Year 2026: Doing Singapore Differently

Action Plan Singapore
An IPS Scenario-Planning Project

Report
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iPS
**Institute of
Policy Studies**

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Action Plan Singapore
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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:
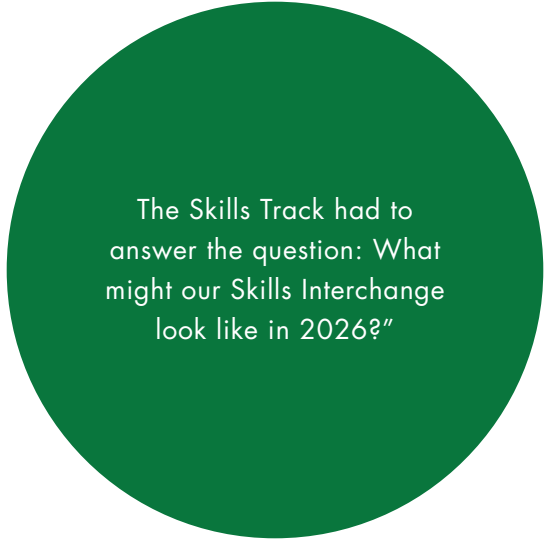
- A two-day scenario-building workshop on each of the three critical issues — the Longevity Track, the Innovation Track and the Skills Track.

- 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 |

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?

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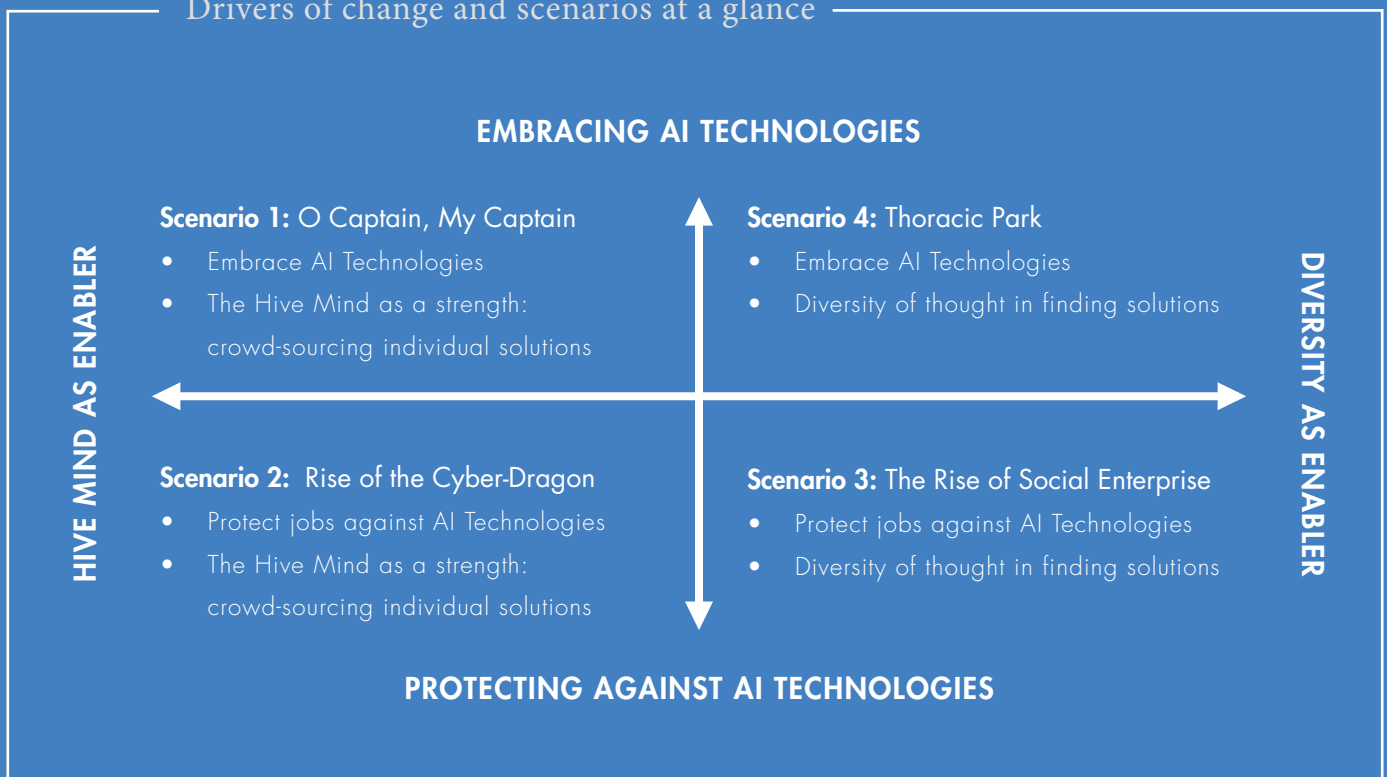
new opportunities and developing all sorts of commercial and social organisations to positively shape the country and Asia. These should generate economic but also other non-tangible, intrinsic returns.

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.

INNOVATION
Summary
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Drivers of change and scenarios at a glance

EMBRACING AI TECHNOLOGIES

HIVE MIND AS ENABLER

DIVERSITY AS ENABLER

Scenario 1: O Captain, My Captain
- Embrace AI Technologies
- The Hive Mind as a strength: crowd-sourcing individual solutions

Scenario 4: Thoracic Park
- Embrace AI Technologies
- Diversity of thought in finding solutions

Scenario 2: Rise of the Cyber-Dragon
- Protect jobs against AI Technologies
- The Hive Mind as a strength: crowd-sourcing individual solutions

Scenario 3: The Rise of Social Enterprise
- Protect jobs against AI Technologies
- Diversity of thought in finding solutions

PROTECTING AGAINST AI TECHNOLOGIES

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 project (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.

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STRATEGY 2

Building a People-Friendly AI World

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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.

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STRATEGY 3

Innovation Takes a Village

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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 then 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.

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[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.

<div align="center">

"PRACADEMICS"

</div>

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.

INNOVATION
Scenarios
—

SCENARIO 1
O Captain, My Captain!

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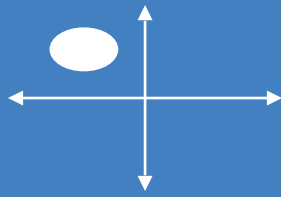
CRITICAL UNCERTAINTIES

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.
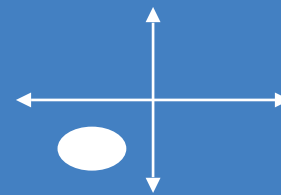
CRITICAL UNCERTAINTIES

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

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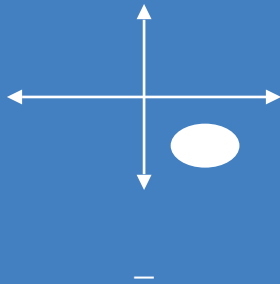
CRITICAL UNCERTAINTIES

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.
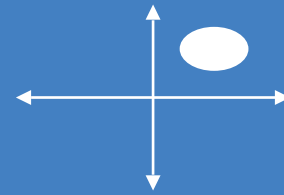
CRITICAL UNCERTAINTIES

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.

SKILLS

What might our Skills Interchange look like in 2026?

Background

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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.
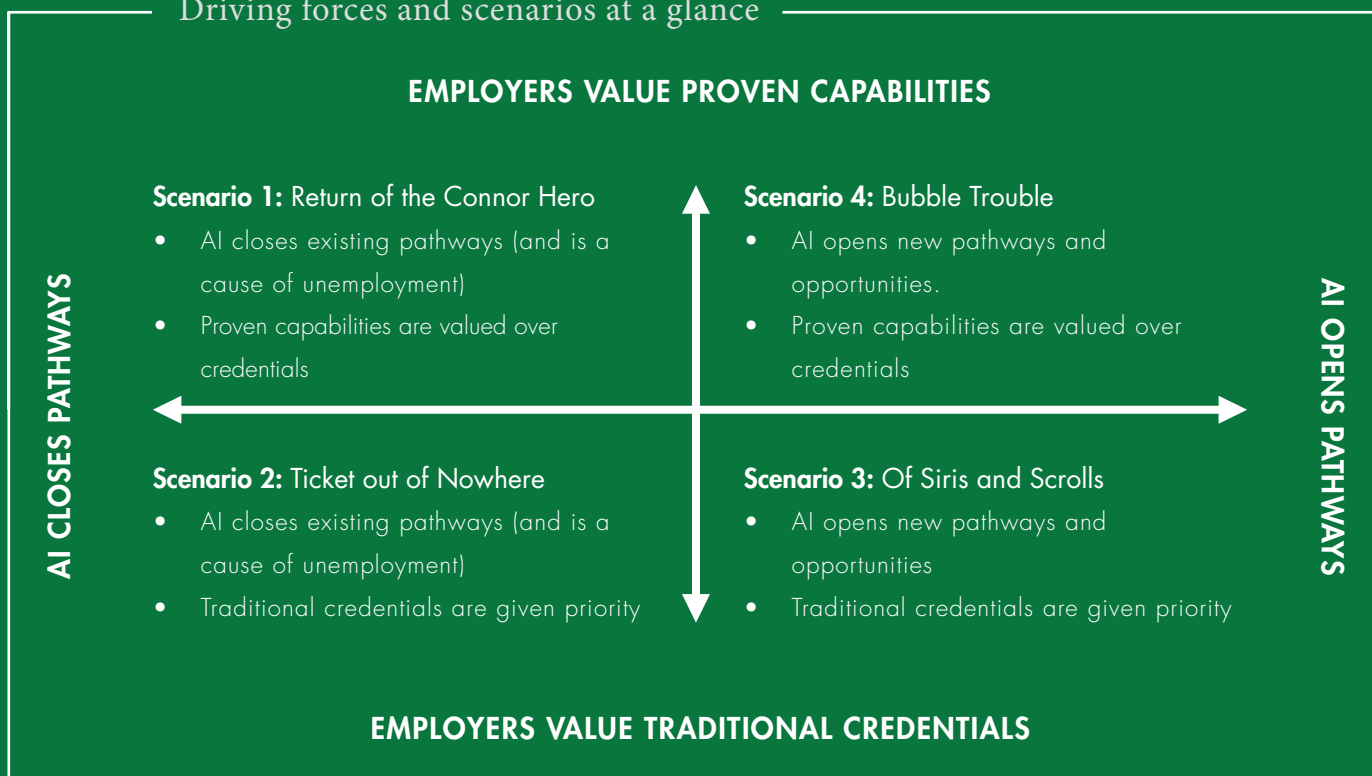
Together, all these different stakeholders can ensure that:

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

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Driving forces and scenarios at a glance

EMPLOYERS VALUE PROVEN CAPABILITIES

Scenario 1: Return of the Connor Hero
- AI closes existing pathways (and is a cause of unemployment)
- Proven capabilities are valued over credentials

Scenario 4: Bubble Trouble
- AI opens new pathways and opportunities.
- Proven capabilities are valued over credentials

AI CLOSES PATHWAYS

AI OPENS PATHWAYS

Scenario 2: Ticket out of Nowhere
- AI closes existing pathways (and is a cause of unemployment)
- Traditional credentials are given priority

Scenario 3: Of Siris and Scrolls
- AI opens new pathways and opportunities
- Traditional credentials are given priority

EMPLOYERS VALUE TRADITIONAL CREDENTIALS

STRATEGIES

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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.

SKILLS
Scenarios
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SCENARIO 1
Return of the Connor Hero
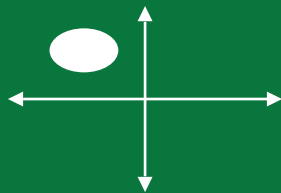
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CRITICAL UNCERTAINTIES

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.
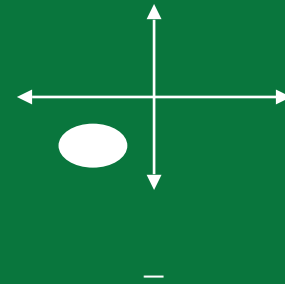
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CRITICAL UNCERTAINTIES

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.

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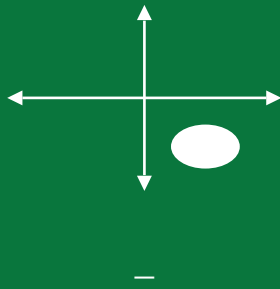
CRITICAL UNCERTAINTIES

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.

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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 enrols 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."
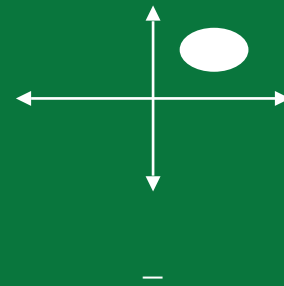
CRITICAL UNCERTAINTIES

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.

LONGEVITY
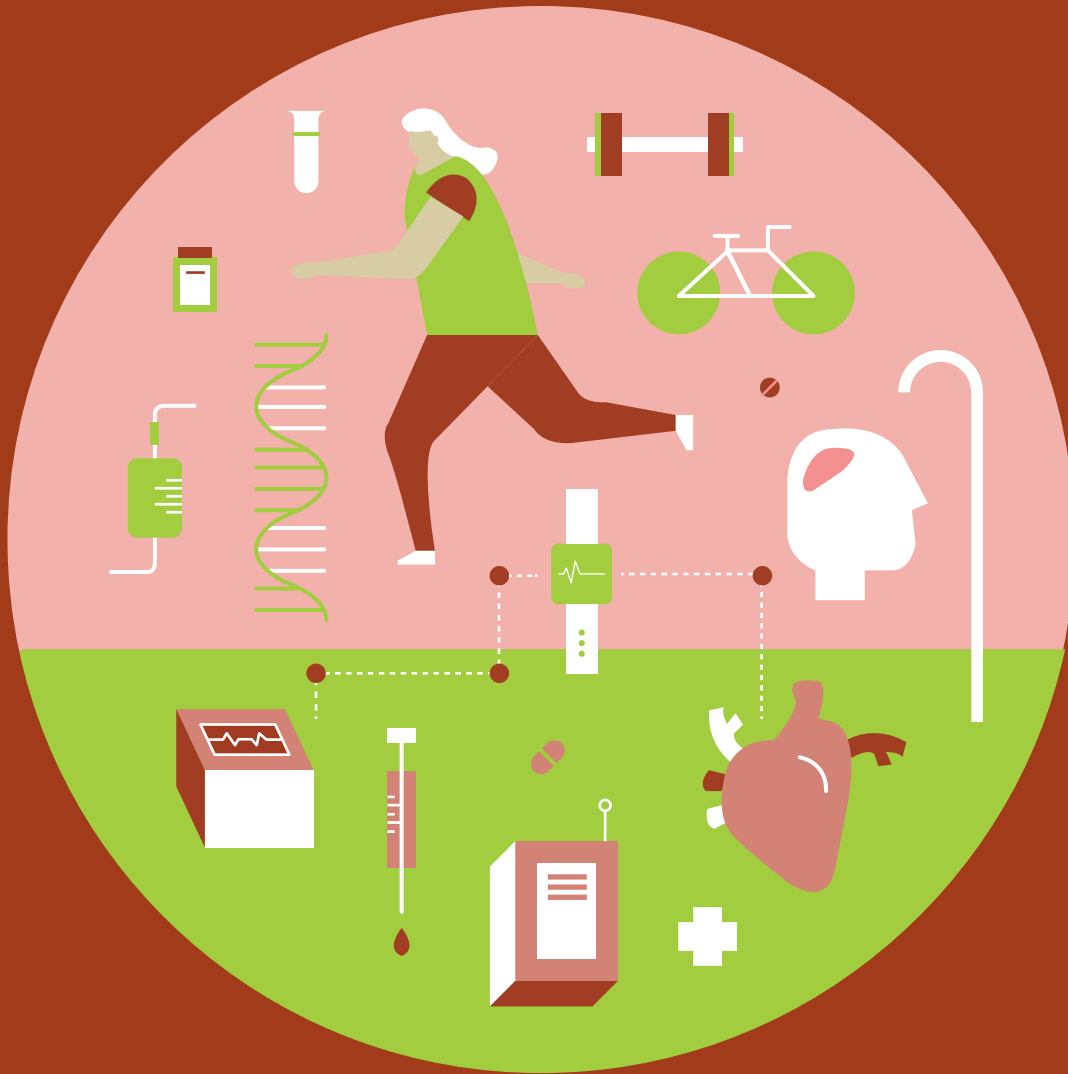
How might our longevity challenge us in 2026?

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?

Summary

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Driving forces and scenarios at a glance

TOP-DOWN STATE-DRIVEN HEALTHCARE DECISION-MAKING

SHORTER, HEALTHY LIFE

LONGER, HEALTHY LIFE

Scenario 1: Stuck In The Middle: Institutional Squeeze
- Top-down decision-making by government
- A shorter, healthy life

Scenario 4: Living Long, Living Well?
- Top-down decision-making by government
- A longer, healthy life

Scenario 2: Auntie May's Cooperative
- Bottom-up, community-driven care
- A shorter, healthy life

Scenario 3: Jon Teo In Shangri-La: Self-Help Not Enough
- Bottom-up, community-driven care
- A longer, healthy life

BOTTOM-UP, COMMUNITY-DRIVEN HEALTHCARE DECISION-MAKING

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.

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STRATEGY 3

Do Not Go Gently:

Preparing for the Great Good Night

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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.

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**TRACK CAPTAIN,
CHRISTOPHER GEE'S REFLECTIONS**

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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.
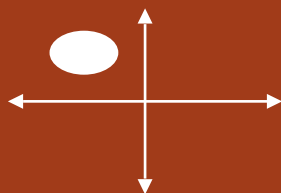
LONGEVITY
Scenarios
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SCENARIO 1

Stuck in the Middle: Institutional Squeeze

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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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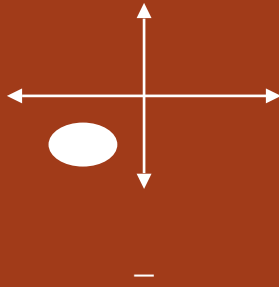
CRITICAL UNCERTAINTIES

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

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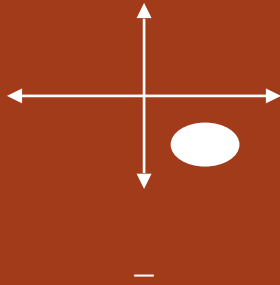
CRITICAL UNCERTAINTIES

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 been 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?

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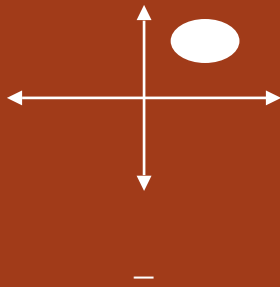
CRITICAL UNCERTAINTIES

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.

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