CAPITAL

7. Our ability to translate ideas to the marketplace is the Innovation Capital, which is the means to create value from our R&D investments. To be differentiated and competitive, it is essential that our Innovation Capital supports approaches that are flexible and responsive to the various needs of enterprises, namely the MNCs and GCCs (**Integrating for Impact**), local companies (**Gearing for Growth**) and high tech start ups (**Seeding for Surprises**).

"Integrating for Impact" – for MNCs and GCCs

8. To attract MNCs and grow GCCs, a customised approach is needed; one that leverages on our intrinsic organisational strengths to responsively integrate capabilities, research institutions and public sector agencies to deliver customised solutions with a common purpose. The Aerospace cluster is a good example of one that has benefited from a customised and integrated approach. This cluster is on course to be defined by innovations that will drive future growth, create high quality jobs and strengthen the relationship between MNCs and the local companies. The box gives more details about the Aerospace cluster story.

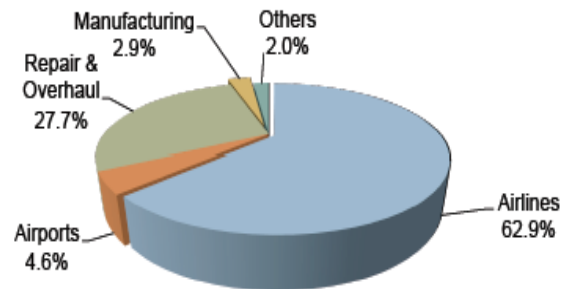
BOX

Aerospace Cluster Example

The Aerospace Cluster in Singapore is a fast growing one with good sustainable prospects. Singapore's aerospace industry grew from US\$13 billion in 2000 to more than double in 2008 with an estimated figure of approximately US\$27 billion, with CAGR of over 10 percent.

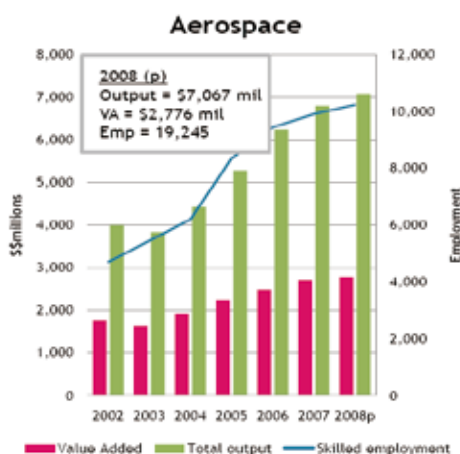
This sector is anchored by world leading companies such as ST Aerospace, Pratt & Whitney, GE and Rolls-Royce. In particular, Singapore is well recognised as an MRO (Maintenance-Repair-Overhaul) hub with a quarter of Asia Pac's market share, or 7 to 8 percent of the global market.

**Singapore Aerospace Industry
Revenue Breakdown, 2008**



Source: EDB, Annual Reports and Frost & Sullivan Analysis

The success of the sector is tied closely to the early-years investment in technologies such as materials sciences, physics, precision engineering and electronics. These traditional strengths enabled Singapore to enter into the high value-add activities of manufacturing the engine parts, avionics and airframe parts, and provide the supporting services such as inspection and testing. As a consequence, the skilled employment in this cluster has tripled to over 10,200 in the past 6yrs (2002 – 2008), of which 80 percent of the workforce is made up of Singaporeans and Permanent Residents.



With the high VA activities in the aerospace industry expected to continue to grow substantially (estimated CAGR of VA by 2020 to be about 10 percent), there will be more business and technological opportunities for aerospace companies, as well as the supporting industries, including the SMEs in the precision engineering and electronics sectors, for instance.

*A*STAR Aerospace Consortium*

To further strengthen the strategic alliances of the players within cluster, and sustain technology leadership and efficacy through R&D, the A*STAR Aerospace Consortium was launched in Jan 2007. This is the world's first-of-its-kind aerospace consortium comprising the four aerospace giants of Boeing, Pratt and Whitney and Rolls-Royce and ASTSR Research Institutes as founding members, and it is the first time that the in-competition giants are collaborating on a common platform to chart R&D strategy and direction in the aerospace industry. In the past 2 years, more companies have joined the consortium, including local SMEs such as TruMarine and IDI Laser Services.

This consortium not only actively engages industry players as well as R&D community, but also taps on existing capabilities, infrastructure and resources in all the research institutes under the Science & Engineering Research Council of A*STAR to conduct pre-competitive research and address technological challenges in the following:

- Inspection and non-destructive testing
- Manufacturing processes and automation
- Advanced materials
- Information and communications
- Computational modelling and dynamics

Members, including the SMEs, have full access to the R&D results developed under the programme and have the option of attaching their company staff to the programme to work on joint projects with researchers from SERC research institutes. This lays the ground for innovation in the global aerospace industry through Singapore-made technologies, facilitates eventual technology transfer of the research conducted, and presents opportunities for our local supporting industries to build new capabilities that will anchor global players in Singapore.

9. The focus of the customised and integrated approach is to develop the appropriate models for interaction and collaboration between and among the public and private sector institutions. These models or innovation platforms create value for the industries in a way that caters to the unique needs of the particular industry. Examples of such innovation platforms include:

a. **Bilateral collaboration platforms.** These are direct research collaboration arrangements between the companies and the public sector research entities. The MNCs and GCCs benefit from acquiring technologies and know-how from the public sector research institutions which have developed a suite of vertically-integrated capabilities. The growth of high value added activities in the Microelectronics and Data Storage industries are proven examples of how companies have benefited from the capabilities of IME and DSI¹⁹ over the years. This model has also been extended to grow the BMS sector, particularly in Biologics where a wide spectrum of integrated capabilities resides in BTI²⁰. In the Biologics sector, the results so far have been encouraging; within the last three years, leading companies in Biologics have invested about US\$2 billion, which is a strong endorsement of the bio-processing capabilities and skilled manpower;

b. **Consortia-type platforms.** Industry players who may otherwise not collaborate are brought together to work on a common space, especially one that is pre-competitive. This is done through the consortium approach which provides a common platform for the players to discuss their areas of interest and develop the agenda for research collaboration, as in the case of A*STAR Aerospace Consortium. The platform also serves to inform the consortium members on the broader development within the sector as well

¹⁹ Institute of Microelectronics and Data Storage Institute

²⁰ Bioprocessing Technology Institute

as facilitate bilateral or multi-lateral collaborations among the members. Such platforms will be especially useful in new growth areas such as clean energy and urban solutions; and

c. **System-level integrated platforms.** One illustrative example of system-level integrated platform is in the BMS sector where this approach is key to the translation of research into application. Here, it is not enough to have a drug discovered in the lab. It is only of value when it has been validated through a properly conducted clinical trial. The process of drug discovery is a long and expensive one for the pharmaceutical companies and involves many institutions, agencies and regulators. The ability to create a platform that is much better coordinated and efficient will create a lot of value for the industries all the way from bench collaborations to the conduct of clinical trials. Hence, an integrated approach comprising the multiple R&D performers (including the industry partners), hospitals, academic medical centres and government agencies to ensure that we have the necessary capabilities in place; the facilitative arrangements to build complex collaborations; and the program management structure and process to execute the trial efficiently is critical to this sector.

10. In each innovation platform, the complexity involved in customising for different industry cluster escalates when more capabilities, performers, and organisations are required to be involved and integrated. Singapore is better able to do this well because of how we have evolved as a small country with no natural resources. Over time, we have developed a strong appreciation for the Singapore Inc or whole of government approach among the people and organisations with a clear focus on effective delivery on the outcomes. This is a mindset and attitude that is part of our differentiating advantage and we should always play to our strength. As we use these innovation platforms to attract more manufacturing related research and innovation activities to Singapore, we should also look at how to capitalise on them to develop new opportunities in the convergence of manufacturing and services sectors.

11. Infrastructure that offers state-of-the-art facilities, test beds, pilot plants and living laboratories for companies are also compelling innovative platforms for public-private sector partnerships. Examples of these include:

a. **Infrastructure for R&D** – Sophisticated infrastructure in our public sector research institutions, such as the proposed 12-inch facility; nanofabrication and characterisation facility, will offer the private sector the use of advanced processing equipment and expertise to innovate and develop new products;

b. **Infrastructure for Piloting** – Pilot scale-up processes such as the Kilo Scale laboratory in ICES²¹ will facilitate companies' effort to test and evaluate new processes before deciding on full scale manufacturing; and

²¹ Institute of Chemicals and Engineering Science

- c. **Infrastructure for Testbedding** – large scale infrastructure, such as CleanTech Park or the Smart Grid, serves as living laboratories for companies to test new technologies and showcase their products.

12. In order for any customised and integrated platforms to be effective, it will be necessary for the private sector research performers to be partners to define and shape the research agenda for collaboration. Further, both public and private sector research performers should be incentivised to actively collaborate so as to capitalise on opportunities in emerging spaces, which often involve multi-disciplines and capabilities.

It is recommended that public sector R&D institutions continue to develop mission-oriented programs to attract MNCs and corporate laboratories, as well as to grow GCCs, and contribute towards developing Singapore as a location of choice for the world's leading, innovation-driven companies. The private sector could also play a more active role in helping to define and shape the research agenda of these institutions, for example through CTO/CSO forums. Furthermore, appropriate incentives should be in place to foster public-private sector partnerships and multidisciplinary research activities, and to provide companies with ready access to state-of-the-art infrastructure and facilities.

“Gearing for Growth” for Local Enterprises

13. Gearing for the growth of local enterprises must take a different approach from that of attracting MNCs or growing GCCs. Public sector R&D capabilities need to be adequately broad-based and the institutions should be facilitative in engaging local enterprises through R&D partnerships, technology development efforts, manpower training and outreach efforts.

14. A broad-based, facilitative approach is needed because there are numerous local enterprises across many sectors. Our local enterprises form a significant portion of our manufacturing sector and they play a major role in supporting MNCs. In 2007, local enterprises in the manufacturing sector, specifically in Precision Engineering, Biomedical Manufacturing, Electronics, Logistics, Engineering & Environment Technology and Chemicals, collectively employed some 170,000 skilled people and contributed to a VA of S\$19.1 billion²², which was about 38 percent of the total VA of the key manufacturing sectors²³.

15. We should create more opportunities to further develop the capabilities of our local enterprises and gear them for continued growth, and support upgrade of their capabilities to keep pace with the rapidly changing technological landscape. This can be achieved through innovation platforms such as:

- a. **Consortia-type Platform** – This platform, mentioned previously in Para 9b, will benefit not just the MNCs and GCCs, but also the local enterprises through facilitating interaction and building of relationships between the two segments of industry players.

²² Source: SPRING Singapore

²³ Source: EDB

Having a mix of MNCs and local enterprises will cultivate a strong local supplier base and help the local enterprises develop keen market sense and capabilities that may eventually be exportable;

b. **Centres of Innovation (COI)** – Centres of Innovation (COI) at Polytechnics or research institutions can help local enterprises upgrade their capabilities, acquire advanced manufacturing expertise and gain access to strategic manpower training. The National RFID Centre and the 5 COIs²⁴ supported by SPRING are good examples and more of such centres should be established, especially in growth areas such as MedTech and Clean Energy;

c. **Outreach platforms** – Proactive outreach programs to the local companies will help to raise their awareness on the various ways in which they can leverage on the public sector research infrastructure to upgrade themselves technologically to move up the value chain and be more competitive. Platforms such as joint A*STAR- SPRING GET-UP²⁵ programme has reached out more than a thousand local enterprises. Many of these local enterprises have benefited from the program via the secondment of researchers and engineers (about 245 researchers and engineers have been seconded to 162 local enterprises since inception) as well as the technical advice and customised technology roadmaps that have been provided. Nanyang Optical is one such company that has benefited. Through the GET-UP program, the company developed its environmentally-friendly ‘LinkSkin’ spectacle frame product range and has successfully penetrated major markets such as Germany, France and Italy since 2008. Such outreach platform can be further scaled up and multiplied through the involvement of the Polytechnics.

16. Local enterprises with good products and expertise often need to establish a credible track record in addition to securing access to patient capital and in some instances financing options to support internationalisation. It is recommended that the Government as a large consumer should also play an active role in being the lead reference user of such capabilities. This can be done by establishing government co-innovation platform through the extension of the current PSIF²⁶ scheme²⁷.

17. It is also recognised that the transition from SMEs to GCCs requires support that goes beyond capabilities building and training. Dedicated financing and organisational support from the Government to identify and nurture such potential “champions” may also be needed.

²⁴ COI for Environment and Water Technology (Ngee Ann Poly), Food Innovation Resource Centre (Singapore Poly), Marine & Offshore Technology Centre of Excellence (Ngee Ann Poly), Precision Engineering COI (SIMTech, and COI for Electronics (Nanyang Poly).

²⁵ Growing Enterprise Technology Upgrade programme

²⁶ Public Service Innovation Framework

²⁷ Or adopting an approach similar to that of the US SBIR (Small Business Innovation Research)

It is recommended that a broad based, facilitative strategy be taken to gear local enterprises for growth through the upgrading of their capabilities. In this regard, the Polytechnics can play a bigger role through both the COI and Outreach platforms. Whenever possible, we should also want to network our local enterprises with the MNCs as part of an industry cluster approach to develop research and innovation activities in a synergistic way, e.g. Aerospace Program. In addition, we should also look at how the public sector itself can provide the innovation platforms for the local enterprises by playing the role of lead reference users.

“Seeding for Surprises” – for Startups

18. A knowledge-based innovation-driven economy must also have a vibrant entrepreneurial sector. Here our research-intensive universities can play a significant role in cultivating and training entrepreneurs through seed funding, supporting small scale incubators and recruiting faculty with entrepreneurial skills and track record as mentors and role models. For example, the University Innovation Fund (UIF) could be extended to the alumni to leverage on their extensive networks. In addition, public sector research institutions can develop a more directed approach in encouraging startup activities originating from their R&D. The bioengineering field (such as MedTech), for instance, presents many opportunities for institutions to effectively translate cross-disciplinary (BMS and S&E) research into value-creating innovations.

19. Other ways to nurture and support start ups include:

a. **Use-driven platforms that bring together practitioners and researcher** – For example, the Boston-based Centre for Integration of Medicine and Innovation Technology (CIMIT) successfully connects clinicians, who define the practical problems, to the engineers, who in turn develop the solutions, which have led to many new technologies and successful start ups. Such use-driven innovation platforms can be replicated in many other areas of the economy;

b. **“Queen Bee” approach to attract foreign-based knowledge capital and to nurture start ups for success** – This involves attracting fully-managed premier service incubators, such as Seattle-based Accelerator Corp which focuses on the biomedical area, to bring about a step change in how we incubate start-ups “Marquee” incubators will also naturally attract foreign knowledge capital to add to the marketplace of ideas in Singapore; and

c. **Marketplace for ideas** – This marketplace should provide ease of access to a range of ideas and intellectual properties (IP) from both public and private sectors to be exploited for commercialisation. This should also include the knowledge capital from overseas as part of the strategy of “not invented here but commercialised here”. We should therefore seek to internationalise the Technology Transfer Networks to greatly facilitate the flow of knowledge capital to Singapore. Taken together, this will create greater intellectual vibrancy and more innovation opportunities.

It is recommended that the universities, having become more research-intensive, play a bigger role in encouraging and supporting entrepreneurial activities including training talent with appropriate entrepreneurial skills; employing faculty that are good mentors and role models of entrepreneurship; and supporting start-ups in the universities. Public sector agencies should also consider adopting or adapting proven models for initiating and accelerating multi-disciplinary research through use-driven platforms to develop breakthrough solutions and products such as the CIMIT model. In addition, we should develop Singapore as a marketplace of ideas in synergy with the growth of “queen bee” and other incubators.

TALENT

20. The underpinning of a knowledge-based economy is the availability of relevant talent. World-class research-intensive universities and research institutions play a key role in the training of high quality research and innovation talent. Figures show that the compound annual growth rate, or CAGR, signals a strong demand for RSEs in both public and private sector, at 6.1 percent and 8.5 percent respectively. Singapore compares well against other benchmark countries in terms of the normalised number of RSEs. However, in terms of the number of PhDs (FTE) per 1000 labour force²⁸, Singapore still has some gap vis-a-vis the other R&D intensive economies such as Finland and Sweden. (Finland – 3.6 (2006), Sweden – 3.0 (2005), Singapore – 1.5 (2007)). At the same time, only about 35 percent of the PhDs in our universities are Singaporeans and Permanent Residents today.

21. Our studies indicate that our local universities supply sufficient numbers of Masters level talent to meet public and private sector demand, and that the demand for PhDs remains strong in both sectors. On the latter, our universities should both seek to increase the number of PhDs that we produced, albeit to better align with industry needs, and the percentage of Singapore Citizens and Permanent Residents (SC/PR) pursuing them. In addition, universities can work with the private sector on mutually interesting and relevant PhD research topics. This will both open up better employment opportunities in the private sector for the PhD graduates as well as enable the private sector to grow their R&D activities in Singapore.

22. It is recognised that there is also a need to attract and train a broad spectrum of talent in the I&E value chain particularly those with knowledge and expertise relevant to the Asian markets. Some of the other talents include patent agents, technology brokers and experienced entrepreneurs and innovators. In addition, we should also look at how to enable this different expertise to work together to speed up the translation from knowledge creation through innovation to the market. In this regard, much can be learnt from the systematic approach that California-based Stanford Biodesign has taken to train researchers, practitioners, entrepreneurs, and other technology transfer professionals to more effectively commercialise their biomedical innovations.

²⁸ Based on figures from OECD

It is recommended that the universities can work towards producing more industry relevant PhDs and also encourage greater participation of Singaporeans and Permanent Residents in such programs. At the same time, Singapore should place greater emphasis and focus on attracting and developing the other talents that are needed to realise the translation from knowledge creation through innovation to economic impact.

FUNDING

23. With MNCs increasingly investing in R&D in this region to respond to the Asian markets and consumers, Singapore is well poised to leverage on our growing public sector R&D capabilities to become a key global R&D hub and an innovation capital of Asia. Singapore's strengths include our strong and sustained public sector commitment to R&D with excellent public research infrastructure; ready access to both local and international talent pool; our representative Asian make up of the population; and our conducive business environment including the use of English, respect for IP and clear legal framework.

24. Singapore's Gross Expenditure on R&D (GERD) grew from 1.9 percent of GDP in 2000 to 2.77 percent²⁹ of GDP in 2008, and the proportion of the private sector's component (BERD) increased from about 63 percent to 71 percent in the same period. Clearly the private sector has responded well to our continued investments in public sector R&D and to our vision of becoming a knowledge-based innovation-driven economy.

25. The S&T2010 Plan had set a target of 3 percent GERD by 2010 to propel Singapore into the league of research intensive countries. Although Singapore is on track to achieve this target, many of the benchmarked countries have since set higher goals for GERD. For instance, the targets set by Korea (5 percent by 2012), U.S. (3 percent), Finland (4 percent) and Sweden (4 percent) strongly indicate that R&D and innovation-driven activities are important in sustaining economic competitiveness.

It is recommended that we aim, by 2015, for 3.5 percent GERD as a percentage of GDP to signal our intent to be an Innovation Capital of Asia. At the same time, we should sustain our investments to continue to strengthen our public research infrastructure to catalyse even more growth in private sector R&D and innovation activities thereby creating many meaningful and high value jobs for Singaporeans and foreigners alike.

CONCLUDING REMARKS

26. Singapore has done an excellent job in growing public sector R&D capabilities in the last decade, although some of them are still in the nascent stage of development. It has also successfully leveraged on the public research infrastructure to stimulate the growth of private sector R&D and innovation activities which now constitutes over 70 percent of GERD.

²⁹ Source: National R&D Survey 2008. GERD as percent GDP in 2008 is 2.77 percent (accurate as of 13 August 2009).

This has also served to grow and anchor the higher value added manufacturing activities in Singapore.

27. Singapore is now well poised in Asia to benefit from the growing opportunities to attract even more private sector R&D and innovation activities as well as higher value added manufacturing as a result of the shift in demand to the Asian markets. Our strong commitment to sustain and develop our public research infrastructure and our ability to work closely with the private sector to create a strong value proposition and deliver on the proposition is what will differentiate Singapore from the other competitors. With this continued focus and efforts, Singapore can emerge as a key global R&D hub and a leading Innovation Capital in Asia.

ESC Subcommittee on Making Singapore a Leading Global City

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SINGAPORE: THE GLOBAL CITY IN ASIA

1. The vision of “**Singapore: The Global City in Asia**” is for Singapore to be an endearing home and leading global city in the heart of Asia. As one of the world’s most liveable cities, Singapore will continue to be an endearing home to which we attach a deep sense of pride and commitment. Our home is also a leading global city that offers our people high value-adding jobs and opportunities to stretch their potential. In addition, Singapore’s cosmopolitan identity will be distinguished from other global cities by our multiculturalism and unique microcosm of Asian diversity.

2. Over the years, Singapore has also established a strong reputation for innovative policies and effective policy implementation, as evidenced by our high standards of living in areas such as healthcare and education, which we have achieved with great cost-effectiveness. As the Global City in Asia, we will be the thought leader in governance, policy making and implementation, with the intellectual capital for governments, businesses and academia to access information and knowledge on regional and global trends. With Asia’s rapid urbanisation, Singapore is also well-placed to serve as a pan-Asian model for economically-vibrant and sustainable high-density development in Asia.

3. Three strategies are proposed to fulfil the vision of “**Singapore: The Global City in Asia**”:

- a. Establishing Singapore as Asia’s most liveable city;
- b. Developing Singapore into New Asia’s hub for innovation and creative enterprise; and
- c. Making Singapore the best home for talent.

How these strategies achieve “The Global City in Asia” vision synergistically

4. People are rooted and drawn to a place where they have the best conditions and opportunities to live, work and grow. If we are to retain our core competitive advantage in retaining and attracting talent amidst intensifying competition from other cities, we must be the best home for talent – a vibrant global city that embraces a rich diversity of talent

and ideas. This will be achieved by offering the best career and developmental opportunities for Singaporeans and diverse talents, fostering a deep sense of inclusion, connection and commitment to Singapore, and building extensive talent networks between Singapore and the rest of the world.

5. Capitalising on Singapore's competitive edge in liveability and cultural diversity, Singapore's position as Asia's most liveable city will be critical in providing Singaporeans with high standards of living, while retaining and attracting talent for sustained economic and social progress. Singapore has the hardware and software to offer a leading quality of life; with sustainable city development leveraging our excellent infrastructure, and our emergence as a distinctive cultural and lifestyle capital, building on our multicultural diversity and cosmopolitan connections.

6. Besides improvements to city liveability, efforts to grow our human capital have to be complemented by the creation of high value-adding and productive jobs. Leading economies of the future will be innovation-intensive and ideas-driven. Through design and the commercial application of our rich cultural content, complementing our strengths in science and technology, Singapore could be New Asia's hub for design innovation and creative enterprise. By instilling design as a core competency in our workforce and enterprises, Singapore has the potential to spearhead intellectual property, innovative products and services that capture new consumer demand arising from Asia's urbanisation and growing affluence.

STRATEGY 1: ASIA'S MOST LIVEABLE CITY

7. Singapore should capitalise on its competitive edge in liveability and cultural diversity to secure its future as Asia's Most Liveable City. First, we have to become **an endearing home offering the best quality of life and vibrant lifestyles** in Asia to both citizens and global talents. Second, Singapore should position itself as **a leading cultural capital in Asia** to complement its economic dynamism.

Be an Endearing Home for All

8. The desired outcomes of an endearing home and vibrant destination are as follows:

- a. An **endearing home** that offers Asia's **best quality of life** and with which citizens and global talents forge **strong emotional ties**;
- b. Asia's **lifestyle and leisure hub**, with a diverse range of quality sports, leisure, arts, entertainment, media, retail and food offerings, supported by a thriving ecosystem of lifestyle businesses and talent; and
- c. Asia's leader in **thought and practice for sustainable urban development and place management**, with distinctive districts that are economically- and socially-vibrant.

9. The key recommendations to achieve the above are:

a. **Make Singapore a Lifestyle Hub by enhancing and diversifying our lifestyle offerings.** We can enhance the quality of life in our city and its attractiveness as a great place to live and visit by diversifying our sports, leisure, arts, entertainment, media, retail, culinary and events offerings. As a lifestyle hub, Singapore could be the leading city in Asia for pinnacle international events in sports, culture and cuisine. This could be supported by infrastructure such as facilities for sporting events, sports academies, and a culinary institution to spearhead culinary innovation. The variety of lifestyle experiences could also be enhanced by developing Bras Basah-Bugis into a new concept retail and creative precinct of weekend markets, outdoor arts events and vibrant local community activity. In addition, we should support the creation of distinctive content with a unique fusion of arts, business and technology, and compelling story telling, that is founded on our multi-cultural heritage and our position at the crossroads of East and West. The events industry could also be supported by platforms to synergise brands and grow these events on an international scale.

b. **Develop economically- and socially-vibrant districts through place management.** Beyond upgrading the physical infrastructure of the key districts (Marina Bay, Singapore River, Orchard Road, Civic District/Bras Basah-Bugis) and historic areas in our city, we need to develop and manage the trades and activities of these places to create authentic and memorable experiences for our local residents and foreign visitors. This will be achieved through place management, which involves a coordinated approach by the people, public and private sectors to brand and market distinctive districts through events and activities, supported by appropriate legislation and incentives. These efforts will generate more economic activity and a stronger sense of identity among stakeholders, local and international communities. Although not yet widely applied, place management by cities around the world is gaining momentum. Investing in capability building for the fledgling place management industry will create new jobs, and potentially develop a new export industry for Singapore as cities around Asia mature and the demand for place management skills grows.

c. **Facilitate lifestyle, creative and arts businesses.** We should review policies, such as our tax regime, to enhance Singapore's competitiveness as a hub for the trading of art and collectibles, and boost the vibrancy of our arts, media and entertainment marketplace. We could look into providing affordable spaces for business clusters, such as Gillman Village, and appointing agency champions like JTC Corporation (JTC) to develop or manage the infrastructure needs of emerging arts and creative sectors.

d. **Develop thought and practice leadership in urban planning and solutions** by investing in cutting-edge sustainable development strategies, technologies and R&D projects in new growth precincts like Marina Bay, Jurong Lake District and Punggol. This will help Singapore maintain our thought leadership in urban planning and urban solutions. Developing these projects will further our professional expertise as we leverage Singapore's advantage in comprehensive process management and the integration of ideas across multiple disciplines.

Some new ideas that could be test-bedded include developing a balanced sustainable development framework to steer our growth; building dedicated cycling networks; using computational fluid dynamics modelling to find ways to channel wind flows to cool the city; introducing biodiversity in urban areas and introducing water-sensitive urban design solutions, such as bio-retention swales, to purify water before it enters reservoirs.

Singapore is also in a strong position to develop a new economic sector in urban planning and solutions. We are gaining international recognition as a very well-planned and highly liveable city, and are already exporting our consultancy service in urban planning and development to other cities. These projects are highly strategic as they could create follow-up investment opportunities for Singaporean companies and strengthen G-to-G engagement with other countries and cities.

Leading Cultural Capital in Asia

10. As a leading cultural capital in Asia, Singapore could be:

- a. The **cultural gateway between the East and the West** – gathering and distilling the best of Asia's cultures and ideas for our residents and international visitors, and bringing the best of the world's cultures to Asia;
- b. The **centre of cross-cultural artistic creation in Asia**, producing and showcasing content inspired by the diversity, depth and fusion of Asian and world cultures; and
- c. A **major marketplace for the visual arts, performing arts and collectibles** in Asia, complementing other established and emerging centres in a pan-Asian arts circuit.

11. To be a leading global city is to be part of an elite community of world cultural capitals. Singapore ranks highly in various business and liveability indices for our first-world business and city infrastructure and networks. While we have attained first-world standards in business and liveability, we are still lagging global city standards for culture³⁰. Our cultural sector falls behind that of global cities like London, Paris, New York and Tokyo in terms of scale, diversity and demand. On the other hand, there has been a major shift of focus in the global cultural

³⁰ In a recent Global Cities report, Singapore ranked seventh overall and within the top ten in terms of business activity and human capital, but it ranked 37th in cultural experience.

landscape towards Asia, as evidenced by the booming Asian contemporary art market and massive investments in cultural infrastructure by competing Asian³¹ cities. To be a player in the league of top global cities, we need to make significant investments in our cultural capital and landscape, specifically to:

- a. **Strengthen Singapore's competitiveness as a hub for the arts** by enhancing our national collection, boosting content development and increasing the depth of professional expertise, including the development of reputable degree programmes in a range of disciplines in the arts, and by encouraging greater discourse and research in our heritage and traditional arts. Singapore could also be the global centre in Asia for cultural scholarship and content development, such as the curation of world-class exhibitions drawing on our multicultural heritage, and the heritage content and collections of leading institutions around the world. Through international collaborations of experts and scholars, Singapore could be an influential originator of distinctive cultural experiences with global appeal.
- b. **Propel growth in cultural philanthropy and sponsorship** by developing or expanding related incentives.
- c. **Develop the cultural tourism sector** by strengthening the promotion of Singapore as a gateway to experiencing the cultures of Asia, and developing more cultural products and services that appeal to target tourist segments.
- d. **Rejuvenate and position the Civic District as a premier arts and cultural destination.** With the opening of the National Art Gallery (NAG) at the former Supreme Court and City Hall buildings alongside Empress Place, the Esplanade and Fort Canning, the Singapore Civic District will be the major civic and cultural heart of the city, containing Singapore's highest concentration of museums, theatres, historical sites and public spaces. We should build on the prominence of the NAG to enhance visitor experience in the precinct, strengthen linkages above- and below-ground between institutions in the precinct, enhance the vibrancy of public spaces with programming, and complete a Phase II development of mid-sized theatres at the Esplanade. The aim is to make the Civic District one of Asia's premier cultural destinations – an iconic public commons that captures the imagination of Singaporeans and visitors, while reaping substantial benefits in nation-building and tourism.

³¹ Hong Kong will develop a US\$2.4 billion West Kowloon Cultural District Project with 15 performing spaces and a "Museum Plus", while Seoul recently released in 2006, a "Vision 2015, Cultural City Seoul" Masterplan investing S\$11.9 billion over 10 years in culture. Further west, Abu Dhabi also recently announced a US\$27 billion mixed-use development project Saadiyat Island Cultural District which will feature the Louvre Abu Dhabi and the Guggenheim Abu Dhabi, amidst other cultural institutions.

STRATEGY 2: NEW ASIA'S HUB FOR DESIGN INNOVATION AND CREATIVE ENTERPRISE

12. Singapore's continued growth and prosperity will rest on our ability to create innovative and differentiated products and services that the world demands. To enhance our competitiveness, Singapore should strive to be a global innovation centre in Asia where consumer insights are gathered, analysed and applied to the creation of IP, products, services and killer applications that penetrate new and growing markets worldwide, taking advantage of Asia's rising affluence and urbanisation.

13. To become the hub for design innovation and creative enterprise, we need to develop an innovative workforce, attract the best creative talents and help existing enterprises diversify into new growth sectors (e.g., lifestyle, media and entertainment industries, health, urban and green solutions) while anchoring the best global enterprises in these industries to develop, test-bed, create and launch world-class niche products and services in Singapore. Capitalising on the rising affluence of Asian consumers and Asia's unique tastes, aesthetics and consumer needs, Singapore could be positioned as New Asia's hub for design innovation and creative enterprise by:

- a. Leveraging Singapore's Global-Asia position to become a trend-setting centre of product and service innovation in Asia. By synergising our access to multicultural content, understanding of Asian consumer tastes and needs, technology R & D and know-how, and capabilities in design, Singapore could be New Asia's hub for design innovation and creative enterprises; and
- b. Developing sophisticated design capabilities and cultivating an innovation mindset in our workforce as core enablers that complement and harness science and technology to innovate commercially-viable products and services that lead global consumer demand.

14. Key recommendations are to:

- a. **Develop design capabilities in our workforce** by accelerating the introduction of design thinking programmes and modules (from pre-tertiary to post-graduate level), at local educational institutions and in partnership with leading foreign design institutions, as well as targeted industrial attachments. The design capabilities of professionals in different sectors could also be enhanced through broad-based design literacy training.
- b. **Grow a critical mass of innovative and creative enterprises** by accelerating the adoption of design as a core innovation enabler across local enterprises by providing an integrated package of business incentives for investments in design, design-driven IP creation, experimentation and commercialisation.
- c. **Enhance physical infrastructure to increase industry collaboration and design innovation.** Collaborative spaces for design innovation by creative and other industries (e.g., interactive and digital media, consumer-centric and urban solutions) could be made

affordable to encourage ground-up entrepreneurship and experimentation by individual talents, promising start-ups, SMEs and innovative enterprises. This could be achieved by converting old buildings and industrial zones into low-cost incubators for creative enterprises (like the Beijing 798 Art Zone and 22@Barcelona³²) and by co-locating a diverse range of creative enterprises within existing or new creative clusters (e.g., at Bras Basah, Gillman Village or Mediapolis, like InnoCentre in Hong Kong, and Treehouse in New York).

d. **Facilitate new industry collaborations and forge strategic linkages between industry players through open innovation platforms and knowledge exchange among enterprises to harness Asian insights for new business opportunities.** This could be achieved by establishing design innovation platforms under an enhanced Design Connect Framework to make Singapore the living lab for at least 3-5 new industry clusters. New cluster developments harnessing Asian insights for design innovation could also be supported by the crowd-sourcing of new ideas, research, development and test-bedding of innovative solutions by enterprises.

e. **Establish an accreditation system to raise professional design standards and encourage pro-design practices, as well as a 'Designed in Singapore' mark for enterprises** to strengthen Singapore's position as a leading and distinctive design capital in New Asia.

STRATEGY 3: THE BEST HOME FOR TALENT

15. The Best Home for Talent starts with Singapore being for Singaporeans. Our strategies to develop and engage talent must serve to stretch the potential of Singaporeans, and attract top quality people from around the world. While the largest Chinese and Indian cities gather deep pools of talent from their respective hinterlands, our advantage lies in our ability to attract diverse and quality people from Asia and around the world, who work alongside their Singaporean peers and add to our capabilities. To do this, Singapore will offer education and development opportunities in world-class institutions, a rich eco-system of career opportunities, and extensive personal and professional networks. These will help our talent stretch their potential and equip them to succeed in the new global economy.

16. At the same time, we will be an endearing home which fosters a deep sense of connection and commitment. Our talent will be passionate about Singapore and our shared future together, even as they seek opportunities and extend Singapore's economic presence overseas. Wherever they may be, in Singapore or abroad, we need to engage our people, so Singapore remains the home and country they feel emotionally rooted to.

³² Beijing 798 Art Zone is a ground-up creative cluster that houses a thriving artist community, among 50-year old decommissioned military factory buildings of unique architectural style. It is often compared with New York's Greenwich Village or SoHo. Other zoning for creative enterprises and startups include Spain's 22@Barcelona which expects to house more than 2,000 companies and Seoul's Digital Media City targets to house 1,000 media, IT and other creative companies by 2015.

17. Key strategic shifts to become a best home for talent are:

- a. **Complementing firm-centric strategies with a talent-centric approach** – For an economy driven by knowledge and innovation, we need an environment that is centred on people and ideas. Our economic development strategy must be complemented by a talent agenda that equips talent to create and capitalise on opportunities.
- b. **Towards greater diversity in our definition of talent** – We need to optimise the potential of our talent across diverse fields so that multiple peaks of excellence can emerge. This diversity will serve to generate new areas of innovation and growth, while contributing to Singapore’s vibrancy as a global city.
- c. **Going beyond the ‘hard’ environmental factors to the ‘soft’ engagement factors** – A best home for talent must offer more than a comfortable environment that meets their material needs. We must engage talent on a deeper social and emotional level, so Singapore can be where talent feel connected, committed and rooted.

18. Key recommendations to equip talent to succeed in the new global economy are as follows:

- a. **Enable a broader spectrum of talent to grow by attracting or developing at least 5 world-class institutions or programmes by 2020 to provide talent development pathways in a wider range of disciplines and to support developments in new areas.** For instance, Singapore could:
 - i) Become the premier arts education centre of Asia and raise the level of professionalism in the cultural sectors with tertiary and post-tertiary programmes in areas ranging from arts management, conservation, curation and research, to the performing arts, such as dance, theatre and music;
 - ii) Propel design-driven innovation by developing design thinking programmes and modules in our institutions (e.g., the Singapore University of Technology and Design); and
 - iii) Build peaks of excellence in new lifestyle areas, including sports, fashion, and niche areas such as culinary skills and sommelier training.

Our economic agencies could also support these new niche institutions through calibrated grants to make these opportunities accessible for a designated number of Singaporeans. More opportunities could also be provided by allowing students outside of the polytechnics to enrol in programmes offered by foreign universities brought in by the Singapore Institute of Technology (e.g., via a bridging course into their programmes).

b. **Support Singaporeans as they venture overseas to capture growth opportunities.** We could support and encourage Singaporeans to venture overseas for new growth opportunities by (i) providing support to Overseas Singapore schools, especially in key Asian cities, so they can better meet the educational needs of Overseas Singaporean children, and (ii) improving re-integration of these Overseas Singaporeans into the national education system upon their return.

c. **Develop talent to reach the apex of their careers by creating a talent eco-system of top jobs and professional networks.** Economic agencies should complement industry development plans with a talent-centric agenda that is focused on (i) bringing in key jobs, which will give our people the opportunities to develop to the apex of their careers, and (ii) attracting top global talent who contribute to the vibrancy of our talent eco-system.

Professional associations and marquee industry events could also be developed to facilitate efforts by talent to connect and network with like-minded talent, as well as to build linkages with key counterpart organisations in other cities within the constellation of global talent hubs.

d. **Complement our firm-centric strategies with a talent-centric approach** by according a 'personalised pass' quota to relevant agencies, which would be responsible for validating the entry of talent into Singapore based on criteria relevant to the particular industry/sector, and adopting a facilitative policy stance towards spouses of talent, who are often talent in their own right (e.g., in seeking employment, be it part-time, full-time or project work in Singapore).

e. **Accelerate the development of critical soft skills for the new economy through platforms for human capital leadership development,** which will:

i) Enable local talent to acquire strategic human resource capabilities (e.g., critical soft skills, leadership, talent management) and equip them with intercultural intelligence for success in Asia and the global business environment; and

ii) Make Singapore the focal point where top executives from around the world can develop corporate leadership, business thinking and networks to operate effectively in Asia.

f. **Leverage schools as a platform to build intercultural skills and foster integration from a young age.** Schools should continue to foster cross-cultural skills and a global perspective as part of the curriculum and school experience. Opportunities for interaction between local and international students in our education system could be strengthened through the efforts of the National Integration Working Group for Schools. For instance, students in national and foreign system schools could participate in more sustained student exchanges in areas of common interest and in joint community involvement projects.

g. **Build greater engagement and connection with our talent by:**

- i) Developing a comprehensive and targeted engagement programme for local talent. Besides efforts to attract global talent to Singapore, there should be a programme to engage talent in Singapore. This could take the form of regular townhall dialogues and symposia to engage local talent on their needs and aspirations, and strategic issues such as the future of the Singapore economy and how Singapore could be the best home for talent;
- ii) Seeding a community-based one-stop welcome centre to provide support and referral services (e.g., job search for spouses, navigation of the school system, community networks and support) for newcomers and returnees, so as to ease their (re)settlement into Singapore; and
- iii) Setting up a programme office to better organise and strengthen networks with our fans, friends and family outside Singapore.

CONCLUSION: TELL OUR STORY WELL

19. While the recommendations above are substantive proposals to improve Singapore's hardware and software as a Global City in Asia, efforts should also be made to **promote Singapore's dynamism as a leading global city through a targeted and coordinated marketing programme**. Singapore has focused largely on the 'making' of the city and less on the 'telling'. Consistent feedback from overseas business professionals and visitors has been that liveability in Singapore, in terms of culture and lifestyle, is much better in reality than general international perceptions. We could be more sophisticated and targeted in marketing our city to align international perceptions with reality. This would also help to attract talents and companies to relocate to Singapore. We also need to instil pride in our city among our citizens, who are Singapore's everyday ambassadors. The role of the media industry in this effort is crucial.

ESC Subcommittee on Fostering Inclusive Growth

COMMITTEE CO-CHAIR BY:

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1. Over the past decade, Singapore's economy grew by an average of 5 percent per annum. Singapore's productivity growth over the same period averaged about 1 percent per annum, a rate on par with that of other developed countries. The broad majority of Singaporeans also enjoyed real wage growth and a rise in living standards. Nonetheless, productivity gains have declined in recent years due to heavier reliance on labour inputs to generate economic growth, especially inputs of foreign manpower. Globalisation, increased competition and lack of relevant skills have also led to slower wage growth for low-wage workers; wages of the 20th percentile worker³³ grew by only 1.2 percent per annum over the period.

2. **Only productivity-driven growth can deliver sustainable and inclusive economic development.** We need to build up dynamic and innovative enterprises that continually seek to develop new and improved ways of doing business through investments in technology and training. We need to raise the quality of our human capital, both local and foreign. We must also strengthen the ability of our low-wage workers to upgrade their skills so that they can move into better and more productive jobs over time. These are the keys to raising Singapore's economic competitiveness, producing sustainable wage growth and improving the standard of living for all Singaporeans.

3. Businesses cannot continue to rely on low-cost, low-skilled foreign manpower as a substitute for investing in productivity improvements such as innovation, R&D and skills upgrading for their workforce. Foreign manpower will remain an important and necessary complement to the local workforce in supporting our economy. However, growth of our foreign workforce will need to slow given physical and societal constraints.

STRATEGIC SHIFT 1: GROWING THROUGH SKILLS AND INNOVATION

4. **We aim to raise Singapore's productivity growth to 2 to 3 percent per annum over the next decade,** putting us on par with what advanced economies such as Finland and Hong Kong have managed to achieve. This will bring productivity to a level that is one-third higher than it is today. Over the next 10 years, productivity will account for about two-thirds of economic growth, as compared to just one-fifth in the last decade. Accelerating enterprise productivity will entail more than just changing work attitudes or raising quality – a focus of earlier productivity efforts. It will require significant transformations in the way companies manage

³³ Full-time employed residents (excluding NSmen).

their businesses, from their supply chain management, production methods to service provision. It will require enterprises to deliver innovative products and services that can command higher value and tap into new markets. Enterprises should naturally aim for higher productivity as a means of increasing competitiveness and profitability. However, this subcommittee believes that there is scope to provide enterprises with support and assistance to catalyse productivity improvement.

Recommendation 1.1: Provide leadership and coordination through a high-level national council to oversee and drive efforts to boost productivity and expand CET (Continuing Education and Training)

5. For productivity to remain at the forefront of the national agenda, this subcommittee recommends setting up **a high-level national council** to provide leadership and coordination at the national level to address productivity challenges across different sectors and different types of enterprises. We should take an industry-specific response, given unique factors such as the competitive landscape and operating model within each industry. The national council should work with industry stakeholders, unions, and other Government agencies to drive productivity efforts within each industry. Productivity efforts could range from the adoption of productivity-enhancing innovations to re-engineering of processes to human capital development and training. For enterprises that are already internationally competitive in their levels of productivity, they must continually innovate to stay ahead.

Recommendation 1.2: Provide incentives to catalyse and sustain productivity transformation in enterprises and industries

6. The Government should **encourage enterprises to undertake initiatives at a national and sectoral level to accelerate large-scale productivity transformation**. This subcommittee recommends that **a National Productivity Fund** should be set up to provide grants to support both industry-wide and enterprise-level productivity initiatives, in areas such as the adoption of innovative business models, processes or technology, research and benchmarking, and other proposals which would be useful for productivity improvements. The Government should also introduce **strong economy-wide fiscal incentives** to encourage enterprises to invest in productivity enhancement and innovation.

Recommendation 1.3: Develop the knowledge base and train personnel to implement productivity improvements

7. To further stimulate firms to build productivity capabilities, we need to develop a knowledge base that companies can tap on. We envision Singapore becoming a leading centre for research in manufacturing and services innovation and productivity, where the latest knowledge is rapidly diffused through an extensive network of research centres, training institutes, industry associations and companies. To achieve this, this subcommittee recommends:

a. **Setting up a Singapore Productivity and Innovation Centre.** The Centre will conduct applied research on productivity and innovation that companies can tap on. Various countries such as Japan, Korea and Hong Kong, have established centres that play such a role. The Centre's efforts should cover all sectors of the economy, starting with the sectors that are lagging in productivity. This Centre can advance applied research in new business models and innovations, encourage adoption of new types of technology, raise capabilities in productivity techniques, and conduct local and international research and benchmarking.

b. **Developing productivity training for managers, line supervisors and workers.** This will enable employees at all levels to learn skills and techniques critical for developing and implementing productivity initiatives, such as demand forecasting, flexible scheduling, implementation of 5S³⁴ in services, supply chain management and service management. This can help to develop a network of productivity professionals who can help companies monitor productivity levels, raise awareness amongst all employees, and implement productivity interventions where appropriate.

STRATEGIC SHIFT 2: A WORKFORCE AT THE GLOBAL SKILLS FRONTIER

8. A productivity-driven economy must be supported by a highly educated and skilled workforce that is able to seize opportunities in new areas and continually adapt to change. **We envision our resident workforce at the global skills frontier.** About half of our residents are projected to have at least a diploma qualification by 2020, up from 39 percent in 2009; including about 35 percent with degrees, up from 27 percent in 2009.³⁵

9. In parallel with the improvement in the academic profile of our resident workforce, we need to raise the skills profile of our workers through the schools and CET system. The CET system will be a critical component of these efforts. By 2015, at least 240,000 individuals will undertake CET annually, up from 100,000 in 2008. We can create new global peaks of excellence in skills through first-class CET institutions with internationally recognised programmes from certificate to postgraduate qualifications.

Recommendation 2.1: Develop multiple skills pathways to complement academic pathways through our schools and CET system

10. To support growth industries and make continuous upgrading a way of life for our entire workforce, we must broaden the definition of upgrading to encompass skills, in addition to academic qualifications. **Singapore needs to establish a stronger focus on skills qualifications through the development of a parallel skills pathway.** We have well-established academic training pathways. However, many existing growth industries such as precision engineering, aerospace and digital animation, as well as potential new areas of growth such as lifestyle

³⁴ 5S is a workplace organisation methodology that uses a list of five Japanese words that start with the letter S. It is a philosophy and a way of organising and managing the workspace and workflow with the intent to improve efficiency by eliminating waste, improving flow and reducing process unevenness.

³⁵ Based on the Ministry of Manpower's resident workforce projections.

and consumer-centric products, call for more skills and craft-based qualifications. In many developed countries, skills-based training pathways form a significant parallel component of their education and training systems, and deep skills and craftsmanship receive high recognition and remuneration, creating a market-based mechanism for investment in skills.

11. Both our schools and CET systems should provide individuals with skills pathways for progression, in order to create opportunities for different types of talent and industries to thrive in Singapore. This subcommittee recommends:

a. **Developing multiple pathways for skills-based progression to complement the academic route, through our schools and CET system.** Skills pathways should start from the education system, similar to what other advanced countries have developed. With the establishment of the Singapore Institute of Technology, polytechnic graduates now have more opportunities for acquiring applied degrees in Singapore. We can provide more opportunities for ITE graduates to progress towards a diploma. Based on a 2007 survey, about one third of ITE graduates upgrade to a diploma within 5 to 10 years after graduation. At present, about 20 percent of ITE graduates progress directly to the polytechnics to obtain a diploma. We should expand opportunities for ITE graduates who are able to obtain a diploma, to upgrade earlier, and via multiple pathways for skills-based progression. This can be through the polytechnics, ITE in partnership with high-quality foreign institutions, or CET institutions. This should bear in mind the need for existing institutions to focus on their mission and capitalise on their strengths to provide students with holistic education and a strong foundation for lifelong learning.

b. **Providing stronger linkages between our academic and skills pathways.** We should also provide meaningful linkages between our academic and skills qualifications. This will facilitate upward mobility for workers and provide employers with greater clarity on how different qualifications relate to one another. There is already mutual recognition between Workforce Skills Qualification (WSQ) and ITE Nitec. We can further extend this to other levels such as with the polytechnics.

c. **Further building up a first-class CET system by attracting best-in-class foreign institutes to Singapore along with continued investment in local CET institutions.** WDA has developed a strong network of about 50 CET centres, and should continue to develop local CET providers as well as attract international providers where relevant. In areas where local expertise is lacking, we should bring in relevant internationally-renowned foreign training programmes to provide a wider range of diploma, degree and postgraduate qualifications. Likewise, to build up a sizable number of skills pathways rapidly while maintaining high quality in the CET system, WDA should bring in best-in-class foreign institutes, via partnerships with institutions such as the CET Centres, WDA's Institute of Adult Learning or the upcoming national CET Campuses if necessary.

Recommendation 2.2: Expand the CET system for broader coverage

12. **The CET system should broaden its reach to cater to the entire workforce at different levels.** The CET system is a national system and should take into account both industry needs for higher skills and the changing composition of the entire workforce. As the workforce will increasingly see more professionals, managers, executives and technicians (PMETs), we must ensure that the CET system caters to their professional needs as well. This subcommittee recommends:

- a. **Developing “T-shaped PMETs” who are professionals** with deep skills in their own fields, yet with knowledge of other related areas in business operations, and who are able to operate in different business environments. To achieve this, we need programmes to develop their versatility in horizontal skills such as project management, HR, sales, finance and management, and professional continuous development courses to gain specialised expertise.

STRATEGIC SHIFT 3: INCLUSIVE GROWTH FOR ALL SINGAPOREANS

13. As we transform our economy to improve the quality of life for all Singaporeans, we must make extra efforts to ensure that economic growth uplifts and upgrades low-wage workers as well. This subcommittee recommends:

Recommendation 3.1: Review Workfare Income Supplement Scheme

14. In 2007, the Government introduced the Workfare Income Supplement (WIS) Scheme to help older low-wage worker supplement their incomes and build up their retirement savings. **With our refocus on enhancing productivity and developing the workforce skills base, the Government should review the WIS to ensure it is focused, timely and effective.**

Recommendation 3.2: A stronger push for training for low-wage workers

15. We want more of our low-wage workers to participate in training, which is a springboard for them to upgrade their skills and earn better pay. We recognise that low-wage workers face particularly severe barriers to upgrading themselves. As many low-wage workers depend on casual work to earn a living, their hours tend to be long and irregular, and they face high opportunity costs when they participate in training. Employers are also generally less supportive of training lower-skilled workers.

16. **We should provide upgrading opportunities and structured assistance for vulnerable workers** so that they will also be able to achieve real and sustainable income growth. The recommendations from this subcommittee are:

- a. **Introduce a broad-based incentive scheme** to encourage employers to send their low-wage workers for training and for these workers to commit to training.

b. **Develop a structured programme to train and place low-wage workers in better jobs.** The programme could be customised to meet the needs of low-wage workers. It should cover basic literacy skills, placement into better jobs (be it with same or different employer), financial assistance to cover opportunity and other costs (e.g. training allowance, completion awards for key milestones), modular classes (to cater to their schedule as many are on rotating shifts with limited leave entitlement), peer support and counselling to provide positive reinforcement and support.

Recommendation 3.3: Closer linkage between productivity and wage growth

17. To ensure sustainability of our productivity efforts, there should also be a **closer linkage between productivity and wage growth** to motivate workers, through performance-based remuneration, to pursue skills upgrading and contribute to raising the capabilities of our workforce.

STRATEGIC SHIFT 4: A SUSTAINABLE FOREIGN WORKFORCE

Recommendation 4.1: Ensure foreign workforce growth remains sustainable in the long-run.

18. To ensure that our economic growth becomes more productivity-driven, **foreign worker (FW) growth at the macro level should slow, in order to maintain the current balance between the foreign and local workforce in the long run.**

19. To **manage our dependence on FWs**, this subcommittee recommends:

a. **Increasing levy rates to better factor in costs from the presence of FWs and to encourage investment in productivity improvement.** The large FW presence has incurred infrastructural and social costs. Levy rates can be a helpful lever to encourage individual enterprises to be more efficient in their hiring decisions and thereby help optimise FW growth at the macro level.

b. **Dependency Ratio (DR) tiers to encourage better deployment of FWs.** DRs indicate the maximum percentage of FWs that an enterprise may hire. In the Manufacturing and Services sectors, levy rates increase when enterprises hire FWs beyond certain thresholds. There is scope to adjust these thresholds so that enterprises continue to have access to FWs but are encouraged to hire fewer but more productive FWs.

20. At the same time, we need to **raise the quality of FWs to support a high-productivity economy.** A more productive workforce, both local and foreign, will continue to root high value-added industries and jobs in Singapore. Better quality FWs will also improve locals' perception and acceptance of foreigners and industries or jobs with a high FW presence. This subcommittee recommends:

a. **Setting effective quality benchmarks that leverage on WSQ and other relevant skills recognition frameworks.** The WSQ frameworks can be leveraged on to help enterprises assess and certify the skills level of FWs they hire from labour suppliers. We could also leverage on other skills frameworks (e.g. Nitec) for specific industries.

b. **Encouraging employers to hire and retain skilled workers.** Increasing the differential between the levy rates for skilled and unskilled FWs will encourage enterprises to hire and retain better skilled and more experienced workers. This can be facilitated through programmes and measures to raise the productivity of both the enterprise and its entire workforce.

21. Finally, **the hiring of FWs should be supported and accompanied by good employment practices.** Good FW recruitment and management practices will help reduce inefficiencies arising from labour disputes, workplace accidents, and mismatches between the FW and his job. This will allow Singapore to remain an attractive destination for experienced and skilled FWs who can help us achieve productivity-driven growth.

ESC Subcommittee on Ensuring Energy Resilience and Sustainable Growth

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A SMART ENERGY ECONOMY: RESILIENT, SUSTAINABLE AND INNOVATIVE

Energy prices, carbon and security will pose challenges

1. The global energy landscape has witnessed a dramatic shift in recent years. There is a growing thirst for energy – driven primarily by Asia’s urbanisation and economic development – and the cost of energy production is rising as traditional sources of energy are depleted and the world turns to unconventional fuels that are more difficult to extract. Economic fundamentals suggest that the long term trend of energy prices will inevitably be upwards, and price volatility will continue to be a feature of global markets.
2. Climate change is a pressing environmental issue that the world will have to grapple with. Even though the Copenhagen Summit failed to reach a global agreement to reduce carbon emissions, climate change will continue to weigh heavily on the minds of political leaders and citizens. Singapore has made a commitment to cut its carbon emissions by 16 percent below business-as-usual (BAU) levels by 2020, provided a legally-binding global agreement is reached; all countries will have to factor in the cost of carbon emissions and other externalities when making choices about economic strategy and energy mix.
3. Energy security concerns will be heightened as a growing mismatch between regions with abundant energy resources and those with rapidly growing demand results in greater dependence on energy imports. As Asia becomes a net importer of energy, there will be a concomitant push to secure energy resources for domestic needs. Periodic economic and geopolitical uncertainties may hinder sustained long term investments in infrastructure required to unlock both traditional and renewable energy sources.

Technology can help us overcome energy challenges

4. Science and technology will play a pivotal role in helping the world meet these pressing energy challenges. The quest for alternatives to fossil fuels has been undertaken through the development of solar, wind, geothermal and next-generation nuclear power generation. Traditional energy sources have also seen technology re-shape their prospects: carbon capture and storage (CCS) can potentially alleviate the environmental impact of conventional coal-fired power generation. The maturing of technologies for obtaining natural gas from shale will bring on-stream significant supplies of this relatively cleaner fossil fuel. On the demand-side, low-

carbon alternatives to everyday appliances and machines are being developed: from electric vehicles, to smart grids and greener buildings.

Singapore's energy position is strong but we must keep abreast of global energy developments

5. Singapore is in a healthy energy position with power generation capacity sufficient to support electricity demand growth for the next decade. The move towards combined cycle gas turbines has made our electricity generation cleaner, more efficient and responsive. The development of our liquefied natural gas (LNG) terminal will enhance energy security by enabling access to diverse sources of natural gas. Over the years, we have built a conducive environment for research, development and test-bedding that allows us to benefit from economic opportunities in the development of new and clean energy technology solutions.

6. However, as a small, resource-constrained country, Singapore is an energy price-taker and will continue to be exposed to shifts and fluctuations in global markets. As a low-lying island state, we are vulnerable to the effects of climate change and rising sea-levels. To meet these numerous challenges and seek economic opportunities from these global energy developments, Singapore must become a smart energy economy that is resilient, sustainable and innovative.

MEETING OUR ENERGY OBJECTIVES

7. The aim of this subcommittee on Energy Resilience and Sustainable Growth was to recommend strategies to achieve our national energy objectives: economic competitiveness, energy security and environmental sustainability.

8. The subcommittee's deliberations were guided by three over-arching principles. First, to ensure that energy does not become a limiting factor in the pursuit of our aspiration to be the global city of choice in Asia. Second, to continue promoting competitive markets as the primary, and most efficient, means of allocating energy in our economy. Third, to remain technology-agnostic and retain the flexibility to exploit the best options that emerge from the still-evolving energy technology landscape.

9. Against this backdrop, this subcommittee has identified five key strategies:

- a. Diversifying our energy sources;
- b. Enhancing infrastructure and systems;
- c. Increasing energy efficiency;
- d. Strengthening the green economy; and
- e. Pricing energy right.

STRATEGY 1: DIVERSIFYING OUR ENERGY SOURCES

10. At present, Singapore is heavily dependent on gas for electricity generation – around 80 percent of our electricity is generated by gas-fired power plants. While gas-fired plants are among the most efficient and gas is the cleanest fossil fuel, Singapore’s high level of gas dependency leaves us vulnerable to price fluctuations and supply disruptions. Furthermore, the indexation of Asian natural gas prices to the price of oil means that cost of electricity in Singapore will be affected by higher and volatile global oil prices.

11. At the same time, Singapore is alternative energy disadvantaged – there is limited scope for the deployment of alternative energy on a large scale. Solar technology has some potential, but given our high urban density, there is limited space to deploy solar panels. Wind speed in Singapore is below the threshold for commercial viability and there is limited land and sea space for the location of wind farms.

A diversified energy portfolio is essential

12. Diversification of our energy sources is essential to achieving our national energy objectives. The market, on its own, may not help with diversification as it will gravitate towards the lowest cost solutions. Hence, Government intervention may also be necessary to balance our energy portfolio on account of security and environmental concerns or where large capital investments are required.

Recommendation 1: Allow entry of new energy options on a market basis

13. In the near-term, the import controls placed on non-LNG fuels to build up sufficient demand for LNG will limit diversification. In the medium term however, Singapore should allow entry of new energy options on a market basis. Further diversification of our fuel mix will encourage healthy competition in our electricity market and benefit household and industry consumers.

14. The power generation industry could consider options such as coal and electricity imports. Coal is expected to remain relatively cheap and is widely available from different source countries. Advances in combustion technologies are reducing the environmental impact. The import of electricity through long-distance high-voltage cables is another option. This will free up valuable land in Singapore. It could also allow us to tap on the significant renewable energy potential, such as hydro-electricity or geothermal power, in our region. Subject to economic viability and safeguards to maintain reliability and environmental standards, these options can effectively complement and supplement our current energy mix in the medium term.

Recommendation 2: Develop renewable energy sources

15. Singapore also needs to turn to cutting-edge technologies that might evolve into viable solutions for Singapore in the long run. While renewable energy sources, such as solar and biomass, are not likely to replace gas-fired generation to meet baseload electricity demand, they can help enhance energy resilience and environmental sustainability.

16. Recognising both the potential benefits and scale limitations of renewable energy, Singapore should aim to have 5 percent of peak electricity demand supplied from renewable energy sources by 2020. Singapore, therefore, needs to continue to support innovation and the infrastructure necessary to develop renewable energy sources as a component of our national energy portfolio.

Recommendation 3: Study the feasibility of the nuclear energy option and develop expertise in nuclear energy technologies

17. With its alternative energy disadvantaged status, Singapore needs to explore all possible options for generation of electricity to meet baseload electricity demand. Nuclear energy should not be excluded. Many countries, including China and South Korea, are expanding their fleet of nuclear power plants in response to carbon and security imperatives. There has also been increased regional interest in nuclear energy programmes. Vietnam and Thailand have announced plans to build nuclear power plants in the next decade while Malaysia and Indonesia are considering this option.

18. In Singapore's case, our small size means that there are several challenges with harnessing nuclear energy. Safety is a major concern, especially given our high urban density. Reliability of power supply is also a consideration – the large size of a typical nuclear plant relative to Singapore's total energy supply may cause problems for the electricity grid if the plant trips or is undergoing maintenance. There are also complex issues relating to nuclear fuel and waste disposal.

19. However, advances in nuclear technologies can help to address these challenges. New generation technologies are being developed which are inherently safer than earlier reactor designs, with safety systems that dramatically reduce the possibility of human error. There are also modular designs which allow smaller reactors to be produced and fuel-efficient designs that reduce the amount of waste produced.

20. While there is no immediate or near term need, Singapore should begin studying the possibility and *feasibility of nuclear energy* as an option for the longer term, particularly with regard to safety, technical factors and economic viability. This is because the process of developing nuclear energy, if deemed feasible, is likely to take at least 15 years. At the same time, *developing expertise in the evolving nuclear energy technologies* will have economic spin-offs and applications in fields such as research and nuclear medicine.

STRATEGY 2: ENHANCING INFRASTRUCTURE AND SYSTEMS

Smart grids will give consumers choice and make renewables viable

21. Intelligent Energy Systems (IES) will be the centrepiece of the smart energy economy. IES, or “smart grids”, use information technology (IT) to allow two-way communication between electricity consumers and grid operators. The next generation of electricity infrastructure will enable applications that empower consumers to manage their electricity usage and integrate new energy technologies into the national grid. First, IES will facilitate the opening of the household electricity market to greater competition among retailers. With a more dynamic retail market, households will be able to choose their electricity retailers and packages that best suit their needs. Second, IES can potentially work with home automation devices and smart meters to programme home appliances to function during off-peak hours when electricity prices are lowest. Smart grids will also be able to manage the intermittent output from renewable energy sources to ensure consistent electricity supply and enable their widespread use.

Recommendation 4: Invest in critical energy infrastructure ahead of demand

22. While some of the required investments will meet the cost-benefit analysis of private companies, others will require aggregation at the national level to achieve a critical mass. These public goods include the electricity and gas infrastructure which may require Government to play a lead role. A robust, advanced and extensive grid and gas transmission infrastructure can make markets more efficient, open new areas for economic development and strengthen our energy security. The Government should therefore be prepared to *invest in critical energy infrastructure ahead of demand*.

23. One example is the liquefied natural gas (LNG) terminal which will allow Singapore to gain access to global gas markets. Investing in the extension of the gas pipeline infrastructure can also potentially reduce the cost of electricity and open up new economic clusters in Singapore. By investing ahead of demand, Singapore will make itself even more conducive for business and enterprise.

Recommendation 5: Develop Jurong Island as an energy-optimised industrial cluster

24. Jurong Island has a diverse ecosystem of over 95 global companies with cumulative fixed asset investments of over S\$30 billion, employing about 8,000 persons to date – it is a key component of Singapore’s petrochemical cluster. In the face of increasing competitive pressure from China, India and the Middle East, our petrochemical industry must strive for greater efficiencies, particularly in the use of energy which is a significant cost component.

Jurong Island can be a model for energy efficient industry clusters worldwide

25. Singapore should develop *Jurong Island as an energy-optimised industrial cluster*. By harnessing innovative systems-level solutions, we can provide integrated, low-cost and low-carbon solutions for the petrochemicals industry. One example is the channelling of “cold

energy” from LNG, which arrives at the terminal on Jurong Island at very cold temperatures, to cool air and separate it into its component gases, which are typically used as inputs for other industrial processes on the island. With government planning and infrastructure investment to enable such ‘exchanges’, companies can save as much as 50 percent of their electricity costs.

26. Other technologies include the use of waste heat for water-desalination and carbon capture and utilisation projects. These measures will not only lower carbon emissions, but also utilities costs for the companies in the cluster, strengthening Singapore’s competitive advantage on both these fronts.

STRATEGY 3: INCREASING ENERGY EFFICIENCY

Recommendation 6: Promote energy efficiency for buildings, industry and in homes

Government can help realise energy efficiency improvements

27. Energy conservation and efficiency underpin Singapore’s efforts to reduce our energy and carbon footprint. This subcommittee reaffirms the Government’s initiatives outlined in the Sustainable Singapore Blueprint (2009) but recognises that there are impediments to energy efficiency measures despite the dual benefits of cost and carbon reductions.

28. For example, tenants who bear electricity costs often have little influence over decisions, made by the landlord, on investments in air-conditioning and insulation. Companies may also pass over investments in more efficient machines and processes because it takes a long time for these costs to be recouped from lower energy bills. At the same time, there is a lack of awareness and information among households, and even some companies, about their energy use and possible ways to use energy more efficiently.

29. The government has introduced incentives such as GreenMark incentive schemes to encourage energy efficiency in buildings. There are also grants for companies to perform energy audits and build capability for energy conservation and efficiency. Government agencies and non-governmental organisations should continue to work together to raise awareness and provide accurate information to help consumers choose equipment that best meet their needs.

30. More should be done however to promote energy *efficiency for buildings, industry and in homes* by enhancing incentives, education and adopting essential legislation such as mandatory energy audits which will help internalise energy management practices. Households and individuals will also have to make changes to their lifestyles. Significant improvements can be achieved in the long run only if a mindset of energy conservation is inculcated in all Singaporeans. The work by public, private and people sector partners to raise environmental awareness in schools and the community must continue.

Recommendation 7: Support clean and efficient technologies in transportation

Public transport key to reducing our energy footprint

31. Government initiatives can go a long way to reduce energy intensity in transportation – the third largest consumer of energy. Promoting the use of public transport remains key as it is significantly more energy efficient than private vehicles. These recommendations build upon the Government’s plans outlined in the Land Transport Masterplan (2008).

32. Alternative transport fuels and technologies could transform vehicles and land transport as we know it today. Conventional internal combustion engines are expected to become more efficient. Transitional technologies such as hybrid-electric vehicles are already commercially available and will be increasingly relevant. Full “plug-in” electric vehicles are also on the horizon but are still expensive and have yet to achieve the scale needed to meet global demand.

Clean technologies for both public and private transport

33. Singapore should put in place the appropriate incentives *to support clean and efficient technologies in transportation*. In public transport, the replacement schedule for buses presents opportunities as half the bus fleet needs to be replaced over the next 5 years. The diesel-hybrid engine is one technology which can be up to 20 percent more fuel and carbon efficient than conventional diesel buses. However, these buses will cost more. The government should support the introduction of clean and efficient technologies for public buses through grants or financing to ensure that energy efficient public transport can be realised while remaining affordable for commuters.

34. For private vehicles, there is a need to set the appropriate incentives for the adoption of clean vehicle technologies. The existing green vehicle rebate (GVR) covers hybrid, Compressed Natural Gas (CNG) and electric vehicles (EVs), but does not take into account actual emissions or efficiency. The government should therefore consider refining the GVR such that it is based on the actual fuel efficiency or carbon emissions of the vehicle. We should also prepare the necessary infrastructure and critical enablers to ensure that new vehicle technologies can be supported when they become viable.

STRATEGY 4: STRENGTHENING THE GREEN ECONOMY

35. The global low-carbon industry is a growing one with expected growth rates of 12 percent until 2020. Singapore’s investments in our clean energy eco-system have positioned us well to seize global opportunities. It has tremendous potential to create opportunities for research, businesses and jobs for Singaporeans.

Recommendation 8: Establish energy as a key national R&D priority

36. Energy should be established as a key *national R&D priority*, with a dedicated funding stream and to be placed on par with other national research priorities like bio-medical sciences

and interactive digital media. Research, Development and Demonstration (RD&D) both expands the menu of solutions available to us in our energy policy and creates economic value by generating knowledge capital. Existing funding should be continued and expanded to the order of S\$500 million over 5 years. By ensuring that basic research is supported, while placing particular emphasis on industry-applied research and commercialisation, long term value and opportunities will be created for the economy.

Recommendation 9: Build capabilities for the green economy

37. We have also made great strides in promoting Singapore as an important test-bed for clean energy companies to develop and experiment with cutting-edge products. Major players in solar manufacturing and bio-diesel have chosen to locate activities in Singapore because they believe the prospects for the green economy in Singapore are bright. We are on track to achieving S\$1.7 billion in GDP contribution and 7,000 jobs from the green economy by 2015.

38. Singapore will need to *enhance the supporting capabilities necessary for our green economy* to scale up, particularly in renewable energy manufacturing, test-bedding and systems integration activities. In particular, there is a need to strengthen project financing for energy efficiency projects and other energy related financial services such as venture capital and derivatives products. Specialist energy service companies will also be critical to help provide the expertise and financing to advise companies on how to make the transition to energy-efficient technologies. The government can also play an important role in training the whole spectrum of the “green collar” work force – from operators to engineers, architects and business leaders.

Recommendation 10: Apply a green lens to government procurement

39. The Government is a significant customer and can stimulate significant demand for energy-efficient products to kick-start such industries. In the European Union, for example, governments have realised that energy-efficient equipment can generate cost-savings over the long term and have put in place green procurement legislation that ensures a fair playing field for all suppliers. In Singapore, the government can do the same to *apply a green lens to government procurement* – helping to stimulate the green economy while reaping savings for tax-payers.

STRATEGY 5: PRICING ENERGY RIGHT

Recommendation 11: Price energy to reflect its total cost

Price energy to prepare for a resource and carbon constrained world

40. The price of energy should reflect its total cost, taking into account various externalities and constraints, such as energy security and environmental sustainability. Price signals will raise awareness and influence energy consumption and investment decisions to achieve energy efficiency and conservation. For example, some countries are looking at various options for carbon pricing, including a carbon tax and cap-and-trade regimes.

41. The Government should therefore study the suitability of energy pricing schemes for Singapore to encourage consumption and investment decisions that take into account global market trends and externalities. This is to ensure that our economy is able to adapt to the rising cost of energy and to a carbon-constrained world, in the event of a global agreement on climate change. Any pricing scheme should be carefully calibrated and introduced gradually with appropriate offsets for groups such as low income households.

CONCLUSION

42. The global energy challenge with all its facets and complexity is a problem that Singapore – an open economy and small nation state – will have to continue to grapple with. Energy that is affordable, clean and reliable will be essential for Singapore’s continued economic growth and competitiveness.

43. This subcommittee’s recommendations will help advance Singapore towards becoming a *smart energy economy*. It will balance and advance the imperatives of being *resilient, sustainable and innovative*, and support Singapore’s efforts to be a distinctive global city in a rising Asia.

ESC Subcommittee on Maximising Value from Land as a Scarce Resource

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HIGHER LAND PRODUCTIVITY FOR FUTURE GROWTH

1. As a small island state, Singapore not only has to host its businesses and industries, but also all its other needs – utilities, homes, schools and defence – within some 710 sq km of land. As we grow as a city, there will inevitably be greater demands on our limited land resources. At the same time, Singapore's land use system must evolve to support Singapore's aspirations as a global city in the heart of Asia.
2. Nevertheless, Singapore has never viewed its resource constraints as a handicap. **Instead, Singapore's land constraint has and will continue to serve as the impetus for us to make strategic shifts towards higher value-added and more land-efficient economic activities, and to think up more productive ways of using land to support future growth.** Through more innovative and productive use of land, as well as spatially distributing economic activities through the development of new integrated activity hubs, we can accommodate both higher economic activity and a higher quality of life for our people. In the next decade, new industrial parks, business hubs and lifestyle destinations will be introduced to make Singapore a great place to live, work and play in.

LAND RESOURCE MANAGEMENT: MANAGE SCARCITY, INCREASE PRODUCTIVITY

We will build on our key fundamentals

Integrated, long-term planning remains key

3. **Singapore has to continue to adopt an integrated, long-term approach to land use and infrastructure planning.** This is needed for us to safeguard sufficient land for various economic uses as well as to support long-term population growth. Through long-term and integrated planning, we can optimise land use, protect amenity and preserve a quality living environment even as our economy and population expands. An integrated, long term land use planning system has been and will continue to be key in ensuring Singapore's leadership as a business and financial hub.

A Dual Approach

4. But we must recognise that a more dynamic global and domestic economic environment, including the shortening of product and economic cycles, means that the government alone cannot ensure that land resources are allocated optimally and in a timely manner. **Therefore, more than ever, Singapore must calibrate a fine balance between the government's and the market's role in the allocation and supply of land.** The government must strategically allocate land to achieve macroeconomic objectives, while allowing the market room to price land and allocate land resources to more productive uses as the economic structure changes over time. In this regard, the ESC recognises that the government should continue with the dual approach of allowing open tender of land within a zoning framework while providing for direct allocation to provide certainty in meeting the specific needs of strategic projects. The ESC also recognises that there is a functioning private property market in Singapore. The government's role is to maintain a stable market where prices move in line with economic fundamentals but we should allow the market room to set prices and respond to demand for space.

And greater emphasis will be placed on...

Increasing Land Productivity

5. In addition to robust planning, we should also focus on making our land use system more nimble and remove barriers that may impede the flow of land resources from less to more land-efficient economic activities. Within the broad land allocation for the manufacturing and services sectors, the ESC recommends that we place **greater emphasis on land productivity when determining land allocation** among various competing uses. The ESC also recommends that we inject greater flexibility in terms of land use zoning and review land uses where needed, to **allow the market greater room to determine land allocation** among competing uses, so as to right price land and to enable Singapore to meet the specific needs of a more diversified economy in a more responsive manner.

Investing ahead to create land and space

6. Land is a strategic resource for future growth. **Hence, the government should take the lead to invest in the creation of land and space to make room for future growth.** This includes intensifying land upwards, downwards and reclaiming land.

KEY RECOMMENDATIONS

Increase Land Productivity

Recommendation 1: Land efficiency as a consideration in economic development and land allocation

7. **Singapore should allocate land at the macro level to support a diverse and resilient economy.** In particular, we must continue to set aside ample industrial land to support manufacturing as a key pillar of the economy.

8. **However, our economic strategy ahead must continue to take into consideration our land constraints and seek to facilitate a move towards higher value-added and more land-efficient activities.** Given its resource constraints, Singapore should take into consideration not just the value-added and skills level, but also the resource efficiency (i.e. land, labour and energy) of sectors in its economic development and investment attraction efforts. In particular, Singapore should measure land productivity in a holistic manner to reflect the “yield” of the land in terms of indicators such as value-added, jobs, spillover and value capture per hectare. The land productivity of various activities should be tracked and applied consciously in its decisions on which sectors to promote and to allocate land to.

9. In this regard, the government should be prepared to continue to directly allocate land for selected economic activities, including projects in the Services sectors, especially if the market or other land allocation mechanisms are inadequate in meeting the needs of these strategic projects.

Recommendation 2: Re-plan, rejuvenate and recycle land

10. **The ESC recommends that we should make bold moves to re-plan our land use to make space for future growth.**

11. A key example is the port land at Tanjong Pagar, Keppel and Pulau Brani. The port’s lease at these terminals will expire in 2027. The government should plan ahead to optimise the development potential of the prime waterfront land that is freed up, including identifying the best economic uses for the land. With a land area of size comparable to Marina Bay, the area can be master-planned and progressively redeveloped as a new waterfront city that can serve as the next big focal point for future economic growth. The area will potentially allow for a substantial expansion of the business district integrated with quality waterfront housing and hotels, lifestyle and tourism uses.

12. The ESC proposes that Concept Plan 2011 should study the feasibility of a consolidated port at Tuas in the long term, with adequate handling capacity to ensure continued competitiveness. If feasible, it will increase port efficiency by allowing the port to achieve greater economies of scale in terms of land and operations, and free up existing port land to support new economic activities in the future.

13. The ESC also recommends that land development agencies like JTC and HDB progressively step up the comprehensive rejuvenation of mature industrial estates towards more land-efficient and higher value-added activities, and to meet the changing needs of industrialists.

Recommendation 3: Make zoning and change of land use more flexible to allow land resources to flow to more productive uses

14. Singapore's limited resources, including land, must be able to be flexibly deployed and redeployed to support new and different economic activities especially in a fast changing economic environment. The responsiveness of our land use system directly determines our nimbleness as an economy. On the other hand, the zoning and land use controls we have put in place are necessary to safeguard amenity, as well as to ensure that sufficient land is safeguarded to support a diversity of economic uses. Too much land use flexibility (or "white" spaces) could affect the land prices, such as for industrial land.

15. **Therefore, the ESC proposes a gradual and targeted injection of flexibility in land zoning and in reviewing land uses, to enable a greater diversity in economic activities.** This will give Singapore greater nimbleness as a system to accommodate different economic activities and allow more space for different activities to compete and right-price land resources.

Recommendation 4: Intensify industrial land use

16. **Industrial land currently takes up more than 10 percent of our total land stock. The ESC recommends that the government consider providing incentives to encourage experimentation in and the implementation of innovative industrial plant layouts to intensify land use.** These incentives can be focused on industrial sectors that are large land-takers and/or which have low plot ratio (i.e. chemicals, wafer fabrication, aerospace, pharmaceuticals, solar and marine sectors). The government should also value industrial land with higher Gross Plot Ratio appropriately to encourage more intensified use.

17. **The ESC also recommends enhancing the master-planning of industrial and business parks to allow greater sharing of common facilities.** To intensify space usage, the government could review and implement a performance based pollution control system to allow integration of dormitories and other ancillary facilities with industrial uses.

Planning For Growth

18. Despite our size, Singapore has ample potential for future growth. As part of our comprehensive long term planning, Singapore will continue to ensure sufficient land and space to support future economic activities.

19. **A key strategy of Singapore's land use planning is to decentralise economic activity across the island through the creation of new commercial nodes outside the Central Area, such as the regional centres.** This will ease the sense of congestion in the existing Central

Business District, reduce the burden on the transportation network and bring jobs closer to homes. Decentralisation can also allow businesses greater choice in business locations.

20. Economic growth and a high quality of life can go hand in hand. Our liveability as a city will be a key source of economic advantage for Singapore in terms of investment and talent attraction. With the shift to a capability-driven economy, we can create more knowledge-intensive jobs for our people. There will be greater room to integrate economic uses together with residential and leisure uses. At the same time, it becomes even more important to improve the quality of living in Singapore to root and attract talent here to support such an economy.

21. Therefore, the ESC recommends that Singapore improves the quality of its land and infrastructure offerings to support its aspiration to be a Global City in the Heart of Asia.

Recommendation 5: Make Singapore a Great Place to Work and Live

22. The government should consider integrating residential, business, leisure and even clean industrial/research uses into “live-work-play” enclaves with character. The new growth areas at Jurong Lake District (JLD) and the Kallang Riverside precinct are examples of such enclaves that will be realised over the next 10 to 15 years. In particular, the Kallang Riverside precinct will have a wide mix of uses, including waterfront residential living within a lush park setting and hotels fronting Kallang Basin catering to family and business travellers alike. There will also be lifestyle and entertainment uses, as well as new opportunities for quality office space at the fringe of the city, with potential for synergies with the nearby Kallang industrial area. While new developments will be introduced, the historic Kallang Airport Terminal Building will be conserved and adapted to new uses, preserving memories while allowing for a new lease of life.

23. Similarly, new industrial parks in the future could integrate more supporting amenities and spaces to engage the public. An example is the industrial park planned at Lorong Halus. Situated on the former rehabilitated landfill and fronting Sungei Serangoon, it is planned to include lush greenery as well as waterfront lifestyle uses alongside industrial spaces.

24. Singapore must systematically plan its land use and infrastructure development to meet the aspirations of a knowledge workforce in Singapore, including housing as well as education needs for their children. New residential options will be injected within the Central Area and around key transport nodes to make the workplace even more accessible.

25. Singapore should also improve its lifestyle infrastructure to make the city an even more attractive place to work and live in. In addition to new parks and park connectors which have been planned, new recreational options both within and outside the Central Area should be created to enhance the liveability of the city.

26. An example is Gillman Village which can be turned into an arts and creative cluster; a prominent destination to anchor and grow the arts and creative businesses. Supported by a thriving ecosystem of arts and lifestyle uses, it will inject economic and social vibrancy into our

landscape. The Village will add to the diversity of attractions along the southern waterfront, which includes the Southern Ridges and the Vivocity/Harbourfront area.

Recommendation 6: Provide choice and diversity in business locations

27. Singapore must provide choice and diversity of business locations if it wants to be a base for both multi-nationals as well as future global SMEs. This diversity and choice is needed to support the whole value chain of activities of businesses, as well as to cater to the different needs of MNCs and SMEs.

28. **The government should seek to catalyse and position new growth areas to serve as attractive hubs for businesses including their Asian and global headquarter activities.** Key growth areas, such as Jurong Lake District, Kallang and Paya Lebar, will be master-planned with excellent amenities, comprehensive transport connectivity, environmental sustainability features and green and blue recreational spaces to host regional and global HQ functions. Coupled with business parks and new Grade A developments in the existing CBD and Marina Bay, Singapore will provide a diverse choice of locations for businesses for their front, mid and back office needs.

29. An example is Jurong Gateway, where a cluster of commercial sites fronting the Jurong Town Hall Road has been master-planned to provide a well supported yet affordable location for businesses including global and Asia HQs. This cluster alone can generate more than 200,000 sqm of office space, out of a total of 500,000sqm of office space planned for within Jurong Gateway. The HQ cluster, which will have an expansive view of the Jurong Lake, is right at the doorstep of a regional transport hub, Jurong East MRT station, and a stone's throw away from new hotels, residential, F&B, retail, entertainment, leisure and other complementary amenities that will be developed within the next 10 years.

30. **The government should also identify suitable “incubator” spaces to support the development of promising SMEs and to help entrepreneurship to flourish.** This includes safeguarding suitable state properties as more affordable incubator spaces for allocation to promising SMEs identified by economic agencies or for creative enterprise to flourish in “white spaces”.

31. **For Singapore to effectively serve as a host for both MNCs and aspiring SMEs, our land use system must allow for greater customisation. The ESC recommends providing greater choice in lease periods to cater to different business needs.** The government can consider allowing longer industrial leases for capital intensive industries but with considerations built in for early termination of the leases, and shorter leases for less capital intensive industries. The government can also consider releasing commercial sites with a shorter lease of 60 years to provide variety to the office space options available.

Recommendation 7: Provide a Plug and Play Environment

32. Singapore must be able to respond swiftly with its land and infrastructure offerings in order to be competitive. It should be prepared to invest in infrastructure ahead of time to anchor strategic investments.

33. **In response to shorter economic and product cycles, the ESC proposes that the government should resource its land development agencies, such as JTC, to prepare and rejuvenate land in advance to provide a plug and play environment for industries and businesses.** This includes putting in place infrastructure and shared facilities ahead of demand.

34. Given an economic structure that is increasingly driven by the twin engines of manufacturing and exportable services, Singapore should retain the nimbleness to respond quickly to new economic opportunities (i.e. to provide for “economic white space”) by perhaps expanding the role of JTC to support all strategic economic activities as required. For instance, the Mediapolis at one-north can be further expanded to support new products and services such as embedding digital media in education, lifestyle and entertainment.

Recommendation 8: Manage cost volatility to create a better business environment

35. The level and most importantly, the degree of fluctuation in housing and office rents directly influence the decisions of businesses and talents to relocate to Singapore. However, given the small and open economy of Singapore, it is not possible to eliminate volatility in property prices. Neither should the government intervene excessively in the market. It should let prices be largely determined by supply and demand conditions.

36. **Nevertheless, the ESC recommends that the government maintains its policy of steady release of land to pre-empt rental spikes.** In this regard, the ESC recommends a review of the Reserve List procedures to make it less onerous for developers to trigger sites placed on the Reserve List so that supply can be more easily activated when needed. The real estate industry and business associations can also help by promoting longer leases and good lease management practices to mitigate office rental volatility.

Create Land And Space

Recommendation 9: Invest in creating and using underground space

37. Land is a strategic resource. Hence, the government should adopt a long term perspective and invest strategically in the creation of land and space.

38. Just as Singapore has reclaimed land in advance to support economic growth in the past, the ESC recommends that the government acts early to catalyse the development of underground space. The government can take the lead by:

- a. Creating basement spaces in conjunction with new underground infrastructural developments (e.g. rail) to add to its “land bank”;
- b. Developing an underground master-plan to ensure that underground and aboveground spaces are synergized and better integrated with surrounding developments and infrastructure;
- c. Establishing a national geology office to collate underground information that will benefit both private and public sector efforts in underground development;
- d. Developing a subterranean land rights and valuation framework to facilitate underground development; and
- e. Investing in underground development R&D and directly investing in cavern level test-beds.

Recommendation 10: Develop greater synergies with land abundant neighbouring regions

39. The ESC recommends that Singapore looks beyond optimising resources within its geographical confines. It can also seek to work with its land abundant neighbouring countries to support the whole value chain needs of businesses, thereby jointly offering investors a more attractive value proposition that spans borders. The ESC suggests that Singapore enhances transport connectivity with our neighbours, as well as study new ways to twin our regions, such as co-operation in twinning our tourism products.

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