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Contributions to the Committee on the Future Economy

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Contributions to the
Committee
on the Future
Economy



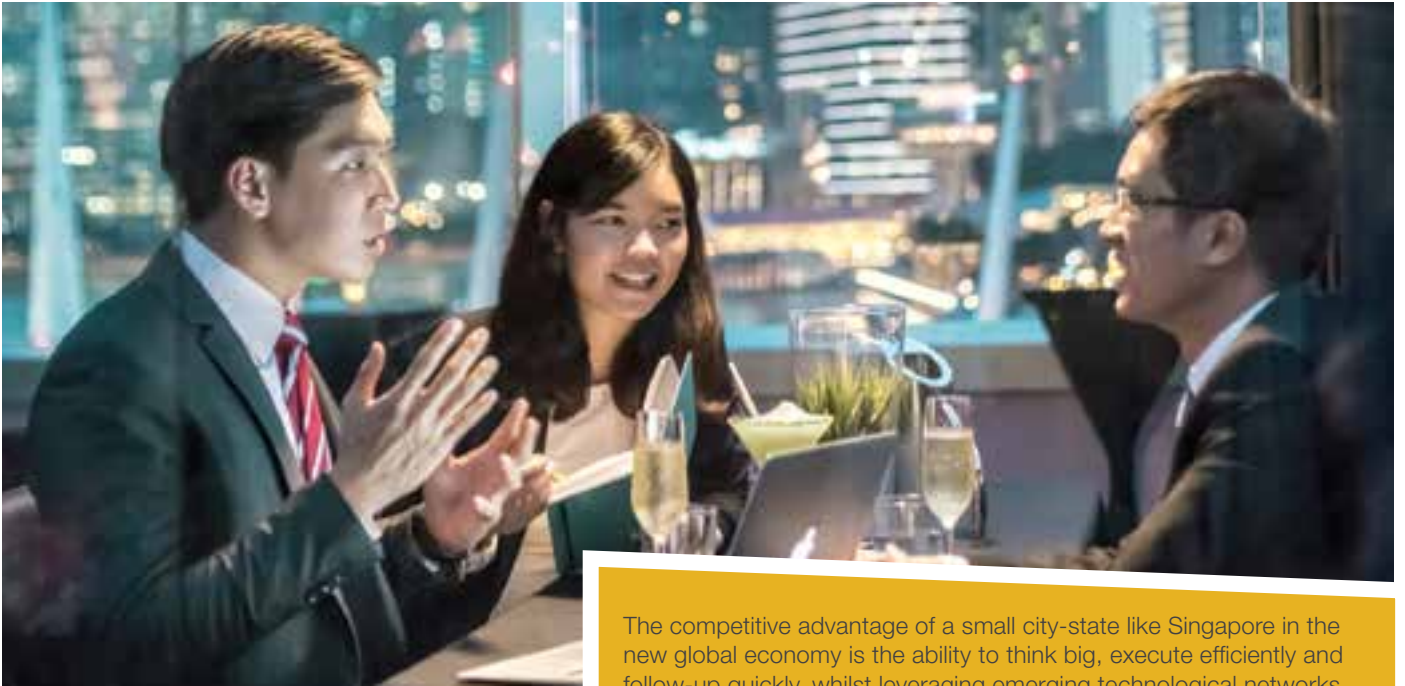


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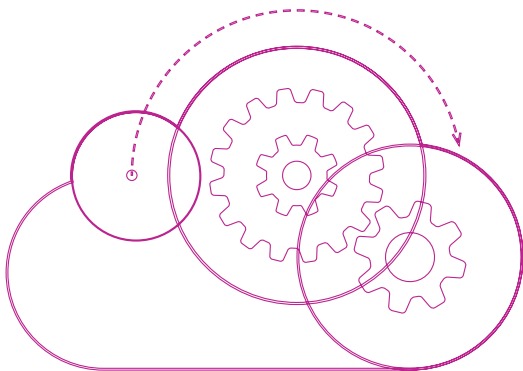
Introduction by SMU President



The competitive advantage of a small city-state like Singapore in the new global economy is the ability to think big, execute efficiently and follow-up quickly, whilst leveraging emerging technological networks to provide scale. What choices should Singapore make to stay competitive and what options does it have that will exploit existing competencies while developing new capabilities?

Singapore Management University (SMU) is one of various organisations and institutions that were asked by Singapore's Committee on the Future Economy (CFE) to provide contributions on these questions. SMU, through the leadership of its Provost, Professor Lily Kong, have proposed ideas from a number of faculty members, administrative leaders and board members who have academic or industry knowledge in five specific areas (CFE 1 to 5). This brochure provides the key ideas that were submitted to the Committee by SMU. SMU itself has a role to play in the area of future jobs and skills (CFE 5). With the pace at which jobs change in the new economy, employees require a good balance of job-specific skills as well as more universal skills such as pattern recognition, strategy, communications and problem solving.

SMU's dynamic curriculum emphasises developing critical skills such as these. Our new collaborative, experiential SMU-X courses bring students into contact with industry partners to work together as cross-disciplinary teams in solving real-world problems. Thus, in addition to applying their domain knowledge, they also develop functional skills and market expertise. Most important of all, they develop soft skills and the ability to adapt to whatever is required for the jobs of Singapore's future economy.



PROFESSOR ARNOUD DE MEYER
PRESIDENT OF SMU



Introduction



In response to the call to contribute to the dialogue initiated by the Committee on The Future Economy (CFE), SMU held a series of engagement sessions with faculty and staff to brainstorm and propose recommendations to add to the government's deliberations on strategies for the next stage of Singapore's economic growth.

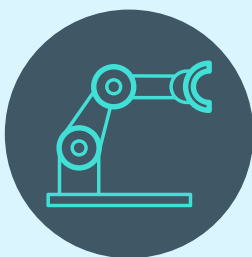
The process was inclusive, with an open invitation to all faculty and staff with interest to attend the engagement sessions. In addition, specific SMU members who have deep content knowledge of these areas (through research, education or practice) were specially invited to attend the sessions to contribute their thoughts. The draft was shared with SMU's Board of Trustees, and the comments shared enabled the draft to be refined and finalised.

The SMU engagement sessions discussed future scenarios as well as practical challenges due to our existing economic and social structures. This paper presents only the key recommendations that have surfaced from the discussions. Some of the ideas may have been raised before but in highlighting them in this current context, we hope that they will be revisited in light of possible changes in the context in which they were previously raised.



Trends

Contributors to the SMU engagement sessions on the five areas highlighted by the CFE discussed strategies against a backdrop of a changing "normal" marked by slower economic growth, changing demographic patterns due to ageing and low birth rates in the Singapore citizen population, foreigner inflow and immigration, geo-political volatility and the disruptive technologies that are forcing us to change the way we work and organise our lives. *References were made to recent reports such as The Future of Jobs and What New Jobs Will Exist in 2035 (World Economic Forum, 2016)¹, Playing to Win: The New Global Competition for Corporate Profits (McKinsey Global Institute, 2015)² and The Future of Work: There's an App for That (The Economist, 2015)³.* Participants at the engagement sessions were cognizant of the following phenomena that are challenging conventional approaches towards human capital development and deployment in Singapore:



- The increasing trend of robots, machines and artificial intelligence replacing workers and the hollowing out of many middle-skilled jobs;
- The emergence of disruptive technologies and global volatility leading to employers and industries being less able to effectively plan for future manpower needs, making it more important that the ownership of skills development should increasingly rest more with the individual rather than firms;
- Changes to individual career pathways where full-time jobs and hierarchical careers in corporations and within a single domain may no longer be a norm nor a guarantee as global competition has led to new models of outsourcing and crowdsourcing.



Within the sphere of education, the technological trends that are and will affect education as described in New Media Consortium's Horizon Report 2016⁴ formed the basis for much discussion on how universities and mainstream schools have to better prepare our students for a complex and uncertain future.

(1) Myers, J. (2016). What new jobs will exist in 2035? <https://www.weforum.org/agenda/2016/02/these-scientists-have-predicted-which-jobs-will-be-human-only-in-2035>

(2) Dobbs, R., Koller, T., Sree, R., Woetzel, J., Manyika, J., Krishnan, R., & Andreula, N. (2015). The new global competition for corporate profits. <http://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-new-global-competition-for-corporate-profits> (3) The future of work: There's an app for that. (2015, January 3). The Economist. <http://www.economist.com/news/briefing/21637355-freelance-workers-available-moments-notice-will-reshape-nature-companies-and-johnson> (4) L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., and Hall, C. (2016). NMC Horizon Report: 2016 Higher Education Edition. Austin, Texas: The New Media Consortium. <http://www.nmc.org/publication/nmc-horizon-report-2016-higher-education-edition/>



CFE 1 – Corporate Capabilities and Innovation



According to the 2015 Global Innovation 1000 Study conducted by PWC⁵ and published in the journal *Strategy & Business*, an overwhelming 94 percent of the world's largest innovators now conduct elements of their R&D programmes abroad. These companies are shifting their innovation investment to countries in which their sales and manufacturing are growing fastest, and where they can access the right technical talent. Collectively, more R&D is now conducted in Asia than in North America or Europe—and in particular by companies whose Global HQs are in Asia (i.e. Asian MNCs). However, Singapore is not getting a competitive share of R&D investments in this new realm.



Singapore's approach to corporate capability development has mainly been to attract and anchor MNCs and global mid-sized companies here through incentives and grants. Moving forward, to progress up the value chain for R&D, Singapore will need to incentivise these companies to also shift

their innovation investment here. We will need to create an ecology of services to assure the companies of Singapore's strengths and capabilities in terms of having the necessary infrastructure as well as the right talent for their R&D efforts.

Moving forward, to progress up the value chain for R&D, Singapore will need to incentivise these companies to also shift their innovation investment here.

Relatedly, Singapore-based businesses need to take on IT-enabled business processes and be able to leverage on emerging technologies and technology-enabled capabilities such as big data, next generation robotics, Internet of Things and 3-D printing for enhancing productivity. Our SMEs also need to remake and reinvent themselves through business model innovations so as to better engage their consumers and users. As economic growth slows down in the developed countries, Singapore companies should be more pro-active in tapping the region and collaborating with neighbouring countries in Southeast Asia for talent in diverse areas, even if there are inherent challenges involved. As corporate capabilities are also dependent on human capabilities, it is critical that we educate and develop our students to be entrepreneurial and flexible, and to be able to think laterally and creatively.



On this topic of corporate capabilities and innovation, we recommend two broad strategies.

1 RECOMMENDATION ONE:

Anchor enterprise-level innovation with design thinking capabilities in Singapore



One of the most critical corporate capabilities in the immediate to mid-term is for companies to be able to compete on innovation and design in order to create new value. A broader business level approach (one that includes but goes beyond R&D) would involve the development of competencies such as business model innovation, understanding the users or consumers, pattern recognition capabilities, regional market perspectives, and iteration and prototyping. The recommendation is for such capabilities development to be anchored in Singapore, with local companies or a Singapore core within global MNCs involved in new value creation.

A two-pronged approach is suggested where global companies are encouraged to set up such a corporate function in Singapore for the region and for local SMEs to be incentivised to build such capabilities. Global and local firms will thus be able to appreciate the advantages of being located in Singapore while operating outside Singapore and be better able to hone their capabilities and understanding of the region.

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Many companies focus on strategy without spending sufficient time and effort to build a conducive culture for innovation and sustainability. Oversight by a board level subcommittee made up of innovators and entrepreneurs and staffed with representatives from external agencies is a useful approach to help develop an innovation road map. Such a subcommittee could define programmes that will institute a culture of innovation across the entire company, backed up by policies and guidelines for growing the performance of a company. These programmes should start from awareness creation to realising and marketing innovations. Companies should also be encouraged to set up dashboards or score cards that can reflect their innovation efficiencies across products, processes and services.



Apart from designing relevant curriculum and programmes for both undergraduates and postgraduates in the field of innovation and design (indeed, this is already being done through a variety of ways), there could be greater support for companies to engage the local universities in applied research. Such research will need to have business relevance and could also involve new knowledge creation.

This will encourage the growth of practice-track pathways for practical researchers within each university, a move that could bring universities even closer to industry.

2

RECOMMENDATION TWO:

Encourage more 'within Singapore' reinforcing loops for the value chain before exporting to final markets

The best way to support the growth of local companies in their efforts to scale would be to encourage larger companies in Singapore to purchase as much as possible within Singapore before final export. Such a reinforcing loop would build a market-based ecosystem over time and enable smaller companies to have a viable local market first. The intention is not to deter larger companies from sourcing from all over the world as Singapore is an open trading port but rather to provide them with an incentive to source locally first.

The Singapore government could design progressive reward schemes for companies that contribute to economic growth at every level. Emphasis should be placed on receiving revenues and profits from outside Singapore in addition to those accrued in Singapore. Companies whose earnings from outside Singapore are much higher than the earnings from within Singapore could be offered greater rewards in the form of lower taxes or more funds for reskilling. While grants and incentives are rather obvious tools that may be used to encourage companies to source locally, tax benefits could also be considered as companies are likely to be more interested in broader aims of savings rather than short term benefits.

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OTHER RECOMMENDATIONS INCLUDE:

- Enabling lower-cost rental or controlled rental neighbourhoods for start-ups and innovation-driven companies by either repurposing government-owned buildings or considering rebates for promising local companies.
- Greater focus on the immediate Southeast Asian region as both a market as well as a node to build new capabilities for firms.



- Review and enhance existing entrepreneurship efforts in order to gain more traction in this area for Singapore. One aspect of this is to ensure a level playing field for companies, especially new ones. Giving out more grants may not necessarily create adaptable and resilient companies.
- There is at present no dashboard available which relates the large sums of investments in innovation across programmes from NRF, SPRING and A*STAR and the resulting increase in contribution to economy and job creation. It would be useful to create such a dashboard and share information across key stakeholders, if not the general public. Such a dashboard should be designed around the metrics that matter rather than track metrics such as the number of patents filed or the number of papers published.



- Universities could focus on competency-based assessment so that our graduates can be more adaptive to changing work environments. Instead of a set series of modules leading to a prescribed degree, undergraduates could be empowered to configure their modules based on the kinds of skills they need to be more industry relevant and flexible.
- Work places could also allow employees to hold various roles across institutions and move across job functions to encourage mobility so that there will be more cross-fertilisation of ideas and skills acquisition. This will lead to a mindset change whereby companies own the outcomes rather than their employees' time.





CFE 2 – Future Growth Industries & Markets



EDB's website contains a comprehensive list of industry clusters that Singapore is currently investing in (such as clean energy, aerospace engineering and medical technology) as well as emerging businesses (such as automotive, space and natural

resources). Based on the strengths of the Singaporean workforce, participants of this session raised several possible growth industries Singapore can focus on. For instance, Singapore can take advantage of its strength in ICT, finance and legal services and build on our reputation as a strong regulator of IT use, to be a trusted provider of data and cyber security services for companies in the region. As a neutral party in many cross-boundary and transnational disputes, Singapore can also play a role in arbitration and dispute resolution for the region.

On the domestic front, one key concern is our ageing population. There will be a significant market in the coming years for services for residential aged care, retirement

living and leisure, community and personal care, and preventative health and wellness. Apart from opportunities involved in reskilling an ageing workforce, there will also be opportunities for businesses to look into new ways of financing the future with innovative products to assist with the challenges of an ageing population with a huge asset base.

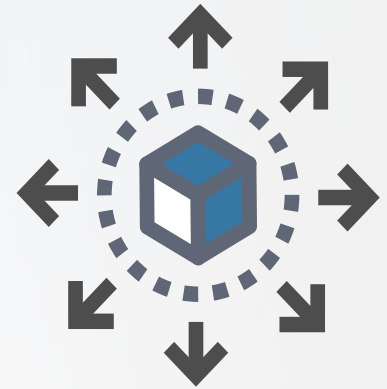
The key recommendations that we would like to highlight are emerging technologies that are disrupting industries; keeping and developing high value added manufacturing; building a circular economy; and the exploration of an eco-system of space, cyber technology and autonomous machinery as a growth industry.



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1 RECOMMENDATION ONE: Build the industry that is transforming other industries

The technologies that are disrupting existing industries today are in fact the basis for new industries themselves. An example is blockchain technology, which is driving the future of banking, e-commerce and e-insurance. Another growth engine is omni-channel marketing that is driving how retail portals as well as traditional businesses are interfacing with their consumers. Omni-channel companies are dominating the market by taking on the whole supply chain in providing node services for big companies. The Dutch company, Adyen, set up in 2006 to provide payment solutions to companies like Uber is a US\$350 million business with a US\$45 million net profit in 2015. This is just one of a breed of 'unicorns' that have built a robust business model from technology and are defining themselves differently from other start-ups.



Disruptive technologies will continue to be a mainstay in the future economy. Companies that are harnessing new capabilities are relatively young and efforts at encouraging start-ups and entrepreneurial efforts in these areas will be important. Assistance will be needed to help local companies with breakthrough technologies to find global clients more quickly in order to prove their relevance and secure markets. Statutory boards such as EDB and IE Singapore which have overseas offices can partner these young companies to establish connections specifically to trial new ideas so as to shorten their learning curve. While having global clients will enable the products to have a higher chance of success, efforts to get young companies from other parts of the world to locate strategic aspects of their business in Singapore will be necessary too. As 'unicorns' do not operate like traditional MNCs looking for global presence, it is necessary to identify new approaches to attract such companies and to rethink what KPIs would be relevant.

Singapore companies can capitalise on a "hinternet" of e-platforms that can help them build soft infrastructure for e-commerce, finance and insurance services. Singapore is trusted in the region and its strength in execution is well-recognised. If we can capitalise on smart data and smart technology and further tap on open platforms, we can grow our reputation in setting smart regulations worldwide for e-citizenship through biometric and other applications to enable individuals all over the region, for instance, to open accounts through their mobile phones, without going to a bank. We can facilitate the setting up of e-companies through smart technology that registers e-identities, which would disrupt the entire offshore company registration system. There is scope for start-ups and businesses to sandbox the development of biometric identification and application. It will require Singapore to have a culture of collaboration and the openness to share assets. The government will also have to be comfortable with de-centralisation and the promotion of peer-to-peer functions that could bypass certain regulatory functions.

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The clear value of disruptive technologies for our economy today necessitates the urgent need for the development of certain essential skills in our future workforce. These include competencies and skills in computer science, coding, digital media and animation and new thinking is therefore needed around what should comprise the 'core curriculum' of Singapore universities.

2 RECOMMENDATION TWO: Keep and develop high value added manufacturing in Singapore

Manufacturing currently accounts for 20% of Singapore's GDP. Although it may be argued that Singapore's manufacturing sector is no longer competitive due to high labour cost, this is only true for factories that produce commodity-type products using standard industry production processes. On the other hand, Singapore will benefit from attracting and retaining "rooted" manufacturing plants. Such plants are those which have high levels of both the complexity and proprietary design of the products they produce, as well as the processes used to produce them. Factories that produce such products need to be supported by continuous research, highly skilled operators and technicians as well as access to expertise and knowledge in their industries. Such factories are described as "rooted" because they are so intertwined with the local technical capabilities, the schools and the suppliers, that it is difficult to uproot them.

In order for Singapore to remain an attractive place for investment in rooted factories, we need to view manufacturing investment in Singapore not as an investment in a local plant, but as an investment in a node in a global network, where information is generated, but also exchanged with and between other plants of the same company, or with partners in the local commons. That will require a lot of flows of people, and will require Singapore to remain a very open country where competent manufacturing experts can move in and out easily, or where foreign talent can come to be trained.

Secondly, rooted plants need long term clarity of their development. That requires a stable macro-economic environment which the Singapore government, the labour organizations and the civil society can ensure to some extent. However, our macro-economic environment does not stop at our borders and we also need to play our part to help ensure that the macro-economic stability extends to the whole of ASEAN by remaining strongly committed to ASEAN's continuing development.

Thirdly, these factories require an attractive industrial ecosystem. R&D on advanced manufacturing systems as is planned under the Research, Innovation and Enterprise (RIE) 2020 is necessary, but not sufficient. We also need a sophisticated network of engineering firms, vendors and suppliers who are able to generate and share sophisticated knowledge.

Finally, we need an outstanding ecosystem of institutions that can provide good skills and human capital. Universities, polytechnics and ITE have a significant role to play. The private education sector needs further upgrading and has to embed itself in international networks so as to provide effective international exposure to our young people.

With the right mindset, a stable macro-economic environment, a policy for open exchange of talent, a vibrant industrial commons and an outstanding ecosystem for talent development, Singapore can become an essential node in global manufacturing, which would help to ensure our long term economic prosperity.



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3

RECOMMENDATION THREE:

Encourage companies to contribute more towards building a circular economy in Singapore to reduce carbon emission and waste



Singapore will benefit from building a circular economy which extends the idea of recycling across the entire value chain of manufacturing activities to build a restorative economy. This will involve reverse logistics, material recovery, after-sales recovery and producer responsibility legislations. The concept of a circular economy goes beyond the conventional idea of reuse and recycle. It will be a knowledge intensive process as

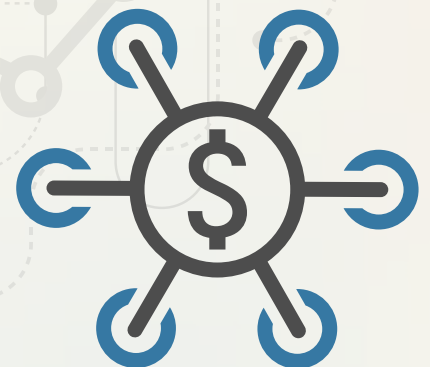
The concept of a circular economy goes beyond the conventional idea of reuse and recycle. It will be a knowledge intensive process as it will be necessary to make use of big data to track large amounts of by-products and waste material for recycling.

it will be necessary to make use of big data to track large amounts of by-products and waste material for recycling. However, there are clear economic opportunities for existing companies to invest in such adjacencies, and provide themselves with new revenue options while reducing the degradation of the environment.



The two areas where impact could be made are in directing demand and providing incentives. In directing demand, the government can choose to be a major buyer of services from companies that invest in the circular economy. By way of incentive, corporate tax benefits could be extended. The government can establish producer responsibility legislations to encourage such efforts. The city becomes the source of materials and these can be reused for manufacturing locally. Network hubs can then be created where these same models can be set up in the region for distributed manufacturing. We see this as a deepening of existing strategies to make Singapore a "Living Lab".

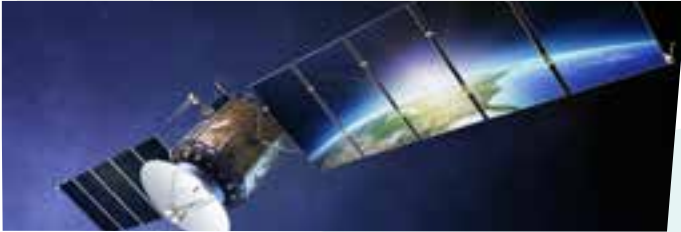
Universities can support these efforts through related research and by making this topic a key module offered by relevant schools such as business, economics and social



4

RECOMMENDATION FOUR:

Build an ecology of space, cyber technology and autonomous machinery as a growth industry



Singapore has already started to look into developments in the space industry. There are natural synergies between space technology, cyber security, cyber forensics and the growth of autonomous machines (from self-driving cars to advanced level robotics in areas of military work). These intersecting technologies can benefit markets of foreign governments, tap military spending and have Singapore's large-scale technology companies grow its market share.

Site security and infrastructure security are urgent needs. Singapore is in a good position to play to our advantage as we are known to be reliable and un-biased. A combination of foreign direct investment with anchoring applied research

It will be essential for the local universities to be involved in the eco-system of such leading edge research with global firms. Exploring new synergies between NRF, the universities and companies in these fields could be rewarding for Singapore from a value capture perspective.

would be necessary to tap this capital-intensive opportunity. The advantage would be that the jobs would all be highly skilled and it would bring to bear all components of science and technology (including 3D and 4D technologies, , analytics and) into this field. What is needed is strong government push to ensure we have a level playing field and the ability to bring in collaborators. Pro-active government involvement will also be needed for associated parts and subsidies to ensure that there is the right infrastructural support for such large projects and that we are able to deliver in terms of quality and standards, as well as stay ahead of our competitors.

It will also be necessary to provide a sufficiently open and collaborative culture to encourage R&D as well as ways to encourage co-developers to stay (e.g. because they are locked in by the infrastructural provisions).

It will be essential for the local universities to be involved in the eco-system of such leading edge research with global firms. Exploring new synergies between NRF, the universities and companies in these fields could be rewarding for Singapore from a value capture perspective. New collaborations should go beyond just two parties.

OTHER RECOMMENDATIONS INCLUDE:

- Further growing the legal, financial management, accounting and audit (governance-related) sectors of Singapore in order to become a major arbitration hub for the region and the world.
- Investing in the sectors of healthcare, insurance, biomedical technology and medical devices which support the 'ageing' market which is becoming larger across Asia.
- Exploring more opportunities in the aviation and air services sectors (especially those with strong technical and technology advantages) as Singapore's connectivity grows in terms of air links.



CFE 3 – FUTURE OF CONNECTIVITY

Singapore has invested heavily in growing its status as a hub in many areas such as finance, medical services, education and tourism. However, our air, land and sea connectivity to the region and the world can be easily impacted for better or for worse, by factors beyond our control. Opportunities have opened up for us, with ASEAN's Open Skies policy, the newly launched ASEAN Economic Community and the Trans Pacific Partnership Agreement. However, territorial disputes in the South China Sea, China's New Silk Road project, the potential widening of the Kra Isthmus canal in southern Thailand as a joint Thai-China initiative will have implications for Singapore's competitiveness, for instance, as a container port. One key question that was posed was whether Singapore should focus on its current strengths to retain its position as a global shipping hub and financial centre or develop new areas in which we can act as a regional centre. Singapore has thus far been relying heavily on the physical trading of goods but new business models enabled by the Internet (e.g. Alibaba) can easily lead to Singapore being bypassed in the future.



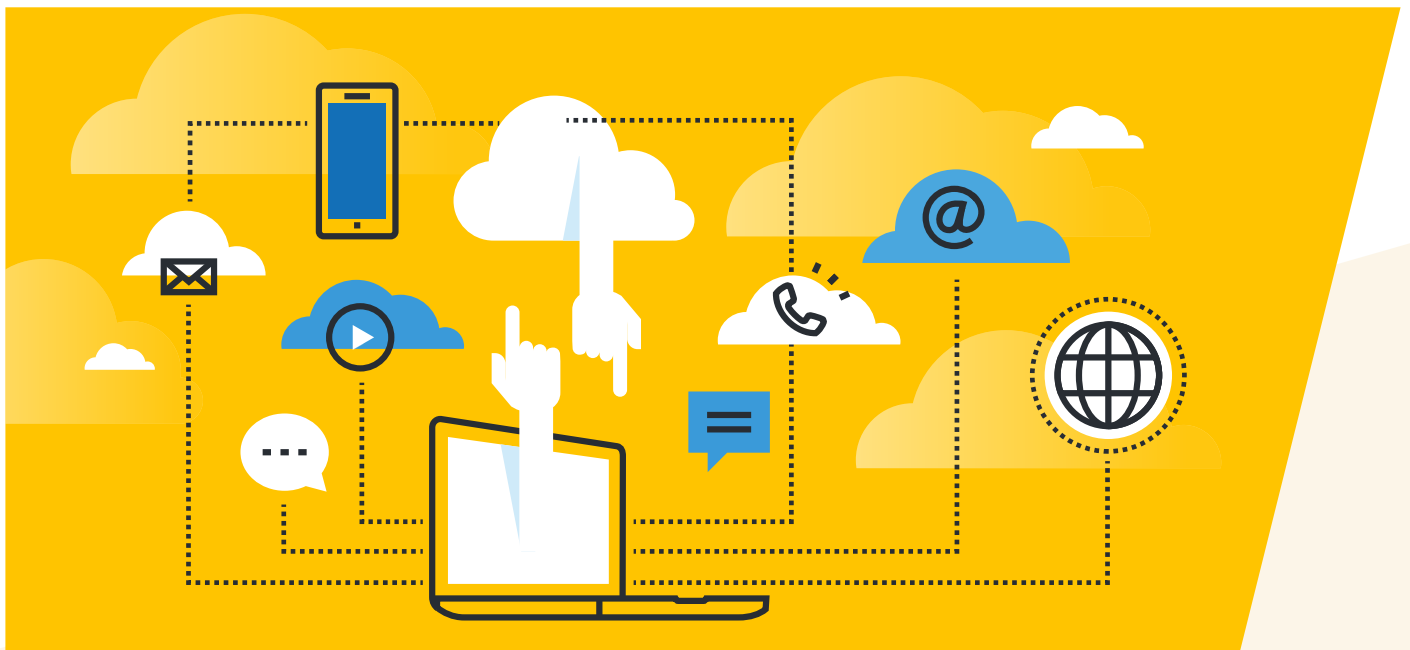
The following are recommendations pointing to how Singapore can build deeper channels of connectivity with the region and capitalise on its key strengths to move into new areas where it can make a significant difference:

1 RECOMMENDATION ONE: Enhance connectivity within the region in terms of innovation, information and digital networks



The physical links of air, sea and land have continuously been improved within Southeast Asia. However, there is a need to take advantage of these to build deeper connectivity with the region, through meaningful collaborations in terms of sharing data and analytics (for security and telecommunications purposes), investing in shared innovation projects to solve social and economic problems that are prevalent, and enhancing digital network connectivity to improve the ease of doing business. There is a great opportunity for our public service to work more closely with our ASEAN neighbours (beyond the work of diplomacy by the Ministry of Foreign Affairs) to enhance collaboration between companies and individuals. Such regulatory and strategy-driven initiatives, pilot projects or special zones created between governments will spur more companies on to build connections.

Singapore has yet to fully exploit its virtual connectivity. We could lead, for instance, in harmonisation efforts for the local and regional integration of financial markets, taking advantage of our strengths in managing diversity due to our multicultural context. Given our strength in 'technovation', we can explore the use of computational capabilities to create new financial instruments for ASEAN markets (e.g. running risk analyses for innovative products such as catastrophe bonds).

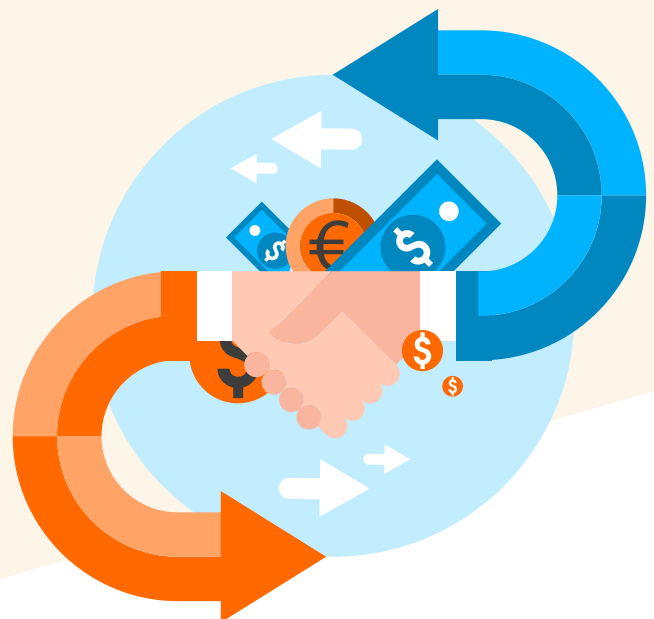


Singapore's stability and reputation as a safe and well-connected city are good pre-requisites for us to become a transit point for digital goods. We will do well to develop capabilities in digital goods protection (both technology capabilities and data protection laws), for instance, to help prevent digital album leaks in the music industry. IT outsourcing, cloud computing services and data storage and movement across the region are deeply hampered by legal restrictions on how data is to be handled and data security is treated differently in different countries. Singapore is in a position to convene an international discussion on laws related to data and come up with regulations or solutions to ensure these restrictive laws do not get in the way of efficiency and value. This will involve the country playing a new role in the 'data sovereignty' debate, much as the European Union and the United States have been working on the new 'Privacy Shield' provisions beyond the 2000s approach of 'Safe Harbour' for cross-border data sharing.

Singapore's financial market size is small. We will need to work with other markets, the US and European markets, for example, via alliances. Trade thrives when information and data can be free, agile and mobile. Compared to real goods, transaction cost need not be high, with data. Singapore companies will do well to work with strong partners to establish strategies to allow for digital goods to be moved across national boundaries, and to figure out how to handle cross-border payments and data sharing standards to diminish the related transaction costs.

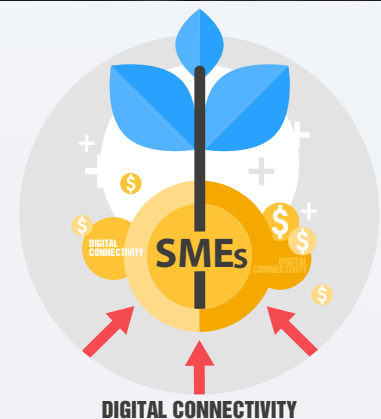
For years, our local universities have chosen to collaborate more with top global universities (such as University of Pennsylvania or Yale) in the area of joint programmes. There is an opportunity here, to work with neighbouring universities on a different collaboration model that involves more leadership from Singapore's side—especially on joint innovation, technovation and infovation projects. These can be centred on data analytics and big data that will be useful for citizens, under-served populations and various industries.

Singapore's stability and reputation as a safe and well-connected city are good pre-requisites for us to become a transit point for digital goods.



2

RECOMMENDATION TWO: Invest in building linguistic and social capital for deepening connectivity



At the level of the individual as well as the organisation, Singapore will need to do more with and in the region. As such, the need to have capabilities in communicating with and understanding the different cultural practices and norms of our Southeast Asian neighbours (over and above content areas such as their history and social-economic development) will be central in any strategy for deepening connectivity.

The education system must consider building cross-cultural awareness and regional studies into the curriculum from secondary school onwards, so that students will be more aware of how to relate to the people and better understand the history and socio-political realities and economics of the region. A third language option focused on a language spoken in the region will be helpful.

At the university level, exploring how a regional studies programme can be incorporated for graduates across schools and building pedagogies around case studies of Asian companies, as well as creating internship opportunities for students with firms in the region will be helpful.

OTHER RECOMMENDATIONS INCLUDE:

- There are opportunities in point-to-point networks that are currently underdeveloped in Singapore. Un-licensed money-lenders (or loan sharks) for instance, can be disrupted by “Uber”-like companies that build crowdsourcing platforms to connect borrowers with lenders.
- Not all Singapore companies benefit from digital connectivity. Singapore has generally done well in this area especially with MNCs. The same cannot be said for local SMEs. We need more efforts to bring the benefits of digital connectivity to SMEs.
- Generally, macro level statistical numbers have been adopted to measure economic successes. The future may require more micro-level or individual level measures to gauge the success of Singapore’s pursuit of the digital economy.
- The environmental challenges facing the region are tremendous, and Singapore is a small city-state that has the skills, the research ability, the public funding and the policy environment to successfully become a regional and global leader in sustainable development. Singapore can strengthen its role as a regional hub for knowledge and best practices by taking the lead to become a modern, environmentally efficient city-state.



CFE 4 – FUTURE CITY



Much has been done to enhance our infrastructure and circumvent resource constraints to improve quality of life in a high-density living environment that characterizes both a global city and a cohesive country. Jurong Town Corporation (JTC) for instance, has experimented with petroleum oil storage in underground tunnels, the Jurong Rock Caverns. Singapore has urban parks in the sky and plans are in place to manufacture electric cars for the city. There are various research centres and think-tanks in the Government and academia, where urban systems studies are conducted and frameworks drawn up on sustainability and urban solutions.

One key dilemma for Singapore lies in balancing the needs of ordinary Singaporeans with those of big businesses. The fairness concept of spatial justice (the idea that public spaces should be equally and effectively accessible and enjoyed by people from all segments of the population) underscores the conviction that public spaces should be planned to encourage interactions between different demographic groups. When the government plans for the development of land for commercial and public use, it needs to explicitly take into account the science and data on urban environmental behaviours. Marina Bay Sands (MBS), for instance, is an area that is available



and accessible to the public but not necessarily perceived as such, as the lower income groups may see MBS as 'a place for the rich' and feel excluded. Such public perceptions matter in practice because they could lead to actual choices that may lead to formation of enclaves in entertainment and other discretionary activities.

The two key recommendations highlighted here are built around the need to enhance mobility and more flexible land use across demographic groups.

1 RECOMMENDATION ONE: Place greater importance on interfacing and multi- purposing nodes, connectors and linkways



Investing in technology for the design and implementation of 21st century public street furniture that can be customised for different purposes and used for interfaces between nodes will be important for the future city. However, how this could be done will require fresh lenses in urban planning and rethinking how people interact with spaces and things.

Applied research from the local universities could be brought to bear in this area as well as enhancing its curriculum to have modules in urban design that traditionally are kept within architectural schools only. More broadly-trained urban scientists (incorporating urban design, urban sociology, urban geography, urban history, behavioural psychology etc.) who understand human behaviours as much as design principles could be an asset.

A highly efficient public transport system may have the unintended negative consequence of discouraging a culture of walking. The government could incorporate more engineering and urban design efforts to promote walking and cycling (as part of moving from point to point). One idea centres on how interfaces are designed. While specific interfaces have been well thought through (for instance, from MRT to buses), the interfaces across other areas need improvement, such as from pedestrian walkways to bicycle lanes to bus stops and back to sheltered walkways. Another proposal is to enlarge the thinking around the purposes of specific nodes such as pathways. What may appear to be designed primarily for joggers and recreational walkers can be designed for commuters to walk from home to their transport node for work. To shelter cyclists and pedestrians from the rain or hot sun, redundancy could be built into the areas around MRT lines. Cafes and other establishments could also be introduced to inject vibrancy into social spaces (e.g. there are lively dining districts built under the train tracks in Tokyo). Smart shelters can be built by installing solar roofs to generate air-conditioning, and have integrated parking spaces for bicycles.

Applied research from the local universities could be brought to bear in this area as well as enhancing its curriculum to have modules in urban design that traditionally are kept within architectural schools only.



2 RECOMMENDATION TWO: Enhance adaptability in land use and related urban policies



More organic and creative neighbourhoods can emerge when land use policy is more flexible and allows for different uses in the short term. This can be done for specific districts and areas where mixed use is the larger intention and therefore specific land sites can be tailored to respond to immediate needs. This will allow for the market to breathe life into urban space. To build Singapore into a global city and a cohesive country, city planning for the future economy must give priority to both city and country goals. How can we do housing in a way where we can still build national identity and yet, are able to provide more housing options for different expatriate groups? Housing policy, for instance can be adapted to

encourage certain households, such as the elderly (with spare rooms in their flats due to their children having moved out) to rent their room(s) to foreigners (students, tourists and workers). This could help add to the pool of affordable accommodation options, address the land scarcity issue, and encourage more social interaction and cohesiveness amongst the various groups. Policies have to be enhanced for such vibrancy and diversity to take place. The outcome could be smaller plots of land, different ways of tendering, direct management of the land sites by government for short periods and deep discussions on the concept of tenancy.

The integration of the various initiatives should be holistic to explicitly ensure they cohere and converge to enhance not only optimal land use for housing, business, industry, transport and connectivity, but also integrated land use for place-making and community development.





Singapore should nurture more street markets that are organically constituted, to raise the level of vibrancy on the island (e.g. the Sungei Road flea market, a rent-free hawking zone that will cease to exist in 2017 to make way for a new MRT station). We should encourage more non-standardised shopping malls.

Most mall owners have no incentive to provide low rent options, especially with the preference for the REITS model. Instead, the HDB should revisit its previous programmes that allow the leasing of commercial units within the first two floors of HDB buildings. We can also introduce mixed use clusters and build taller HDB flats where functions such as child care and senior citizen corners, retail and therapy units may be integrated. Zoning rules can be made more flexible. For instance, dormitories for construction workers can be turned into sites for new industries when construction work is done and there is no longer the need for housing foreign workers.

Recommendations One and Two are inter-related. The integration of the various initiatives should be holistic to explicitly ensure they cohere and converge to enhance not only optimal land use for housing, business, industry, transport and

OTHER RECOMMENDATIONS INCLUDE:

- Underground development can help address the demand for space (storage, transport, office space and living quarters). However the social and psychological impact can be significant and decisions regarding what “goes up or down” or “stays up” will require a paradigmatic shift in thinking models for urban integration. Merely focusing on incorporating engineering advances into urban planning will be insufficient.
- Educational efforts to encourage a set of etiquette for riding bicycles, crossing traffic lights, using Uber, etc.
- Explore having more people work in Singapore but live outside Singapore. This necessitates the need for efficient transport modes in and out of Singapore such as ferry terminals and ferry services. The high speed rail to Malaysia is a step in this direction. The positive outcome is an expansion of Singapore’s liveable space.





CFE 5- FUTURE JOBS AND SKILLS

In the discussion on the future of work, there was a clear concern about acceleration in the digitisation of goods and services, which has led to the creative destruction of jobs. Traditionally, higher education had a role to play to prepare individuals for specific careers and gainful employment. The proven formula is fast becoming obsolete as educated workforces operate in a transboundary and transnational way, and firms have broadened their quest for high-skilled, low-cost workforces across national borders. Technologies are also speeding up the deskilling of previously skilled workers. Enterprises are able to articulate their immediate skills needs but not future ones, as they are constantly having to go through major restructuring to stay competitive, due to the emergence of technology-enabled business models and volatility from lower growth, more competition and unpredictable environments.

In the future economy, career pathways will become more dynamic and less predictable. We may have need for innovation managers, change managers, stress managers,

product designers and service designers. Yet, career expectations will continue to be derailed as jobs will not be what they used to be. Companies will contract more services instead of employing more staff, resulting in more contractual and freelancing work.

Highlighted below are two recommendations that are aimed at helping to make Singaporean workers more resilient for the future:



1 RECOMMENDATION ONE: Emphasise the importance of “learning to learn” skills for the future workforce

With the pace of jobs changing in the new economy, workers will require a fair balance of job-related skills as well as cross-job skills. In the latter, important skills such as pattern recognition, negotiation, strategy, communications and problem solving will become even more critical as they enable workers to cross industries and jobs effectively.



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We propose that schools as well as the institutions of higher learning place a greater priority on these critical skills for all workers so that they can effectively compete and survive. Local universities will have to get closer to industry and help students better understand what problem solving looks like in the work place. Rather than prepare them for one specialisation, student will do well to have skills and competencies in other contrasting areas. They will need to have built up domain expertise, functional expertise as well as market expertise. These three legs must also be topped off by soft skills to make them adaptable and agile. The ownership of skills acquisition has to rest with individuals and not the education institution or organisation they hope to land a job with as these can no longer guarantee them lifetime employment.

2 RECOMMENDATION TWO: Transit to a creator-led economy



The EPL model is a useful alternative to help the highly-skilled move into an alternative career should they get displaced amidst economic restructuring. This model is also more practical in the real world context because traditional thinking of entrepreneurship is that it is at the opposite end to careers inside organisations.

With the new architecture of work arrangement in the technological and digital era, there is an increasing demand for highly-skilled experts who are creators. They have deep expertise and competency in their domain of practice and are able to integrate and connect across fields and sectors to create new products and services. These creators or 'serial masters' are the ones who will be able to develop an 'omni-channel' career, one that extends beyond fixed employment with one employer. They may take on the role of a micro-entrepreneur to brand and market their expertise, and seek out opportunities to add to their credentials. As professionals, they will need to engage in networking and work arrangements of a collaborative nature across fields. To hone leadership in their own domain or expertise, they will have to

continue to "learn-practise-enhance". The advantage of this entrepreneur-professional-leadership (EPL) model⁷ lies in skills mastery and a better approach towards income security.

The EPL model is a useful alternative to help the highly-skilled move into an alternative career should they get displaced amidst economic restructuring. This model is also more practical in the real world context because traditional thinking of entrepreneurship is that it is at the opposite end to careers inside organisations. The EPL model considers the importance of timing, opportunity and then ability. The government can consider creating awareness of EPL careers and enhance their career advisory beyond jobs to EPL careers.

OTHER RECOMMENDATIONS:

- A paradigm shift is needed for people to appreciate the value of making things or creating things. Unlike in the West, the idea of making things has been relegated to tasks that are of "low value". If our young can be imbued with the creativity and curiosity to make things and not put a low value on menial tasks or craft, they will be better able to spot opportunities when these arise, for unique business propositions in blue-collared industries such as garbage collection or recycling manufacturing waste in the circular economy mentioned in CFE 3.

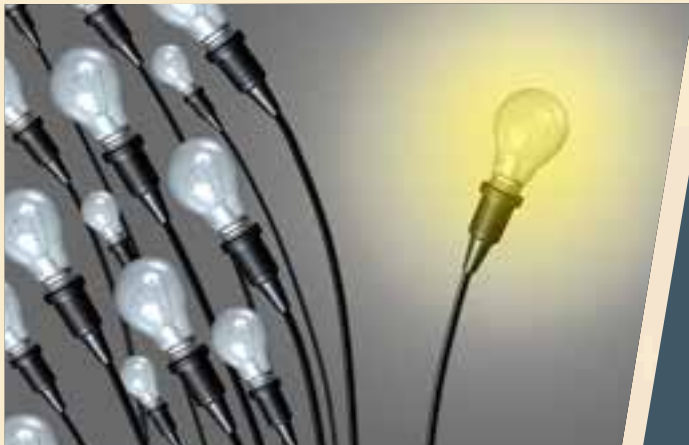


(7) See article, "The Social Graph of Work" by Esko Kilpi at <https://eskokilpi.wordpress.com/2014/03/31/the-social-graph-of-work/>

OTHER RECOMMENDATIONS:

- Our system has to prepare our people better to handle periodic unemployment that is inevitable for many professionals in hitherto “safe” jobs. Although the issue may be viewed as a structural one where unionized workers are perceived to be generally better “taken care of” (through tripartism and existing guidelines on retrenchment), sectors such as banking and finance expect people to go in knowing what to expect during an economic downturn. There is a need for these professionals to develop a different and more adaptable mindset when it comes to being forced out of a job, forced to take less pay or a lower level job. Counselling units built within centres for skills recognition will be important to help professionals transit into other careers which are more suited to their experience and interests or which may require different skills than the ones they have developed thus far.

- There is increasing need for but a dearth of local leadership. Singapore missed the opportunity of building up a local core over the last 20 years. Locals either gave up the opportunity for, or were passed over for regional and international postings. As a result, they do not have the skills and experience required to fill leadership positions that have oversight of regional or international operations. There is a need to encourage individuals to pursue overseas work and a need to incentivise companies to field individuals for roles abroad. Infrastructures to support families may be considered, including boarding schools in Singapore for “left-behind” children.



- For a long time, there has been little room for failure in Singapore. The cost of failure in Singapore is very high, possibly because it is a very small country. A record of bankruptcy, for instance, is frowned upon by employers and can never be expunged. The social stigma of failure is high and this discourages risk taking. If we want to nurture more unconventional thinkers, entrepreneurs and people who would push boundaries, we need to develop a support (and supportive) system (beyond the education system) to help encourage people to do different things, help them deal with failure and help society view failure with empathy.





Concluding Remarks

Through the engagement sessions on each of the five topics delineated by the CFE, a few common strands have emerged across the recommendations.

Disruption is a word that featured in all five sessions. Disruption will not be a one-time event, but rather a continuous “pressure to innovate” that will re-shape customer behaviours, business models, and the long-term structure of all industries. Singapore-based firms and SMEs need to build their capacity to handle emerging technologies and re-engineer their growth strategies. Innovation and capabilities that can work towards new business innovations must be integrated as a core function within our SMEs and firms.

R&D surveys have reported that innovations are having the greatest impact where they employ business models that are platform-based, data-intensive, and capital-light. Singapore’s strength lies in its ICT capabilities, finance and legal arbitration. We should capitalise on our reputation for neutrality and reliability to harness emerging technologies such as blockchain technology, to keep pace with and ride the wave of disruptions in the financial sector and for digital goods.



As global competition stiffens and growth in China and other developed markets are stymied, Singapore companies need to tap the Southeast Asian region for new opportunities. In order to engage our neighbours well, efforts have to be made to develop strong cross-cultural awareness and linguistic connectivity. Our young people must be encouraged to collaborate with their counterparts in Southeast Asia, take up internships in the region and learn new languages so as to be more able to capitalise on the opportunities that developing economies with a rising middle income group can provide. Apart from the public service, our local firms should also reach out to work with regional firms to see what areas of expertise they can leverage for growth.

Finally, the future workers in the Singapore economy must equip themselves with domain expertise, skills and competencies valued by industry as well as market knowledge, in order to stay adaptable and nimble. Cross-disciplinary and experiential learning, internships and real-world applications of what they learn in school must be a regular part of their personal curriculum. An education model where pre-employment training and continuous education and training become a seamless continuum will have to be the order of the day.





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