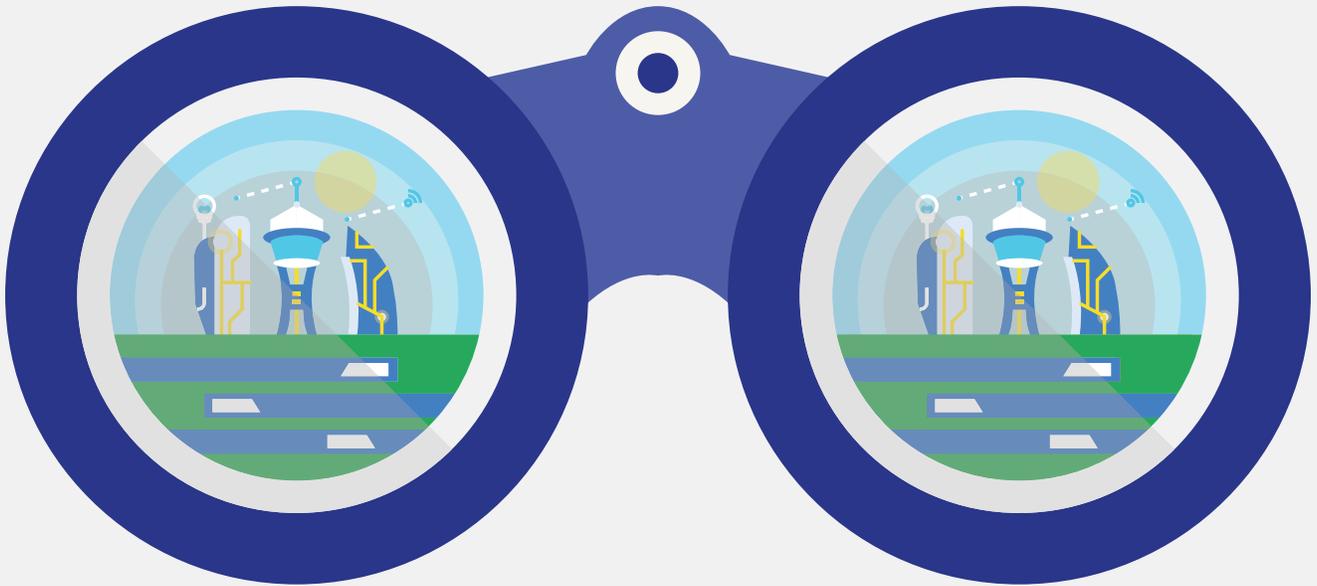


Year 2026: Doing Singapore Differently



Action Plan Singapore
An IPS Scenario-Planning Project

Report
26 January 2017

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Action Plan Singapore

Focal Questions:

What will Singapore's socio-economic landscape be in 2026?

How will the three issues of innovation, skills and longevity affect that future?

ACTION PLAN SINGAPORE

We considered how we can become an innovative society; one that celebrates the mastery of skills so that we can enjoy fulfilling and well-paying careers through their use; and, benefit from the fact that we are living longer lives. These were three issues we felt are critical in shaping Singapore's future over the next decade.

OBJECTIVES

The objectives of the project were to:

- Write scenarios of how these issues might play out over the next decade and propose strategic action plans that help the country achieve its goal of being an innovative and in-

clusive society given those possible scenarios.

- Bring together experts on and stakeholders of the three issues who would not ordinarily meet, to discover a sense of shared interest and strategic mission as they discuss those issues.
- Set some common targets and embark on a collective effort to address those three issues in practical ways.

The other indirect outcomes we hoped the IPS project would achieve were to:

- Share the methodology of scenario-planning with the leaders of critical sectors of Singapore to reinforce their strategic and

adaptive mindset; to equip each of them to be future-ready, agile yet strategic in their response to emerging national, regional or global developments, taking the whole-of-society perspective as they do that.

- Raise an awareness of the important interactive effects of different areas of public policy and action to uncover opportunities for tighter coherence and mutual benefit in the activities of different sectors.

The scenario-planning methodology was selected because:

- It effectively engages diverse cross-sectoral forms of expert knowledge; participants are assured that they do not need to know more than what they already do, to contribute meaningfully to the project.
- It helps develop a deep and critical understanding of the range of drivers of change that have the potential to affect participants and their respective sectors.
- Participants get to co-create a set of plausible yet challenging alternative scenarios to facilitate a questioning of past assumptions around how the future might unfold.
- It enables participants to formulate a set of strategies that are robust and resilient in response to the divergent thinking that has preceded.

THE BIG IDEAS OF ACTION PLAN SINGAPORE

What then were the big ideas of Action Plan Singapore? This is the five-minute summary of the key output from the three tracks of deliberation — Innovation, Skills and Longevity. We encourage readers to refer to the reports of each track to understand the detailed rationale for these big ideas.

INNOVATION TRACK

Developing Singapore, the Innovation Village

First, the participants of the Innovation Track identified these as the top two critical uncertainties that will shape whether we can build a strong ecosystem for innovation:

- How will Singaporeans respond to the emerging technologies in artificial intelligence (AI) — embrace it or protect themselves from it?
- Will the key enabler of scientific, commercial and social transformation be a distributed form of strategic intelligence that results in collective and coherent national effort (the “Hive Mind”) or the full, ground-up release of cognitive and social diversity?

Second, the participants proposed these as the most important strategies:

- Create a **Stay Ahead Scheme** that identifies and trains Singaporeans in the key skills and competences that enable them to operate in a world of disintermediating technologies as well as AI. This would help them as students, entrepreneurs and skilled labour.
- Facilitate the development of **quality rating scales, standards and operating guidelines** for emerging models of value creation that arise from the use of disintermediating technologies

and other technological revolutions. These would raise the level of trust in Singapore firms that create new products and services using those innovations, especially in the area of social services.

- Create a market for new social service provision models developed by using emerging forms of technology and accredited by the new rating and standards systems with a **voucher system by which citizens receive government subsidies for the purchase of social services**.
- Write a **roadmap for developing a people-friendly AI world** and introduce a pioneer credit system to incentivise entrepreneurship as well as attract and develop talent to tap AI in Singapore especially in the areas of healthcare, hospitality and manufacturing.
- Foster an **innovation market** that allows for research and development not only in technology, but more critically to experiment with **new models of collaboration among universities, research centres and corporate entities** — which includes cutting-edge start-ups, small and medium-sized enterprises, government-linked companies and multinational corporations.
- Uncover the potential in **mid-career entrepreneurship** for job and wealth creation.
- **Upgrade social safety nets to mitigate the disruption to employment** from technological development that strikes the balance between flexibility in labour markets on the one hand and income and social security for workers on the other.

SKILLS TRACK

Making Singapore a Skills Interchange

First, the participants of the Skills Track identified these as the top two critical uncertainties that determine whether Singaporeans will adopt the orientation of skills mastery and lifelong learning:

- Will emerging technologies in AI have the primary effect of closing existing pathways to good jobs and careers or opening new ones?
- Will employers place greater emphasis on credentials or proven capabilities in how they hire in 2026?

Second, the participants proposed these as the most important strategies:

- Develop the system of “**PracAdemia**”, which creates synergy between the workplace and the school in curriculum design; identifies, teaches and assesses the soft and practical work skills required by industry; fosters experimentation; and is delivered by a corps of hybrid educators — practitioner-academics. This strategy builds on the current national SkillsFuture initiative.
- Create an **Employee Employability Scheme** that uses adaptive technology to measure the match between capabilities and needs of industry. This should help Singaporeans identify the skills and capabilities that are required in different industries.
- Create a **Credential Capability Index** that benchmarks or rates individual graduates and employees on whether they have employable, industry-relevant skills.
- Introduce a system that augments learners’ individual learning portfolios, to track their competencies, psychometric data as well as

capture their personal aspirations so as to assist them in career and skills development guidance.

- Introduce a national **Job Satisfaction Index** to monitor the overall job satisfaction level of workers.

LONGEVITY TRACK

Making the Most of the Longevity Dividend

First, the participants of the Longevity Track identified these as the top two critical uncertainties that will shape how longevity will challenge us:

- Will Singaporeans, on average, spend more of their longer lives in good health or poor health?
- Will decisions about healthcare be made centrally and in a top-down fashion with the state as the primary actor, or in a bottom-up, community-driven way?

Second, the participants proposed these as the most important strategies:

- Introduce a **time-banking system for volunteer care called "Eldersave"** where volunteer caregiving offered at any point in one's life is recognised, earned and saved so that these credits can be used to receive a similar amount of caregiving from other volunteers when one needs it in the future. This is to reduce the load of caregiving by family and low-skill foreign caregivers and provide caregivers the opportunity for flexible caregiving and work arrangements.
- Introduce **SkillsFuture++ which comprises subsidised skills training and scholarships targeted at caregivers** who are not working, with online modular or blended forms of education and appropriate career counselling.

- Introduce **Senior Industrial Attachment Programmes** so that workers above 50 years old would be able to access senior-friendly internships in various industries.
- Introduce an **Ageless Scorecard** to grade companies on the level of inclusion of people of all ages in their workforce.
- Develop the **Happy Life Index** to measure the professional and personal happiness of workers who are 50 years old and above.
- **Family physicians should be paid on a capitation basis** by the state to make primary care more affordable to all Singaporeans.
- Establish **a national registry on eldercare and disabilities** to facilitate better planning and distribution of assistance provided by Singapore's "many helping hands" of the voluntary welfare sector, and Eldersave.
- Develop an **End-of-Life Toolkit** that helps Singaporeans become aware of the different care options they have and decide what they want to access for the different stages of disability and illness in advance. This is rolled out by an **End-of-Life Office** and implemented through **certified care coordinators or navigators** placed at hospitals, nursing homes, general practitioners' clinics and religious organisations. It should be integrated with related programmes like the Central Provident Fund system. This toolkit should be disseminated to all senior citizens.

THE PROCESS OF ACTION PLAN SINGAPORE

In designing the project, we were conscious that the participants we were hoping to attract would have constraints on their time and therefore, we could only afford to engage them in a rapid-fire version of the scenario-planning and strategy-building process. As such, it was decided that the process would entail the following and be kept to a maximum of a four-day commitment:

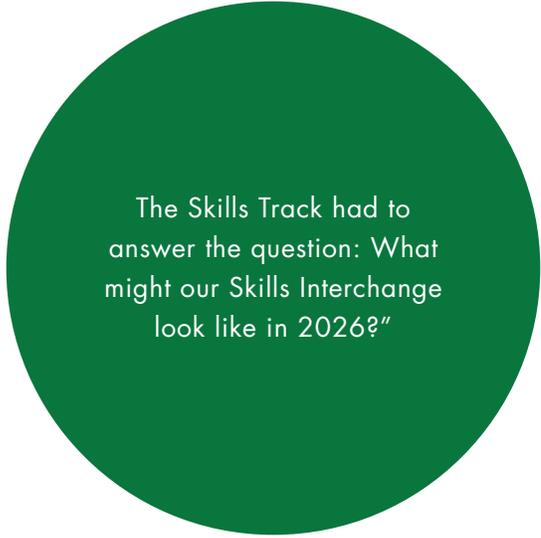
- A two-day scenario-building workshop on each of the three critical issues — the Longevity Track, the Innovation Track and the Skills Track.
- A one-day cross-sectoral conference that brings the participants of all three tracks together as well as other fresh eyes to explore the convergences and divergences in the scenarios. This was to initiate the process of strategy-building.
- A one-day strategy-building workshop where the three tracks flesh out the strategies initiated at the conference based on the relevance to the scenarios they developed in their respective tracks.

THE PEOPLE AND PROGRAMME

Based on their expertise, IPS researchers were placed as heads of each track. Dr Faizal Yahya was the Innovation Track Captain; Dr Teng Siao See was the Skills Track Captain; Christopher Gee was the Longevity Track Captain. Dr Gillian Koh was the coordinator of the project. Each track had a question to focus its discussions around.



“What might our Innovation Village look like in 2026?”



The Skills Track had to answer the question: What might our Skills Interchange look like in 2026?”



The Longevity Track had to answer the question: “How might our longevity challenge us in 2026?”

The “Innovation Village” was coined, as is explained in the report, to suggest that the level of analysis for it was about developing a sustainable and vibrant ecosystem for innovation rather than to brainstorm on specific innovations. The “Skills Interchange” was coined also to refer to a system in which Singaporeans can meet to share, buy, and create skills that are appropriate for the jobs and careers of the future. An “interchange” suggests that the process of acquiring skills need not be through commercial transaction where one has to “buy” those skills through formal educational institutions. Skills can be shared through unpaid processes.

The tracks were coded in different colours — blue for the Innovation Track to represent the blue sky thinking and blue ocean developments that innovation entails; green for the Skills Track, representing the green shoots of personal renewal and fresh initiatives that skills-training and mastery will bring; and an auspicious red for the Longevity Track to signify the narrative of how living a long life in Singapore adds to the wealth of the nation and is something to be celebrated.

About 100 people were involved in some way in Action Plan Singapore. This includes the joint-team from Innovator.sg and Padang that was commissioned to facilitate the workshops and conference. The lead facilitators were Jon Hoel, Derrick Chiang and Adam Lyle.

The schedule of the meetings was as follows:

SCENARIO-PLANNING WORKSHOPS

Workshop 1	Longevity	04 - 05 August 2016
Workshop 2	Innovation	16 - 17 August 2016
Workshop 3	Skills	23 - 24 August 2016

CONFERENCE	Participants from all three tracks, as well as a fresh set of participants.	05 September 2016
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STRATEGY BUILDING WORKSHOPS

Workshop 1	Innovation	19 September 2016
Workshop 2	Skills	20 September 2016
Workshop 3	Longevity	21 September 2016

REPORT

What follows is a record of the ideas, concerns, scenarios and strategies that were identified or generated. These detailed reports comprise the following sections:

- Background
- Summary
- Drivers of Change
- Scenarios
- Strategies
- Track Captain's Reflections
- List of Participants

We have chosen to share the findings in a specific order — those of the Innovation Track, then the Skills Track and finally the Longevity Track. Where appropriate, we have made cross-references among strategies that are similar or in which there are convergences across the different tracks.

NEXT STEPS

An Open Invitation

After the publication of this report, participants who had suggested specific strategies will be invited to meet and consider how they wish to operationalise those strategies. This will be facilitated by IPS. Other stakeholders whom we think would be interested in these deliberations, including public agencies, will also be invited to join in.

IPS will organise a conference to share the outcome of these deliberations at the end of 2017.

We invite experts and leaders of any groups who have an interest in this next stage of Action Plan Singapore to contact us via ips@nus.edu.sg and state the specific tracks and strategies you wish to help develop further.

Finally, we wish to thank all the participants and our team of facilitators for their time and commitment to the project. We are deeply grateful to you for sharing with us your expertise and wisdom, and are inspired by your enthusiasm in wanting to see Singaporeans and the country thrive, well into the future.

INNOVATION



What might our Innovation Village look like in 2026?

Focal Question:

What might our Innovation Village look like in 2026?

BACKGROUND

Over a period of several weeks, Action Plan Singapore participants considered key driving forces that are likely to reshape our society and economy fundamentally.

Lacking a hinterland from which to draw natural resources and develop critical mass for economic growth at Independence, Singapore successfully attracted trade and investment to its shores. It optimised the use of its human capital by developing a strong organisational capacity to become the economic miracle it is today. It did that by playing a successful catch-up game with the leading industrial and economic hubs of the world. Today, we face the challenge of becoming pace-setters and innovators; of becoming a place that generates indigenous technology and its own fresh thinking to move up the next ladder of development.

In this Action Plan Singapore project, we have construed “innovation” to be not just a business challenge, but a calling to solve societal (as well as regional and global) challenges in ways that ride on the best that science and technology, creative thinking as well as organisational genius have to offer. Innovation is the sustainable application of ideas for practical use, where the term “sustainable” refers to all its financial, ecological and time-based connotations.

Innovation can therefore be manifested in the creation of hardware, software, products, services, processes as well as culture and behaviour. It can lead to the transformation of the way things are financed, branded, marketed, delivered and even desired by the end-user.

We considered how Singapore in the year 2026 (the time horizon we used in the project) might become a global hub of innovation, where Singaporeans actively engage in unlocking

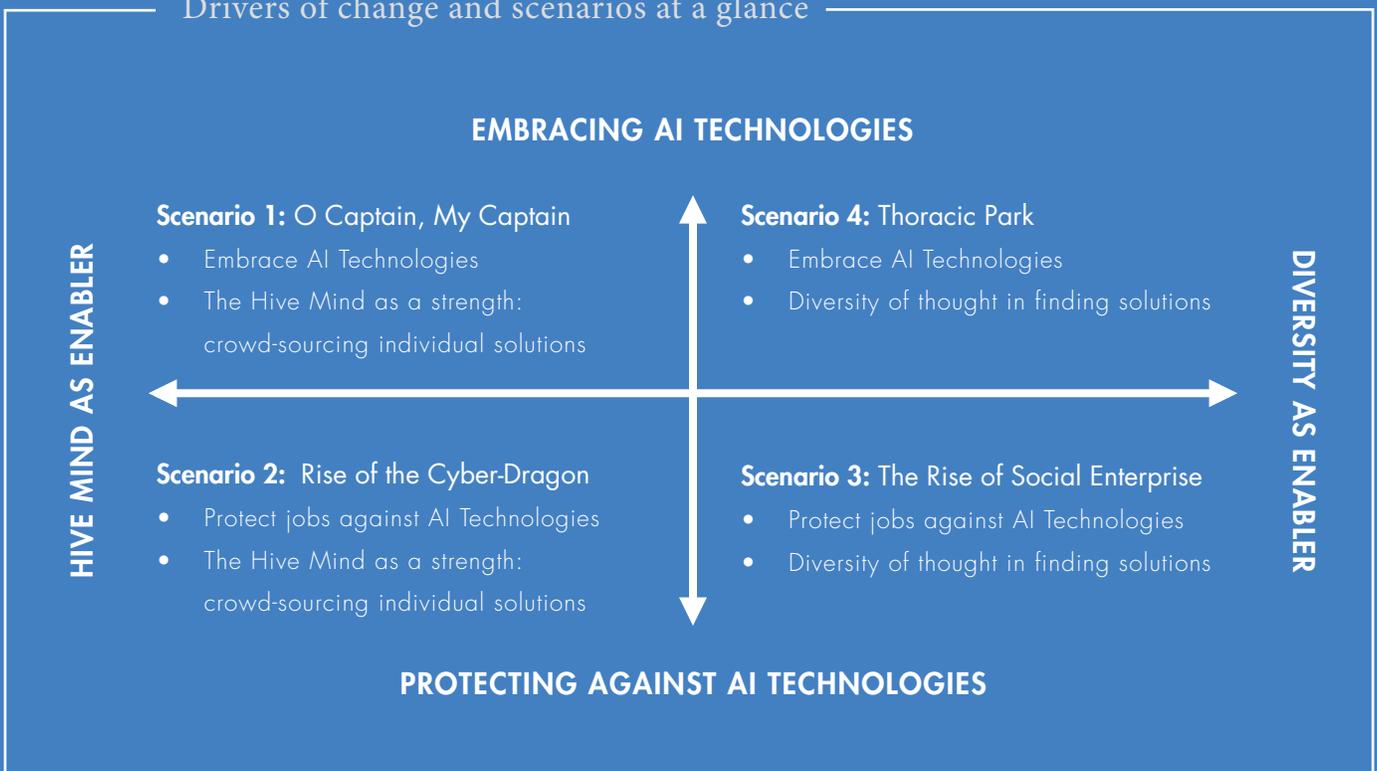
new opportunities and developing all sorts of commercial and social organisations to positively shape the country and Asia. These should generate economic but also other non-tangible, intrinsic returns.

Therefore, this area of interest in the Action Plan Singapore project examines how an ecosystem that supports such a future can take root. It asks, “What are the roles that various institutional stakeholders can play in bringing that about, be it academia, government agencies, multinational corporations (MNCs), government-liked companies (GLCs) and even social, not-for-profit, non-government organisations?” It asks, “How can Singaporeans themselves be at the heart of this transformation?”

There is one other factor that we considered – the impact of artificial intelligence (AI), which has the potential to eventually reshape not only industry but also human society. While AI will augment human intelligence and generate new opportunities that are almost inconceivable today, during Action Plan Singapore’s 2016 to 2026 time horizon, Singapore is likely to face major socioeconomic challenges in seeking to cope with the disruption before it has time to reorient itself and reap the longer-term benefits of the AI revolution. The disruptive effects of AI by 2026 might not only be confined to lower-skilled workers but affect even highly skilled workers. While waiting for the longer-term positive effects of AI to outweigh the shorter-term disruptive effects, Singapore will have to anticipate and respond to those immediate effects.

Participants were not asked to predict the future but to consider the critical uncertainties that shape how we get there and how that might happen. In doing so, they had deep conversations about the current innovation ecosystem, technological change, the state of our human capital, and the challenges that must be overcome to build that Innovation Village of 2026.

Drivers of change and scenarios at a glance



STRATEGIES

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STRATEGY 1

Firing-up New Models of Value Creation

Strategy 1 focuses on harnessing the power of disruptive business models and their associated technologies and services to positively impact economic and social development. We have used the term “new models of value creation” to refer collectively to disruptive business models, the effects of which are already visible in the market and society. (There is a similar but separate strategy that tackles the issue of the rise of AI and the impact that is likely to unfold only in the medium to long-term, after the 10 year time horizon that this project is bound by.)

As new models of value creation continue to displace traditional businesses, industries and jobs, it will be at the cost of re-skilling and facilitating the re-employment of at-risk and displaced individuals. Also, regulatory inertia by government or consumer bodies may mean there is an inconsistent quality of service and a lack of minimum standards across different platforms of value-creation. On the positive side, these new value models open fresh pathways for entrepreneurship and business success. The strategy proposes the introduction of a Stay Ahead Scheme that improves workers’ skills and core competencies to address the immediate downsides of this development. It also emphasises the need to develop industry standards that would strengthen trust in these products and services. These will make the new products and services attractive to customers and ensure that such new business models travel well, regionally and globally. The timelines and specific goals of the strategy are set out below:

By the end of 2018, a comprehensive cross-industry review will have identified the positive and negative impact of new models of value creation, and appropriate cross-sectoral policies to optimise the upside and mitigate the downside will have been introduced. Half of the workers displaced will have been re-trained and re-employed within six months through the Stay Ahead Scheme.

As part of the strategy, help is given to Singapore’s small and medium-sized enterprises (SMEs) to try out new models of value creation. Current and new cross-industry regulations needed to foster a competitive and innovative growth environment for SMEs within Singapore and in the region will have been tried out. There is a 10% increase in the number of Singapore SMEs that have regional offices. SMEs’ contribution to the gross national product (GNP) has also increased.

New quality rating scales and guidelines have been introduced to provide consumers with standardised information to guide their choices. These are applied to the traditional social services sector too. A government social service rating agency will provide clients with standardised information about the social and healthcare services that these new social service providers offer. Voucher systems issued by the government will be used to access social and healthcare services provided by this wider range of entities.

By the end of 2022, Singapore SMEs that venture overseas generate an even larger share of the national income. This is based on a 25% increase in those that have regional offices.

Three-quarters of the workers displaced by the new technologies and business models will be re-trained and re-employed within six months, keeping the national unemployment rate under 4%.

The systems of quality rating scales and guidelines that started to emerge by 2018 now provide open access to accurate and relevant information on the pricing and quality of the new products and services including those in the social and healthcare sectors. Three-quarters of citizens are deemed to be eligible for vouchers, receive them and exercise their choice from the wide range of providers.

By the end of 2026, a regional standard of regulation of new products and services arising from these new technologies and business models that can be applied across ASEAN has been ratified. SME involvement in regional business will have risen and overall GNP share contributed by SMEs will have risen too. As many as 95% of workers displaced by these new models of value creation will be re-trained and re-employed within six months. All eligible citizens will be allocated social service and healthcare vouchers and there will be comprehensive systems that provide as well as rate public services for needy individuals and social groups.

STRATEGY 2

Building a People-Friendly AI World

How AI and AI-related technologies will disrupt the traditional structure of the economy and society is still unclear even to experts. This strategy addresses how the benefits of AI technologies to Singaporeans can be maximised while the potential downsides can be minimised. The timeline and specific goals of the strategy are set out below:

By the end of 2018, a study titled “Building a People-Friendly AI World,” reporting on the positive and negative impact of AI, and on which jobs and skills are at risk of being disrupted by AI will have been completed. The study will suggest how the positive impact can be accentuated and negative impact mitigated. It will propose the

supporting legislative framework, education and training that will be needed to take advantage of AI. This is based on a broad consensus among key stakeholders and views garnered from public consultation. This will prompt programmes to promote AI-literacy and the adoption of AI by SMEs.

The study will propose a framework to support displaced workers which includes systems for welfare support for a limited duration, greater subsidies for re-skilling programmes, and improved jobs-to-company skills-matching platforms. This reactive approach will be complemented by a proactive approach where the government and key stakeholders have created an AI development roadmap which anticipates the changes in jobs and skills and provides “pioneer credit” to firms that incentivises them to adopt suitable worker-friendly AI innovations.

By the end of 2022, 50% of SMEs in sectors such as healthcare, hospitality, and manufacturing will have adopted AI-augmented jobs. There will be increased participation in the SkillsFuture programmes of the day.

By the end of 2026, the increase in the proportion of SMEs adopting AI-augmented jobs will increase from 50% to 70%. By this time, programmes, policies and strategies to accentuate the positive impact of AI and mitigate its negative impact will have been successfully implemented.

STRATEGY 3

Innovation Takes a Village

There are three major challenges to Singapore remaining globally competitive. First, Singapore’s small population and land constraints; second, the challenges and opportunities provided by a rapidly-developing ASEAN and the third, the unintended consequences of government policy that have to be mitigated. To ensure that innovation

adds significantly to economic growth, Singapore needs a critical mass of talent and fostering that is a significant task of the education system. Innovation is also seen as a core service that is exported to the region. The timeline and specific goals of this strategy are set out below.

By 2018, stronger and more effective linkages will have been built among the local start-ups, SMEs and MNCs. This will be through contracting relationships, open innovation platforms and joint ventures that generate pathways to new markets and real revenue.

The government also develops a robust regulatory framework for disruptive technologies across the different industries where these are emerging (a current example would be in the financial world, referred to as “fintech”). It is able to attract an increasing number of overseas start-ups to headquarter in Singapore. Immigration policy is refined to provide adequate skilled personnel for this particular group of start-ups. The number of recognised and well-respected coding, technology and innovation schools in Singapore rises. The education policy is now oriented to producing innovation-oriented graduates as the mainstream curriculum — from kindergarten through to post-secondary and tertiary level institutions — has been re-designed to achieve that. All these help Singapore to be identified as an innovation hub.

By 2022, the strategy will lead to an increase in the percentage of GNP generated by businesses that are less than 10 years old, and in the level of contribution by Singaporean SMEs to GNP. Institutes of higher learning now provide a greater number of tech graduates with relevant skills to take up jobs that use cutting-edge technology. This will allow for higher real median gross wages for a larger pool of local graduates. By this time, 10 Singapore-founded start-ups will have been acquired by global MNCs. There will be deeper collaboration between academics

and commercial entities in designing a diverse and flexible education curriculum in Singapore educational institutions.

By 2026, productivity growth drives the rise in Singapore’s GNP in a far more robust way than ever. There will be a maturing innovation market, helped by an increase in the number of university-based technology spin-offs, collaborative projects between universities and corporations, and patents registered. This will create a self-sustaining, self-reinforcing and thriving innovation ecosystem that will attract a critical mass of MNCs, research scientists, venture capitalists, and entrepreneurs to the country.

Singaporeans will be encouraged to go overseas to gain regional experience, facilitated especially by more SMEs engaging in business regionally, and an increase in flow of capital investments by Singapore companies overseas. Singapore will be involved in the development of more Smart City projects beyond its shores.

TRACK CAPTAIN, FAIZAL YAHYA’S AND FACILITATOR JON HOEL’S REFLECTIONS

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THE SUM OF ALL CHANGES: Living and Working in a VUCA World

Singapore’s successful economic development in the past has been achieved through a game of catch-up with the leading industrial and economic hubs of the world. Today, we face a different challenge: becoming a place that generates indigenous technology and fresh thinking to move up the next ladder of knowledge-based economic transformation.

We now live in what has been called a “VUCA” world — one that is volatile, uncertain, chaotic

and ambiguous. The traditional strategies for growth, long-term economic development and governance can no longer be assumed to work.

While it is almost axiomatic that individuals, organisations, and national economies with relatively low risk aversion and a relatively high appetite for experimentation will be more likely to thrive in such a VUCA world, the bulk of Singapore's economic activity has been focused around traditional business models involving established proprietary vendors, trade and arbitrage, and rent-seeking economic activity. So how can Singapore, a trading economy with no physical hinterland, expand its virtual hinterland, ramp up its knowledge base and innovation quotient, and create deeper and broader linkages with the outside world with attractive offerings of products, services and capital investments?

LONGEVITY:

Singapore's Ageing Population is an Innovation Challenge

A key factor to consider in thinking of Singapore's economic future is its demographic profile. Singapore's fertility rate now stands at 1.3, below replacement rate, and our population is ageing. As people live longer, they will require even more resources to sustain their livelihoods or afford the care they need. If older Singaporeans can remain active and engage in value-creating activity for longer, then the more obvious challenges of aged care can be somewhat alleviated.

OUR SKILLS CHALLENGE

The skills challenge is one that ranges right across the board for the whole country, but it is especially pronounced in relation to innovation. In a VUCA world, we need to consider how we can effectively equip Singaporeans with the skills of the future. As AI becomes capable of doing an increasing range of human tasks, sections of the workforce face further disruption.

NEW VALUE MODELS ACCELERATING THE PACE OF CHANGE IN THE IMMEDIATE TERM

In the more immediate term, and as we look at how technological change will affect Singapore, new models of value creation will continue to disrupt traditional businesses. For example, Uber and Airbnb are both sharing economy businesses that offer cheaper services than taxis and traditional hotels, respectively. These new models of value capitalise on evolving consumer behaviour, preferences, and societal values, smartly incorporating these elements into new business models that deliver value to customers in new ways. On the supply side, these also allow people to monetise some of the resources that they have at hand to support themselves especially in the uncertain labour market. However, traditional companies may view these disruptive innovators with great wariness as the former have a higher cost base than the new entrants.

Economists have also raised the alarm more generally about "job-polarisation" as the effect of technological change whether it is through these disintermediating technologies or the more systemic wave of AI. This job polarisation is where the availability of middle-skilled jobs like those found in manufacturing are declining but where both low-skill and high-skills jobs, especially in the services sectors, are expanding. In other words, these trends threaten to divide the workforce into two groups — one doing routine low-paid, low-skilled jobs, and the other doing non-routine, highly paid, skilled jobs. With regard to disintermediating technologies, these are already providing increased value directly to the consumer, automating and therefore replacing the "middle-man occupations".

So what are these "middle-man" or "middle companies" supposed to do to stay relevant in the midst of change? Adapt and innovate.

THE IMPERATIVE TO DELIVER NEW VALUE AND CREATE NEW CUSTOMERS

Peter Drucker said, “Because the purpose of business is to create a customer, the business enterprise has two — and only two — basic functions: marketing and innovation. Marketing and innovation produce results; all the rest are costs.”¹ Drucker said that in 1954, yet in the years since, large enterprises have become ever-more complex with large numbers of people working in areas that do not directly generate revenue.

Even just to tread water, to maintain our position, we need to innovate new ways to create customers internationally. To maintain our current level of employment in the year 2026, we need to create thousands of enterprises supplying new products and services.

TIME TO UPDATE OUR PARADIGM?

Singapore is in one sense highly fortunate to be a compact and nimble player on the global stage, because we should have, theoretically, the ability to respond faster in a VUCA world. However, while we have this strength at the national policy level, we need to strengthen our capabilities at the organisation, and personal levels.

Our society and economy are highly optimised around a particular paradigm within which we compete to achieve a respected place. Economically, it is centred around the activities of MNCs, GLCs, trade, arbitrage and wealth management. Societally, it is centred around meritocracy, and Action Plan Singapore Innovation Track participants agreed that we are brand-conscious in terms of the schools, universities and the organisations we aspire to join.

¹ Peter Drucker, *The Practice of Management* (New York: Harper & Row 1954), 37.

This paradigm is optimised for the more sedate, predictable world of the past. Success in a VUCA world demands a new paradigm and a higher level of agility in the way we think and do business, at the national, organisational and personal levels.

Not everyone needs to aspire to be a start-up entrepreneur. There are various ways Singaporeans can contribute to the innovation economy, whether self-employed, working in a start-up, a SME, a large enterprise, a non-government organisation (NGO) or in the public sector.

With a great deal of support for innovation and entrepreneurship — such as through Singapore’s National Framework for Research, Innovation and Enterprise, schemes like the Technology Incubation Scheme of the National Research Foundation (NRF), JTC LaunchPad@one-north and the concurrent rise of private co-working spaces — an innovation ecosystem has started to form, and a culture of entrepreneurship and innovation in Singapore is taking root.

BARRIERS TO INNOVATION AND ENTREPRENEURSHIP IN SINGAPORE

What might stand in the way of deepening the momentum, and prevent the Action Plan Singapore strategies from gaining traction?

Policymakers, business and opinion leaders are well aware of the deeper cultural and structural barriers to entrepreneurship in Singapore.

These include the “fear of failure” especially among young Singaporeans who express their concerns in terms of whether they would be able to keep up with their peers if they do not turn out to be successful in their ventures. Many young Singaporeans would view a failed venture as time wasted not climbing the career ladder, even if the start-up founders did not suffer major financial

loss. This is a major psychological barrier to entrepreneurship in Singapore. Also younger Singaporeans worry about not being able to fulfil their filial obligations to their parents, which reinforces this fear.

However, start-ups and SMEs are essential to job and wealth creation. It is useful to make a clear distinction between founding a start-up, and working for a start-up as an employee. The latter involves much less financial and reputational risk. For every start-up founder, several employees may be needed, and for our Innovation Village of 2026 to be successful, surely every Singaporean son and daughter should be at least willing to consider working for a start-up for a year or two at the beginning of their careers, and be proud to tell their friends about their experience. Parents should be proud that their children are doing something that by 2026 may become a rite of passage. By 2026, perhaps taking a gap year to work at a start-up as a young person might be seen as a definitively Singaporean thing to do. In any case, “safe” career paths may not even exist in a decade’s time. Although the risks of entrepreneurship are very high, the kind of skills one can acquire as an entrepreneur equips one to navigate a VUCA world.

MID-CAREER ENTREPRENEURSHIP

Apart from the young, we have to consider how the disruptions in the economy may affect other Singaporeans. If past trends are any indication, workers aged 30–49 years of age may comprise a large proportion of Singaporeans who are made redundant due to technological change over the next decade — a group that can least afford it given their financial responsibilities. However, seeing that they will have skills, experience, and a network of trusted contacts to draw upon and sell to, with the right support, they may have a greater chance of success than younger people at entrepreneurship.

A study found that in many cases, Singaporean mid-career entrepreneurs (MCEs) were disillusioned with corporate life and saw setting up their own business as a positive alternative for extrinsic and intrinsic reasons. While most are unlikely to generate high-growth “moonshot” start-ups that attract venture funding, some may instead be small companies that provide job satisfaction and a good livelihood for a growing percentage of Singapore’s workforce.

Innovation has become even more important to an economy like Singapore’s but the question is whether its businesses and workers can absorb and take advantage of these disruptive trends. Or more profoundly, we have to ask if they can be the ones proactively generating such innovation and change; if they are positioned to take full advantage of the new technologies.

SOCIAL SUPPORT AND SKILLS-TRAINING

Regardless of the employment landscape, another area of concern would be to upgrade our social policies to mitigate the adverse impact of disruption in various industries; those where the effect of employment displacement will be the greatest. Some version of Denmark’s “flexicurity” system that aims to achieve both flexibility in labour markets and security for workers should be explored.

While companies are still able to “hire and fire” easily, they also need help to support unemployed workers as they re-train for new jobs. In Singapore, among larger companies, workers are often re-trained and re-deployed internally into other units or departments.

There are now the public schemes under the SkillsFuture Initiative that can help. For them to be effective however, more attention should be placed on ensuring Singaporean employers come to be at the heart of this ecosystem. They have to help design training curriculum that is relevant to

the workplace. Their input is critical. They also have to open their doors of employment to those who have received the training. They should look past the formal credentials or lack of them among job seekers and instead, pay greater attention to the capabilities that these men and women have acquired through past work experience and recent skills training.

“PRACADEMICS”

An essential piece of the puzzle is ensuring that the providers of that training, whether in formal curriculum or on-the-job are actually effective in doing so. Linking this to the discussions in the Skills Track of this project, there is a need to develop a core of “PracAdemics” — people who can combine the theoretical and academic core of education with the practical vocational skills and soft-skills training that are industry-relevant as well as up-to-date with technological developments. This seems like a tall order and may be the weakest link in the chain that deserves attention. This is discussed in greater detail in the report on the Skills Track.

Obviously, all these are useful only if they are undergirded by a clearer framework of what are core skill sets that the worker of the future may need. This is something that the Innovation Track of this project has focused on. The concern is also that with the speed of technological change and its impact across several or all industries, the life cycles of job categories will be much shorter and the need for new skills will increase. This means that policy intervention, if any, will need to be timely and implemented quickly.

The Action Plan Singapore Process and the Drivers of Change in the Innovation Landscape

Participants discussed and identified key drivers of change that will answer the question: What might our Innovation Village of 2026 look like?

Participants were drawn from a variety of backgrounds, including corporations, investors, independent consultants, NGOs, government and academia. They initially participated in a two-day scenario-planning workshop where they defined what they thought were the two most critical uncertainties that might shape that future. They then used these to create four possible stories of the Innovation Village.

Some points to note: our frame of reference was the ecosystem of innovation rather than specific innovations. The focus was on macro-level drivers of change, rather than deep dives into specific technologies. We have not, for example, delved into specific technologies such as nanotechnology or biotechnology, or considered in detail what a future of human augmentation might look like. Also, due to the composition of the working group,

there was more focus on helping early-stage companies than facilitating corporate innovation. Clearly, all the output from the workshops, including the strategies, would benefit from consultation with a wider group of sectors and technology domain experts so that they can be fleshed out in greater detail.

CRITICAL UNCERTAINTIES

Participants were asked, as is usually the case in standard scenario-planning methodology, to identify and prioritise the key critical uncertainties that they thought would shape Singapore's innovation ecosystem.

To explain, there are three categories of drivers of change. The first category comprises the predetermined elements which are systemic forces of change that are already perceptible and set in the structure of the system that is being discussed. The second category are the "black swan" or "wild card" events which are deemed to have a

very low likelihood of occurrence but could have a significant effect on the system if they did take place. The third category is the set of critical uncertainties which are again systemic forces of change that are recognised to have the potential to be game changers but where it is not yet clear when or how those might occur.

Instead of trying to predict the future (an impossibility), scenario-building focuses on identifying the main driving forces of change that are likely to shape the future. Vivid narratives are written around how two or three of drivers of change deemed to be critical uncertainties that might interact with one another to create different scenarios of the future. These highlight the fact that the future is not predetermined and can play out quite differently from how one might imagine to be the case.

The top two critical uncertainties ranked by the perceived degree of potential impact, and the degree of uncertainty were:

- How will Singaporeans respond to the emerging technologies in AI — embrace it or protect themselves from it?
- Will the key enabler of scientific, commercial and social transformation be a distributed form of strategic intelligence that results in collective and coherent national effort (the “Hive Mind”) or the full ground-up release of cognitive and social diversity?

The other critical uncertainties that were discussed were:

- Will the global economy be relatively more open or closed (protectionist) to trade and investment flows?
- How scarce will the key resources (energy, materials, water, land) be?

- What will be the degree to which individuals feel they can realise their individual aspirations in economy of the future?
- Location freedom — what will be the degree to which people can work anywhere, perhaps because they are enabled by technology?

It may be helpful to explain the issues raised by the top two critical uncertainties before we proceed to describe the scenarios that the participants wrote.

CRITICAL UNCERTAINTY 1

Will we embrace AI or focus on protecting ourselves from it?

It is axiomatic that developments in AI will accelerate the pace of technological advancement and spur innovation but they will also challenge jobs, our way of life, our self-concept as humans. It is therefore unclear how our society will respond as AI becomes more pervasive in Singapore.

Participants observed that countries that embrace AI might well be the ones that move to the forefront of innovation. However it is also conceivable that there may be a populist backlash at some stage, and governments may feel compelled to intervene to assist humans displaced by AI, possibly even to impose measures that constrain AI displacement of human beings.

CRITICAL UNCERTAINTY 2

Will we embrace diversity or the “Hive Mind” (unity of purpose and action) to maximise the potential of human innovation?

With the slowing of mature economies and the rising importance of the information economy, conventional wisdom holds that it is greater diversity in thought, talent, and experience that is essential to promoting vibrant innovation and

entrepreneurial activity. Going forward, it may therefore be essential to not just tolerate but to positively encourage diversity of that sort for innovation to flourish. But how do we do that? How do we encourage a more freewheeling culture of innovation?

One participant called for Singapore to develop an innovation culture that is more like what is found in Silicon Valley, which gave rise to a discussion about the differences between the United States (US) and Singapore. The US has a much larger constellation of entrepreneurial activity, a bigger domestic market and greater diversity than Singapore. It is therefore important to consider what is different, because adopting overseas paradigms without adapting them to our specific context may not be very effective. One participant said that it may be more useful to compare Singapore with other large metropolises even if they are embedded in larger national economies, rather than doing a country-to-country comparison.

“Hive Mind” as the way to maximise our potential by strengthening the sense of unity of purpose and action is not as fashionable nor associated with innovation. It is argued that a nascent version of the Hive Mind was what helped countries like Japan, Korea, China and Singapore industrialise rapidly, although conventional wisdom holds that as a national economy approaches the technology frontier, it needs to innovate more, and that unity or conformity of any kind will be a hindrance rather than a help.

However, the Hive Mind does not mean the same thing as how a beehive operates. In a beehive, worker bees go about their tasks in a robotic manner. Participants did not conceive of the Hive Mind as negating individuality, or devaluing differences between people. Rather, it is where individual thinking could be amplified and networked, not isolated or diminished. Hive

Mind was conceived as a cultural evolution, inspired by the observations that technology is driving greater connection between people; it is a distributed network of intelligence. (Contrast this with social media which has seemed to have driven a tribalisation of thought. We have seen the rise of fact-free politics in the US, where opinion, reinforced by tribalised online echo chambers, has apparently become more important the fact-based consensus). By 2026, we could be closer to achieving a truer Internet of human minds, where not only will it be easier to communicate and understand each other, it will be easier to act with unity of purpose. In the political arena, technology may eventually lead to a cultural shift towards greater consensus around facts and data rather than tribalisation of thought. In the business world, Hive Mind could be a means of aligning individual and team aspirations with the larger whole, with communication taking place in an omni-directional fashion.

Implicit in this is that Singapore does not have the luxury of having a large population base, that some degree of specificity in focus may lead to a more advantageous outcome for our Innovation Village and adopting a Hive Mind could be key to achieving such a future.

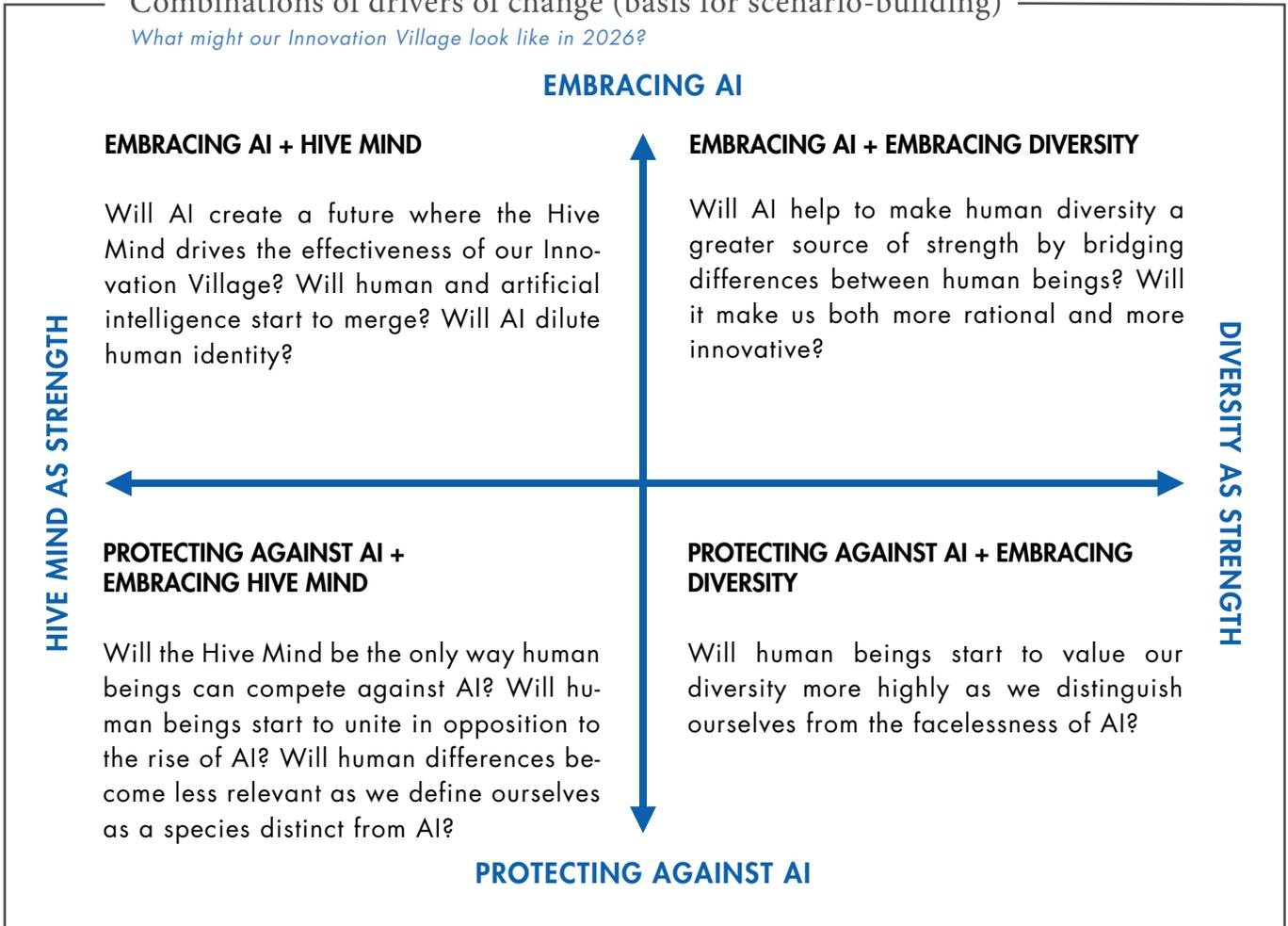
We do not necessarily need to make an either or choice between diversity and Hive Mind, as they could co-exist. However, when it comes to scenario-building methodology, we need to construct stories around polarities.

CREATING SCENARIO STORIES

We overlaid the two critical uncertainties onto a 2x2 matrix to create four quadrants. Each quadrant has two overarching characteristics, based on the respective polarities of the two critical uncertainties. The following table illustrates the scenario logic for each quadrant.

Combinations of drivers of change (basis for scenario-building)

What might our Innovation Village look like in 2026?



DEVELOPING STRATEGIES

Participants started to create strategies at a conference on 5 September 2016, and at subsequent strategy workshops held for the three tracks, which includes the Innovation Track. The overarching objective was to create strategies aimed at realising the positive impact and mitigating the negative impact described in the four scenarios for 2026.

Of course, imagining the full impact of AI in year 2026 is difficult. As we entered the strategy-development phase of the project, we decided to widen our focus slightly. We posited an additional category of technologies for which the impact has been visible for some years. To provide a more immediate focus for our strategies, we introduced the term “new models of value creation” as an overarching term that refers to a combination of innovative business models and existing web- and mobile-based disintermediating technologies.

We have already seen the emergence of value creation such as Airbnb, Uber, Carousell, and so on. What these have in common is that they disintermediate parts of a previously existing value chain; they are platforms that enable consumers to do business more directly. For example, in the case of Airbnb, a consumer can rent an apartment more or less directly from the individual owner of the apartment. The underlying technology is not particularly new, and the innovation is more around the model of value, and the widening acceptance of it by customers, i.e., a new way of creating value, incorporating numerous elements, some of which may not be particularly new.

Companies like Airbnb and Uber have been warmly received by consumers because they offer choice and convenience at lower prices, and consumer preferences have evolved to a point where many people are comfortable doing business directly with the owner of an apartment

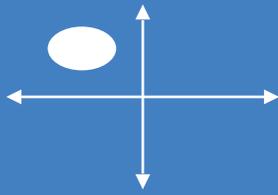
or a private car. However, traditional companies may be wary of these disruptive innovators as they have a higher cost base than the new entrants. If traditional companies feel they need to reduce their cost base just to maintain market share, they may feel forced to reduce their employee headcount.

As there have been major layoffs in the banking sector recent years, we may be witnessing the consequences of this kind of disruptive innovation such as fintech (financial technology) where start-ups nibble away at the revenue that has traditionally been the mainstay of banks and financial companies. Although it is by no means clear what is the extent to which such disruptive innovation is to blame (as opposed to cyclical factors,) such developments have banks and financial companies worried about their core business.

The point is, that these effects are already felt as new models of value have emerged merely from drawing upon existing technology. As the technology frontier progresses, and as even newer AI and machine-learning technologies are commercialised, traditional industries will face greater disruption.

SCENARIO 1

O Captain, My Captain!



CRITICAL UNCERTAINTIES

1. Embrace AI
2. Hive Mind

EMBRACING AI

Recognising that AI and AI-related technologies are here to stay, Singaporeans decide to embrace these to augment their roles as workers and citizens. Government and citizens alike take an open approach to adopting AI and adapting to it.

HIVE MIND

Citizens begin to converge in thought and action (empowered by social media), driving bottom-up change. There is also top-down change wrought by a government seeking to pre-empt citizen concerns and stay in power.

It is now January 2022. Lin, 35, is a senior teacher in one of the AI-enhanced precinct schools. Her daughter, Carol, 12, has a learning disability and is enrolled in the Pasir Ris-Punggol precinct school and will be taking her PSLE at the end of the year.

In 2020, Singapore's overwhelmingly successful Smart Nation initiative leads the government to unify teaching standards in all precinct schools through the use of a breakthrough learning platform called the "Artificial Learning Teaching Intelligent System" (ALTIS). ALTIS carries out direct teaching to each student, fulfilling MOE's vision of "One student, one teacher". Since its introduction, the PSLE pass rate has consistently hovered around a near-perfect 99.5%.

The introduction of ALTIS coincides with historically low student enrolment numbers, a result of the decades of low national fertility rates. In a bid to optimise the use of costly resources and address a shrinking labour force, the Ministry of Education (MOE) clusters all schools into key precincts based on the population density in each district. This leads to a significantly higher teacher-to-student ratio with three teachers to 10 students within the classroom. Furthermore, the consolidation of schools leads to the dissolution of "elite" schools.

Due to her learning disability, Carol is unable to grasp her ALTIS lessons and requires a more hands-on approach to learning. She spends time every day after school with her mother, going through intuitive tactile learning exercises to prepare for the PSLE.

Lin's dedication to her students leads her to be promoted to being the principal of a cluster of AI-enhanced schools, expanding her job to overseeing the development and running of all educational institutions in the north-east region. She learns of the MOE's plan to streamline the teaching workforce within her cluster due to the unparalleled success of the ALTIS programme. The

move will see the re-deployment of form teachers into largely administrative roles leaving one teacher to each class. As part of this initiative, MOE tasks Lin to plan and execute the redeployment of teachers in her cluster.

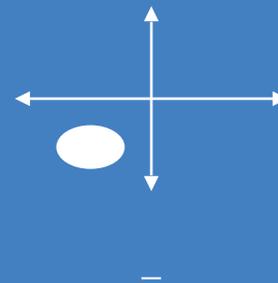
However, being the parent of a 12-year-old with a learning disability, Lin is fully cognisant of the need for the human-touch in education despite the immense success of ALTIS. Her view is increasingly shared by a small but growing number of teachers who believe that a student's development will be incomplete without the continued pastoral guidance provided by teachers. Encouraged by the movement, Lin redoubles her efforts, championing the need for more, not fewer, teachers in the classroom.

Understanding the challenges of embracing a purely technological approach to education absent of human intervention, Lin spearheads a national effort to rebalance the human element in an increasingly technological environment – petitioning the MOE to review the policy of removing teachers entirely from the classroom. Carol sits for her PSLE at the end of the year, but without more hands-on help from busy mum, she barely scrapes through, exposing the fundamental shortcomings of a pure ALTIS approach.

A year later, the surplus and changing role of teachers leads MOE to pilot a new programme called the Teacher Learning Re-design Initiative (TLRI) aimed at re-designing the nature of teaching in schools. With ALTIS handling the core academic curriculum, teachers are expected to focus on the non-academic and overall holistic development of their students, such as character-building and greater appreciation for the arts, sports and the natural world, ushering in a new era of education.

SCENARIO 2

Rise of the Cyber Dragon



CRITICAL UNCERTAINTIES

1. Protectionism
2. Hive Mind

PROTECTIONISM

In reaction to displacement of humans by AI, society's response is to completely reject the growth of AI or impose restrictions that protect the traditional role of humans in the workplace.

HIVE MIND

Citizens begin to converge in thought and action (empowered by social media), driving bottom-up change as well as top-down change by a government seeking to pre-empt citizen concerns and stay in power.

Growing pressure from unemployed workers displaced by the AI revolution forces the government to develop policies that mitigate the effects of such displacement.

Jason Chang, a 35-year-old with a Masters degree in Financial Engineering from Imperial College, is replaced by AI within a large Singaporean bank. As a financial advisor, he makes stock picks for his clients. The AI that replaces him — developed out of the fintech accelerator — is able to make better and faster picks.

Intense investment in the fintech sector over the past four years has dramatically improved AI technology and its adoption leading to significant layoffs in the financial sector where Jason is but one of the latest to be retrenched. Like many other similarly unemployed people, he takes to social media to vent his frustration. A pro-human movement begins to emerge, causing momentum to build around populist protectionist policies such as taxing and even banning AI services and research into AI, and the introduction of measures to provide jobs for those already displaced by AI.

During the 2020 General Election, a strong pro-human message is sent to the government by the electorate. In response, the government introduces a raft of measures that are coordinated across labour laws, tax policies and IT regulation. Jason is a beneficiary of these new measures — job re-skilling and up-skilling in non-AI fields takes place.

By the end of 2021, Jason finds employment at another Singaporean financial institution in a government-mandated human-only position — although there is debate between the government and private companies on defining such jobs. Jason's institution is beginning to struggle in competition with superior Chinese fintech companies. China has embraced AI and invested in developing higher AI capabilities, becoming the best in Asia in this space.

In 2022, the government is beginning to explore the option of imposing a COE system (one that is similar to a long-standing system imposed for the management of the car population) on owning AIs and a per-user charge on users of AI services. The revenues would be earmarked for a sinking fund — an expansion of the existing Workfare scheme — that would subsidise the hiring of workers for human-only positions in local companies.

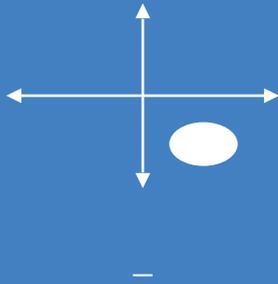
Jason's former colleague, Billy Bob, feels the new policies from the 2020 General Election restrict career and business opportunities for him in Singapore, and sees a brighter future in China helping develop better AI systems for his field. He decides to leave for China where he will reinvent himself as an engineer in the field of AI technology.

By 2025, Jason's institute has become non-competitive, despite a previously strong regional presence, and must begin to downsize. Jason once again finds himself out of work and without the right skills to be hired. The domestic employment outlook is bleak as Singapore's workforce is poorly prepared for the AI-dominated world, but on the other hand, its best and brightest have moved on to more competitive countries like China.

While Billy Bob is a high-tech engineer in China, Jason jostles in the queue for a premium spot on the Sheares Bridge overlooking the river, staring into the waters below...

SCENARIO 3

Rise of Social Enterprise



CRITICAL UNCERTAINTIES

1. Protectionism
2. Diversity

PROTECTIONISM

In reaction to the displacement of humans by AI, the society's response is to completely reject the growth of AI or impose restrictions that protect the traditional role of humans in the workplace.

DIVERSITY

Singaporeans realise the importance of diversity — vocations, skills, perspectives, culture, race and religion — in driving innovation. Rejecting the false comfort of groupthink and the herd instinct, they open themselves to diversity and embrace it wholeheartedly.

It is now 2022. Ayesha, 42 years old and a talented lawyer, arrives at work. Her boss summons her to his office to tell her that she is no longer needed and a machine will take her place. Ayesha had seen this coming for some time now.

Machine-learning programmes, such as one named Victor, process statutory documents and cases to write affidavits that are then submitted to the courts. The machine advises clients on how to proceed with their case submissions, such as seeking arbitration with their adversaries. She is unemployed but Ayesha is a social warrior and actively contributes to the advocacy campaigns of Greenpeace and migrant worker rights. As a lawyer, she was overworked and found the legal industry to be rent-seeking; overcharging clients for services. Due to her resilience, she considers her sacking as an opportunity to give back to society. She sets up a social enterprise with a group of friends to assist other displaced workers re-skill and find new jobs.

Since 2018, the government has been promoting the revised SkillsFuture+ Fund to provide skills-upgrading for individuals displaced by AI technology. Ayesha gets grants, development assistance and market research through AI services from it. Through this grant, she gains the credibility to source for more funds from foundations and also from crowd-funding. Although she is not earning as much as she used to, she is content with her current work and the sense of mission it gives her.

Engaging in an advocacy role, she speaks to the grassroots members of the People's Association in her neighbourhood, encouraging them to take up skills-upgrading to adapt to AI, and advocates for fairer compensation for people who have activities augmented by AI. She files suits against unfair dismissal by companies and is a well-known advocate.

One of her clients, Dr Toh, 52 years old, is a radiologist in private practice that faces severe negative profit margins due to rising costs. She closes her practice and hopes to go back to the public hospitals. Unfortunately, the algorithm to read medical images has been perfected and fewer radiologists are needed. The Head of Diagnostic Radiology of one such hospital encourages her to consider Family Medicine, so that she can practise as a General Practitioner.

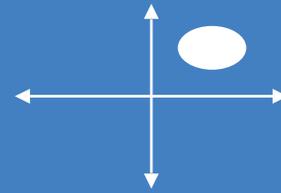
Unfortunately, the Singapore Medical Council requires her to sit for specialist exams and to clock many hours before she can be recognised as a family medicine practitioner.

Dr Toh sees the advertisement in the “Social enterprise against AI” network and speaks to Ayesha about her case. Ayesha suggests that Dr Toh “up-skill” and move into a different medical specialty such as health management. Unfortunately, at 52 years old, Dr Toh is not sanguine about reaping worthwhile returns from such an effort; the costs of re-specialisation are too high. In addition, she lacks experience in other areas and is not able to move upstream into the role of health management and supervision.

This experience is not unique to Dr Toh. Across industries such as taxis and airlines, unions establish quotas to prevent new entrants from competing with existing practitioners. Existing practitioners are up-skilled and taught to use AI, but those displaced are truly left behind. In the General Election in 2026, Dr Toh waits in line holding the voting card with anger welling up within her as she considers her future.

SCENARIO 4

Thoracic Park



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CRITICAL UNCERTAINTIES

1. Embracing AI
2. Diversity

EMBRACING AI

Recognising that AI and AI-related technologies are here to stay, Singaporeans decide to embrace their use and augment their roles as workers and citizens. Government and citizens alike take an open approach to adopting AI and adapting to it.

DIVERSITY

Singaporeans realise the importance of diversity — vocations, skills, perspectives, culture, race and religion — in driving innovation. Rejecting the false comfort of groupthink and the herd instinct, they open themselves to diversity and embrace it wholeheartedly.

It is now 2019 and Dr Bruce Wayne-Tan is a 45-year-old established paediatric cardiothoracic surgeon (heart surgeon for kids) who works in a tertiary hospital in Singapore.

He realises that his physical capabilities are beginning to fail as he grows older. During long surgeries, he feels weak, and his associate consultant is starting to take on more advanced roles. Nonetheless, he wishes to continue to save lives and wonders how he can do this even with his diminished physical capacity.

Over the years, he had noticed that many job functions around him, such as food delivery and dispensaries have become increasingly automated partially due to better technology but also due to the willing embrace of technology by the general public. Even in daily life, street cleaners and traffic police have increasingly been replaced by self-regulating machines.

In 2020, Bruce is invited to a medical technology convention where he runs into a medical technology engineer who was part of the team that created the Da Vinci machine — a high-precision surgical machine that can be used from an adjacent room. The engineer tells him that the team had found a way to produce the Da Vinci machine cheaply, make it work from the other end of the world, and was in the prototyping stage. Bruce eagerly agrees to work with that team.

In a trial of the second generation Da Vinci machine in Mexico City, Bruce realises that the prototype could not operate with the same level of precision as it normally would if he were using it on-site. Despite that, he still saw some potential in it as a teaching device.

Working with the team and hospitals around the world, he launches the first global, location-independent heart surgery training programme for medical students, conducting lessons with multiple

classes in multiple locations all at one time. In 2021, Bruce figures out how he can automate his class; by mounting a screen on the machine while making use of a script that explains the actions the machine is taking. This allows the programme to be aired whenever his counterparts want it, instead of a live stream.

From 2024, Bruce starts getting approached by experts from other high-precision industries, such as gourmet cooking schools, art institutions and the US military that seek to use the same technology for their projects. While agreeable at first, by 2026, he realises that the technology of high-precision machines is starting to be misused. Some Da Vinci machines have gone missing too, especially in the less-developed countries, due to the lack of proper regulation and security systems. The high-precision technology is being used for malicious purposes such as the construction of explosive devices and the making of illegal drugs. Criminals could do these things off-site and get away with it. He also realises that many of his counterparts have lost their jobs because they were no longer needed to train new surgeons which gives them good reason to criticise him.

Focal Question

How might we harness the power of disintermediating services to positively impact economic and social development by the year 2026?

STRATEGY 1*Firing Up New Value Models*

With the rise of disintermediating technologies, companies serving as intermediaries face increased risk of redundancy. It has also resulted in the rise of the new sharing economy, which has displaced traditional business models and jobs. Individuals are now able to tap new income streams that leverage asset-sharing models. This leads to a growing discontent among those running and working in conventional businesses. On the upside, these technologies have provided consumers with greater access to information and a wider market of service providers.

To address the implications of the emergence of these new business models, we propose several initiatives including a continuous and progressive skills enhancing programme called the Stay Ahead Scheme that seeks to improve an employee's core competencies over the course of his or her career; provide an early-in-life vocational training programme aimed at equipping students with the necessary skills to succeed in every key industry. We also propose introducing a comprehensive voucher-based welfare system to facilitate the development of new types of social and healthcare services and the establishment of a social service rating agency to ensure clear and open access to information about the quality of these new services and the providers.

SITUATION

In the last decade, the rise of disintermediating technologies has led to an evolution of business models and consumer preferences. What we witness is the removal of intermediate third parties or steps that were once required, thereby allowing businesses, individuals and governments to connect to end users directly in novel ways. This has given rise to new business models, new ways of generating value and even brand new industries.

Several existing businesses that leverage such disintermediating technologies include the accommodation rental business Airbnb and ride-sharing platforms Uber and Grab. Also referred to as the sharing economy, these businesses have allowed individuals to monetise their personal assets by sharing them for a fee.

While consumers have welcomed the rise of these new types of businesses, these have dramatically altered the business-to-business (B2B) and business-to-consumer (B2C) spaces as well as traditional supply and distribution chains, leading to decreased job security. Channels including those that link citizens to government and businesses to government (B2G) are also transformed by the use of the new technologies. However, job losses and declining margins may be offset by productivity gains with these disintermediating technologies making it easier and cheaper to set up and operate. There also currently exists considerable opportunity for governments to extend the use of new models beyond traditional economic outcomes say in the

areas of on-demand social services in the government-to-citizen and consumer-to-consumer (C2C) space.

CHALLENGES

- Displacement of traditional businesses and industries leading to a decline in jobs offered by those sectors.
- Cost of re-skilling and re-employment for at-risk and/or displaced individuals.
- Regulative inertia by government results in inconsistent quality of service and a lack of minimum service standards across different industries that use these disintermediating technologies.

OPPORTUNITIES

- Creation of potentially new pathways that allow individuals and businesses to leverage on asset ownership for monetisation.
- Decreased operating costs.

OVERARCHING OBJECTIVES

1. **Mitigate negative socioeconomic impact and accentuate positive impact of these new models of value-creation.**
2. **Encourage SMEs to innovate and incorporate disruptive technology to transform the economy.**
3. **Transform existing methods of delivering of social services.**

OVERARCHING OBJECTIVE 1

Mitigate negative socioeconomic impact and accentuate positive impact of disintermediating technologies.

By December 2018:

- Comprehensive cross-industry review to achieve clarity on the negative and positive impact of disintermediating technologies completed.
- Whole-of-government and cross-sectoral plans created.
- Programmes, policies and strategies mitigating negative impact and accentuating positive attributes of disintermediating technologies are implemented.
- Public system for decentralised delivery of basic social services established.
- Cross-industry review of the impact on the types of skills and job opportunities as a

result of disintermediating technologies completed.

- Review of the impact of disintermediating technologies on the fabric of society completed.
- 50% of workers displaced by disintermediating technologies are re-trained and re-employed within six months.

By December 2022:

- 75% of workers displaced by disintermediating technologies are re-trained and re-employed within six months.
- Full employment maintained (<4% unemployment rate).

By December 2026:

- 95% of workers displaced by disintermediating technologies are re-trained and re-employed within six months.
- Full employment maintained (<4% unemployment rate).

Action Plan by December 2018:

(See "CredAbilities" and "Making Passion Pay for Itself" strategies in the Skills Report and "Ageless in Singapore" strategy in the Longevity Report)

The rise and subsequent adoption of disintermediating technologies by businesses has fundamentally disrupted traditional

business models, leading to the displacement of workers across the industries. This effect is compounded by an ageing population, with older workers facing the increasing threat of redundancy.

- **Production of a Report:**

- A comprehensive cross-industry review

- o Identify potential sectors that are best able to leverage disintermediating technologies to increase worker productivity output.
 - o Highlight the positive and negative impact of disintermediating technologies on jobs especially in how it leads to structural unemployment.
 - o Identify core skills and competencies necessary for workers engaging in disintermediating technologies.

- **Stay Ahead Scheme:**

- o Customise and augment existing SkillsFuture programmes to leverage on the opportunities available in the industries as highlighted in the report.
 - o Replace ad-hoc programmes with continuous, progressive and mandatory skill-enhancing courses conducted over the duration of an employee's employment within a specific industry.

- **Teaching for Mastery Programme:**

- o Launch early-in-life specialised voca-

tional training programmes aimed at equipping students with the hard skills necessary to leverage on disintermediating technologies.

- o Introduce mandatory core basic programming and entrepreneurship classes beginning in primary school with the option of undertaking further specialisation at the secondary and tertiary levels.

- **Revamp of assessment criteria:**

- o Introduce vocational and entrepreneurial-based modes of assessment alongside traditional exam-based grading.
 - o Augment existing "co-curricular activities" (CCA) system to encompass external collaboration with SMEs and start-ups, thereby increasing early exposure to the industry. Also, to improve core competencies.

OVERARCHING OBJECTIVE 2

Encourage SMEs to innovate and incorporate disruptive technology to transform the economy.

By December 2018:

- Review of current and new cross-industry regulations needed to foster a competitive and innovative growth environment completed.

- Clearer industry-specific regulations and rules established.
- Negotiation on regional standards and regulation in ASEAN launched.
- Increase in overseas contributions to gross national product (GNP).
- Review of potential growth industries and opportunities for SME development and investment completed.
- 10% increase of SMEs that have regional offices (regional expansion).
- Increase in the contribution of SMEs to the country's GNP.

By December 2022:

- Continued increase in the overseas contributions to the country's GNP.
- Programmes and support platforms to encourage SME innovation and calculated risk-taking established.
- 25% increase of SMEs with regional offices (regional expansion).
- Continued increase in the contribution of SMEs to the country's GNP.

By December 2026:

- Regional standard of regulation across ASEAN member states ratified.

- Continued increase in the overseas contribution to the country's GNP.
- A vibrant domestic SME and start-up environment with start-ups using disintermediating technologies operating regionally and internationally.
- 50% increase of SMEs with regional offices (regional expansion).
- Continued increase in overall share of SMEs' contribution to GNP.

Action Plan by December 2018:

SMEs are critical to ensuring Singapore's economic competitiveness with their total output accounting for nearly half of Singapore's GDP in 2015. As disintermediating technologies become more pervasive and disruptive, there exists considerable opportunity for SMEs to leverage such technology to streamline their business processes, lower operating costs and grow their consumer base – both domestically and regionally.

- **Review of current and new cross-industry regulations:** This aims to identify the necessary changes to existing regulations and the inclusion of new ones that will empower SMEs to fully leverage disintermediating technologies to augment their business.
- **Review of potential growth industries and opportunities for SME development:** Comprehensive study of key growth sectors to identify the necessary expertise required

for SMEs to thrive in an economy where these disintermediating technologies are pervasive. Conclusions derived from the review will serve as a basis for establishing government support platforms for both new and existing businesses looking to adopt disintermediating technologies.

- **Regional Standards:** Commencing negotiations for a unified regional standard across ASEAN to facilitate cross-border expansion for SMEs.

OVERARCHING OBJECTIVE 3

Transform existing methods of delivering of social services.

By December 2018:

- Review of existing and potential new social service regulations completed.
- Review of potential social impact and political fallout completed.
- Review of potential stakeholders (end-consumer and service providers) completed.
- Basic voucher system for needy individuals and social groups established.
- Government Social Service Rating Agency established.

By December 2022:

- Open access to accurate and relevant information on pricing and quality of respective healthcare options established.

- 75% of eligible citizens allocated social service vouchers.

By December 2026:

- 100% of eligible citizens are allocated social service vouchers.
- Comprehensive voucher system for needy individuals and social groups established.

Action Plan by December 2018:

Current methods of delivering social services are constrained by both manpower and logistical challenges, with service providers often overlapping in the provision of various social services. In addition, there exists considerable difficulty in matching various social organisations with needy beneficiaries and vice versa. Furthermore, recipients often face limited access to information thereby inhibiting their selection of service providers that are best suited to their needs.

• Production of a Report:

- A comprehensive social impact review
 - o Identify and examine the potential socioeconomic repercussions of disintermediating technologies on the overall fabric of society.
 - o Set key indicators for cultural erosion, diminishing national identity, social inequality and state of primary social institutions such as the family and religious organisations.

- o Chart the effects of disintermediating technologies on labour market and the spillover effect on mental state of individuals.
- **Basic Voucher-Based Welfare System:** Issuance of vouchers to all eligible citizens above 21 years of age that may be exchanged for future palliative care and other social and healthcare services.
- **Government Social Service Rating Agency:** Establishment of quality rating or grading scale, and guidelines to provide consumers standardised information to improve decision-making and selection among various service providers.
- **Reduce Barriers to Entry:** Streamline and create transparent regulatory frameworks.

Focal Question

How might we harness AI to positively impact economic and social development?

STRATEGY 2

Building a People-Friendly AI World

The emergence of AI and AI-related technologies, e.g., big data, predictive analytics and the automation of mundane, high-frequency tasks, has the potential to disrupt the traditional structure of the economy and society. While this disruption can result in a varied range of foreseeable and unforeseeable positive and negative outcomes, this track focuses specifically on innovation and how AI might be harnessed to achieve positive economic and social outcomes. Participants of the Action Plan Singapore conference identified five strategic goals to be achieved by 2026 and they are as follows:

1. To achieve broad consensus on which jobs and skill sets are most at risk of AI-enabled automation.
2. To ensure Singaporean workers displaced by AI are re-skilled and re-employed quickly.
3. To skill Singaporean workers and students ahead of the curve, i.e., before they are displaced.
4. To mitigate the negative socioeconomic impact and accentuate positive impact.
5. To achieve a degree of social and economic harmony.

Adapting AI to serve our needs requires an approach that augments existing practices with the use of AI to improve productivity and enable greater innovation than before. This augmentation must be inclusive and equitable, providing the means for affected workers to remain in the workforce and continue to contribute.

Recognising that the topic of AI requires specialist knowledge in order to grasp its complexity fully, the following policy suggestions and targets serve to illustrate the scenario and answer the focal question at a conceptual level. AI experts should be consulted if there is a need to build on this scenario and further understand the impact of AI and its uses.

SITUATION

Experts suggest that AI is going to have an impact on human society that will be considerably larger than when the first Industrial Revolution transformed agricultural society. But even AI experts are unclear about the precise nature of the impact and how soon they will occur. That means anything we mention in this section is tentative.

AI is on the radar screens of many policymakers and industry leaders, but is still ill-defined, and it is challenging to know where to focus. Therefore in this document “AI-laypersons” from various organisations attempted to assemble a set of questions related to AI that need to be answered by AI experts in cooperation with other stakeholders. While we cannot suggest which industries and social segments are likely to be most affected and in what timeframe, we hope that the set of questions that we have posed will be useful. We have also suggested a set of next steps that may be useful in further clarifying the AI landscape.

OVERARCHING OBJECTIVES

1. **Achieve broad consensus on which jobs and skill sets are most at risk of AI-enabled automation.**
2. **Skill Singaporean workers and students ahead of the curve (i.e., before they are displaced).**
3. **Mitigate negative socioeconomic impact and accentuate the positive impact.**

—

OVERARCHING OBJECTIVE 1

Achieve broad consensus on which jobs and skill sets are most at risk of AI-enabled automation.

By December 2018:

- A study on the positive and negative impact of AI is completed.
- Reports on which jobs and skill sets are at risk of being disrupted by AI are also completed.

By December 2022:

- 75% of workers displaced by disintermediating technologies are re-trained and re-employed within six months.
- Full employment maintained (<4% unemployment rate).

By December 2026:

- 95% of workers displaced by disintermediating technologies are re-trained and re-employed within six months.
- Full employment maintained (<4% unemployment rate).

Action Plan by December 2018:

There is a need to discuss:

- What forms will AI take over the next decade?
- What will the general and sector-specific impact of AI be?
- What is the direction of development; how can the positive impact be accentuated and negative impact mitigated?
- What are the necessary supporting legislative framework, education and training, as well as, labour protection e.g., unions?

This would potentially involve:

- A research study to understand the timeline of AI development and the impact.
- Discussion and consensus on the study and possible responses.
- Discussion on proactive steps to take advantage of AI and augment existing jobs.
- Consensus between stakeholders on respective roles and responsibilities in adapting to AI.
- Passing of the necessary legislation to support AI-augmentation of jobs, along with re-skilling and up-skilling measures.

OVERARCHING OBJECTIVE 2

Skill Singaporean workers and students ahead of the curve (i.e., before they are displaced).

By December 2018:

- Full sharing of Workforce Development Agency's (WDA) sectoral manpower development plans with the entire labour

pool i.e., identification of new skills and competencies for affected Singaporean workers.

By December 2022:

- 50% of SMEs in healthcare, hospitality and manufacturing sectors adopt AI-augmented jobs.
- Pilot of SkillsFuture 1.5, leading up to SkillsFuture 2.0.

By December 2026:

- Increase in proportion of SMEs that adopt AI-augmented jobs from 50% to 70%.

Action Plan by December 2018:

Building on the findings of the study — conducted under overarching objective 1 to understand the impact of AI — a mass campaign is launched to share with the public how AI can be used to improve people's lives on a daily and professional basis. This is a proactive move to encourage the use of AI and facilitate increased AI-related literacy to reap the gains in productivity and profits.

This includes, but is not limited to:

- Government policy that promotes AI literacy.
- Policy that supports SME adoption of AI technology.
- Mass campaigns for SMEs to understand the immediate benefits of AI adoption.
- A willingness to allow companies that are unable to evolve to wither on the vine.

OVERARCHING OBJECTIVE 3

Mitigate negative socioeconomic impact and accentuate the positive impact.

By December 2018:

- Reports on which jobs and skill sets are at risk of being disrupted by AI are published.
- Full public sharing of WDA's sectoral manpower development plans i.e., identification of new skills and competencies for affected Singaporean workers.

By December 2022:

- Pilot of SkillsFuture 1.5, leading up to SkillsFuture 2.0.

By December 2026:

- Programmes, policies and strategies have been implemented which successfully accentuate the positive impact of AI, and mitigate the negative impact of AI.

Action Plan by December 2018:

Two approaches can be taken towards re-skilling workers: proactive and reactive.

Reactive approach:

- Welfare support (given over a fixed duration) for displaced workers.
- Subsidised re-skilling programmes.
- Development of jobs-to-company matching platforms (skills vs. company needs) in the manner of Uber.

Proactive approach:

- Government-led development of a roadmap for the development of people-friendly, worker-friendly AI.
- Anticipatory targeting of vulnerable workers and provision of re-skilling support.
- Pioneer credits to incentivise firms to use AI.

Focal Question

How can we build an Innovation Village to help Singapore stay globally competitive?

STRATEGY 3

Innovation Takes a Village

SITUATION

There are three major factors that can determine whether Singapore will be innovative and globally competitive in the future. The first challenge is its small population and how that shapes the scale of talent that the country can tap on. The second has to do with the challenges and opportunities of operating in a rapidly-developing ASEAN region; and the third is the challenge of developing a vibrant SME sector that is also willing to expand into the region.

The small population can be overcome by leveraging Singapore's global connectedness, political stability and good governance to attract

high quality regional talent to strengthen the talent pool in Singapore. The second can also be overcome if Singapore companies see the resources and markets they can tap by regionalising.

The third is to ensure that government policy does not create the unintended consequence of curbing the entrepreneurial impulse. For example, the increase in government risk-sharing schemes to offset the challenges of commercialising new forms of technology may create a situation of dependency. Effective government and economic success may discourage entrepreneurship. Adversity is a key impetus to innovation and entrepreneurship, and the prosperity achieved tends to incentivise "safer" career pathways. The linkages between industry and training institutes may be improved although this also risks creating a top-down education system that produces workers, not innovators.

OVERARCHING OBJECTIVES

1. **Ensure innovation adds significantly to Singapore's economic growth.**
2. **Develop a viable pool of talent to sustain a leading-edge Innovation Village.**
3. **Make innovation a significant part of the education process.**
4. **Export innovation to other regions as a core service.**

OVERARCHING OBJECTIVE 1

Ensure innovation adds significantly to Singapore's economic growth.

By December 2018:

- Programmes are created that drive up real revenue for start-ups through linkages with MNCs and SMEs. Linkages are created that allow start-ups to take their products and services to the market.
- Plans, policies and schemes are well in motion to realise and accentuate the positive impact of collaboration between start-ups and MNCs, and between start-ups and SMEs.
- The regulatory framework for disruptive technologies (e.g., fintech, sharing economy, e-commerce, and data) is established.

By December 2022:

- Increase in the share of GNP generated by businesses no more than 10 years old.
- Increase in the share of GNP by Singapore SMEs.

By December 2026:

- Increase in share of GNP growth by SMEs, driven by rising productivity.
- Increase in number of university-based technology spin-offs, instances of collaboration between university and corporations, patents filed in industry, university and research institutes, as well as government research agencies.
- Emergence of a robust innovation market, in terms of variety and resilience across several key sectors (advanced manufacturing, ICT, urban technology, energy).
- Widespread adoption of disruptive technologies across consumers and businesses, and digitisation of business processes.
- Emergence of a self-sustaining and thriving innovation ecosystem that attracts a critical mass of MNCs, research scholars, venture capitalists, and entrepreneurs.

Action Plan by December 2018:

Government agencies gather interest and ideas from start-ups, SMEs and MNCs for ways to enhance collaboration among them. This may include contracting relationships, open innovation exchanges, joint ventures for product development and so on. Government agencies, working alongside trade and industry associations, will broker such conversations as well.

The government expands the on-going research and development in some strategic and emerging industries. In addition, the government releases useful data on the commercial sector and its growth to facilitate more research on the firm-level determinants of innovation. This will provide a clearer picture of the innovation landscape for

policymakers, consultants, and business schools so that they can promote the sorts of management capabilities, structures and resources that will be needed to build a successful, sustainable innovation ecosystem.

A more complex institutional structure which promotes digitisation and innovation will have evolved, with SPRING, trade associations and consultants providing the impetus for the adoption of technologies. They will also contribute to the adaptive capacity of member organisations.

Relevant government agencies work closely together to develop the ecosystem of research institutes, MNC innovation labs and SME technology adoption. This will be focused on enhancing the product development capabilities of innovation labs based in Singapore, while ensuring downstream adoption of digital technologies by SMEs and suppliers.

OVERARCHING OBJECTIVE 2

Develop a viable pool of talent to sustain a leading-edge Innovation Village.

By December 2018:

- Immigration policy for software engineers and other human capital so that it is streamlined to ensure there is a balance between having adequate skilled personnel for start-ups and achieving rising median wages for such workers both foreign and local.
- Attract a rising number of overseas start-ups to locate their headquarters in Singapore.
- Raise the number of recognised and well-respected coding, technology and innovation schools in Singapore.

By December 2022:

- Institutes of higher learning and private education institutions provide a greater number of tech graduates with relevant skills.
- Increase in the number of highly-skilled technical personnel in the ICT and manufacturing industries who earn higher median gross wages that are comparable to the tech capitals in the world, of which a majority are local graduates.

By December 2026:

- A movement for Singaporeans to go overseas to gain regional experience will have started. Singaporeans who were traditionally averse to working overseas now appreciate the benefits of working abroad.
- The above is implemented through a voluntary bottom-up movement of Singaporeans choosing to work in, or create start-ups in regional cities, or through SMEs sending their staff overseas.
- Increase in the number of Singapore-based companies operating in the region or globally.
- Growth in capital investments in overseas operations by Singapore companies.

Action Plan by December 2018:

Trade associations jointly sign an industry petition to the government to trigger a dialogue on talent acquisition and immigration issues. Various bodies representing the industries, trade associations, unions, people sector, urban development, etc., will be engaged in the conversation. This is to ensure there is a targeted and sustainable pro-immigration regime that is aligned to the best interests of Singaporeans' economic and social

needs. This will involve negotiations between the public and private stakeholders and interested parties. The government will work with grassroots leaders to co-create an integration programme for foreigners in Singapore to ensure there is a healthy level of social cohesion despite the revised immigration rates.

After consultation that includes proposing eligibility criteria, implementation of trial visas and feedback, a start-up visa category for foreigners is implemented. It will replace the current EntrePass that sets high minimum hurdles for application which are not feasible for most entrepreneurs. Visa applications will also be streamlined under a single office as opposed to applying to multiple agencies for visas.

In line with the regionalisation drive, economic ministries in neighbouring countries work together with Singapore to promote programmes for cross-border firm collaboration and joint ventures. This builds on the existing programmes like the ASEAN scholarships that promote inter-regional awareness. Offices will be established across ASEAN to identify synergies and areas of future cooperation. Eventually, this can be expanded to involve multiple regional stakeholders, such as the World Bank, Asian Development Bank and the (future) ASEAN Economic Community Secretariat, to promote joint development projects at the regional, national and firm levels.

OVERARCHING OBJECTIVE 3

Make innovation a significant part of the education process.

By December 2018:

- The education system is established to produce innovation-oriented graduates from kindergarten through to tertiary-level as well as via lifelong learning programmes.

- Revision of syllabus from kindergarten, through to the post-secondary, tertiary and post-tertiary education to align with the goal.

By December 2022:

- Increase in the number of projects implemented by Singapore and regional partners that arise from the educational programme.
- Closer collaboration between academics and commercial units to develop a diverse and flexible seamless educational curriculum.

By December 2026:

- Increase in the percentage of fresh graduates who opt to move into the start-up/innovation scene.

Action Plan by December 2018:

The government conducts forums on the incorporation of innovation education into the formal and continuing education curriculum at different stages.

The government in partnership with education researchers in Singapore and elsewhere conducts research on the development of an innovation-oriented curriculum. This includes academic research on pedagogy and applied policy research into the efforts around the world to introduce innovation into both formal and continuing education. This culminates in a White Paper on proposed changes to the educational curriculum. After extensive consultation and trials with relevant stakeholders, policy changes will be implemented to promote an innovation-oriented workforce of the future.

At the tertiary level, polytechnics, universities and skills incubators will be established to ensure that students receive on-the-job skills training,

which can be conducted after school or during vacation. For example, General Assembly, which provides code development courses, can work with universities to develop “hands-on” training for students during term breaks. University career offices will collaborate with associations like the Association of Small and Medium Enterprises to develop internship programmes for students keen to experience SME and start-up environments.

OVERARCHING OBJECTIVE 4

Export innovation to other regions as a core service.

By December 2018:

- Marketing Singapore as an innovation centre and leader.

By December 2022:

- 10 Singapore-founded start-ups acquired by global MNCs.

By December 2026:

- Three innovation projects that are spawned by Singapore entities and implemented overseas.
- 10 Smart City projects in cities around the world.

Action Plan by December 2018:

Following the example of countries like Israel, Singapore can promote its infrastructural project management capabilities to develop its brand as an exporter of innovation cities.

Government agencies work alongside Singaporean and international corporate partners to export innovative infrastructure development, project management and maintenance capabilities

to the region for development. In particular, government agencies broker conversations between technology-driven MNCs and leading local enterprises to jointly market infrastructure solutions in the region. The Smart Nation project in Singapore showcases that ability to deliver. The government and trade associations organise conferences and events to raise the commercial profile of Singapore companies and its Smart Nation initiative.

RANKING OF OVERARCHING OBJECTIVES

To ascertain which strategies are the most robust across the scenarios that were developed, we adopted the following criteria in ranking them:

- Desirability — Will stakeholders want it?
- Feasibility — Can it be executed?
- Viability — Would investing time and money in this strategy deliver sustained benefits over time?

Among the three criteria, the third component of viability was identified to be the most critical in determining the overall efficacy of a strategy. Participants were asked to score each strategy on viability on a scale of 1–10,

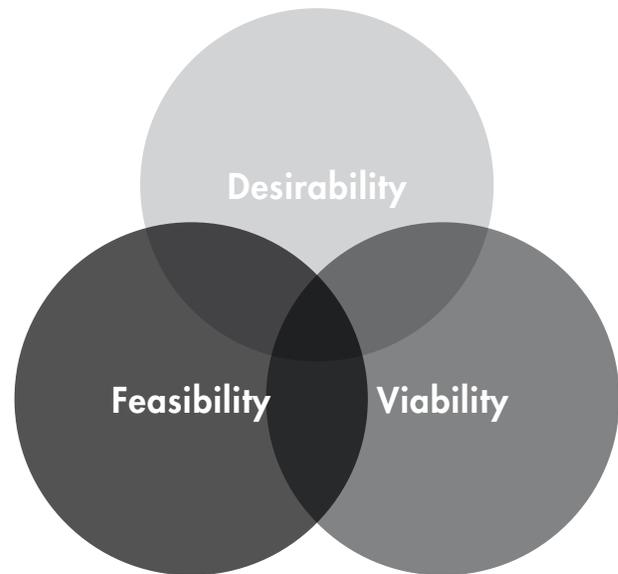
A score of 1 indicates that the time and money required to execute a solution would far outweigh the potential payoff in terms of desired outcomes and sustained benefits over time (i.e., the benefits would not justify the investment). A score of 10 would indicate that the strategy is not worth pursuing, at least for that scenario.

A score of 10 indicates that participants perceive the policy/project as being able to deliver excellent and sustained benefits in relation to the time and money required to produce those benefits. The potential payoff in terms of desired outcomes and sustained benefits over time would far outweigh the time and money required. A score of 10 across several scenarios would suggest a highly robust policy/project option.

If a policy/project consistently scores highly across multiple scenarios, it is more likely to be a robust strategy that performs well across those scenarios.

If a policy/project scores high on one or two scenarios, but low across other scenarios, it may only be worth pursuing if no other policy/projects exist that address those one or two scenarios.

If a policy/project scores low across all scenarios, it may be better to focus limited resources on alternative solutions.



Scenario 1 (S1):

○ Captain, My Captain!

Scenario 2 (S2):

Rise of the Cyber Dragon

Scenario 3 (S3):

Rise of Social Enterprise

Scenario 4 (S3):

Thoracic Park

STRATEGY 1: Firing-up New Value Models

Scores of 1 to 10 for how participants perceived the viability of each strategy, with 1 being “not viable” to 10 being “very viable”.

	<u>Scenarios</u>			
<u>Overarching Objective</u>	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Re-skilling workers before they are replaced by disintermediating technologies	<u>7.1</u>	5.2	6.3	6.1
Encouraging SME-start-up innovation	<u>6.9</u>	3.9	3.7	6.8
Having industry-specific regulations*	<u>7.7</u>	5.6	4.1	4.4
Transform existing methods of delivering social services	<u>6.0</u>	3.9	3.6	5.4

*This objective was merged with “Encouraging SMEs-start-up innovation” into Overarching Objective 2 “Encourage SMEs to innovate and incorporate disintermediating technologies to transform the economy” in this final report.

STRATEGY 2: Building a People-Friendly AI World

Scores of 1 to 10 for how participants perceived the viability of each strategy, with 1 being “not viable” to 10 being “very viable”.

	<u>Scenarios</u>			
<u>Overarching Objective</u>	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Generate more new jobs annually, than jobs lost to AI*	<u>6.0</u>	4.1	4.6	5.9
Ensuring Singaporean workers displaced by AI are re-skilled and re-employed quickly	<u>7.0</u>	3.9	4.3	5.1
Re-skilling Singapore workers before they are displaced by AI	6.2	3.9	3.5	<u>5.2</u>
Mitigate negative socioeconomic impact, and realise and accentuate the positive impact of disintermediating technologies	4.6	3.9	3.6	<u>4.9</u>

*This objective was merged with “Ensuring Singaporean Workers displaced by AI are re-skilled and re-employed quickly” into Overarching Objective 2 “Skill Singaporean workers and students ahead of the curve (i.e., before they are displaced) in this final report.

STRATEGY 3: Innovation Takes a Village

Scores of 1 to 10 for how participants perceived the viability of each strategy, with 1 being “not viable” to 10 being “very viable”.

	<u>Scenarios</u>			
<u>Overarching Objective</u>	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Programme driving real revenue for start-ups through MNCs and SMEs	4.7	3.8	2.8	<u>5.2</u>
Having a viable pool of talent to support a leading Innovation Village	5.1	3.8	5.2	<u>8.1</u>
Making innovation a significant part of the education system	<u>7.2</u>	2.8	4.7	6.3
Exporting innovation to other regions	<u>6.9</u>	1.8	2.8	5.4

Track Captain's and Facilitator's Reflections

TRACK CAPTAIN'S AND FACILITATOR'S REFLECTIONS

by Dr Faizal Yahya, Senior Research Fellow, Institute of Policy Studies and Jon Hoel, facilitator from Innovator.sg

THE SUM OF ALL CHANGES:

Living and Working in a VUCA World

Singapore's success as a highly developed, globalised economy has been predicated on the success of traditional business models and large enterprises. With a small domestic market fully immersed in the ebb and flow of international trade, Singapore's economic position has never been an easy one, and our position today is a product of the ingenuity and industry of our Pioneer Generation. They played a successful catch-up game with the leading industrial and economic hubs of the world. Today, we face a different challenge of becoming pace-setters and innovators; of becoming a place that generates indigenous technology and its own fresh thinking to move up the next ladder of development.

Also, we now live in what has been called a "VUCA" world — one that is volatile, uncertain, chaotic and ambiguous. This VUCA world is a challenging one for business people and politicians because traditional strategies for

growth, long-term economic development and governance can no longer be assumed to work. There is a great deal of ambivalence and anxiety about economic regionalism and globalisation as income insecurity among workers has deepened across many countries. Public intellectuals the world over are considering if there is a need to re-think the model of capitalism altogether.

In any case, we note that it is almost axiomatic that individuals, organisations, and national economies with relatively low risk aversion and a relatively high appetite for experimentation will be more likely to thrive in such a VUCA world and be the wealth creators of the new age. Yet in recent decades, the bulk of Singapore's economic activity has been focused around traditional business models involving established proprietary vendors, trade and arbitrage, and rent-seeking economic activity, rather than on generating trailblazing pathways in scientific or business development, with mavericks leading the way. So what are the prospects of us making that transition?

While many countries will be faced with the temptation to retreat inward in the face of this complex VUCA world, Singapore as a trading economy with no physical hinterland has no viable alternative but to expand its virtual hinterland, ramp-up its knowledge base and innovation quotient, and create deeper and broader linkages with the outside world, offering attractive products, services and capital investments.

LONGEVITY:

Singapore's Ageing Population is an Innovation Challenge

A key factor to consider in thinking about Singapore's economic future is its demographic profile. Singapore's fertility rate now stands at 1.3, below replacement rate, and the population is ageing. As people live longer, they will require even more resources and a qualitatively different

cultural, social and work landscape to maintain citizens' overall sense of well-being.

We have tackled this challenge as a separate track within Action Plan Singapore, but it is worth noting here that this challenge is also an innovation and skills challenge. If older Singaporeans can remain active and engaged in value-creating activity for longer, then the more obvious challenges of aged care can be somewhat alleviated.

OUR SKILLS CHALLENGE

The skills challenge is one that ranges right across the board for the whole country, but it is especially pronounced in relation to innovation. This is yet another factor to consider as we look to Singapore's economic future. We have an education system that has an excellent reputation internationally, but in a VUCA world, we need to consider how we can effectively equip Singaporeans with the skills of the future. In both the Innovation and Skills Tracks within Action Plan Singapore, participants separately nominated AI as a major driving force of change. As AI becomes capable of doing an increasing range of human tasks, sections of the workforce face further disruption. They may even face the atrophy of certain soft and social skills.

NEW MODELS OF VALUE CREATION ACCELERATING THE PACE OF CHANGE IN THE IMMEDIATE TERM

In the more immediate term, and as we look at how technological change will affect Singapore, we can see new models of value creation disrupting more and more traditional businesses. For example, Uber and Airbnb, are both sharing economy businesses that offer cheaper services than taxis and traditional hotels, respectively. Companies like these seem to have emerged out of nowhere to achieve prominence. While they are enabled by technology, what they have

done is about more than just technology. New models of value capitalise on evolving consumer behaviour, preferences, and societal values, smartly incorporating these elements into new business models that deliver value to customers in innovative ways. On the supply side, these also allow people to monetise some of the resources that they have at hand to support themselves especially in the uncertain labour market.

While consumers have eagerly embraced companies like Uber and Airbnb, traditional companies may view these disruptive innovators with great wariness as the former have a higher cost base than the new entrants. If traditional companies feel they need to reduce their cost base just to maintain market share, one way they might be tempted to do so is to reduce their employee headcount. We see disruptive innovation as fintech start-ups nibble away at the revenue that has traditionally been the mainstay of banks and financial companies. While Singapore embraces the fintech revolution, we must also prepare for the impact it will have on the jobs, wages and careers of those who are currently working in the banking and finance sector.

On that score, economists have already raised the alarm more generally about "job-polarisation" as the result of technological change whether it is through these disintermediating technologies or the more systemic wave of AI. Job polarisation occurs when the availability of middle-skilled jobs like those found in manufacturing declines but the availability of both low-skill and high-skills jobs, especially in the services sectors, expands. In other words, these trends threaten to divide the workforce into two groups: one doing routine low-paid, low-skilled jobs and the other doing non-routine, highly-paid and skilled jobs.

In 2013, Carl Benedikt Frey and Michael Osborne examined the probability of automating 702 occupations in the US and found that 47%

of workers in the US had jobs with a high risk of being automated.² These included workers in the transportation, logistics and office support. Workers in the sales and services also faced high risk of being displaced by AI.

Subsequent and similar studies by Frey and Osborne for the case of Britain put the figure of those at high risk of being automated as being 35% of the total work force. In Japan, the figure was 49% of the total workforce.

In contrast, Mokyr et al. surveyed the historical impact of the industrial revolution in the late 18th century and argued that just as in the past industrial revolutions, AI and automation will create new products and services and these innovations will lead to new types of occupations.³ This provides an alternative view of the future of work.

In relation to Japan, Morikawa conducted a survey among 3,000 firms in the manufacturing and service industries to examine the potential impact of AI and robotics (automation) on business and employment. The survey focused its attention on the relationship between the skills of human resources and AI-related technologies.⁴ Responses regarding the impact of the development and the diffusion of AI and robotics on future business were generally positive. However, in contrast, the perception of the impact of AI and robotics on

² Carl B. Frey and Michael A Osborne, "The Future of Employment: How Susceptible Are Jobs to Computerisation?" mimeograph, (Oxford: Oxford Martin School 2013).

³ Joel Mokyr, Chris Vickers, and Nicholas M. Ziebarth, "The History of Technological Anxiety and the Future of Economic Growth: Is This Time Different?", *Journal of Economic Perspectives*, 29 (2015), 31–50.

⁴ Masayuki Morikawa, "The Effects of AI and Robotics on Business and Employment: Evidence from a Survey on Japanese Firms," *RIETI Discussion Paper*, 16-E-066 (2016).

employment was negative.

Digging deeper, Morikawa found that firms that expected positive effects of AI and robotics on their businesses had significantly higher ratios of university graduates and employees with postgraduate degrees. Conversely, the ratio of highly educated employees was lower among firms that anticipated a negative impact of AI and robotics on their employment. Morikawa concluded that in Japan, the diffusion of AI and robots will raise the rate of return to higher education and considers it a necessity to upgrade human capital to maintain workers' level of employability in the AI future.

With regard to disintermediating technologies, these are already providing increased value directly to the consumer by automating and therefore replacing the "middle-man occupations". As we stand at the dawn of the fourth industrial revolution, businesses and commercial transactions will thrive in the interaction between the Internet and the increasing amounts of information, but this will aggravate the problem for the middle-man further. Take for example, the crowdsourcing of opinions of millions of eager participants, who freely and instantly provide crucial information on their travel experiences with little or no bias because they have no vested interest to take care of. Now imagine the plight of the poor travel-agent, who used to be the subject matter expert on holiday destinations, flight connections and hotel properties now competing with thousands of real time reviews from TripAdvisor as well as aggregators that are direct providers of services — he simply cannot keep up.

Observers of the Internet note that these new technologies give users the power to directly look up medical, legal information, travel, or comparative product data directly and in some cases, remove the need for the mediator (doctor, lawyer, salesperson) or at the very least, change

the relationship between the user and the product or service provider.

So what are these “middle-man” or “middle companies” supposed to do to stay relevant in this fast disintermediating world? The two extreme book-ends of the solution are as always, “do nothing” or “get out of the business”. Darwinism theory states that “It is not the strongest of the species that survives but the most adaptable”. So adapt, innovate, but how?

THE IMPERATIVE TO DELIVER NEW VALUE AND CREATE NEW CUSTOMERS

Peter Drucker said, “Because the purpose of business is to create a customer, the business enterprise has two – and only two – basic functions: marketing and innovation. Marketing and innovation produce results; all the rest are costs.”⁵ Drucker said that in 1954, yet in the years since, large enterprises have become ever-more complex with large numbers of people working in areas that do not directly generate revenue.

The point Drucker was making – and the point Singaporean enterprises need to understand – is that it is only by expanding our businesses and growing our markets that we can thrive. If Singaporean enterprises stand still, our businesses and markets risk being gradually competed out of existence. Conversely, many of the technologies described above offer Singaporean companies an opportunity to punch well above their weight if they can adopt them swiftly and smartly. There are opportunities to take advantage of.

Even just to tread water, to maintain our position, we need to innovate new ways to create customers internationally. To maintain our current level of employment in the year 2026, Singaporean

enterprises need to grow, and we need to create thousands of new ones supplying new products and services.

TIME TO UPDATE OUR PARADIGM?

Singapore is in one sense highly fortunate to be a compact and nimble player on the global stage, because we have, theoretically, the ability to respond faster in a VUCA world. However, while we have this strength at the national policy level, we need to strengthen our capabilities at the organisational and personal levels.

Our society and economy are highly optimised around a particular paradigm within which we compete to achieve a respected place. Economically, it is centred around the activities of MNCs, GLCs, trade, arbitrage and wealth management. Societally, it is centred around meritocracy, and Action Plan Singapore Innovation Track participants agreed that we are brand-conscious in terms of school, university, and the organisations we aspire to join.

This paradigm has served us efficiently for many years, helping us to generate growth and prosperity, yet it is optimised for the more sedate, predictable world of the past. Success in a VUCA world demands a new paradigm and a higher level of agility in the way we think and do business, at the national, organisational and personal levels. In a world where many MNCs shed more jobs than they generate, we need to take more of our destiny into our own hands, and make the success of start-ups, medium enterprises, research and technology commercialisation part of what will define us over the next decade.

It is not that everyone must aspire to be a start-up entrepreneur. Just as there are separate branches of the Singapore Armed Forces (SAF), to use an analogy, there are various ways Singaporeans can contribute to the innovation economy, whether

⁵ Peter Drucker, *Ibid.*, 37.

self-employed, working in a start-up, a SME, a large enterprise, an NGO or in the public sector. Innovation can be expressed in so many ways and should be found everywhere.

Singapore's National Framework for Research, Innovation and Enterprise was conceived to systematically augment the gaps in our innovation and entrepreneurship ecosystem, offering numerous schemes aimed at encouraging start-ups and commercialising new technology. Government agencies like the National Research Foundation (NRF), SPRING and others, operate a wide range of grants, vouchers and schemes in support of the framework, aimed at building up our ecosystem, and supporting promising enterprises.

Indeed, the Technology Incubation Scheme of the NRF has attracted numerous investors into Singapore by offering to put up 85% of the capital in a start-up when investors put in the remaining 15%. The Wall Street Journal reported that venture-capital tech investments in Singapore in 2013, "outstripped those in Japan, South Korea and Hong Kong combined."⁶ The government's outlay has generated large follow-on investment from the private sector, providing the kind of scale that makes Singapore more than just a little red dot on the world innovation and entrepreneurship map.

Another one of the more visible initiatives has been the JTC LaunchPad @ one-north, which is supported by government agencies, A*STAR, NRF, SPRING and the Info-communications Media Development Authority of Singapore, or its predecessors, the Infocomm Development Authority and the Media Development Authority.

⁶ Newly Purnell, "Singapore Aims to Become Southeast Asia's Silicon Valley," *The Wall Street Journal*, 26 February 2014, <http://www.wsj.com/articles/SB10001424052702304071004579406393779804868>

This has given entrepreneurship in Singapore its centre of gravity, creating a physical cluster of start-ups, accelerators, investors and supporting services in the middle of a wider cluster of media and related knowledge-based industries in the one-north region. Thanks to these initiatives, an ecosystem of entrepreneurship and innovation in Singapore is taking root.

This is beginning to get recognised. The Compass *Startup Ecosystem Ranking 2015* report (formerly known as *Startup Genome*) rated Singapore 10th out of its 20 best start-up ecosystems in the world, ahead of places like Paris, Sydney and Toronto.⁷ This is a nice accolade even if Japan, China, and Korea were not analysed in the report. Given that Singapore's core strengths are in long-term planning, combined with sustained focus and execution, it is possible that over the next decade, we may see a critical mass developing around entrepreneurship and tech-based entrepreneurship especially, so that government leadership is replaced by a self-sustaining ground-up momentum.

Back to the value of the JTC LaunchPad, it should be noted that there has also been an organic trend towards the use of co-working spaces in Singapore, which facilitate greater collaboration and networking opportunities, while reducing the cost of rent. There are now more than 20 co-working spaces in and immediately around Singapore's Central Business District and many more outside it. These help to sustain self-employed freelancers and contractors who are active in Singapore's emerging "gig" economy, the success of which is important for itself but also for its potential to absorb displaced PMETs in the

⁷ Michael Tegos, "Report: Singapore is the 10th best startup ecosystem in the world, but it lacks talent," *Tech in Asia*, 17 July 2015, <https://www.techinasia.com/compass-startup-ecosystem-ranking-report-2015-singapore>

future. Recognising the value of such structures also, some large enterprises have introduced co-working-style spaces as well as innovation hubs within their companies to gain the same benefits of collaboration, knowledge-sharing, a sense of community and creativity that energises workers.

BARRIERS TO INNOVATION AND ENTREPRENEURSHIP IN SINGAPORE

What might stand in the way of deepening the momentum, and prevent the Action Plan Singapore strategies from gaining traction?

Policymakers, business and opinion leaders are well aware of the deeper cultural and structural barriers to entrepreneurship in Singapore, but it may be useful as background to enumerate some of the barriers to innovation and entrepreneurship here. Simply labelling Singaporeans risk-averse by disposition ignores important situational and structural factors.

Chua and Bedford note that:

“A psychological barrier — fear of failure (FoF) — has been proposed by local government officials as an explanation for the low entrepreneurial intent among Singaporean youth... Despite Singapore’s strong institutional support for entrepreneurs, the financial consequences of business failure were still the top concern among our participants.”⁸

However, Chua and Bedford suggest that FoF among young Singaporeans is expressed in surprising ways. While they were “concerned about their future, they did not express these

⁸ H. Sheryl Chua and Olwen Bedford, “A Qualitative Exploration of Fear of Failure and Entrepreneurial Intent in Singapore,” *Journal of Career Development* 43, no. 4 (2016):320.

concerns in terms of uncertainty but in terms of comparisons with peers.”⁹

Their findings suggest that young Singaporeans are focused on keeping up with peers — a product of the education system and employers that place a high value on academic credentials. Apparently, many young Singaporeans would view a failed venture as time wasted not climbing the career ladder even if the start-up founders did not suffer major financial loss. Although the finding was based on a small sample of younger Singaporeans, if this view were widespread, it would constitute a major psychological barrier to entrepreneurship in Singapore.

Another finding was that concerns about meeting filial obligations might pose a barrier to entrepreneurship among young people. Independent Singapore’s first Prime Minister, Lee Kuan Yew once cited this Chinese saying: “A good lad does not become a soldier, good steel does not become nails,” (好铁不打定, 好汉不当兵). He explained it was a cultural attitude that Singapore once had to overcome in order to build up the Singapore Armed Forces (SAF).¹⁰ Building up our Innovation Village poses a similar national challenge in this time that perhaps is no less important to our future than building the SAF in that we are defending the economic place in the sun which Singapore has attained as the result of more than 50 years of ingenuity and toil in a no less challenging global environment.

⁹ *Ibid*, 320.

¹⁰ Kuan Yew, Lee, *From Third World to First: The Singapore Story 1965-2000* (Singapore: Times Media Private Limited and The Straits Times Press 2000), 33. Lee wrote: “Ours was no easy task. We had to reorientate people’s minds to accept the need for a people’s army and overcome their traditional dislike for soldiering. Every Chinese parent knew the saying hao han bu dang bing, hao tie bu da ding (a good lad does not become a soldier, good steel does not become nails).”

Therefore, we need to proactively consider how to tackle cultural barriers to innovation.

While our Innovation Village is about more than just start-ups, we need to acknowledge that start-ups and SMEs are essential to job and wealth creation. It is useful to make a clear distinction between founding a start-up, and working for a start-up as an employee. The latter involves much less financial and reputational risk. For every start-up founder, several employees may be needed, and for our Innovation Village of 2026 to be successful, surely every Singaporean son and daughter should be at least willing to consider working for a start-up for a year or two at the beginning of their career, and be proud to tell their friends about their experience.

Perhaps more importantly, parents should be proud that their children will be doing something that by 2026 might be seen as a rite of passage. In the same way that young people in some countries take a gap year and travel, or do part-time work, perhaps by 2026, taking a gap year to work at a start-up might be seen as a definitively Singaporean thing to do. Perhaps it can be seen as something that is fun and a great learning experience. It can be valued for teaching a young person team work, the satisfaction of being part of an early-stage venture, and for connecting with the world. While it would be a matter of free choice, it would also be, in effect, a form of national service in powering Singapore's Innovation Village.

It is natural to feel apprehensive should one's beloved son or daughter wish to take the path of entrepreneurship where the risk of failure may exceed 90% and it would be understandable to want to dissuade them. It is also laudable that young Singaporeans want to do the right thing by their families. Young Singaporeans who are educated to define success as a comparison in grade scores, salaries and titles naturally see

entrepreneurship as a risky distraction.

However, taken together, these attitudes will dampen the effect of well-conceived and well-funded programmes to promote entrepreneurship. Singapore is making great strides as a start-up ecosystem, but there may be a significant level of hesitation on the talent side. This is not just an individual hesitation. It reflects a concern for family, and for what peers are doing and it takes place at the social-psychological level across society. These are the barriers that we must be cognisant of and actively address. After all, "safe" career paths may not even exist in a decade's time. Although the risks of entrepreneurship are high, the kind of skills one can acquire will provide useful equipment to navigate a VUCA world.

MID-CAREER ENTREPRENEURSHIP

Apart from the young, we have to consider how the disruptions in the economy may affect other Singaporeans. If past trends are any indication, workers aged 30 - 40 years of age may comprise a large proportion of Singaporeans who are made redundant due to technological change over the next decade — a group that can least afford it given their financial responsibilities. However, given that they will have skills, experience, and a network of trusted contacts to draw upon and sell to, with the right support, they may have a greater chance of success than younger people at entrepreneurship. This, even as we know that start-ups, including those supported by venture-funds and angel investors face significant risk in any case.

It is interesting that one study suggests that a high proportion of Singaporean mid-career entrepreneurs (MCEs) described themselves as risk-averse, yet reportedly took a matter-of-fact attitude to mitigating risk that may be instructive

for policymakers seeking to overcome attitudinal barriers to entrepreneurship in Singapore.¹¹

The study found that in many cases, Singaporean MCEs were disillusioned with corporate life and saw setting up their own business as a positive alternative. In the words of one Singaporean mid-career entrepreneur:

“Reward was essentially in terms of both extrinsic and intrinsic ... the intrinsic was personal freedom of doing the things you wanted to do and you felt that you could do for the rest of your life, not dependent on some employers who might terminate your services due to economic downturn, which was out of your control.”¹²

While it would be wonderful if a Singaporean entrepreneurial hero could achieve global prominence like Steve Jobs, perhaps the local heroes that Singapore needs in the greatest numbers are MCEs. Not all might generate high-growth “moonshot” start-ups that attract venture funding but they may instead build small companies that provide job satisfaction and a good livelihood for a growing percentage of Singapore’s workforce by offering interesting twists to existing business models, technology or services. Singapore will also need many more of such ventures to offer that volume of new jobs that will be required.

The founder of Banyan tree, Ho Kwon Ping sees value in entrepreneurs who have worked for MNCs for many years and then leave that company to become a supplier to their former employers. At the DBS Asian Insights conference in 2016, he

¹¹ Pui-Yen Alison Say and Margaret Patrickson, “Switching to Entrepreneurship in Mid-Career: A Singaporean Perspective” *Journal of Enterprising Culture* 20, no. 2 (2012): 119-149.

¹² *Ibid.*, 139.

said this form of entrepreneurship “feeds into the food chain of the Singapore economy very well.”¹³

Innovation has become even more important to an economy like Singapore’s but the question is whether its businesses and workers can absorb and take advantage of these disruptive trends. Or more profoundly, we have to ask if they can be the ones proactively generating such innovation and change; if they are positioned to take full advantage of the new technologies to generate fresh streams of value for themselves and the national economy.

SOCIAL SUPPORT AND SKILLS-TRAINING

Regardless of the employment landscape, another area of concern would be to upgrade our social policies to mitigate the adverse impact of disruption in various industries, those where the effect of employment displacement will be the greatest. Some version of Denmark’s “flexicurity” system that aims to achieve both flexibility in labour markets and security for workers should be explored.

While companies are still able to “hire and fire” easily, they also help to support unemployed workers as they retrain for new jobs. In Singapore, among larger companies, workers are often retrained and redeployed internally into other units or departments.

There are now public schemes under the SkillsFuture initiative umbrella that can help. For instance, SkillsFuture’s Earn and Learn Programme is a work-study programme that gives fresh

¹³ Leslie Shaffer, “How Singapore can stay relevant after 50th,” *CNBC*, 10 July 2015, <http://www.cnbc.com/2015/07/10/dbs-asian-insights-told-entrepreneurship-not-the-best-route-for-singapore.html>

graduates from polytechnics and the Institute of Technical Education (ITE) a head-start in careers related to their discipline of study is timely and most welcome.

For them to be effective however, Singaporean employers must choose to be a part of this ecosystem as the accent of the current national skills-training system is placed on workers buying into it. Employers or industry groups should have an integral role in designing training that is relevant to the workplace. Their input into that is critical. They also have to make the commitment to open their doors of employment to those who have received the training. They should look past the formal credentials or lack of them among job seekers and instead, pay greater attention to the capabilities that these men and women have acquired through past work experience and recent skills training. After all, SkillsFuture is designed to help employers cope with a labour-lean environment, and ensure that employees have work-relevant capabilities.

This scheme could also be extended to suitable candidates who have been retrenched but have the skills required for the in-demand industries. For example, the Place and Train Programme is already established in the early childhood (child care) industry to raise the number of suitably trained preschool teachers. This scheme could be extended to other industries and also be open to individuals wanting to make a switch from a different industry.

“PRACADEMICS”

An essential piece of the puzzle is ensuring that the providers of that training, whether in formal curriculum or on-the-job are actually effective in doing so. Linking this to the discussions in the Skills Track of this project, there is a need to develop a core of “PracAdemics” — people who can combine the theoretical and academic core of

education with the practical vocational skills and soft-skills training that is industry-relevant as well as up-to-date with technological developments. This seems like a tall order and may be the weakest link in the chain that deserves attention. This is discussed in greater detail in the Action Plan Singapore Skills Track.

Obviously, all these are useful only if they are undergirded by a clearer framework of what are core skill sets that the worker of the future may need. These must be multidisciplinary in nature and allow the worker to switch tracks of specialisation; to adapt the same skills for another industry.

Nonetheless, the concern is also that with the speed of technological change and its impact across several or all industries, the life cycles of job categories will be much shorter and the need for new skills or switching skill sets or industry will increase. This would mean that policy intervention, if any at all, will need to be not only timely but also implemented quickly.

We hope that Action Plan Singapore on Innovation has also provided some potential scenarios to various stakeholders to prepare themselves for the changes that will unfold between now and the year 2026.

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SKILLS



What might our Skills Interchange look like in 2026?

Background

Focal Question

What might our Skills Interchange look like in 2026?

BACKGROUND

Entrepreneurs, unionists and social innovators will have a wide scope to create and re-design work to provide quality jobs for the local workforce, given their sense of business trends and innovation. The future of work will involve the development of human capital from the source of supply to the placement end of meeting the demand of employers.

For this to occur smoothly, educators, trainers, human resource consultants, recruiters and leaders of professional guilds need to be in closer communication so that there is sufficient training for the competencies that are required for the jobs of the future — a future that will be deeply reshaped by the technological developments of the nature that were discussed in the Action Plan Singapore Innovation Track. Also, with speed of technological change and its impact across several or all industries, the life cycles of job categories will be much shorter and the need for new skills or switching skill sets or industry will increase. Add to that the phenomenon that global economic cycles have become shorter and sharper, the question is how Singapore's workforce can be resilient through all these effects of business disruption,

technological change and economic restructuring.

As such, unionists, career counsellors and even groups in the "maker movement" can play important roles in supporting the Singaporean worker through these changes.

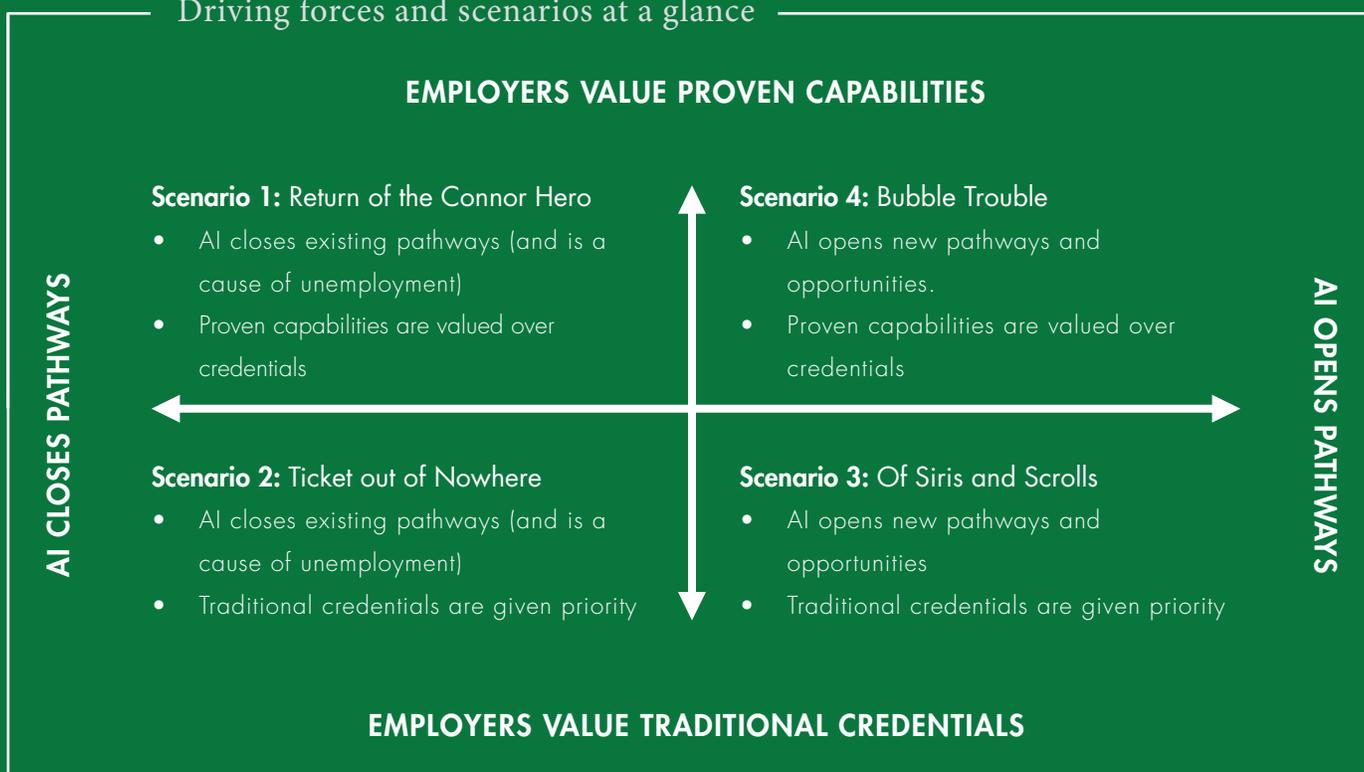
Together, all these different stakeholders can ensure that:

First, Singaporeans feel that skills training and the education system develop their passion and mastery in their chosen fields of endeavour. **Second**, jobs are created and designed to tap the different skills, demographic profiles as well as passions of Singaporeans. **Third**, recruitment and the mindsets of employers, as well as the work ethic and career orientation of employees are transformed to help them all become more resilient in the midst of change and competition.

Skills are a critical area of interest that can help to raise corporate capabilities of Singaporeans and Singapore businesses. What follows is an executive summary of the output of the participants in this Skills Track of the Action Plan Singapore project, followed by a full description of that output.

Summary

Driving forces and scenarios at a glance



STRATEGIES

STRATEGY 1

PracAdemia

Strategy 1 focuses on marrying the academic and practical aspects of education in formal school curriculum and identifies a key problem that has to be addressed: the lack of synergy between the workplace and the school in the design of curriculum. Skills that employers need are not the skills that people are graduating with, causing inefficiencies where companies have to spend resources conducting training for new staff — something that they may not even be willing to do.

The strategy aims to bridge the gap between the workplace and the school by identifying, teaching and assessing the soft and practical skills, as well as those specific to industries that employers will be looking for. Institution inertia towards closer industry-education collaboration for this, has to be overcome. Also, interactive, artificial intelligence (AI) can be tapped to help learners develop the soft, social and thinking skills. Tertiary-level, applied training of this sort must seek to develop a culture of experimentation. This system is called “PracAdemia” and is driven by a corps of hybrid educators who are practitioner-academics. The timelines and specific goals of the strategy are set out below:

By 2018, it is proposed that a White Paper will have been written to guide the piloting of these new practices in the education system. Accordingly, it is also proposed that 150 model PracAdemics will be identified through an accreditation system for such educators that will have been established. At the heart of the strategy is the need for current stakeholders to understand what skills graduates will need by the next decade and therefore, an

important component to achieving these milestones for academics and educators is to go out industry to develop that linkage.

By 2022, the strategy aims to have 10 successful pilot projects and 5,000 PracAdemics trained. Not more than 40% of final scores in PracAdemic courses are to be derived through paper examinations with the rest of the assessment to be done via a project-based work. Those assessments systems should focus on the process and not just the product of the project. AI will be used alongside human educators to train and assess the soft, practical skills of learners.

By 2026, the strategy aims to have 80 successful pilot projects, 10,000 PracAdemics trained. Research that tracks the impact of this new form of curriculum indicates that its graduates earn more and are happier employees, while employers are also satisfied with them. All assessment of learners in this system is now based on their portfolio of projects.

STRATEGY 2

Cred-Abilities: Ensuring Credentials Accurately Reflect Capabilities

This strategy focuses on ensuring that credentials are an accurate representation of potential employees’ capabilities. Acknowledgement of the need for skills rather than paper qualifications alone is growing as it is ultimately the capabilities of human capital that drives outcomes, not paper qualifications.

In the past, when formal education levels were low, paper qualifications such as university degrees were the most practical way of finding good employees. Over time, this has only served to spark a “paper-chase” and an “arms race” for credentials. The strategy suggests a system that measures capabilities so that employers know what they are getting from their potential employees. The

new system of credentials that is more reflective of capabilities motivates employees to stay current in their skill sets. Standards are developed so that benchmarks for capabilities needed in respective industries are transparent. These also give an indication to employees of how mobile they can be across different industries. These allow employers to scale up their activities easily too because there is clarity about the requisite capabilities needed when they look for manpower. The timelines and specific goals of the strategy are set out below:

By 2018, this strategy hopes to have piloted an adaptive technology system that measures the capabilities-needs fit. An Employee Employability Scheme (EES) will be piloted to incentivise employees to learn industry relevant skills. A Credential Capability Index (CCI) that benchmarks employee capabilities will also be ready for piloting. This CCI will be different from existing schemes as it measures employee capabilities on a granular and individual basis.

By 2022, 100 employers across six industries will make use of the new adaptive technology that fits employees according to capabilities and organisational needs. The EES employee user base will number 5,000, with significant increases in employee and employer satisfaction, as well as a 15% increase in staff retention among this group. All public and half of the private education institutions in Singapore will use the CCI to signal the capabilities of their graduates.

By 2026, 1,000 employers will be using the adaptive technology. EES's active employee user base will number 50,000, with high satisfaction among employers and employees, and a 25% increase in employee retention. The CCI will be used by education institutions nationwide.

STRATEGY 3

Making Passion Pay for Itself: Strengthening the Link Between Personal Aspirations and Market Demand

This strategy focuses on creating effective links between the personal aspirations and expectations of students on the one hand, with market demand on the other. It proposes several initiatives, such as a Skills-Industry Matching System (SKIMS) that will enable better matching between jobseekers and businesses by identifying what are the core skills that are required in each industry and a Job Satisfaction Index (JSI) to monitor and track overall satisfaction of workers, as well as improve the way teachers are equipped with career guidance skills.

By the end of 2018, the strategy proposes that a comprehensive education and labour market review be completed by key public service stakeholders in consultation with private industry. This is to attain baseline measurements of the current state of how the aspirations of potential employees and market demand match. A National Articulation System that considers qualifications, competency and aspirations for admission in education will be implemented, and the JSI will be created. SkillsFuture's Individual Learning Portfolios (ILP) will be augmented with comprehensive datasets of student's core competencies and psychometric data as well as any other relevant information, to better match them with careers. The timelines and specific goals of the strategy are set out below:

By 2022, with all these programmes in place, the strategy expects to see significant improvement in all areas — more local talent being retained and a reduced dependence on skilled foreign labour; more successful career switches across industries; and higher employee-employer satisfaction rates. Half of all teachers in formal educational institutions will be trained as career counsellors, and a

quarter of the assessment criteria for students will be based on co-curricular, vocational and industry participation, emphasising other skills rather than just paper qualifications. These assessment criteria which apply across all institutions and students have a lower benchmark than for PracAdemic courses mentioned in Strategy 1, in recognition of the fact that not all students would work in occupations that require such a tight alignment between academia and practice.

By 2026, this strategy expects to see comprehensive changes, with further reduction in dependence on foreign skilled labour, half of all assessments for students being based on skills and competencies rather than traditional paper qualifications. It expects to see high employee-employer satisfaction rates, more successful careers switches across industries, and three quarters of all teachers nationally being trained as career counsellors.

TRACK CAPTAIN, TENG SIAO SEE'S REFLECTIONS

The Skills workshops were a rare opportunity for representatives from diverse sectors to discuss an issue that is often dealt with within its narrowly defined domain. Overall, participants felt that there could be greater alignment between the education system and industry to ensure that skills development is more relevant to industry at one level, and that there is greater alignment between the aspirations and expectations of learners with market demand for labour at another level.

There was an emphasis on ensuring that learners be equipped with soft skills and practical industry-relevant skills as well as the disposition to be lifelong learners rather than just the hard academic training to make them ready for an AI-world, not replaced by it. The system would have to move away from the heavy reliance on high-stakes examinations to achieve paper

credentials towards portfolio-based assessment that demonstrates capabilities.

In developing the idea of "PracAdemia", it is important to recognise that there may well be a strong industry-academia nexus in certain sectors already. Instead of duplicating efforts in those instances, they can be shared as best practice across other industries and to skills-training providers.

It will be a difficult task to identify, measure, teach and assess the "soft skills" needed for the jobs of the future. It will also not be simple to create a benchmarking tool, the proposed Credential-Capability Index for each sector that is also generic enough so that all capabilities can be evaluated in the same format and can allow learners to see how those capabilities are transferable across different sectors.

On the point of strengthening career guidance to take better heed of learners' aspirations and expectations, it is recognised that the Educational Career Guidance scheme has been in place for a few years in the mainstream national education system. What is the challenge however is the process of helping learners discover what their interests are and developing "multiple pathways" by which those aspirations can be fulfilled. Certainly, schemes that allow learners to take some time away from formal education — a gap year — to ascertain their passion and interest through say internships in the workplace for instance, might help.

The Action Plan Singapore Process and the Drivers of Change in the Skills Landscape

At the start of the project, participants were taken through a process of thinking about the key drivers of change that will help them answer the question: What will our Skills Interchange look like in 2026? In other words, what will affect the world of work and what is the nature of skills that will be needed over the next 10 years? They ranked those drivers of change to decide on two with the highest level of uncertainty about how they might play out and the greatest potential impact they might have, to establish what we call the top two critical uncertainties.

Those two critical uncertainties selected by the group were:

- Will emerging technologies in AI have the primary effect of closing existing pathways to good jobs and careers or opening new ones?

- Will employers place greater emphasis on credentials or proven capabilities in how they hire in 2026?

The list of other drivers of change that were considered by the participants were:

- Will we be able to predict what will be the most valuable skills in the future?
- Will society become more inclusive or more stratified?
- Will we place more emphasis on nurturing Singaporean talent or importing foreign talent?
- Will we be able to retain top local talent in Singapore?

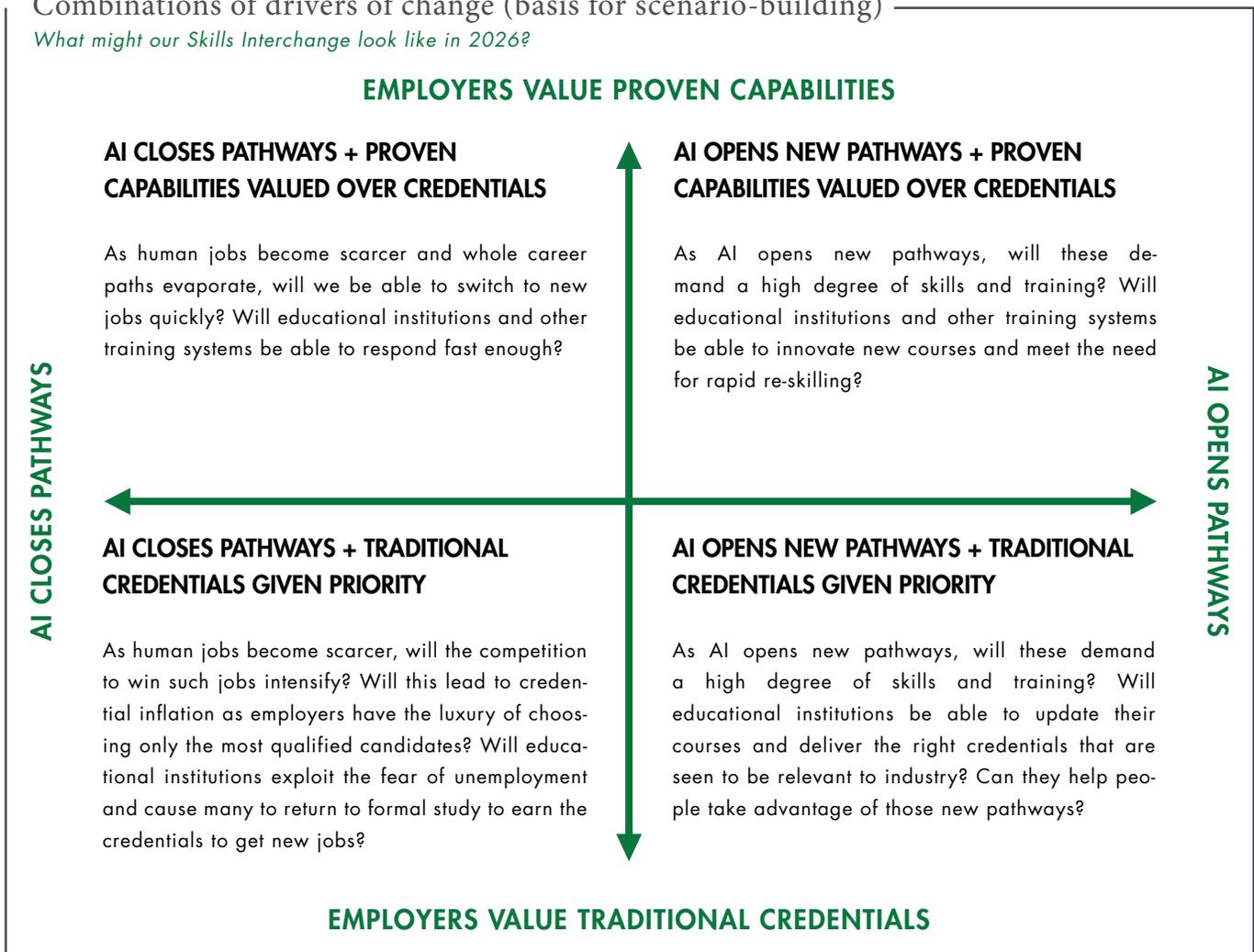
- Will people prefer to be part of the gig economy or develop a corporate career?
- Will workers be open or closed to lifelong learning?
- Will success be judged by material or non-material criteria?

With these critical uncertainties that were identified, the participants went on to build scenarios about how the future might look like if they were to interact with one another.

The diagram below provides, at a glance, the questions and considerations that shaped those scenarios. The scenarios provide vivid plausible narratives of the future Skills Interchange to provoke further thinking about the concerns we should have, as well as suggest strategies that should be put in place to ensure that Singapore’s and Singaporeans’ best interests are served in how we respond to the evolving skills landscape over the next decade. What follows is a record of those scenarios and the strategic considerations and recommendations that participants offered.

Combinations of drivers of change (basis for scenario-building)

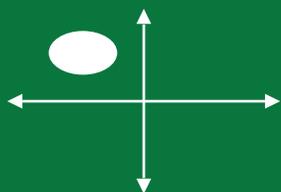
What might our Skills Interchange look like in 2026?



Scenarios

SCENARIO 1

Return of the Connor Hero



CRITICAL UNCERTAINTIES

1. AI closes existing pathways
2. Employers value proven capabilities

AI CLOSES EXISTING PATHWAYS

The advent of operational AI systems has closed many career pathways, as machines are able to subsume a majority of jobs. This is worse for junior-level workers who have not developed management capabilities.

CAPABILITIES

Capabilities are more valued than paper qualifications for hiring employers. This primarily affects people who are in fading industries and fresh graduates. Career paths also become more specific, and while skills are more valuable, they are less transferable.

It is January 2018. John Connor-Lim, 39, is an accountant at a small local enterprise in Singapore. He has a wife, Sarah, and 10-year-old twins, Simon and Garfunkel.

John's firm implements a new accounting system that allows him to pull information from documents and generate full financial reports. Lower-level staff are laid off when it is launched.

This goes well until February 2019, when advancements in robotic algorithms lead to machines subsuming more and more of what an accountant does, and John is made redundant too.

This happens in other industries. The traffic police are integrating robots, delivery vehicles are self-driving and fast food services are automated, if not fully robotised.

The resultant reduced cost and increased revenue is well received by the government.

In 2020, John finds that recruitment processes are even more stringent as he goes job hunting. In addition to several rounds of interviews and psychometric tests, industry experience and specific industry know-how are more valued than qualifications. Accountancy as a profession no longer pays high wages due to widespread automation. John's lack of specific business-to-business experience makes him unemployable. He is also rejected for the post of an intellectual property manager position as he lacks industry experience. The situation is worse for fresh graduates, many of whom lack sufficient work experience. Graduate employment rises to 50%.

In 2021, the job market collapses as even high-capability jobs such as paralegals and bankers are replaced fully by AI. A few other trends emerge: Some people manage to switch industries or acquire new skills within the same industry. For

example, bus drivers now drive 20 buses instead of one — all from a control room. Others start their own ventures; in FY 2021–2022, the number of new start-ups doubles locally. Former workers who cannot do either and are unable to keep up their CPF contributions to finance their homes are evicted from them. Homelessness increases by 30% over the same time period.

In 2022, John, frustrated, starts a 3-D printed animal paperweight company. While using advanced technology reduces business costs significantly, the lack of demand means his business is unsustainable and is put on an indefinite hiatus.

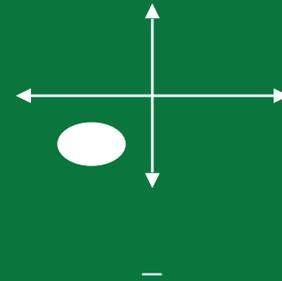
In 2023, John’s children, now teenagers, are trying to select subjects for the “O” Levels examinations, but he and Sarah just do not know how to advise them because it is not clear what jobs they should be preparing for. As corporations buy out robot manufacturers, John realises that brands are more homogeneous than ever.

In 2024, growing unemployment and public distrust of AI and machines results in a massive public backlash and widespread dissatisfaction across many services due to the lack of human touch. Overall, demand for machines falls, although back-end operations remain largely automated. There is a resurgence in services sector employment, with the Workforce Development Agency (WDA) helping people get back to work.

In 2025, John enters the services industry, lured by a more positive outlook on career longevity. He approaches former clients and business partners to offer consultancy services, riding on his old abilities to earn an income. He may not earn as much now but it allows him the time to listen to Simon and Garfunkel.

SCENARIO 2

Ticket out of Nowhere



CRITICAL UNCERTAINTIES

1. AI closes existing pathways
2. Employers value proven credentials

AI CLOSES EXISTING PATHWAYS

The rise of AI displaces employees from their traditional tasks and roles (especially in Singapore) and the effect is amplified in jobs that typically serve as “alternative career choices” (driving taxis, etc.).

CREDENTIALS

Academic credentials (degrees, etc.) are the primary means of hiring in companies, accompanied by acceleration in demand for these academic credentials. Furthermore, the shrinking availability of jobs spurs an ultra-competitive “credentials race” amongst workers, who seek to continually differentiate themselves and signal employability and potential. The rocketing demand for traditional academic credentials allows universities to raise the fees for the courses they offer, creating a vicious cycle for jobseekers and students.

For the past five years, since 2017, AI has increasingly displaced traditional human roles, and Singaporeans respond by turning to credentialism to remain employable. The acquisition of academic credentials serves the dual purpose of learning newer, more relevant skills and signalling their capability to potential employers.

This increased demand for academic credentials has the universities raising the fees of the academic courses they offer to reap additional profits. This sparks off a vicious debt-credential cycle — out-of-work employees take on heavy debt burdens to enrol in academic courses, hoping that this will lead them to good new jobs. What they find is that they are bound to their old jobs, which drives them to take on more debt to fund the acquisition of even more academic credentials. However, the narrowing market puts more power into the hands of employers who can now demand that those who want professional jobs must have doctoral degrees.

In 2021, Sara Connor Lee — Sara Lee for short — a 45-year-old senior teacher with “A” Levels and an NIE diploma to her name, is told that her skills as a teacher are no longer required. The traditional role of teachers is now one where they facilitate learning and focus on the human aspect of teaching — motivation, values and other soft skills to do with problem-solving, creative thinking and working in teams to name a few. Technology has increased the productivity of teachers who are savvy enough to use it. However, older teachers who are not as tech-savvy find themselves out of touch with the needs of students and unable to communicate effectively with them.

Sara Lee’s principal tells her that her performance has fallen due to her inability to keep up, and she will be transferred to a more human-facing role — parent-teacher liaison. However, this is only a part-time role at best, which fails to pay as

much, and one where she is needed only when the school arranges to meet parents.

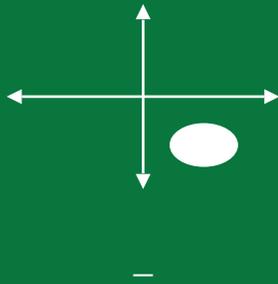
Sara still has her mortgage loan to finance and her children are about to enter university. She is desperate to find permanent employment. She takes a good look at her skills and what the market needs, realising that she may have the soft skills to value-add to technological learning, but she needs more educational qualifications. Taking advantage of SkillsFuture credits, she returns to university to take a degree in applied finance so that she can join the insurance industry — a traditional alternative career path for out-of-work Singaporeans. Desperately trying to find a job in the industry, to her horror, she learns that AI has taken over the insurance industry, allowing for automatic premium evaluations and sales.

In a fit of desperation, she decides to take advantage of the rise of credentialism among students by setting up a business that exports the Singaporean pedagogy and teachers who have also been made redundant. Southeast Asian countries are the target market, which tend to admire the Singapore education system and wish to learn from it or have their students benefit from it. Considering the fact that a lot of these Southeast Asian countries do not yet possess the means to purchase and incorporate AI into their mainstream educational syllabi and methods, Sara finds potential in the untapped education market in these countries and simultaneously aims to reduce widening income gaps in these countries through a provision of her services to lower-income communities in rural areas.

“If you can’t beat them, join them” is her new motto.

SCENARIO 3

Of Siris & Scrolls



CRITICAL UNCERTAINTIES

1. AI opens new pathways
2. Employers value proven credentials

AI OPENS EXISTING PATHWAYS

AI has developed tremendously, especially from 2017–2020, with the advent of intelligent robots with lightning-speed algorithm-processing abilities.

CREDENTIALS

Hiring of employees is conducted primarily through credentialism, where there is an inflation of degrees and traditional educational qualifications (degrees, etc.) are the key proxies for capabilities.

The year is 2021. Devi, a 45-year-old pharmacist and single mother, is retrenched by PharmFirst, due to the advent of PharmBots, a relatively novel AI-enabled robot that can analyse clients' medical and drug histories

and prescribe medication.

Devi had anticipated this. Back in 2017, facial-recognition software used by companies such as Uber became a huge success, as documented in her son's history books. Companies, sensing the potential of these technologies, invested in algorithm-processing to incorporate many other functions that eventually led robots to becoming better pharmacists than most of the human professionals.

Her foresight led her to put aside some savings, but Devi is conscious that these are finite; and the rising cost of living could drive her and her son to the streets. Back when she was a teenager, people could easily land jobs without tertiary qualifications, but soon, everyone started getting degrees and now every young adult has a bachelor's degree.

Hoping for the best, she calls up other pharmaceutical companies to see if they will hire her but they all say the same thing: "We're not hiring". Feeling dejected, she asks her old and only friend, Siri, who is on her telephone. "Siri, what am I supposed to do? I have no job, I need money and I'm probably going to be evicted soon."

Little did she know, Siri's answer would change her life. Devi enrolls in the National University of Singapore (NUS) for its Skillz4Dayz Programme. One aspect of this programme was developed through NUS's collaboration with corporations dabbling in AI and revolves around the management and maintenance of AI.

The year is 2025 and Devi successfully graduates with a degree in AI coding,

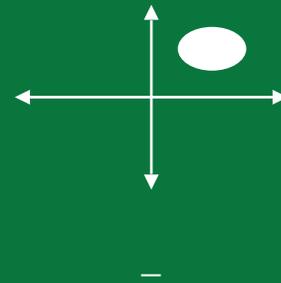
and thanks to the FromSchooltoWorkplace initiative (an AI programme endorsed by the university to match CVs and one's school track records to available jobs), Devi's skills in programming AI functions are successfully matched to technology firm, TheTop1%. Her home is saved. She looks forward to working with AI instead of viewing it with disdain. As she steps onto the podium during her university commencement ceremony, she locks eyes with her son, whom she cannot help but worry about.

Aakash, failing to heed his mother's words about an AI-driven future of obsolete jobs, enrolled in a psychology course in NUS back in 2020, confidently believing that psychology would remain a field that requires the human touch and would pay well. He built dreams of working as a counsellor in schools to better the lives of LGBT kids like him. By 2024, with online software that can aid psychiatric diagnoses, a surge in self-diagnosis, and the addition of more stringent criteria in recruiting psychology students, Aakash finds it a struggle to secure a job related to psychology.

To avoid being a burden to his mother and to pay his large tuition fee loans, Aakash temporarily enters the sex industry, which surprisingly has not been rendered obsolete. Out of a burning hatred for his job, Aakash decides to spend his free time writing about his experiences as a sex worker on his blog site and then decides to pursue a course in creative writing. As he logs on to NUS's Skillz4Dayz Programme, he thinks to himself, "Perhaps it isn't too late for me after all."

SCENARIO 4

Bubble Trouble



CRITICAL UNCERTAINTIES

1. AI opens new pathways
2. Employers prioritise capabilities

AI OPENS NEW PATHWAYS

Rapid advancement of technology has led to the rise of machine learning and AI, resulting in accelerated automation across all industries.

CAPABILITIES

The shrinking of jobs spurs a competitive "credentials race" amongst workers, to differentiate themselves in order to gain employment. With the surge in demand for credentials, the underlying quality and value of traditional degrees are diminished. However, employers gradually come to realise that it is the real capabilities and passion for a job that matter, not credentials, for effective recruitment and generating economic value.

In the year 2020, Singapore becomes the first “Smart City” to use consumer-level AI. In 2021, the Ministry of Manpower and the Ministry of Communications and Information form the Automated Labour Development Agency (ALDA), a sister organisation to the Infocomm Media Development Authority, to help small and medium enterprises better integrate AI into their businesses.

Traditional credential-based educational institutions struggle to keep up with newly-formed online institutions, which offer shorter and often less rigorous curricula. This leads to credential inflation and a surfeit of “professionals”. University enrolment is at an all-time low.

It is now 2022. Barry Lee, 53, owns a premium bubble tea franchise, Gone Cha, and is exploring how to ride the AI wave although he has believed till now that handcrafted tea is superior in flavour.

His rival, Coi, has invested in a fully automated solution, replacing its stores with bubble tea vending machines, and retrenching more than 90% of its staff. To stay relevant and competitive, Barry participates in the Automated Solutions for Progressive and Innovative Retail Enterprises (ASPIRE) scheme from ALDA, which assigns him a small group of machine-learning developers to automate his business.

A month later, Barry’s developers create an automated bubble tea system called “Gone Cha 2.0”, but he soon realises that the new system is unable to provide the same flavours and fails to meet his expectations. Furthermore, Barry is shocked to find that the system is identical to the one at Coi. After several trials, his sales volume declines. Barry discovers that the developers assigned to him were chosen based on their credentials, not

passion for nor knowledge of the food and beverage industry. The developers’ abilities are “sub-standard” due to the inflation of credentials.

Barry fires the ASPIRE developers and seeks a new team through online advertising. Believing that an individual’s capability is more valuable than mere credentials, Barry focuses on assessing the candidates’ technical expertise and industry interest through a set of on-the-job interviews and tests.

He finds a small group of developers with both the technical knowledge and an interest in his business. In 2024, they launch the new AI bubble tea system. Barry is now able to offer quality personalised tea services. His new machine recognises each unique customer and offers customised options depending on the time of day, weather, mood and budget. Barry’s profit quadruples overnight. The runaway success causes him to replace all his stores with machine kiosks. With the surplus manpower, Barry decides to launch a custom delivery service, staffed by retrained retail employees.

Yet, as Barry’s business booms, his older employees cannot take on the back-breaking job of delivering bubble tea, nor can they be re-trained effectively. Barry reluctantly lets them go.

In 2025, the unemployment rate of seniors above 60 years old has reached 90%. Across the island, AI displaces older workers, leading to greater age discrimination in hiring processes. This occurs as living costs skyrocket and there is no comprehensive system of social safety nets to help them. Disgruntled, they campaign against age discrimination, petitioning the Ministry of Manpower to re-examine hiring practices and regulations.

Focal Question

How can we marry academic and practical aspects of education by 2026?

STRATEGY 1

PracAdemics

The key problem identified in this section is the lack of synergy between the workplace and the education system. Essentially, the skills that employers need are not the skills that people are graduating with. This creates inefficiencies because companies have to expend excessive resources to conduct training. With the private sector generally unwilling to incur these costs, and education institutes not being agile enough, more needs to be done to foster a collaborative relationship between the two. Most of the courses of action in this strategy focus on the different ways in which bridges between the workplace and the school can be built, and how we can create a culture that destigmatises failure and encourages people, both in the workplace and the school, to experiment and refine their ideas.

SITUATION

While the value of skills is acknowledged, the private sector has mostly been unwilling to absorb the costs of training. At the same time, there are marked differences between education content and workplace-ready skills. While there is an agreement that soft skills are an educational need, the difficulty in identifying, assessing and quantifying soft skills, combined with the lack of agility on the policy side of things pose a roadblock. Despite that, there are still opportunities in skills training and education, depending on which sectors embark on industry-education collaboration, and whether educational institutions are agile enough to respond to the new demands effectively.

CHALLENGES

- Cost of re-skilling and re-employment for at-risk and displaced individuals. Business owners may continue to value hard skills more, and as such, may not see the value or be willing to collaborate on such initiatives given that they may incur significant costs and risks. Employers may also be reluctant to invest much in training workers for fear of them job-hopping.
- There are gaps in understanding between educators and practitioners, meaning that practitioners may not make the best educators. The two groups also disagree on perceived needs in academia.
- There is an over-reliance on the government for problem-solving.
- Within the government, there is a lack of agility on the part of the ministry or ministries in charge of responding to educational and industry needs. Without shared goals, the fact that different outcomes are desired by different stakeholders leads to institutional inertia.
- The credentials arms race is still very prevalent.
- Difficulty in identifying, assessing and quantifying soft workplace-ready skills, especially in schools.
- It may be harder to acquire soft skills with decreases in interpersonal contact thanks to the culture bred by the use of information technology.

OPPORTUNITIES

- The Ministry of Education and the Ministry of Trade and Industry could merge for closer industry-education collaboration, along with higher rates of private-public cooperation than ever.

- There could be a higher number of independent schools, which are more autonomous in their curriculum as well as more agile.
- Teachers can also be trained to be facilitators of industrial development.

OVERARCHING OBJECTIVES

- 1. Overcome institutional inertia to develop a new system.**
- 2. Develop PracAdemics (academics with industrial experience).**
- 3. Use technology to better facilitate training in soft and social skills.**
- 4. Build a culture that rewards experimentation and refinement.**

—

To achieve all the objectives, and taking into account the linkages among them, the following set of measures and action steps were developed:

By December 2018:

- White Paper written and pilot projects to develop trial versions of new practices are introduced.
- 150 model PracAdemics identified and accreditation system established.
- Use of AI and other technologies to help identify desired soft, practical, workplace-ready skills.
- Diversified assessment criteria for both schools and students instead of high-stakes examination.

By December 2022:

- 10 successful pilot projects completed.
- 5,000 PracAdemics “created”.
- Use of AI and other technologies alongside human educators to train and assess soft, practical workplace-ready skills of students.
- Not more than 40% of final scores are defined by an exam. The rest is to be project-based to focus on the process of developing the project as much as the end product.

By December 2026:

- 80 successful pilot projects completed.
- 10,000 PracAdemics “created”.
- Management research establishes that these graduates earn more, are happier and their employees are more satisfied with their performance than that of other workers.
- Assessment is now done completely by portfolio.

Action Plan by December 2018:

The Skills Track identified the need to overcome institutional inertia so as to build new education systems that impart soft skills and feature greater industry-education collaboration. While a complete over-haul is neither possible nor necessary, many pilot projects to achieve these aims can be implemented. However, these need to be well-planned and robust enough to augment rather than hinder current educational practices.

- Meet current stakeholders to understand what current graduates need.

- Experts and policy managers to assess the added value of the initiative.
- Develop a proposal for a system that facilitates interactive signalling of what practical soft skills are needed.
- Draft a White Paper on “developing a future-ready, work-ready workforce for 2026”.

One of the common critiques of academics is their lack of industry experience. Similarly, one of the common critiques of the industry is its lack of impetus to help people learn beyond their job function. This track aims to bring the two groups together to collaborate on university or polytechnic modules that combine the best of both worlds.

- Send 300 teachers out to relevant industries for a year.
- Pair them with industry experts to review, devise and plan a study module.
- Get them ready to teach in this new way by 2018.

Despite the importance of soft skills, hardly enough seems to have been done to impart these skills at educational institutes and workplaces in a scalable manner. This track aims to narrow down what these skills are, identify the most desirable and implementable ones and work on turning them into programmes.

- Identify and examine the potential socio-economic repercussions and implications of the new technologies that are being introduced into industries and the workplace on the overall social fabric of society, and contact academic and industry partners to collect and generate information on needed soft, work-ready skills.

- Design tools and platforms for partners to easily assist in this regard.
- Clean the data to generate meaningful information.
- Generate a report based on that information, and devise ways to incorporate this into existing strategies.

A risk-averse mindset is detrimental in today's world, especially when it comes to innovation. Despite that, risk-averse mindsets are built and reinforced in the education system in part because failure is heavily stigmatised. This track seeks to encourage experimentation at all levels of education, and at the workplace.

- Appoint a committee and work closely with different stakeholders to set up frameworks to identify which soft skills are desirable in encouraging more experimentation among learners.
- Ensure that these criteria are measurable and implementable.
- Identify different strategies for evaluating students of different age groups.

Focal Question

How do we ensure that credentials are an accurate reflection of employees' capabilities?

STRATEGY 2

Cred-Abilities: Ensuring Credentials
Accurately Reflect Capabilities

Acknowledgement of the need for skills rather than just paper qualifications is growing. The emergence of this trend stems from the recognition of the fact that employees' skills rather than their credentials are ultimately what drive outcomes. In the Singaporean context, this has special importance as we have historically been characterised as a "paper-chase" society where education has evolved into an "arms race" for academic credentials. This track seeks to understand how the emerging focus on skills can be coupled with the historical focus on credentials to accurately signal the skills of jobseekers and their

value to prospective employees. This improves the employee-employer fit and employee morale as a result. The following overarching objectives have been identified for realisation by 2026.

- Create a system that measures capabilities so employers know what they are getting.
- Ensure credentials accurately reflect current capabilities of employees so that they are motivated to stay current.
- Develop standards for benchmarking among industries and institutional training so that employees remain mobile and employers can scale up their activities easily.

These objectives are interrelated and mutually reinforcing, focusing on employers and employees within the system and improving the fit between employees' skills and employers' needs.

SITUATION

Singapore's story is unique from other post-colonial countries especially with its rapid social and economic development. While it is part of the Asian Growth Miracle, the challenge of credential inflation is one that is shared with the other Asian countries that enjoyed that miracle, like South Korea and Taiwan.

In the past decade, there has been growing demand for university degrees, which has sparked stiff competition for entry into the more exclusive schools as young people try to differentiate themselves from their peers by getting the "right credentials".

On the employer side, the tendency to select degree-holders — a relic from times when formal education levels were low — has been codified into existing human resources practices, exacerbating student competition for exclusive degrees.

Despite the best efforts of students and the proliferation of academic degrees and tertiary institutions, academic credentials do not accurately reflect the skills that employers need and ultimately serve only to signal the ability to graduate but do not provide a more nuanced picture of students' skills and capabilities.

CHALLENGES

- Gatekeepers that shortlist applicants based on credentials.
- Ability of Institutes of Higher Learning (IHLs) to evolve quickly to meet demand and create innovative courses.
- Difficulty of IHLs in providing students with relevant vocational experience.

OPPORTUNITIES

- It is increasingly becoming an employers' market, hence employers' mindset drives employees' behaviour.
- There can be closer relationships between institutions and industry.
- Capabilities are increasingly measurable, and can be built into credentials.
- Innovation in curriculum design can lead to accurate assessment of capabilities.

OVERARCHING OBJECTIVES

1. **Create a system that measures capabilities so employers know what they are getting.**
2. **Ensure credentials are reflective of current capabilities so employees are motivated to remain current.**
3. **Develop standards that allow for benchmarking between industry and institutional training so that employees remain mobile and employers scale easily.**

—

OVERARCHING OBJECTIVE 1

Create a system that measures capabilities so employers know what they are getting.

By December 2018:

- Adaptive technology system that measures capabilities-needs fit is developed for piloting.

By December 2022:

- 100 employers across six industries make use of adaptive technology that “fits” employees according to capabilities that match organisational needs.

By December 2026:

- 1,000 employers make use of the adaptive technology that has been developed.

Action Plan by December 2018:

- Catalogue both providers of and provision of industry-based training.
- Seek funding for the initiative.

- Develop framework for testing and benchmarking of credentials and capabilities.
- Pilot the Credential Capability Index (CCI) to link industry needs with employee capabilities and provide a benchmark.

OVERARCHING OBJECTIVE 2

Ensure credentials are reflective of current capabilities so employees are motivated to remain current.

By December 2018:

- Employee Employability Scheme (EES) — a scheme to incentivise employees to learn industry-relevant skills, is ready to be piloted.

By December 2022:

- EES employee user base numbers 5,000, with 60% satisfaction rating among employers and employees and 15% increase in staff retention.

By December 2026:

- Active employer user base numbers 50,000, with 80% satisfaction among employers and employees and 25% increase in staff retention.

Action Plan by December 2018:

- Organise multi-stakeholder discussion.
- Tripartite funding determined as result of discussion.
- Develop an employee upgrading scheme based on outcome of discussions that allows employees to continue upgrading themselves to learn industry-relevant skills.

OVERARCHING OBJECTIVE 3

Develop standards that allow for benchmarking between industry and institutional training so that employees remain mobile and employers scale easily.

By December 2018:

- CCI — an index that benchmarks employee capabilities, is ready to be piloted. This scheme will differ from the existing WSQ scheme run by the WDA, so that employee capabilities with CCI will be measured on a granular and individual basis.

By December 2022:

- All public and 50% of private education institutions use CCI to signal the capabilities of their students.

By December 2026:

- All public and private employment institutions use CCI (nationwide adoption of CCI).

Action Plan by December 2018:

- Hold conferences, symposiums and workshops on the requirements of such a technology.
- Draw up terms of reference based on feedback from the conferences, symposiums and workshops above.
- Find general funding for the development of new credential system.
- Prototype new system and adaptive technology based on feedback from the above sessions.
- Apply adaptive technology using CCI to evaluate candidates on their “fit” to the job.

Focal Question

How might we more effectively link personal expectations and market demand as we build our Skills Interchange for 2026?

STRATEGY 3

Making Passion Pay for Itself:
Strengthening the Link Between Personal Aspirations and Market Demand

There is a pressing need to address a growing mismatch between individuals' personal expectations and the market, with new job seekers and businesses facing increased difficulty in the hiring process, leading to job dissatisfaction and employer dissatisfaction with workers. To address this, we propose introducing several initiatives, including a Skills Industry Matching System (SKIMS) that will enable greater matching between job seekers and businesses, and a Job Satisfaction Index (JSI) to monitor and track overall satisfaction of workers as well as greater investment in equipping teachers with career guidance skills so that they can lead students towards pathways that best suit their aspirations and skill sets.

SITUATION

Today, the job market has become increasingly competitive with alternative lower-cost sources of labour available from emerging regional countries, which has eroded Singapore's overall labour competitiveness. Furthermore, there is an entrenched aspirational mismatch amongst job seekers who seek self-fulfilment in specific industries but are not able to achieve that and end up working just to make a living. This has led to a greater need to strengthen the link between workers and businesses to ensure that individuals are most gainfully employed in sectors which match both their aspirations and expectations.

CHALLENGES

- Growing proportion of elderly in the population, which means that there is a greater emphasis on meeting the needs of a rapidly ageing population.

- Rising cost of living spurring the need for higher wages amongst workers, leading to declining regional wage competitiveness.
- Rising volatility in future market demand for industry specific jobs, where jobs of today may not necessarily be the jobs of tomorrow – thereby translating to greater uncertainty amongst job seekers.
- Difficulty in uncovering the passion that students have, resulting in greater aspirational mismatch between employees and employers.
- Difficulty in identifying the specific and necessary skills demanded by the future job market.
- The notion of traditional educational institutions is changing from linear models to that of being creators and curators of values and knowledge.

OPPORTUNITIES

- Advancements in machine-learning have allowed for deeper automation of high-frequency, high-volume tasks.
- Growing emphasis on non-credential based modes of assessment with larger focus on capabilities instead of qualifications.
- Jobs increasingly favour soft skills and creative thinking.

OVERARCHING OBJECTIVES

1. **Identify and develop skills to meet future market demand.**
2. **Enable students to better discover their personal passions and aspirations.**
3. **Develop multiple pathways to meet aspirations.**

—

OVERARCHING OBJECTIVE 1

Identify and develop skills to meet future market demand.

By December 2018:

- Comprehensive education and labour market review undertaken by key public service stakeholders in consultation with private industry completed:
 - o Conduct initial survey of employers and employees to gauge current state and sentiment of the existing match between aspirational and market demand.
 - o Establish baseline measurement of the match between aspirational and market demand.
 - o Conduct public engagement forums.
- Restructure teaching curriculum and assessment to encourage deeper vocational and industrial participation amongst students.
- Establish SKIMS, aimed at providing better matching between core skills and the respective future industries.

By December 2022:

- 20% improvement in local talent retention achieved.
- 10% reduction of dependence on skilled foreign labour achieved.
- 25% of assessment criteria for students based on extracurricular, vocational and industry participation established.

By December 2026:

- 20% reduction of dependence on skilled foreign labour achieved.
- 50% of assessment criteria for students based on extracurricular, vocational and industry participation established.
- Post survey of employers and employees to gauge final state and sentiments of existing match between aspirational and market demand completed.
 - 40% positive increase from baseline 2018 survey achieved.

Action Plan by December 2018:

(See “Building a People-Friendly AI World” in the Innovation Track report)

There is rising volatility over the future market demand for jobs within specific industrial sectors, where jobs of today may not necessarily be the jobs of tomorrow. This has led to a need for early identification of key market trends so as to ensure that workers are well equipped with the necessary skills to meet future market demand.

- Comprehensive Education and Labour Review: Production of a report that assesses potential

areas of skills development, jointly undertaken by the Ministry of Manpower (MOM) and MOE in consultation and collaboration with private sector stakeholders.

- Establishment of National Committee to Review Skills Requirement for the Future Economy: The committee will consist of key higher education providers, MOM, MOE, WDA & SPRING representatives as well as major private sector stakeholders, and will undertake an annual review of the various industries. Subsequently, the committee will produce a roadmap, highlighting the necessary measures to be undertaken in order to match industrial demand with graduate output.
- An aspiration and job market survey of employees and private sector employers is conducted to gauge overall sentiment and current perspectives with regards to specific industries.

OVERARCHING OBJECTIVE 2

Enable students to better discover their personal passions and aspirations.

By December 2018:

- National Articulation System is implemented, to consider qualifications, competency and aspirations for admission into different education tracks.
- Job Satisfaction Index (JSI) created.

By December 2022:

- 20% successful career switches across industry sectors.
- 25% employee job satisfaction rate achieved.

- 25% employer satisfaction rate achieved.
- 50% of teachers across all educational institutions trained as career counsellors.

By December 2026:

- 50% successful career switches across industry sectors.
- 50% employee job satisfaction rate achieved.
- 50% employer satisfaction rate achieved.
- 75% of teachers across all educational institutions trained as career counsellors.

Action Plan by December 2018:

(See “Firing-Up New Value Models” in the Innovation Track report and “Ageless in Singapore” in the Longevity Track report)

Changing notions of the role of traditional educational institutions — from linear models to the idea that they are creators and curators of values and knowledge, as well as the growing emphasis on non-credential-based modes of assessment with greater focus on capabilities instead of qualifications has led to a need to fundamentally reassess existing educational pathways. An increasing number of jobs now favour capability, soft skills and creative, novel thinking over traditional qualification-based modes of assessment.

- Restructuring of educational admissions criteria: Institutions consider other options outside of academics, placing greater emphasis on vocational training and industrial participation.
- Restructuring of core educational curriculum to impart broad-based transferable skills across

sectors, such as critical thinking, management, financial literacy and negotiation skills.

- Using Big Data for better job matching: Track each worker’s overall performance and organisational fit across various jobs to allow for better matching for potential future jobs.
- JSI: Conducted annually with core components and it includes aspirational fulfilment (purpose-driven work), meaningful engagement with organisation, work-life balance and work environment.

OVERARCHING OBJECTIVE 3

Develop multiple pathways to meet aspirations.

By December 2018:

- SkillsFuture’s Individual Learning Portfolios (ILP) are augmented with not only comprehensive data sets of students’ core competencies but personality and psychometric data in order to facilitate better career matching.
- Mandatory mentoring and coaching programme implemented for all students at all levels of education.
- 30% of teachers across all educational institutions trained as career counsellors.

By December 2022:

- 50% of teachers across all educational institutions trained as career counsellors.

By December 2026:

- 75% of teachers across all educational institutions trained as career counsellors.

Action Plan by December 2018:

(See "Innovation Takes a Village" in the Innovation Track report)

Current difficulties in uncovering student passion and aspirations have resulted in a large aspirational mismatch between employees and employers, leading to diminished job satisfaction and overall productivity in the workplace. This mismatch may be due to students not receiving adequate, detailed career guidance early in the education process, resulting in greater discrepancy between their chosen education pathway, career options and their aspirations.

- **Career Profiling Tool:** Students are profiled at an early stage in order to assess aspirational and personality profiles as well as talent, thereby increasing their fit with potential future industries and occupations. Augmented by machine learning, candidates are better matched to respective industries to maximise their aspirations and abilities.
- **Equipping teachers with career counselling skills:** These career counsellors are equipped with deep expertise of current industry trends so as to match students' aspirations to market demands thereby establishing greater link to a student's preferred career.
- **Mandatory mentoring and coaching programme:** An extensive industrial mentoring system to guide students in choosing their education and future career is established.

RANKING OF OVERARCHING OBJECTIVES

To ascertain which strategies are the most robust across the scenarios that were developed, we adopted the following criteria in ranking them:

- Desirability – Will stakeholders want it?
- Feasibility – Can it be executed?
- Viability – Would investing time and money in this strategy deliver sustained benefits over time?

Among the three criteria, the third component of viability was identified to be the most critical in determining the overall efficacy of a strategy. Participants were asked to score each strategy on viability on a scale of 1–10.

A score of 1 indicates that the time and money required to execute a solution would far outweigh the potential payoff in terms of desired outcomes and sustained benefits over time (i.e., the benefits would not justify the investment).

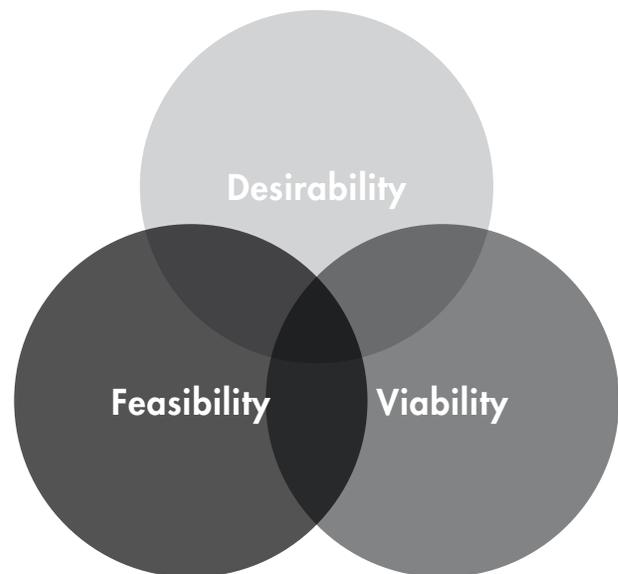
A score of 10 would indicate that the strategy is not worth pursuing, at least for that scenario. A score of 10 indicates that participants perceived the policy/project to have the potential to deliver excellent and sustained benefits in relation to the time and money required to produce those benefits. The potential payoff in terms of desired outcomes and sustained benefits over time would far outweigh the time and money required. A score of 10 across several scenarios would suggest a highly robust policy/project option.

If a policy/project consistently scores highly across multiple scenarios, it is more likely to be a robust strategy that performs well across those scenarios.

If a policy/project scores high on one or two

scenarios, but low across other scenarios, it may only be worth pursuing if no other policy/projects exist that address those one or two scenarios.

If a policy/project scores low across all scenarios, it may be better to focus limited resources on alternative solutions.



Scenario 1 (S1):
Return of the Connor Hero

Scenario 2 (S2):
Ticket out of Nowhere

Scenario 3 (S3):
Of Siris and Scrolls

Scenario 4 (S4):
Bubble Trouble

STRATEGY 1: PracAdemic

Scores of 1 to 10 for how participants perceived the viability of each strategy, with 1 being “not viable” to 10 being “very viable”.

	<u>Scenarios</u>			
<u>Overarching Objective</u>	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Overcome institutional inertia to develop new system	5.5	7.1	6.5	4.7
Develop PracAdemics	7.8	8.4	7.5	6.6
Transform hiring practices	8.4	7.9	7.8	6.6
Develop a system to effectively teach and value soft skills	6.3	7.2	7.3	6.4

STRATEGY 2: Cred-Abilities

Scores of 1 to 10 for how participants perceived the viability of each strategy, with 1 being “not viable” to 10 being “very viable”.

	<u>Scenarios</u>			
<u>Overarching Objective</u>	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Create a system that measures capabilities	7.9	5.5	6.8	7.5
Ensure credentials are reflective of current capability	7.0	6.1	7.4	5.9
Develop standards that allow benchmarking between institutional and industry training	5.9	4.8	6.6	5.6

STRATEGY 1: Making Passion Pay for Itself

Scores of 1 to 10 for how participants perceived the viability of each strategy, with 1 being “not viable” to 10 being “very viable”.

	<u>Scenarios</u>			
<u>Overarching Objective</u>	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Identify and develop skills to meet market demand	<u>7.9</u>	7.6	7.1	6.9
Enable students to better discover their aspirations	7.7	<u>7.9</u>	7.0	7.1
Develop multiple pathways to meet aspirations	8.5	8.1	8.0	7.1

Track Captain's Reflections

TRACK CAPTAIN'S REFLECTIONS

by Dr Teng Siao See, Research Fellow, Institute of Policy Studies

The workshops were a rare opportunity for representatives of diverse sectors to come together for an enriching dialogue over a topic that was previously very much discussed within its own more narrowly-defined domain. Overall, there was a sense among participants that the alignment between the current education system and the industry could be improved for better job-matching and to identify skills that are relevant to industry.

Strategy 1 (PracAdemics) attempts to offer solutions to a perceived lack of alignment between the demand and supply of skills, in particular, directing our attention to the need to forge greater congruence between educators and practitioners, to set common goals between academia and industry.

The suggestion of gathering various stakeholders to discuss collaboration for a smoother academia-industry transition and interaction is a constructive one. However, the discussion was generic in nature. To make progress on this, it would be helpful to first survey the landscape to identify which industries require greater alignment

between academia and industry. Presumably, not all jobs need similar relations between academia and industry. Moreover, there may already exist industry-academia collaboration, say in the poly-technics, that is working well. There will not be a need to duplicate that; instead, it could be shared as a best practice for other industries and skills-training providers.

As part of the effort to address the need to ensure educators and curriculum remain updated and relevant to unfolding industrial developments, the idea of developing "PracAdemics" was raised. Pairing educators and industry experts to review and plan a study module seems a good way in the short term to help both educators and curriculum to stay current. To cultivate PracAdemics in a sustainable manner, however, further deliberation is needed on how to ensure that there is greater involvement and commitment to this objective from both the education and industrial sectors. Long-term involvement of government bodies such as WDA may also be crucial as an intermediary between training and education providers on one hand, and industry on the other.

Quantifiable objectives have been offered in the strategy section of this report, but perhaps more important than increasing the number of PracAdemics, for instance, is the creation of permeable spaces across sectors in a sustainable manner. More thought will be needed on the KPIs (key performance indicators) of educators as well as practitioners so that their work of crossing sectors is taken into account in their job performance. Perhaps more dialogue can be had between the sectors to refine goals and ensure that expectations are realistic.

Another issue raised in Strategy 1 is the incorporation of "soft skills" in both the curriculum and evaluation of students. Although "hard" skills are usually more assessable than "soft" skills, it is the combination of the two that makes an

individual a productive, balanced and desirable worker. Moreover, “soft” skills help the individual worker to more effectively market and deliver their “hard” skills. There may be a need to consider if certain “soft skills” can be measured or evaluated the way hard skills are. For instance, cross-cultural competencies can be assessed by evaluating attitudes and cross-cultural understanding, yet it is true that it is more difficult to accurately assess “integrity”. It should also be noted in planning curriculum that certain soft skills, especially dispositions may take a longer time to develop than hard skills and would probably need to be incorporated in the curriculum at a younger age.

In Strategy 1, it is recognised that the mode of assessment shapes, to a large extent, whether the desired skills can be acquired successfully. The recommendation is to move gradually away from the heavy reliance on high stake examinations and towards portfolio consolidation, which showcases the actual experiences and skills of an individual learner instead of credentials. These should become key indicators of a person’s suitability for a job.

To enable credentials to better reflect capability and help employers to find suitable employees that match their needs, the objectives of Strategy 2 (Cred-Abilities) are mainly to construct systems of measuring capabilities and creating standards that allow for benchmarking across industries, as well as between industry and institutional training. The suggested milestones appear straightforward and more focused when compared to other strategies. The proposed Employee Employability Scheme (EES) aims to incentivise employees to learn industry-relevant skills and help with staff retention.

In theory, the proposed CCI which aims to benchmark employee capabilities, is distinct from but complements the WSQ scheme run by WDA (which measures employee capabilities on a

granular and individual basis). While the intent to provide a benchmarking index is commendable, some questions need to be answered before discerning the merits of such an index. Can all capabilities be easily evaluated in the same manner? (For instance, nurses, theatre performers and engineers probably need to be assessed differently). Further thought and research will be needed to shape a standard index that can capture the combination of hard and soft skills required by different industries.

If an index is considered a useful benchmarking tool in principle, then CCI may have to be designed to suit the needs of each key industry. Currently, the Skills Framework under the SkillsFuture Initiative charts out the career pathways, relevant skills required and training programmes available for each key industry. While the Framework is still being developed, those interested in the construction of any benchmarking index for an industry should refer to it.

If stakeholders share the view that some form of benchmarking will be helpful, perhaps a mix of qualitative and quantitative evaluation would be more effective in handling different types of capabilities. There could however be negative implications in constructing and using a benchmarking index to signal capabilities of students in educational institutions; students could be streamlined into fulfilling certain “KPIs” too early without cultivating an adaptable learning disposition or explore their own passions.

The third strategy (Making Passion Pay for Itself) factors in an important although sometimes underrated consideration in nurturing fulfilled workers while meeting market’s demand, i.e., individuals’ aspirations. The suggestion of the MOM and MOE working closely to conduct a comprehensive Education and Labour Review is a constructive and necessary one. Not only will the identification of key market trends allow a better

alignment of skills demand and supply, each Ministry will then be able to plan more effectively, factoring in the need for such an alignment while fulfilling its other functions.

Monitoring job satisfaction is a good idea, especially when the job market is deemed to be more volatile in future. The Gallup Survey series on Employee Engagement suggests that Singaporean workers are generally disengaged and unhappy workers and this has knock-on effects on productivity.¹⁴ Monitoring and improving employee engagement as well as overall job satisfaction may be vital for improving productivity and the performance of the national economy over the long term.

One of the objectives of Strategy 3 is to provide career guidance and profiling at an early stage to ensure a better fit with potential occupations and industries. The Educational Career Guidance (ECG) scheme was put into place for Primary 3–6 students from 2012 and secondary school students from 2014. ECG counsellors have also been planned for ITE and polytechnics while career guidance has also been put in place for universities. It would be constructive to review the contribution of such a scheme to producing fulfilled workers in well-matched jobs. Understanding the effectiveness of the current career guidance schemes would offer us a better gauge of the need for further plans relating to the expansion of career guidance initiatives or increasing the number of career guidance counsellors in educational institutions as proposed in the strategy.

Interestingly, although one of the objectives under Strategy 3 is to enable multiple pathways to

¹⁴ Chee Tung, Leong, "Solving a National Productivity Puzzle", 11 February 2014, http://www.gallup.com/businessjournal/167318/solving-national-productivity-puzzle.aspx?g_source=Employee%20Engagement%20Singapore&g_medium=search&g_campaign=tiles

meet aspirations, apart from building individual learning portfolios and career guidance, there were no further suggestions on how to create such "multiple pathways". This could be taken up by MOE, MOM and other relevant agencies. One idea is to help ease the transition students make into higher education by encouraging them to take a gap year from their studies to explore and ascertain their passions and interests in the workplace. This is especially so in the emerging industries. If youths should decide to change path, the industry in which they have worked could issue a letter of referral or certification of participation that could help them switch to a course that is more appealing and suited to them.

It should be noted too that while the importance of acquiring the disposition of learning and re-learning as well as the transference of skills were mentioned many times throughout the Action Plan Singapore events, little in the strategies proposed focus on the infrastructure to support the acquisition of these skills. This area should feature more heavily in future discussions on and planning for the future of Singapore's economy.

The stakeholders involved in the Skills Track of the Action Plan Singapore demonstrated much enthusiasm in the dialogues and ideas. However, this may be the first time that many participants were working across diverse sectors which meant that it took a while to clarify ideas and come to a consensus on what they wished to propose. A much richer discussion with many of the ideas mentioned in the Strategies Workshop can be fleshed out further. We invite interested stakeholders to offer their platforms to do this; to explore which are the viable ideas and bring them to fruition in the fast-changing landscape of work in Singapore.

SKILLS

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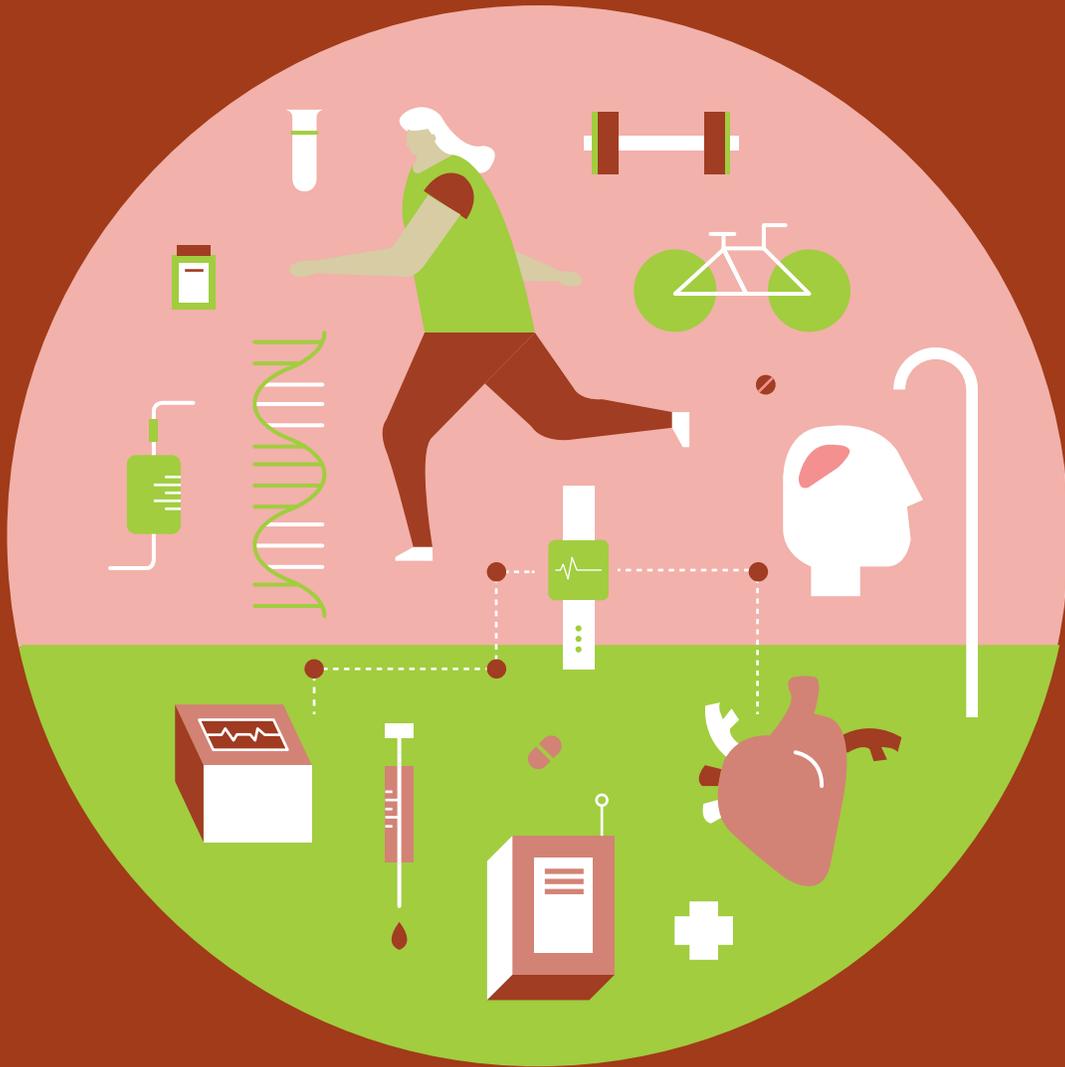
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LONGEVITY



How might our longevity challenge us in 2026?

Focal Question:

How might our longevity challenge us in 2026?

BACKGROUND

Singaporeans are expected to live longer, yet they are also having fewer children, who have been the traditional providers of care, concern and support in old age.

The well-being of our elderly will require a whole-of-society effort to help them age successfully, with voluntary welfare organisations (VWOs), employers, caregivers (both professional and informal), the community and the government all having a role.

There is however a danger that with the sense of urgency resulting from the country's rapid pace of ageing, the various stakeholders fail to act in a coordinated way. Clarity for all the different groups that need to work on solutions together will be required over critical issues. The following are some questions they should deliberate on together: Who will bear the costs associated with

living longer lives be it in terms of healthcare, social support or general well-being?

What infrastructure, whether these are hardware, software (IT) or "heartware" will we need to live long lives of quality and dignity?

Will Singapore continue to be a cohesive society where the generations continue to care for and depend on one another, or will there be conflict among them?

What can employers and the community do to engage seniors to remain active in society, whether through work or other means?

Should Singapore be an ageless society, where age does not matter in all aspects of life; or should it be an age-friendly one, where special considerations are given to the needs of the old and this is accepted by all?

LONGEVITY
Summary

Driving forces and scenarios at a glance



STRATEGIES

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STRATEGY 1

Caring for Caregivers:

Keeping Them Employed and Valued

Strategy 1 focuses on improving Singapore's eldercare system. Currently, caregivers tend to be female family members who have trouble maintaining employment as they play that role of supporting their aged. The strategy aims to ensure that they can maintain paid employment as well as have their contributions as caregivers valued throughout their lives. Part of this requires tapping broader networks of community care. Opportunities for lifelong learning are made available to them as well. The timelines and specific goals of the strategy are set out below:

By the end of 2018, a national survey to collect data about the situations facing caregivers is completed, and a White Paper with recommendations on strengthening the national system for flexible work as well as caregiving arrangements is produced. At the heart of the recommendations is the time-banking "Eldersave" system, where volunteer caregiving (not necessarily just to kith and kin) at an earlier stage in one's life is recognised, earned and saved for a similar amount of caregiving by other volunteers in the future when one needs it. Experts and relevant government agencies study how the idea can be implemented. SkillsFuture++ is specifically targeted at caregivers, for them to learn relevant work skills in modular online or blended forms.

By the end of 2022, Singapore's reliance on low-skilled foreign caregivers is reduced by 50%, as flexible caregiving and work arrangements are also in place for 50% of the workforce. SkillsFuture++ is more widely adopted and

scholarships from public bodies and universities are made available to people of all ages rather than just young people. "Eldersave" is now operationalised among people who are aged 30 and below.

By the end of 2026, all scholarships from public bodies and universities are made available to recipients regardless of their age, and flexible caregiving and work arrangements will have been established for 80% of the Singaporean workforce, further reducing reliance on low-skill foreign caregivers. The whole primary care system will be integrated on a managed care basis. "Eldersave" is now operationalised for people who are aged 50 and below.

STRATEGY 2

Ageless in Singapore:

Removing Age-Based Barriers at Work,
Home and Community

Strategy 2 aims to address ageism in the workplace by removing the stigma against older workers, giving them newfound self-confidence by ensuring that they have the skills to stay employed and ultimately, delivering to them the ability to enjoy a higher sense of well-being. The idea that the elderly are a source of low-cost labour, associated with stereotypes of being a poor fit to current workplaces or that they are expensive to hire, will have been removed. The timelines and specific goals of the strategy are set out below:

By the end of 2018, we will have a robust roadmap for dealing with ageism in the workplace. This will include an internship system for workers above 50 years of age in various sectors, called Senior Industrial Attachment programmes. Also there will have been the development and release of the first round of data for the Happy Life Index (HLI) — an index to measure the professional and personal happiness of all the workers, which includes the

senior ones. More elderly workers will be trained under SkillsFuture++ programmes, where their participation rate is tracked.

By the end of 2022, companies will be issued an Ageless Scorecard, an index that assesses how well employers have been able to eradicate ageism in the workplace. The target is to have 5% of companies receive an A+ grade. This will coincide with the abolishment of the retirement age and 50% of elderly employees scoring “happy” on the HLI. By this time, 50% of those 50 years old and above will have enrolled in SkillsFuture++ programmes at least once.

By the end of 2026, 40% of companies in Singapore will have received an A+ on the Ageless Scorecard, and 80% of the elderly employees should score “happy” on the HLI. By this time, 80% of people 50 years old and above will have enrolled in SkillsFuture++ programmes at least once.

STRATEGY 3

Do Not Go Gently:

Preparing for the Great Good Night

Strategy 3 focuses on helping people plan for the final stage of their lives. Given that Singapore is a rapidly ageing society and that there is an increasing number of health and care options, there is a need to deal with the stigma of discussing the end of one’s life.

To do this, an End-of-Life Toolkit will be created, so that it can be used by elder professionals, such as doctors, nurses, senior home carers, as well as people who are deemed to be spiritual mentors, or “care coordinators and navigators” as many of them are called. The toolkit will provide information about end-of-life issues, the options as well as the skills needed to discuss the topic with the elderly and their families. It guides them in their decisions on the options. The timelines and

specific goals of the strategy are set out below:

By the end of 2018, a taskforce to address this issue directly will be appointed with the specific goal of producing a White Paper to highlight the scale and number of issues to be addressed. One output will be the development of and the content for the End-of-Life Toolkit.

By the end of 2022, the taskforce will make way for the End-of-Life Office, which will implement the public rollout and training for the toolkit, approaching elderly at key touch points to encourage them to plan for their final days. The Office will accredit people in the use of the toolkit.

By the end of 2026, the End-of-Life Office will certify all eldercare professionals in the use of the toolkit. By this time, 25% of the population, especially the older portion of the population, will have been taken through the toolkit to make decisions with regard to end-of-life issues.

TRACK CAPTAIN,

CHRISTOPHER GEE’S REFLECTIONS

The three strategies laid out in the Longevity Track are all connected by some element of life-course planning, measurement and support. They are also designed to spur the changing of institutions, practices at home and at work, and most importantly mindsets towards the elderly and their caregivers.

There is another link across the strategies: time, and its value. Whilst workers in formal employment are remunerated for the time they spend doing their jobs, non-market activities such as caregiving and volunteerism are poorly recognised, barely measured and thus seemingly lowly valued. The time-banking “Eldersave” scheme forces us to consider how time that is invested in essential non-market activities such as caregiving and volunteerism should be more properly valued.

A number of the elements in the strategies build on existing platforms, frameworks and mechanisms or on announced policy reviews. This is the case with the Ageless Scorecard and the Happy Life Index in Strategy 2, and the End-of-Life Toolkit in Strategy 3. The extension of the SkillsFuture scheme to older workers called SkillsFuture++ (focused on career-counselling and on developing caregiving capacity and skills in both Strategies 1 and 2) fits well into the current policy directions, whilst the care navigator programme of Strategy 1 could be overlaid onto the infrastructure already established by the Pioneer Generation Office.

The upcoming review of the statutory retirement age should consider many of the features of all three strategies, especially the findings of the proposed White Paper on flexible work arrangements in Strategy 1, and the incorporation of a Happy Life Index in Strategy 2 in any transition away from a formal retirement age. The review of long-term care financing in government should be undertaken in the context of a national conversation on end-of-life issues that is found in Strategy 3.

In ranking the proposed strategies' viability, the highest scores were awarded to those with bottom-up approaches and a significant element of person-centricity. To this end, partners with on-the-ground expertise in healthcare, allied services, social enterprise, voluntary, educational or community-based sectors will be invaluable to follow up on these strategies. They should work with philanthropic, grassroots organisations and of course, government ministries and agencies, as it is only through a nation-wide, systemic approach to the issues raised that real change can happen.

The Action Plan Singapore Process and the Drivers of Change on the Future of Longevity

At the start of the project, participants were taken through a process of thinking about the key drivers of change that will help them answer the question: How might our longevity challenge us in 2026? In other words, how would Singapore respond to the trend of having more people above the age of 65 years old as we approach 2026, a decade from now? Participants ranked those drivers of change to decide on two with the highest level of uncertainty of how they might play out and the greatest potential impact they might have, to establish what we call the top two critical uncertainties.

The two critical uncertainties in relation to longevity selected by the group were:

- Will Singaporeans, on average, spend more of their longer lives in good health or in poor health?

- Will decisions about healthcare decisions be made centrally and in a top-down fashion with the state as the primary actor, or in a bottom-up, community-driven way?

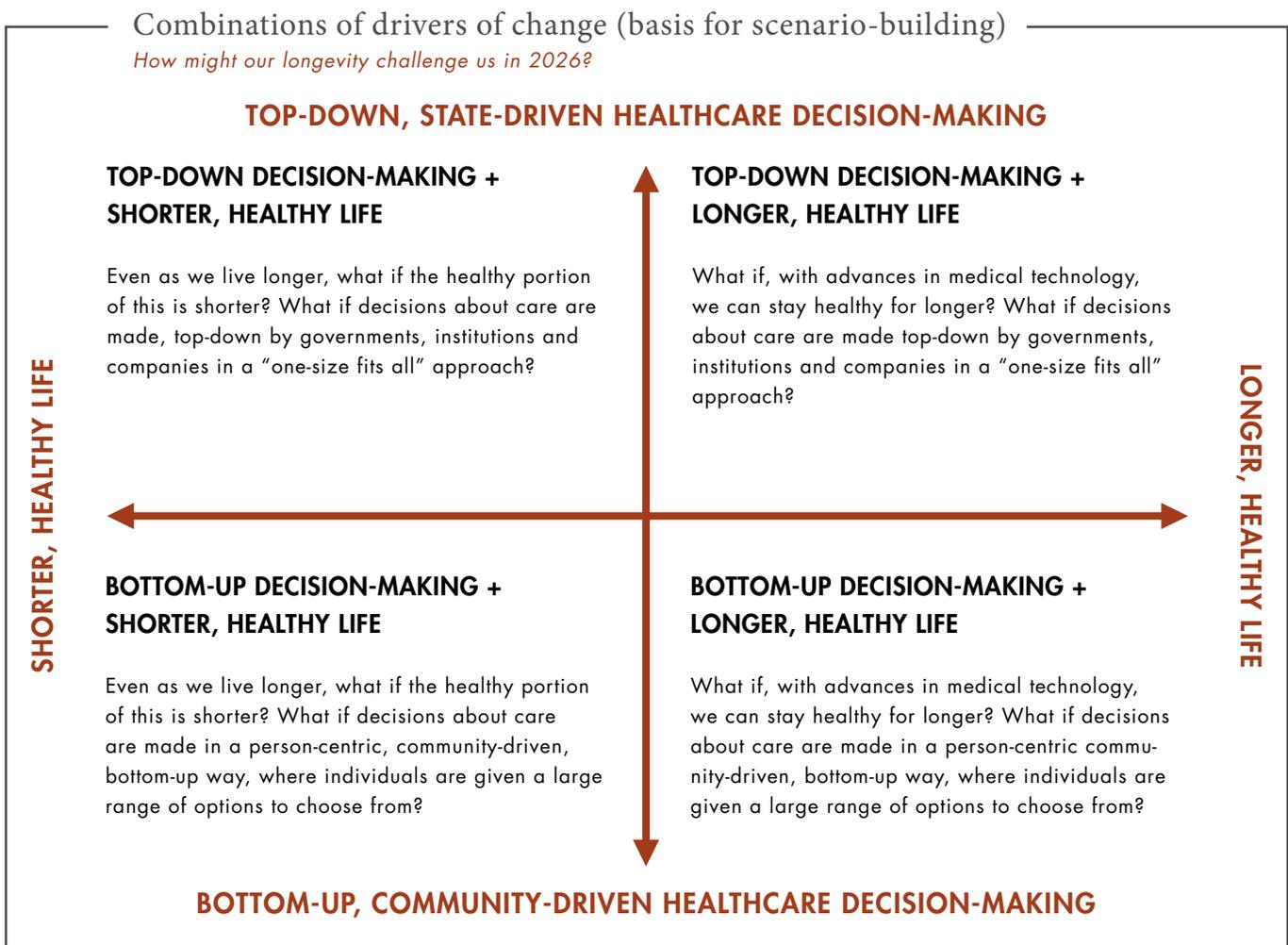
Additional drivers of change that were identified included:

- What will our access to life-enhancing science be?
- What will our access to affordable caregiving be?
- Will there be flexibility in hiring older workers?
- How will businesses respond to ageing in terms of their offerings of products and services?
- What progress will we make in planning for end-of-life matters?

- Will there be more support for caregiving?
- What will perceptions of ageing be?

After the critical uncertainties were identified, the participants went on to build scenarios of how the future might look like if those two trends were to interact with each other. The diagram below provides, at a glance, the questions and considerations that shaped those scenarios. The scenarios provided vivid and plausible narratives of how people might live in 2026, given that a

greater proportion of Singaporean society would be 65 years old and above. These scenarios helped to provoke further thinking about the concerns we should have, and raised suggestions about the strategies that should be put in place to ensure that Singapore and Singaporeans' best interests are served in how we respond to the longevity revolution that is unfolding here. What follows is a record of those scenarios and the strategic considerations and recommendations that participants offered.



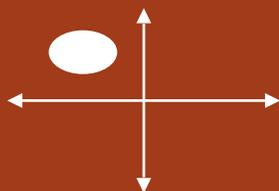
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LONGEVITY

Scenarios

SCENARIO 1

Stuck in the Middle: Institutional Squeeze



CRITICAL UNCERTAINTIES

1. Top-down, state-driven
2. Shorter, healthy life

TOP-DOWN

The state is the main agent of regulation and change, and focuses primarily on attending to the needs of the bottom 20–30% of the population (by income), leaving it to the private sector and the market to provide for the rest, resulting in a middle-income squeeze.

SHORTER, HEALTHY LIFE

Failure of early prevention and promotion of healthy living results in shorter spans of healthy life even if they are longer overall. Although a typical 65-year-old can expect to live another 30 years, many more of those remaining years will likely be spent in poor health.

It is January 2021. A general election has been called. The high cost of living, especially in medical and aged care, is set against a backdrop of a slow-growing economy. Such major issues are leading the media to expect yet another “watershed election”. Over the last five years, the government has rolled out an integrated National Health and Social Welfare Database that contains comprehensive health and social data on all Singaporeans. The government now runs most nursing homes, and the highest quality of care across the continuum is provided by government-run institutions. Primary care has been nationalised, with polyclinics providing 90% of the population’s primary care needs at an affordable price, especially for the bottom 30% of income earners, although long queues for treatment abound, and high co-payments are a big concern for middle-income earners. Within the region, protectionist and nationalist policies are becoming the norm, impacting labour mobility.

For Priyanka, it is a worrying time because of what happened to her mother, Lakshmi, recently. Priyanka, a 64-year-old divorcee is waiting in the queue at her Member of Parliament’s (MP) Meet-the-People session in Yishun. She has been waiting for three hours and is getting worried about her 90-year-old mother Lakshmi, who recently suffered a stroke and is currently hospitalised at Khoo Teck Puat Hospital. Whilst Lakshmi enjoys full government subsidies for hospitalisation, Priyanka has been advised by the medical social worker there that her mom will not be eligible for the same level of subsidy for her long-term care when she is discharged, as the combined incomes of Priyanka and her 30-year-old only daughter Kanchana (an Uber driver with irregular earnings) are just above the qualifying threshold.

Lakshmi has been offered a private nursing home bed in Tuas, but costs are \$5,000 a month, well beyond their means. The family used to employ a foreign domestic worker from Indonesia, but

caregiving is now tightly regulated and provided mainly by private managed care organisations employing highly-skilled Singaporeans that cater to the well-off.

Priyanka has been discussing with her daughter the prospect of her working overseas to earn more, even though she is also worried about her own physical condition, which has been deteriorating, and about her own future. Kanchana too worries about finding good jobs overseas, as around the world, job opportunities have declined. With Singapore's deteriorating relationship with Malaysia, options to work and obtain care in Iskandar have also diminished.

Priyanka's number is called, and she meets the MP who is sympathetic.

Fast forward to 2026. Priyanka has recently become unemployed due to her worsening health. She is now forced to revisit the social worker to determine if her mom will now be eligible for subsidised care in a government-run nursing home. She has also been offered a new bio-electronic stimulus therapy, *Neuropeutica™*, that will improve the physical and cognitive condition of adults, but this would cost \$50,000 per person. Priyanka has sufficient funds beyond her Medisave savings to afford a course of treatment for only one person in the family.

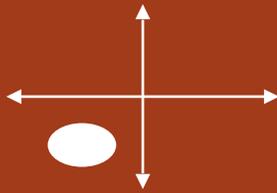
This time, it is her daughter who will take her to see the social worker. Kanchana, now 35, was unable to go overseas to find work and continued to work as freelance driver. However, she has started to develop acute back pain and has been driving less recently.

On their way to the appointment, both Priyanka and Kanchana worry about each other's situation. Priyanka is worried for her daughter, and what her life will be like caring for two older, infirmed family members as the sole breadwinner.

Kanchana in turn is concerned about Priyanka's mental condition as her mum seems very depressed since becoming unemployed and of late has been accessing websites on assisted dying and euthanasia.

SCENARIO 2

Auntie May's Cooperative



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CRITICAL UNCERTAINTIES

1. Bottom-up, community-driven
2. Shorter healthy life

BOTTOM-UP

Senior-centred care, in which the needs and preferences of the elderly are placed at the heart of a more consultative aged care system, has become the norm in Singapore. Singaporeans are also more inclined to organise interest groups and lobbies among themselves to solve common challenges and champion specific causes at the state level.

SHORTER, HEALTHY LIFE

Failure in early prevention of diseases and promotion of healthy living has resulted in a greater proportion of Singaporeans experiencing multiple critical illnesses as they age.

It is now 2021. Insufficient emphasis on self-care has caused people to experience illnesses earlier in their lives. Dementia now afflicts an unprecedented 15% of the elderly population. The government has adopted a less interventionist and more consultative approach to aged care, and Singaporeans are more willing to self-organise and work with the state to address the challenges that senior Singaporeans face.

The sharing economy has also matured and driverless vehicles are ubiquitous. However, because the services rendered by this sharing economy do not allow for the building of human relationships, over time, they do not meet the needs of older persons, who prize human connectedness over efficiency, especially those living with dementia.

Auntie May, a homemaker, lives with her husband, Joe, who suffers from moderately severe dementia and urinary incontinence. Both are aged 75 and their Medisave funds have long been depleted. Joe still manages to walk and feed himself, but does not qualify for ElderShield payouts because of the requirement of inability to perform at least three "Basic Activities of Daily Living" before receiving long-term care benefits.

They do not employ a foreign domestic worker (FDW) as the cost of doing so has risen following restrictions on manpower outflows in the neighbouring countries that are the usual sources of FDWs. The general practitioners (GPs) in their neighbourhood are reluctant to spend additional time consulting with Joe and many are not confident in managing dementia, so they usually end up referring Joe to the accident and emergency department (A&E) of the hospital nearby instead.

Auntie May is thus forced to send Joe to the A&E every time he experiences episodes of agitation. However, the driverless ambulances unnerve her

husband and he often refuses to board them. The increased use of mobile phones to conduct medical transactions in this new sharing economy is also confusing for May.

When the hospital suggests that Joe be sent to a nursing home, May is deeply displeased. She cannot afford it, and the available nursing homes that are operated by voluntary welfare organisations consist of large wards and lack privacy. May believes Joe will be very insecure in such a "home".

Rather than continue suffering and burdening May, Joe expresses his desire to die with dignity. Calls for assisted suicide among ailing older Singaporeans have grown louder and several small private clinics have started offering assisted suicide services. The government has eased its strict stance on this matter over the years following growing public advocacy for assisted suicide.

Out of desperation, May confides in her neighbours in her housing estate and finds that they are experiencing similar caregiving challenges. They decide to gather more neighbours to seek solutions. They realise that they possess different skillsets; some are retired nurses and doctors, while others are former civil servants.

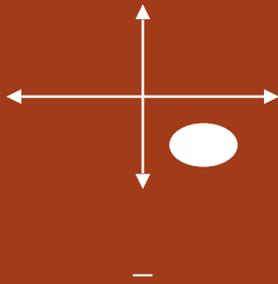
By 2022, they have formed a cooperative, engaging the skills of different members and pooling resources to care for infirmed elders in the housing estate. The elders are grouped in one flat during the day and caregivers take turns to be "on-call". The cooperative also pays for common healthcare needs. The retired healthcare workers, like nurses and doctors, provide the home-based primary care support, while the retired civil servants help to coordinate with other government agencies and charities. The elders in the community are satisfied as they get to age and die in familiar surroundings.

However, many members lack the skills and energy required to manage persons with dementia and seniors with multiple co-morbidities. It is also difficult to coordinate among the multiple views raised during their weekly meetings. The neighbourhood GPs are also discouraged to care for elders with complex needs given the poor compensation they would receive for it.

Together, members of the cooperative lobby the government, requesting for additional funding for re-skilling members, as well as for direct health and social support. By 2026, seeing the value in this cooperative's model of care, the government decides to invest in it, with plans to replicate the model elsewhere in Singapore.

SCENARIO 3

Jon Teo in Shangri-La: Self-Help Not Enough



CRITICAL UNCERTAINTIES

1. Bottom-up, community-driven
2. Longer healthy life

BOTTOM-UP

The government has scaled back on funding for aged care services. Instead, a more *laissez-faire* approach is adopted, where people are encouraged to rely on themselves, the community and private businesses for aged care. Subsidies only go to the most deprived, leaving the rest to rely on savings and private transfers. The scaling back of government intervention has also encouraged the rise of volunteerism.

LONGER, HEALTHY LIFE

This was achieved through the early prevention of ailments and promotion of active lifestyles.

It is 2025. The government has in recent years scaled back on assistance for dependent elderly. Subsidies only go towards the most deprived elderly. The private sector has become more active in providing care options for middle-income and upper-income seniors. There is also renewed emphasis on self-help. Seniors are encouraged to receive help from and give back to the community. VWOs are providing training for new volunteers and volunteerism rates amongst seniors are rising. These seniors have seen vast improvements in their physical and mental well-being as a result of their active participation in the community.

Jon Teo, aged 75, has been volunteering actively with an eldercare service organisation since his retirement from his sales job five years ago. His wife met with an accident and passed away a year ago and he lives alone in a three-room flat as his children have moved overseas.

At the annual integrated community health-screening event, Jon is diagnosed with mild cognitive impairments. Concerned that his condition might deteriorate further, Jon and his children begin to look into home-based, long-term care. However, he discovers that the range of government-funded options is very limited. Even though he no longer earns an income, the annual value of his residence will cause him to fail the means-testing threshold for subsidies, which has become stricter in recent years. Jon's personal and CPF savings would have sustained him for another 10 years if he were to live independently. However, opting for private long-term home care would throw his plan off by more than three years, even with transfers from his children. Even though institutionalised care would be less harsh on his finances, Jon is adamant about ageing-in-place.

His volunteer manager advises him to tap the "Volunteer Service Time Bank", which was created five years ago by the People's Association to facilitate interaction and interdependence within

communities. Volunteers accumulate merit points for their service, which can subsequently be exchanged for services for their own use. Jon has 3,600 merit points in his time bank, which can be exchanged for five years of care services.

Although such care is provided by neighbours who are not medical experts, they have undergone basic training and can provide sufficient assistance to him.

Jon and his children are satisfied with this arrangement but worry about what Jon should do when the five years are up. His doctor introduces him to a new drug that prevents further cognitive decline, which Jon is very interested in. However, the new drug has not yet been approved for use. The doctor explains that given the small size of Singapore, it is difficult for Singapore to fully evaluate the large number of new technologies and interventions that are being developed worldwide. Singapore adopts a cautionary stance and makes such interventions available only after extensive data have been collected elsewhere.

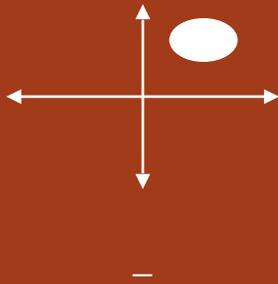
Jon is dismayed. However, his doctor informs him that there is now the option to sign a waiver and bypass formal approval procedures. In recent years, patient advocacy groups have been calling for the fast-tracking of the approval for such medical interventions. In response, the government is increasingly taking a patient-centred approach and now accords more autonomy to the patient.

Jon is briefed about the possible risks and complications before taking the drug. There have been cases where patients who had taken drugs provided through the "Patient Choice Waiver System" experienced life-threatening complications. Unfazed, Jon decides to go ahead and becomes one of the first to try this new combination of drugs. However, as this is not an approved treatment, he is unable to use Medisave and relies on his private savings and transfers from

his children to finance his treatment. Even though this drug is much cheaper than private home care, Jon hopes that in the future, this drug can become an officially licensed medication such that he can rely on his Medisave to purchase it.

SCENARIO 4

Living Longer, Living Well?



CRITICAL UNCERTAINTIES

1. Top-down, state-driven
2. Longer healthy life

TOP-DOWN

The state provides direction and funding for ageing-related issues. Many of these schemes are, however, aimed at the majority or groups that are easily reached, and there is insufficient consideration for segments of the population that are left out. On the other hand, those who have been well taken care of by the government have grown so reliant that they hesitate to participate in, much less initiate, community or private initiatives.

LONGER, HEALTHY LIFE

In this scenario the government invests in physical infrastructure and workplace health schemes, but fails to consider those who are not involved in formal work. There is also a lack of consultation with the public to understand the socio-economic realities driving the poor uptake of these workplace health schemes and usage of facilities.

It is 2023. The government has acknowledged the benefits of healthy living and early prevention of ailments. Exercise facilities have sprouted across Singapore. In 2017, the Health Promotion Board enhanced the Workplace Health Promotion Grant to subsidise 100% of workplace health programmes in small and medium-sized enterprises (SMEs). The scheme was previously a co-payment system where firms had to foot 20% of the bill. Uptake of the scheme was modest. Since the upgrade, many more firms have tapped the grant to initiate exercise programmes and regular health screening for their staff. There have been significant improvements in average health and reductions in expenditure on secondary healthcare.

There are, regrettably, segments of the population that have been left out. Many blue-collar workers are paid by the hour or by production output. These workers are often unwilling to attend their companies' health programmes as it would compromise their working hours and salaries. Also, those who are not in formal employment, such as freelance workers and homemakers, fall outside of the scheme's radar. As the trend towards the gig economy continues, an increasing number of people are left out of schemes tied to formal employment.

Sixty-five year-old Auntie Yuli and her husband are examples of those who have benefitted from the government's health promotion efforts and those who have fallen through the cracks, respectively. After 40-odd years in a desk-bound job, the sedentary lifestyle left Auntie Yuli with a poor immune system and low energy levels. However, since her company began offering free aerobics lessons six years ago, she has participated in them regularly and has seen her state of health improve.

Her husband, on the other hand, is a freelance mechanic and had to manage his own exercise

regime. He could not find time for regular exercise as work was always competing for his time.

Fast-forward to 2025. Auntie Yuli's workplace begins the large-scale adoption of labour-saving technologies and dismisses half of its administrative team, including Auntie Yuli. Though not explicitly stated, it is evident that the first to go were older workers who had become less efficient with age. She tries to search for a new job but is unsuccessful due to her age and how the proliferation of digital technologies have made labour redundant.

Shortly after, Auntie Yuli's husband is hit by a severe stroke. His lengthy hospitalisation takes up a good proportion of their savings and her Medisave funds as he does not have his own. He unfortunately succumbs to the illness. Auntie Yuli does not have children and questions how she will cope emotionally and financially. Distraught, she seeks help from her local family service centre. The social worker helps her to monetise her flat through the Lease BuyBack scheme and registers her under the Silver Support Scheme. Both would give her a small monthly payout. She is also referred to a volunteering opportunity at Mendaki, which successfully helps her to stave off negative thoughts.

Auntie Yuli is able to afford the basics with her payouts, but with the soaring cost of living, she is unable to afford luxuries like fitness classes. She is worried as her ailments have returned just months after she was retrenched and stopped her exercise regime.

Some of the elderly volunteers at Mendaki are discussing the idea of moving to retirement villages in Iskandar, which are increasingly popular due to the lower prices of property and services. The volunteers who want to move feel that their needs are not adequately met by Singapore's social service and healthcare system. A couple of them speak only Malay and find difficulty navigating

the local healthcare system that is increasingly dominated by foreign professionals with whom they have a language barrier. Some others, like Auntie Yuli, are unable to keep up with the cost of living in Singapore. However, she feels uneasy about leaving Singapore for good. Furthermore, she is used to having assistance coordinated for her by the authorities and is hesitant to seek alternatives beyond government-sanctioned services.

Focal Question

How might we allow caregivers to keep working effectively or at least smoothly re-enter the workforce by 2026?

STRATEGY 1

Caring for Caregivers:
Keeping Them Employable and Valued

The mantra of family responsibility may be coming under stress as Singapore’s population ages rapidly and the dependency ratio rises. Family caregivers of the elderly are facing mounting strain and difficulties in maintaining and re-entering paid employment. We propose measures to value people’s contributions throughout their life course, establish nation-wide flexible work and caregiving arrangements and enable caregivers to continually access opportunities for professional development. We also recommend redefining the “Many Helping Hands” approach by tapping broader networks of community care to reduce the burden on the family. This involves integrating existing initiatives such as care navigator networks as well as eldercare and disability registries at the national level.

SITUATION

For years, the government has promoted the virtues of filial piety and family responsibility in Singapore to discourage over-reliance on the state for social support. However, as Singapore’s population ages rapidly, family caregivers of the elderly — many of whom are women — are under great strain. Caregivers also face difficulties finding and maintaining paid employment during this period. However, this situation also enables us to consider how else we may value people’s contributions throughout their life course, such that caregivers can easily re-enter the workforce. We also consider broadening Singapore’s community care infrastructure to reduce the burden on the family.

CHALLENGES

- Lack of organic community care infrastructure.
- Asian cultural values of “filial piety” — guilt associated with not caring for parents or sending them to a home.
- Caregiving is highly gender-specific.
- Caregiving seen as low status occupation.
- Opportunity cost of caregiving.

OPPORTUNITIES

- Flexible life-course management.
- Re-defining the “family” as an institution.
- Recognising caregiving as a transferable skill.
- Change the two-working persons household norm.

OVERARCHING OBJECTIVES

1. **Overcome institutional inertia to develop a new system of caregiving.**
2. **Redefine the “Many Helping Hands” concept to better integrate the care infrastructure, thus reduce the burden on the family.**

—

OVERARCHING OBJECTIVE 1

Overcome institutional inertia to develop a new system of caregiving.

By December 2018:

- A nationally representative time-use survey is set up and data is collected by IPS.
- A working committee to study time-banking “Eldersave” scheme is set up by a relevant government agency with expertise on manpower issues.
- A White Paper on national flexible work and caregiving arrangements is produced by manpower agency and other relevant bodies.
- “SkillsFuture++” for caregivers who are not working is set up. It will be a platform that provides access to career counselling, skills development and online and blended learning.

By December 2022:

- A time-banking “Eldersave” scheme for all aged 30 and below is operationalised.
- Flexible caregiving and work arrangements are established for 50% of the Singaporean workforce.

- Singapore’s reliance on low-skill foreign caregivers is reduced by 50%.
- 70% of scholarships are made available to people of all ages by ministries, universities and other relevant bodies.

By December 2026:

- Assessment is now fully done by portfolio. The time-banking “Eldersave” scheme for all aged 50 and below is operationalised.
- Flexible caregiving and work arrangements are established for 80% of Singaporean workforce.
- Singapore’s reliance on low-skill foreign caregivers is reduced by a further 50%.
- 100% of scholarships are made available to all ages.

Action Plan by December 2018:

The family is traditionally regarded as the first line of support for caregiving in Singapore. However, the rapidly ageing population is putting increasing financial and psycho-social pressure on family caregivers of the elderly. Caregivers also experience difficulties maintaining and finding paid employment during and after a prolonged period of caregiving. We thus propose new ways to recognise and value people’s contributions so that caregivers can remain employed and smoothly re-enter the workforce.

- IPS to set up and collect data through a nationally representative time-use survey.
- Set up working committee under national manpower body to study time-banking “Eldersave” scheme in countries like the United Kingdom, US and Japan.

- Gather partners from foundations, charities and VWOs to discuss and produce a White Paper on national flexible work and caregiving arrangements.
- Launch more online training courses so that caregivers can upgrade themselves while caregiving.

OVERARCHING OBJECTIVE 2

Redefine the “Many Helping Hands” concept to better integrate the care infrastructure, thus reduce the burden on the family.

By December 2018:

- The state rhetoric of “family as first line of support” is reduced and a campaign to raise awareness of the psychological stress of caregiving is launched in a joint effort by organisations like Agency for Integrated Care, Lien Foundation, and the media.
- Cultural and generational differences in perceptions of caregiving are better understood through surveys and focus group discussions.
- Payment on a capitation basis¹⁵ for family GP practices is piloted.
- National registry of eldercare and disability is set up by Ministry of Health, Agency for Integrated Care or other relevant parties.
- Common shared healthcare services are set up by Regional Health Systems.

¹⁵ Capitation is a fixed per capita payment made to the healthcare professional (e.g., a general physician) for medical care provided to a fixed group of enrolled individuals.

- A care navigator scheme is launched with a pool of 100 care navigators.
- A scheme to unify health and social care into set of long-term care services is introduced.

By December 2022:

- Access to family physicians on a capitation basis is provided for all aged 65 and above.
- The care navigator system is established nation-wide.
- Free counselling/wellness centres and programmes are set up to provide psychological and emotional support to caregivers.

By December 2026:

- Whole primary care system is integrated on a capitation basis.

Action Plan by December 2018:

To reduce the burden of caregiving on the family, we propose redefining the “Many Helping Hands” concept by looking to broader community networks for the provision of care. We recommend that family physicians be paid on a capitation basis to make care more affordable, and that a national registry on eldercare and disabilities be set up to facilitate the integration of healthcare services in Singapore. In addition, we suggest integrating a nation-wide care navigator system in partnership with hospitals and key government ministries to support caregivers.

- Reduce rhetoric of “family as first line of support” and raise awareness of emotional and psychosocial stress of caregiving.

- Set up national registry of eldercare and disability.
- Regional Health Systems to set up common shared healthcare services.
- IPS to produce a Working Paper on schemes to unify health and social care into set of long-term care services.
- Pilot integrated care navigator system.

Focal Question

How might we remove ageism by 2026?

STRATEGY 2

Ageless in Singapore:

Removing Age-Based Barriers at Work,
Home and Community

Age-based discrimination, or ageism, is a common problem in Singapore. Ageism is not directed at the elderly alone, but even towards mid-career professionals in their middle age. Common observations made by these mid-career professionals are that companies often say they are too senior or expensive, salary-wise, to hire, leaving them in a lurch despite their willingness to work. Additionally, concerns within the workplace highlight the growth of technology use in the workplace and the displacement of older employees due to the challenges in catching up — often resulting in the elderly being treated as a source of low-cost menial labour. In light of these trends, we have identified the following outcomes to be achieved by 2026:

1. Develop ageless workplaces — where age of workers is not a relevant consideration to whether they can take on and progress in their jobs; only their capabilities are important.
2. Improve self-image of older adults — helping them realise that retirement is not the end of their ability to contribute.
3. Develop future-proof skill sets — ensuring that skill sets remain relevant as a base for pivots into other employment.

The realisation of these objectives would lead to the eradication of ageism in the workplace and promote more socially equitable outcomes. A critical component to this would be the changing of employer mindsets from one that stereotypes older workers to one that values the experience that they bring, and actively seeks them out.

SITUATION

Ageism is a problem today. The drivers of ageism are stereotypes against the elderly and mid-career professionals, employer mindsets and employees' seemingly outmoded skills. Coupled with the growing trend of an ageing population, the need to develop and implement solutions that remove ageism and its underlying causes is an urgent one that calls for swift action. The multi-faceted nature of ageism requires coordinated action targeted at three main groups — employers, the younger generation and the elderly themselves to produce holistic outcomes that shift mindsets.

CHALLENGES

- Custom of treating the elderly as a source of low cost labour.
- Consumer society focused on the young and beautiful.
- Too many anti-ageing promotions, reinforcing the emphasis on youth.
- Stereotypes of the elderly and their poor fit to market requirements.
- Higher cost of hiring elderly compared to hiring fresh graduates with more "drive".
- The perception that the skills of senior workers are perceived to be irrelevant to market needs.
- Self-image of elderly as people who are no longer needed by society.

OPPORTUNITIES

- Hiring to suit the purpose regardless of age.
- Greater intergenerational tie-ups, e.g., mentoring and reverse mentoring.

- Rise of the younger generation.
- More "success stories" of elderly role models.
- Not everyone wants to play ping-pong — possibility of wider selection of recreational activities for the elderly.

OVERARCHING OBJECTIVES

1. **Develop ageless workplaces — where age of workers does not matter; only their capabilities are important.**
2. **Improve self-image of older adults — help them realise that retirement is not the end of their ability to contribute.**
3. **Develop future-proof skill sets — ensuring that skill sets remain relevant as a base for entry into other employment.**

—

OVERARCHING OBJECTIVE 1

Develop ageless workplaces — where age of workers does not matter; only their capabilities are important.

By December 2018:

- A robust roadmap for dealing with ageism in the workplace is drawn up.
- Introduce Senior Industrial Attachment Programmes (SIAP) — programmes that promote the internship of workers above 50 years old at new companies. SIAP aims to take on 10% of elderly workers.

By December 2022:

- Ageless Scorecard where companies are scored according to how well they eradicate ageism in the workplace — 5% of companies receive an A+.
- 15% of elderly participating in SIAP.

By December 2026:

- 40% of companies receive an A+ on their Ageless Scorecards.
- 25% of elderly participating in the SIAP.

Action Plan by December 2018:

- Consultation with WDA and MOM to develop terms of reference for designing and executing a study on workplace ageism.
- Review existing data and studies conducted on workplace ageism.
- Focus study on benchmarking the manifestations of ageism and underlying causes.
- Launch pilot project that redesigns the workplace to eliminate ageism and demonstrate the value of a diverse work-team.

OVERARCHING OBJECTIVE 2

Improve self-image of older adults — help them realise that retirement is not the end of their ability to contribute.

By December 2018:

- Development and release of the Happy Life Index — an index that measures the professional and personal happiness of

workers above 50 years old. Aim for 10% of elderly scoring “happy” by 2018.

- SIAP — programmes that promote the internship of workers above 50 years old at new companies. SIAP to aim to take on 10% of elderly workers.

By December 2022:

- Abolishment of retirement age, and an average of 50% of elderly scoring “happy” on the Happy Life Index.

By December 2026:

- 80% off the elderly scoring “happy” on the Happy Life Index.

Action Plan by December 2018:

- Profile role models and opportunities.
- Design and determine media campaign that will change self-image of older workers.
- Research, define and implement Happy Life Index.
- Media campaign to change government language to remove negative age context, e.g., ElderShield at 40 years old.

OVERARCHING OBJECTIVE 3

Develop future-proof skill sets — ensure that skill sets remain relevant as a base for entry into other employment.

By December 2018:

- 25% of all elderly workers to have taken part in SkillsFuture programmes.

By December 2022:

- 50% of 50 year-olds and above have enrolled in SkillsFuture programmes.
- 15% of 50 year-olds and above start up their own enterprises.

By December 2026:

- 80% of 50 year-olds have enrolled in SkillsFuture programmes.
- 35% of 50 year-olds and above starting up their own enterprises.

Action Plan by December 2018:

- Creation of Skills Inventory Platform; determining mechanism for self-profiling of skills, inclusion of tacit skills, e.g., people skills into mechanism.
- Integration of Skills Inventory Platform with SkillsFuture++.
- Design and trial of SIAP (for older workers to intern at new companies) – in consultation with WDA and the Singapore Business Federation.
- Promotion of co-creation events between younger workers and workers above 50 years of age.

Focal Question

How do we help people plan the final stages of their lives by 2026?

STRATEGY 3

Do Not Go Gently:

Preparing for the Great Good Night

With a rapidly ageing population and a declining birth rate, there is an increasing need to examine end-of-life options and planning to ensure citizens are best positioned for their senior years. To address this, we propose spearheading a National Conversation to have meaningful discussions on end-of-life issues, and developing an End-of-Life Toolkit to equip seniors with the necessary information in their planning and decision-making process. This will be supplemented with an educational pilot programme for citizens above the age of 55.

SITUATION

Singapore's population is ageing rapidly and with an ageing population comes the challenge of preparing Singaporeans for the complications that come at the end of an individual's life. Some of these challenges are medical in nature, such as when to continue care and when to stop; but they also include other similarly difficult topics such as inheritance and writing of wills. This is further complicated by the changing demographics of Singaporean society, with more people either growing old without children or other family members, who would traditionally have been expected to make these decisions on their behalf.

Stigma regarding death prevents meaningful conversations that, while causing some initial

discomfort, would go a long way in preventing distress particularly at a time when an individual is poorly placed to resolve such issues. This remains true despite efforts by both government agencies and charities to change the situation. This plan aims to provide a framework to build on their work towards a national campaign to de-stigmatise the end-of-life conversation.

CHALLENGES

- Stigmatisation of talking about death and other end-of-life issues in general.
- Religious or cultural reluctance to speak about death.
- A rapidly ageing population.
- Ageing population increasingly lacks traditional family-based support structure.

OPPORTUNITIES

- Basic framework of the conversation is already in place.
- Acknowledgement of the issue both by government and relevant relevant charities and VWOs.
- Setting up a more formalised, easily approachable front to a difficult conversation.

OVERARCHING OBJECTIVES

1. **Start a National Conversation: De-stigmatise talking about end-of-life issues; there is a need to get people to talk more openly about it.**
2. **Educate senior citizens about their responsibilities and options regarding planning for end-of-life.**

OVERARCHING OBJECTIVE 1

Start a National Conversation: De-stigmatise talking about end-of-life issues; there is a need to get people to talk more openly about it.

By December 2018:

- The setting up of a taskforce to address this issue directly.
- The taskforce will produce a White Paper taking into account work already done by organisations such as the Agency for Integrated Care, as well as work done in the development of an End-of-Life Toolkit, a comprehensive set of advice and procedures targeted at seniors for use by staff of organisations that work with seniors.
- The White Paper will highlight the number and scale of issues that will need to be addressed. The scale of the National Conversation that will need to take place, the budget that will be needed to run the National conversation, as well as the budget to implement the End-of-Life Toolkit should be established.

By December 2022:

- The taskforce will make way for the End-of-Life Office.
- The End-of-Life Office will augment the End-of-Life Toolkit with the feedback and experience that the office has gained from the National Conversation.

By December 2026:

- The End-of-Life Office will be well established, regulating the certification of those using the End-of-Life Toolkit.

Action Plan by December 2018:

De-stigmatising the discussion of end-of-life issues is a difficult task. It can be successful by ensuring that senior citizens are not just made aware of the issues, but are provided clear avenues of assistance from multiple sources in order to make sound decisions about their future and that of their family. This will be achieved if there is a concerted effort by government organisations, religious groups, and other senior care organisations.

- Create a taskforce to define rollout plan and execute it until 2022 when the End-of-Life Office is setup.
- The taskforce will define and prioritise what can make the most difference. It will consult with key stakeholders for consultation, including members of the interfaith religious community, society and professionals involved in end-of-life care.
- The outcome of these consultations will inform a White Paper on end-of-life issues and solutions. The White Paper will help strengthen the taskforce, by further defining its priorities in starting the National Conversation.
- With the priorities set up, a budget can be assigned to the taskforce in the 2018 Singapore Budget.
- The budget will be used to set up a National Conversation. The national conversation plan is a full education plan with community and grassroots engagement to raise awareness, by means of events such as exhibitions or conferences.

OVERARCHING OBJECTIVE 2

Educate senior citizens about their responsibilities and options regarding planning for end-of-life.

By December 2018:

- The completion of a preliminary End-of-Life Toolkit that focuses on the informational needs of senior citizens regarding end-of-life planning.
- The toolkit will be issued to a small number of organisations that work with senior citizens, such as nursing homes, GP clinics and religious organisations. These organisations will test the toolkit and provide feedback to the end-of-life taskforce, who will add that feedback to their White Paper.

By December 2022:

- The first version of the End-of-Life Toolkit will be completed and adopted by all stakeholders.
- The End-of-Life Office will have a certification process for the employees of all organisations that work with senior citizens to ensure they are able to use the information contained within the toolkit effectively.
- By December 2022, 80% of all seniors above the age of 55 will have been “touched” by this programme, meaning that even if they have not made any end-of-life plans, they will at least have been made aware of the issue and that assistance is available.

By December 2026:

- The End-of-Life Toolkit will be in its second iteration, having been refined by the full-scale rollout.

- 50% of the population aged 40 and above will have interacted with the toolkit in some form, or 25% of the population.

Action Plan by December 2018:

The taskforce deals with the overarching organisational logistics of this goal. There is just as much work to be done at an individual-to-individual level. Previous initiatives such as the Advanced Care Programme sought to provide information to those who were looking for it. But the challenge is dispersing end-of-life planning information to a wide spectrum of senior citizens, particularly those not currently aware that such planning, is needed.

The End-of-Life Toolkit is a comprehensive information source for senior citizens, to be utilised by organisations that work with them. This will not be limited to the “obvious choices”, such as hospitals, religious organisations and nursing homes (although these represent the largest organisational target group); but will integrate with all manner of programmes, such as the CPF.

The development of this toolkit will incorporate knowledge already put in place by programmes such as the Advanced Care Programme, but will rapidly integrate information gleaned from its own development.

- The taskforce will oversee the setting up of a pilot programme to educate seniors about planning for the future. The initial target for this pilot programme will be seniors over the age of 55, but will target younger groups as time goes on.
- The first phase of the pilot programme is to find out what might work and not work in trying to educate individuals, as well the organisations that it needs to target in order to achieve its goals.

- The pilot programme will then train professionals from within the original batch of target organisations. The initial pilot is likely to target around three organisations, probably nursing homes and community groups. The taskforce can then review the result with the stakeholders.
- The pilot programme will deliver the first version of the toolkit. Version 1.0 will be then distributed to spiritual professionals, social and medical professions such as nurses, GPs and staff at VWOs. Professionals will be trained in its use, to bring up the subject of end-of-life planning with seniors and their families whenever there is an appropriate opportunity to do so.
- The pilot programme and the toolkit’s development are estimated to take around two years.

RANKING OF OVERARCHING OBJECTIVES

To ascertain which strategies are the most robust across the scenarios that were developed, we adopted the following criteria in ranking them:

- Desirability — Will stakeholders want it?
- Feasibility — Can it be executed?
- Viability — Would investing time and money in this strategy deliver sustained benefits over time?

Among the three criteria, the third component of viability was identified to be the most critical in determining the overall efficacy of a strategy. Participants were asked to score each strategy on viability on a scale of 1–10.

A score of 1 indicates that the time and money required to execute a solution would far outweigh the potential payoff in terms of desired outcomes and sustained benefits over time (i.e., the benefits would not justify the investment).

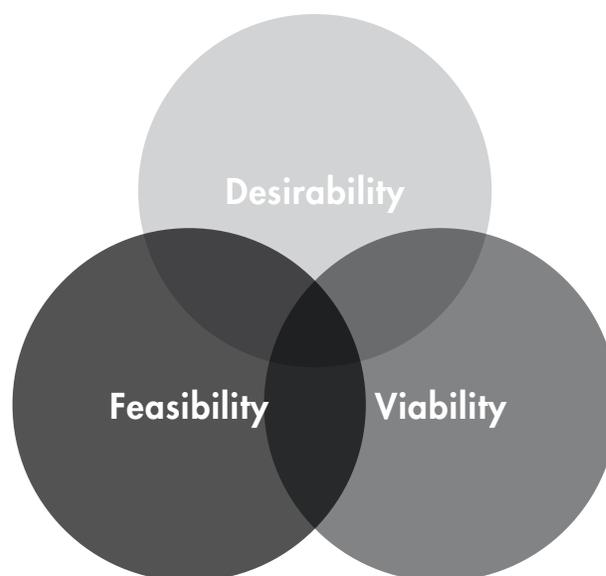
A score of 10 would indicate that the strategy is not worth pursuing, at least for that scenario. A score of 10 indicates that participants perceived the policy/project to have the potential to deliver excellent and sustained benefits in relation to the time and money required to produce those benefits. The potential payoff in terms of desired outcomes and sustained benefits over time would far outweigh the time and money required. A score of 10 across several scenarios would suggest a highly robust policy/project option.

If a policy/project consistently scores highly across multiple scenarios, it is more likely to be a robust strategy that performs well across those scenarios.

If a policy/project scores high on one or two

scenarios, but low across other scenarios, it may only be worth pursuing if no other policy/projects exist that address those one or two scenarios.

If a policy/project scores low across all scenarios, it may be better to focus limited resources on alternative solutions.



Scenario 1 (S1):

Stuck in the Middle: Institutional Squeeze

Scenario 2 (S2):

Aunty May's Cooperative

Scenario 3 (S3):

Jon Teo in Shangri-La: Self-Help Not Enough

Scenario 4 (S4):

Living Long, Living Well?

STRATEGY 1: Caring for Caregivers

Scores of 1 to 10 for how participants perceived the viability of each strategy, with 1 being “not viable” to 10 being “very viable”.

<u>Overarching Objectives</u>	<u>Scenarios</u>			
	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Create a value system where people’s contributions are recognised	6.9	8.3	7.9	8.3
SkillsFuture++ *	6.9	7.6	7.3	7.6
Re-define the “Many Helping Hands” concept	7.4	7.7	8.6	8.4

*In this final report, this objective was merged with “Creating a value system where people’s contributions are recognised” as Overarching Objective 1 called “Overcome institutional inertia to create a new system of care-giving” in this final report.

STRATEGY 2: Ageless in Singapore

Scores of 1 to 10 for how participants perceived the viability of each strategy, with 1 being “not viable” to 10 being “very viable”.

<u>Overarching Objectives</u>	<u>Scenarios</u>			
	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
Develop an ageless workplace	5.4	8.0	7.8	4.6
Improve the self-image of older adults	5.3	6.4	7.4	4.0
Future-proof skill sets	5.7	7.3	7.9	5.8

STRATEGY 3: Do Not Go Gently

Scores of 1 to 10 for how participants perceived the viability of each strategy, with 1 being “not viable” to 10 being “very viable”.

	<u>Scenarios</u>			
<u>Overarching Objectives</u>	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S4</u>
De-stigmatise the conversation about end-of-life issues	7.7	7.3	8.2	7.7
Educate seniors that it is their responsibility to discuss and plan their end-of-life issues	7.2	7.8	7.9	7.4
Better equip the social, spiritual, and medical systems so that the concerned professionals can better advise seniors and their families*	7.8	7.1	7.3	7.7

*In this final report, this objective was merged with “Educating seniors that it is their responsibility to discuss and plan their end-of-life issues” under the Overarching Objective 2 “Educate senior citizens about their responsibilities and options regarding planning for end-of-life in this final report.

Track Captain's Reflections

TRACK CAPTAIN'S REFLECTIONS

by Christopher Gee, Senior Research Fellow,
Institute of Policy Studies

The longevity sector plans developed by the participants of this track (professionals dedicated to the task of helping Singapore's seniors age successfully or challenging the concept of ageing) carry on in a tradition running from the Inter-Ministerial Committee of Ageing in 1999.

All the three strategies laid out in the Longevity Track are connected by some element of life-course planning, measurement and support. They are also designed in large part to spur the changing of institutions, practices at home and at work, and most importantly mindsets towards the elderly and their caregivers. They are also designed with an eye not entirely on today's elderly but Singapore's future population of all ages.

There is another interlinking thread to all of these strategies: time, and its value. Whilst workers in formal employment are remunerated for the time they spend doing their jobs, non-market activities such as caregiving and volunteerism are poorly recognised, barely measured and thus seemingly lowly valued. The time-banking "Eldersave" scheme proposed under Strategy 1 is innovative and should be pursued actively as it will force us

to consider how time that is invested in essential non-market activities, such as caregiving and volunteerism, should be more properly valued in our society. The Ageless Scorecard and Happy Life Index in Strategy 2 and the End-of-Life Toolkit in Strategy 3 build on existing platforms, frameworks and mechanisms to measure and plan over the life course. What is different and is the message this set of recommendations sends — that nation-wide implementation will be necessary if we seek to successfully change mindsets over the value of peoples' time, talent and contribution to their families and community, even as they age.

The following are further notes on how a number of the elements in the strategies build on existing initiatives or upcoming reviews that have been announced. First, the extension of the SkillsFuture scheme to older workers (that focus on career-counselling and on developing caregiving capacity and skills in both Strategies 1 and 2) fits well into the current policy directions that the government has put in place, whilst the care navigator programme of Strategy 1 could be overlaid onto the infrastructure already established by the Pioneer Generation Office.

Second, the upcoming review of the statutory retirement age should consider many of the features of all three strategies, especially the findings of the recommended White Paper on flexible work arrangements in Strategy 1 and the incorporation of a Happy Life Index in Strategy 2 in any transition away from a formal retirement age.

Third, the other review of long-term care financing in government should be undertaken in the context of a national conversation on end-of-life issues, which is found in Strategy 3.

Lastly, I would highlight that the highest rankings were consistently awarded to strategies in scenarios that involved bottom-up approaches

and a significant element of person-centricity, suggesting a need for a whole-of-society approach to tackling the challenges of longevity in Singapore. To this end, partners with on-the-ground expertise in healthcare, allied services, social enterprise, voluntary, educational and community-based sectors will be invaluable to follow through on these strategies. Other important allies in the cause would be philanthropic organisations such as the Tsao and Lien Foundations that do significant work in this domain. The government, led by the Ministries of Manpower, Health, Social and Family Development, National Development, assisted by agencies such as the Agency for Integrated Care and the Central Provident Fund Board, can work with these grassroots-level stakeholders to undertake this action plan for an all-age-friendly Singapore.

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