CENTRE FOR STRATEGIC FUTURES

FORESIGHT

About the Centre for Strategic Futures

The Centre for Strategic Futures (CSF) was established in 2009 as part of the Strategic Policy Office in the Public Service Division of the Prime Minister's Office. This situates it at the heart of the government, with the ability to reach across agency stovepipes.

The Centre is very much like a think tank within government, focused on researching emerging issues with potentially significant implications on policy, and experimenting with new methodologies for generating insights about the future.

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Foreword

This is a special year for Singapore – we celebrate 50 years of independence and it is a time for both reflection on what we have built over the last half century, and for thinking about what the future will bring.

Fifty years ago, Singapore was a colonial entrepot with limited industry, and few urban developments beyond the central city area. The metropolis we have today is the product of long-term planning and decades of concerted effort to realise these plans. Our new financial district in Marina Bay and the Gardens by the Bay are built entirely on reclaimed land that was planned three decades ago. The Marina Barrage that has allowed the bay to serve as a freshwater reservoir was also conceptualised in the 1980s. This was not called "foresight" in the early days, but it entailed having clarity of vision, navigating uncertainty and adopting strategies that would allow us to take advantage of opportunities, and confront and surmount challenges.

One can never predict the future. Still, in the Singapore Government, we have sought to systematically build up the capacity to think deeply about what may lie ahead. I was fortunate to be involved in the exercise to develop the first set of National Scenarios in 1997. While the scenarios exercise was not so much to forecast the future, many who worked on the scenarios found that the process of thinking through possible trajectories for different driving forces, and the insights we gleaned from the process, have shaped how we think and frame issues in the two decades since. The scenarios themselves have also given us a valuable way of understanding how the world may change.

The Government set up the Centre for Strategic Futures (CSF) in 2009 as a futures think tank within government, to pursue long-term futures research, experiment with methodologies, and build foresight capabilities across the Public Service. The creation of a unit like CSF is a testament to the continued emphasis on foresight in the Singapore Government.

Foresight in our government, is not a paper exercise about theories – every day, policy decisions for the short-, medium- and long-term are being made, and foresight informs this process. We are not just thinking about what tomorrow will bring, but also about what we can do about it now. Thus, while CSF in its foresight work deals with research into emerging issues, it has increasingly partnered government agencies in our growing foresight community on the translation of insights into strategy. Projects such as the one on the impact of automation on the Singapore workforce, and the evolving role of the state, illustrate some of these endeavours.

I hope you enjoy the discussions on key ideas explored and insights gained by our CSF team over the last year in this publication.

Peter Ong
Head, Civil Service

Welcome Note

At the Centre for Strategic Futures (CSF), we are often asked how we see the future playing out, or what the future of Singapore might be. To that question, I often reply that the futures (in the plural) that we focus on uncovering are the ones that people are not thinking enough about. Our role is not to predict, but to signal to decision-makers new opportunities and new risks that they might not otherwise be alert to.

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The issues that we choose to tackle vary from year to year, and the collection of articles in this publication captures our efforts over the past year. Some are continuations or offshoots of previous projects as we sought to deepen our understanding and bring the insights closer to the audience. Others are more exploratory in nature, looking at new issues which we think could have significant impact on Singapore. Our aim is to have a portfolio that covers the important territory, but also ventures into the less defined.

To go about these projects, we had to go beyond our small (though relentlessly curious and enthusiastic) team in many ways. We spoke to people from different backgrounds, across the public and private sectors, from academia and civil society, to get a sense of where assessments converge, and also pay close attention to where opinions and experiences differ. It is through new ideas and weak signals that we hope to reduce the number of "unknown unknowns". As the scenario planners at Shell put it, "The future is neither completely predictable nor completely random."

We bring all our projects to different audiences within the Singapore Government so that these ideas and insights can contribute to policy formulation, decision-making and resource allocation within the Government. On this front, we benefit greatly from the fact that we are not alone in our foresight efforts within the Singapore Public Service. There is a growing pool of futurists in other government agencies, who, like CSF, are on the same quest to use futures to inform the present. Two articles in this publication reflect the results of such partnerships – we worked with the Ministry of Trade and Industry's Futures Group on a scan for key trends in battery technology and renewable energy, and collaborated with the Ministry of Manpower to study the impact of automation on the Singapore workforce.

The articles in *Foresight 2015* are by no means the final answers to the questions we have thought deeply about. I hope you enjoy reading about our journey over the past year, and we would love to hear your thoughts and comments on them. We are also constantly on the lookout for new ideas, so do let us know if you have suggestions on what we could pursue.

Joan Moh
Head, Centre for Strategic Futures

2014 Highlights

Rahul Daswani

Small countries like Singapore cannot change the world but the more we understand global trends and emerging challenges, the better we will be able to adapt to benefit from these trends and tackle these challenges.

The mission of the Centre for Strategic Futures (CSF) is to position the Singapore Government to navigate emerging strategic challenges and harness potential opportunities. We experiment with and apply a range of foresight tools to research and analyse issues of strategic importance to Singapore. With our findings, we seek to prompt decision-makers and policy-makers in the Singapore Government to think differently about how the future may unfold. Through our various platforms, we seek to develop a collective instinct and capacity for strategic thinking across the government. This article provides a summary of CSF's work in 2014, some of which have been featured in this publication.

Research and Analysis

Figure 1: The Centre for Strategic Futures' Scenario Planning Plus Toolkit

We apply different tools from our Scenario Planning Plus (SP+) toolkit at various stages of our foresight process, from defining the issue we are trying to address, to sense-making, to exploring the range of plausible futures and the strategies we might employ to thrive in different scenarios. We often use a combination of tools in our projects.

Our project on Trust was a good illustration of how we explored the dynamics of public trust in government through the use of a realistic operating environment that takes into account the nuances of the trust relationship between the public and government. In terms of strategy design, we experimented with using gaming to help public officers grapple with the abstract concept of public trust and how the choices they make in their daily work can impact and shape public trust. We discuss this Trust project in more detail from pages 37 to 44. We believe that foresight work needs to go beyond theoretical frameworks and should help organisations develop the instincts and reflexes to deal with change. Formats like games and facilitated conversations can be helpful in this respect, and the conversation toolkit we developed on the evolving role of the state, described from pages 65 to 72, is another example of our efforts in this area.

Some of the projects we worked on in 2014 were offshoots of earlier projects. In 2012, CSF undertook the Emerging Strategic Issues (ESI) 2.0 project, which identified and prioritised emerging risks and priorities for the Singapore Government. Through the exercise, we shortlisted 48 issues that agencies collectively assessed would have a significant impact on Singapore, but that the government was not prepared for. In 2014, we conducted "deep dives" into a few of these issues in partnership with other ministries, to discuss the specific policy challenges posed and how the government might address these challenges. One of the "deep dives" was into the impact of automation on jobs and workers. Together with the Ministry of Manpower, we jointly studied how the confluence of advances in technologies such as robotics, artificial intelligence and big data analytics could impact different job types. The findings for this study can be found from pages 21 to 28. We also explored the future of citizenship, investigating the emerging challenges and implications for policy-makers. The key issues and questions that arose are discussed from pages 29 to 36.

Engagements and Connections

CSF actively seeks out fresh perspectives from thinkers outside the Singapore Government, and has sought to grow and deepen our networks in the past year. We are grateful for the privilege of exchanging perspectives with more than 150 thought leaders locally and abroad annually. These exchanges have not only given us fresh insights into various issues, but have also helped us to develop our thinking and practice in futures methodology and content.

In 2014, we had the opportunity to meet with a number of experts during their trips to Singapore, and engaged them on topics spanning complexity, governance, social dynamics, geopolitics, technology, and economics. Some key highlights for us were the discussions we had with Catherine Fieschi, Director of UK think tank Counterpoint, on the anxieties of the middle classes in advanced economies. We also had several engaging sessions with Paul Light, the Paulette Goddard Professor of Public Service at NYU Wagner and author of *A Government Ill Executed: The Decline of the Federal Service and How to Reverse It (2008)*, on shared insights on the causes of government failure, and strategies to avoid "a

sclerotic impulse" in the public service. We also met Professor Scott Page, Director of the Centre for the Study of Complex Systems at the University of Michigan, on the value of cognitive diversity in a complex environment, and the importance of organisations discerning when to value diversity and when to value homogeneity.

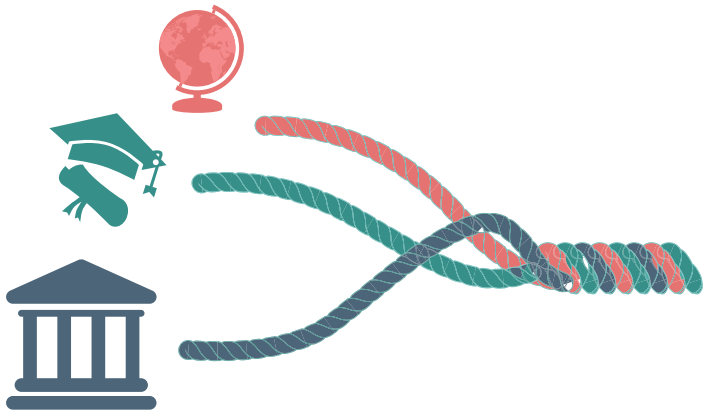

Figure 2: CSF engages with a variety of thought leaders

To connect with our foresight counterparts in other governments and with organisations engaged in innovative research and thinking, we made trips in 2014 to the US, the UK and China. Members of the CSF team were also invited to speak on strategic foresight in the Singapore Government at the 5th International Conference on Foresight organised by the Japan National Institute of Science and Technology Policy (NISTEP) and the School of International Futures (SOIF) – Hawaii Research Centre for Futures Studies' (HRCFS) Asia-Pacific@Hawaii Spring Retreat. At the World Economic Forum (WEF)'s invitation, CSF joined its Global Strategic Foresight Community as a founding member, participating in its inaugural meeting in New York. These platforms provided a valuable opportunity to exchange ideas with senior futures practitioners from leading public, private and civil society organisations, and thought leaders in various fields.

Distinguished Visitor Programme and Distinguished International Fellows

In 2014, CSF introduced two new programmes. The Distinguished Visitor Programme facilitates more in-depth engagements with top thinkers and experts while the Distinguished International Fellows programme recognises experts who are long-standing contributors to the Singapore foresight community.

Our first two Distinguished Visitors were risk experts Nassim Nicholas Taleb, author of *The Black Swan* and *Antifragile*, and Richard Bookstaber, author of *A Demon of Our Own Design*. During their visits, we had rich discussions on how systems could be made more "anti-fragile" by subjecting them to stressors and how we might better manage the impact of cascading shocks in systems where risks were tightly coupled.

In recognition of their long-standing relationship with CSF and their contributions to the broader futures community in the Singapore Government, CSF appointed Peter Schwartz, an eminent futurist and currently Senior Vice President for Global Government Relations and Strategic Planning for Salesforce.com, and Richard O'Neill, President of The Highlands Group, as our Distinguished International Fellows in 2014.

Capability Building

Developing the Public Service's capacity to think about and prepare for the future continues to be a key part of CSF's role.

We convene a range of platforms that bring together policy-makers and futurists to explore and discuss emerging issues and their implications. Chaired by our Head of Civil Service, the Strategic Futures Network brings together senior decision-makers from all the ministries and major statutory boards. At the working level, CSF convenes a bi-monthly platform we call Sandbox where futurists across the Singapore Government meet to exchange ideas and updates on ongoing projects. CSF also convenes FutureChats between visiting experts, futurists and policy-makers in the Singapore Government. Our Senior Advisor, Mr Peter Ho, chairs Futures Conversations, a discussion with futurists and policy-makers on emerging issues and their strategic implications.

CSF runs a series of courses dubbed "FutureCraft" at the Civil Service College which teaches some 150 public servants how they might use foresight tools in their policy research and formulation. Besides sharing the usage of the SP+ tools, FutureCraft serves as a platform for foresight practitioners within the Singapore Government to exchange their experiences on the successes, challenges and best practices for foresight.

Tale of Two Cities Holds Lessons for Singapore

Peter Ho
Senior Advisor, CSF

Boston, a former port turned IT hub, shows the importance of economic complexity. Detroit, dependent on the car industry, is the flip side.

Complexity is a powerful lens that can illuminate for us the challenges of urban governance, and what we can do in response. This is because cities, like all human systems, are enormously complex. But it was not always so. During the Neolithic Revolution, agriculture emerged and people began to produce food, instead of just hunt for it. The nomadic life of the hunter-gatherers began to be replaced by more sedentary societies based in human settlements like villages and towns. Villages and towns grew into cities over time. The urban milieu became the catalyst for the development of a multitude of new human capabilities. Over time, people were no longer just hunters or farmers. They became builders, craftsmen, businessmen, entertainers, teachers, scholars and so on. As inhabitants of towns and cities took on increasingly specialised roles, and as cities grew, social and economic complexity increased.

But the human impulse is to reduce complexity. The complexity that began to emerge in towns and cities created an imperative for a new form of organisation – government – to manage it. An early, rudimentary form of government was the council of elders, which governed through consensus rather than imposed rules. But as cities evolved, they grew larger and more complex. Furthermore, ambitious rulers began conquering other cities and extending their reach of power. The challenges of controlling geographically diverse and complex cities demanded a more sophisticated form of urban governance than just the council of elders.

Establishing Rules to Manage Complexity

The Code of Hammurabi, dating back to around 1754BC, provides clues as to how early civilisation managed urban complexity. The code comprised some 282 laws covering a variety of subjects. It prescribed punishments for those who flouted it. Through the code, King Hammurabi maintained political order and managed the complexity arising from the different practices, precedents and norms in the Babylonian empire.

What is interesting is the way in which the code appears to have promoted economic freedom and diversity: the code paints a picture of an economy driven by private property, as the king did not own any land. The code was an instrument to manage an early form of capitalism. Today, we recognise in it many aspects of the modern economy: the enforcement of property rights, the protection of the weak against the strong, and the use of commodity as money and credit. The code freed up the economy, which in turn promoted long-term growth. Literacy, political structures, levels of industrialisation and per capita income are conventional indicators of economic health.

However, economists Ricardo Hausmann and Cesar Hidalgo have suggested that the most important predictor of growth is economic complexity, or the diversity of products that an economy possesses. Countries with the most natural resources tend to have simple economies, as they do not produce unique goods. Thus, economies that are dependent on a particular kind of export – for example, oil or timber – may do well when demand for these products is high, but fail in the long run because they are not diversified and cannot compete in other sectors. A case in point is Detroit, a city that built its fortunes on the automotive industry. Detroit became highly reliant on the automotive industry. But after World War II, automakers began to move to suburban areas, outside the city proper. This in turn led to residential movement to the suburbs. From a peak of 1.85 million in 1950, Detroit's population today is less than 700,000, a decline of more than 60%. Population flight led to a loss of tax base and jobs. Detroit declared bankruptcy in 2013, and its unemployment that year was 23.1%.

Catalysing Complexity: the Case of Boston

The ability to produce unique goods and services depends on the amount of "productive knowledge" in an economy. This is the kind of knowledge derived from experience and exposure to different sectors and domains of production. Invention and innovation occur when these bits of productive knowledge are connected. Improvements to economic growth can be achieved either by harnessing existing capabilities in new combinations, or by accruing new capabilities to expand the productive potential of the country. So, urban governance is not all about reducing complexity. Instead, in some cases, it should catalyse complexity, by creating more networks to connect multiple economic domains.

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For example, in contrast to Detroit, Boston is a city that was shocked and surprised, but then reinvented itself, at least three times in its 400-year history. Harvard economist Edward Glaeser tells of how Boston, in the 17th and 18th centuries, was the leading port in America. But by the mid-18th century, Boston as a port had been eclipsed, first by Philadelphia, then by New York. What saved Boston from the fate of other New England ports was a large population of Irish immigrants. By the late 19th century, Boston had transformed itself into a centre of manufacturing built on immigrant labour, and it prospered on the back of America's industrialisation. But Boston's heady period of growth was over by 1920. Population growth slowed and even began to shrink after 1950.

However, in the last two decades of the 20th century, Boston again reinvented itself, this time from an industrial city in decline into a high-tech, service-based economy. Its population grew rapidly between 1980 and 2000, reversing 50 years of stagnation and shrinkage. Boston is now a centre of the information economy. Today, education is the dominant factor in Boston's economy. Boston ranks highly in its share of employees in managerial and professional jobs. Its top four export industries today are all skills-based: technology, finance, education and health care.

Using the lens of economic complexity, the Boston case shows us that the ability to re-orientate and create new value hinges on economic complexity. From its earliest days, Boston was never just a port. Artisans manufactured some of the goods traded on Bostonian ships. Boston had banks, brokers and insurers from its seafaring days because shipping needed financial services. Education was always valued in the colony – Harvard University was founded in 1636 with government money. Its rich, complex strengths and competencies enabled Boston to reach within itself to find new connections and value propositions. These enabled Boston to reinvent itself time and again when other more brittle, less economically complex cities like Detroit, heavily dependent on manufacturing, went into terminal decline.

Wicked Problems

As complex systems, cities produce wicked problems. Political scientist Horst Rittel described wicked problems as highly complex issues: large, intractable, with no immediate or obvious solutions. They have causes and influencing factors that are not easily determined ex-ante. They hardly ever sit conveniently within the responsibility of any single agency or authority. Worse, wicked problems have many stakeholders who not only have different perspectives, but who also do not necessarily share the same goals. It is not difficult to find wicked problems in an urban setting: ageing, environment, transportation, urban planning, and so on. In other words, wicked problems cause big headaches for governments.

Worse, wicked problems have many stakeholders who not only have different perspectives, but who also do not necessarily share the same goals.

Boundaries and Complexity

Boundaries are very often used to reduce complexity. This is achieved by drawing boundaries around smaller parts of a larger system in order to make things easier to manage. Nations are divided into provinces, provinces into cities, cities into municipalities, and so on. Companies are organised into departments, and governments into ministries.

This approach is useful and necessary – up to a point. But it is often not adequate for addressing wicked problems. The reality is that no single government agency is really equipped to deal with wicked problems in its entirety. Letting ministries and government agencies tackle different wicked problems on their own often leads to duplication or contradictions, waste and sub-optimal policies, and even new wicked problems.

The Whole-of-Government Approach

Breaking down organisational silos is key to tackling the wicked problems of complexity. Because wicked problems are inherently complex in their scale of uncertainty and disagreement, they are best tackled by diverse teams, drawing on different knowledge systems and experiences, and sharing information drawn from large parts, if not the whole, of the government system. In Singapore, we call this effort the Whole-of-Government approach. We adopt the Whole-of-Government approach in urban planning. While other countries have large land areas, which allow new cities to develop and replace other cities that may decline in relevance and fortune, Singapore as a small island nation does not have that luxury. Urban planning in Singapore needs to take into account the complexity of packing in housing, green space, industrial land, commercial and retail space, land for transportation needs, and military training areas, all within the confines of a small island of 718 sq km.

Because wicked problems are inherently complex in their scale of uncertainty and disagreement, they are best tackled by diverse teams, drawing on different knowledge systems and experiences, and sharing information drawn from large parts, if not the whole, of the government system.

In Singapore, the entire process, from the review of our strategic Concept Plan to the implementation of a detailed land-use Master Plan, involves close collaboration among economic, social and development ministries and agencies, as well as consultations with various stakeholders in the private and the public sectors. This whole-of-government approach enables all stakeholders to better understand the interdependencies and implications of land use and strategic decisions. One example of the approach in coordinated and strategic land use is the Marina Barrage. It is a huge fresh-water reservoir created by damming the mouth of the Singapore River. It is located right in the middle of the Central Business District, an astonishing achievement considering Singapore's small size. Yet it had been planned more than 20 years ago, because the policymakers and urban planners understood even then that issues such as climate change and increasing demand for water would emerge in the future. Today, the Marina Barrage serves multiple functions. It alleviates flooding in low-lying city areas by keeping seawater out, and boosts Singapore's water supply by storing rainwater during the monsoon seasons. It is also used for recreational water activities.

Complexity and Experimentation

The challenges that complexity throws up cannot be overcome simply by replicating what worked well in the past. In complex systems like cities, the Newtonian characteristic of clear cause and predictable effect is often absent. It is not always possible to use deterministic, linear analysis to work out the effects of a policy input. Governments must be willing to put aside "tried and tested" perspectives, and instead experiment with new approaches and solutions.

In complex operating environments, exploration and experimentation are often more valuable than predictions of analytical models. As military analysts would say, in unknown terrain, a compass is more useful than a map. So rather than plan exhaustively for every contingency, we must be prepared to experiment, even if we cannot be entirely certain of the outcome. Pilot programmes, prototypes and "beta versions" should be the norm in dealing with wicked problems. If they succeed, then they can be expanded. If they fail, then the damage is contained.

Experiments in Behavioural Science

In Singapore, we have taken this approach in addressing the problem of congestion on public transport systems. Traditional approaches to alleviating congestion on public transportation systems often involve supply-side measures such as increasing the frequency of train and bus services, growing fleet sizes, using vehicles with larger capacities, or building new routes. However, new strategies are also needed given the rise in complexity and diverse expectations.

In Singapore, we are currently experimenting with a palette of behavioural levers to encourage commuters to make changes to their travel patterns to help reduce transportation demand during peak hours. These include providing free travel on rail trips into the city in the earlier part of weekday mornings, working with various organisations to pilot flexible work arrangements that stagger reporting hours or enable working offsite, and cash rewards for making morning off-peak trips on the rail system. These experiments carry relatively little risk, but enable us to try out new ways to address the congestion problem.

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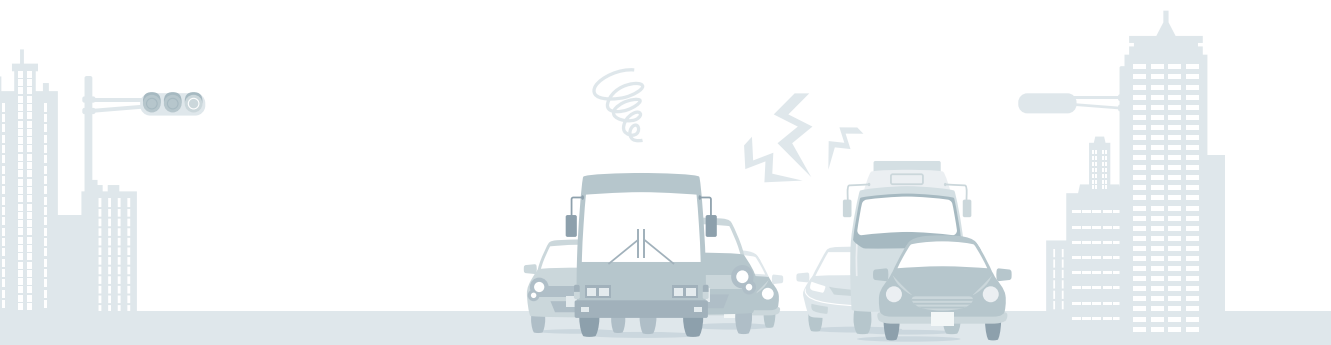

Complexity Causes Uncertainty

The complexity of the operating environment of cities creates uncertainty. As a result, governments often have to make big decisions, and develop plans and policies, under conditions of incomplete information and uncertain outcomes. This is an additional source of complexity across time, not just within a specific time frame. Prediction is not possible when dealing with inter-temporal complexity. Instead, the approach should be to reduce uncertainty where possible. An orientation towards thinking about the future in a systematic way is the right approach. Some of us call this process foresight, or futures thinking. The practice of foresight in government is really about identifying the factors that will shape the future. This is so that policy makers can devise strategies and formulate policies to maintain positive trajectories and shift negative ones in a more positive direction. The goal is to make better decisions today and shape the future, not to predict what it will be.

Prediction is not possible when dealing with inter-temporal complexity. Instead, the approach should be to reduce uncertainty where possible.

Scenario Planning

Scenario planning is one way to do this, in the sense that it projects different possible futures based on our understanding of the operating environment today. Used intelligently, it can be a very important tool for planning, and can help overcome cognitive biases by challenging our mental models. Scenarios are one of the most popular and persuasive methods used to provide a plausible description of what might happen in the future. They assist in the selection of strategies through the identification of possible futures. Scenarios make people aware of problems, uncertainties, challenges and opportunities that such an environment would present, open up their imagination and initiate learning processes.

For the past two decades, the Singapore Government has been using scenario planning. National scenarios are developed at the Whole-of-Government level every few years. These then help the ministries and agencies in anticipating in their policies, plans and even budgets for the challenges and opportunities that could arise in the future. Our urban Concept Plan and Master Plan are based on scenarios developed for a Singapore many years into the future. Scenarios have therefore been very useful in helping our city-state to navigate complexity across time.

Big Data and Complexity Science

The agents within a complex system like a city – the people, public and private institutions, markets and networks – all generate a lot of data, much of which is location-based. Combined, this constitutes what we now refer to as big data. Complexity science offers a way to marry different tools – such as agent-based modelling that is used *inter alia* for traffic flow dynamics, combined with insights from big data using data analytics – to gain a better understanding of the city in all its complexity.

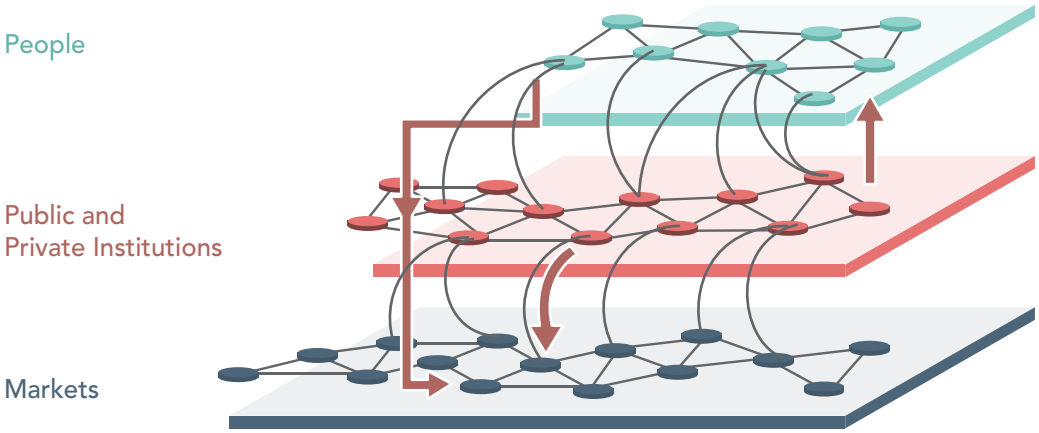

Figure 1: Agents within a Complex System of a City

The tools of complexity science combined with the insights from big data can help us to "see" the city differently, through new lenses. What then are the fresh possibilities to "imagine" and "shape" a different and better city for the future? And if we can imagine a different city of the future, we can take active steps towards realising it. We could imagine driver-less taxis that allow shared trips to reduce pressure on the roads while meeting passengers' demand. We could also imagine traffic lights that change in response to traffic conditions that are monitored by sensors on the roads. In societies that are rapidly ageing, like in Singapore, this could mean placing a network of sensors in the elderly's homes, which could monitor and track their daily living movement and patterns, and send out alerts to family members or neighbours when they deviate from daily norms, such as the frequency of use of the toilet, fall detection, and so on.

Conclusion

The complexity of cities needs to be managed. Too little complexity can lead to brittleness. The right level of economic and social complexity that gives a city the resilience of say, Boston, is partly due to good luck, but mostly due to good governance.

The example of Boston teaches us that nothing is forever, and that the most adaptable and flexible cities are the ones that will survive and succeed over the long term. The rise of complexity in the world today throws up enormous challenges for urban governance. Foresight will help governments to better deal with complexity and its challenges. So too will the exploitation of big data and the new tools of complexity science. But fundamental changes are also needed to the organisation of government.

The Whole-of-Government approach should be nurtured and extended, where possible, to include business, civil society and other actors. Collectively, they contribute to the broad concept of governance, even if they are not part of "government", traditionally defined. The future of urban governance lies in such systems-level coordination, to facilitate better forward planning, foresight and futures thinking.

The future of urban governance lies in such systems-level coordination, to facilitate better forward planning, foresight and futures thinking.

This article was adapted from a speech delivered in February 2015 at a workshop on Understanding Complexity – Offering Solutions to Problems of the 21st Century in Vienna, Austria.

Research and Analysis

Automation and the Future of Work

Risk Management & Futures Unit, Ministry of Manpower,
and Centre for Strategic Futures

Adapted by Tiana Desker-Torvinen, Shashikalah Krishnan and Terence Poon from the joint study

PLC Industries is a precision engineering firm in Singapore that manufactures components for products ranging from surgical microscopes to high-speed cameras. Recently, they introduced two UR10 robotic arms – a type of unfenced robot that mimics the movement of a human arm. The introduction of the two robotic arms improved efficiency at PLC by 40% and boosted product quality. PLC also achieved significant labour savings; one worker can now perform tasks that previously required four workers.

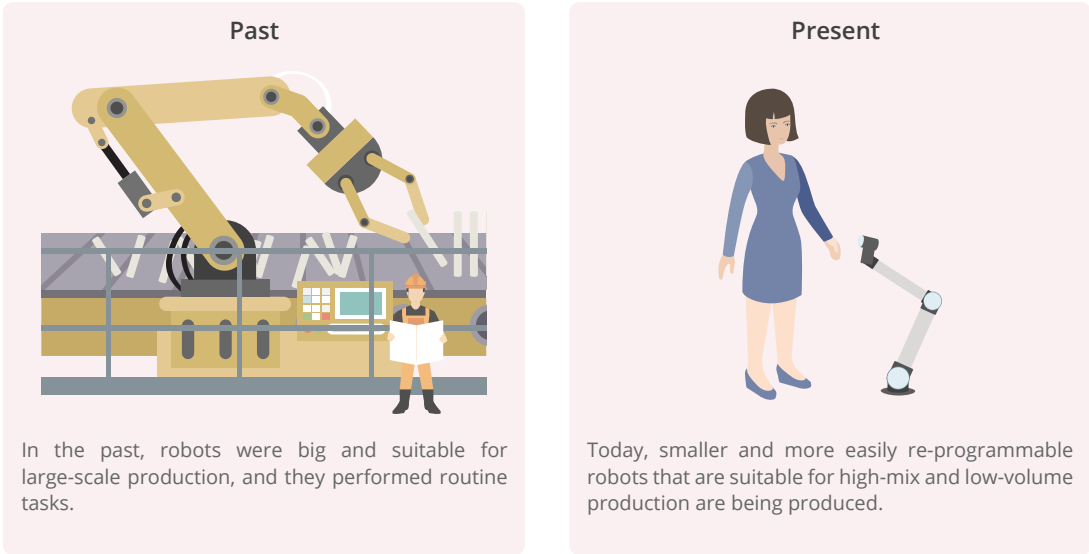

Figure 1: New Wave of Technologies: What has Changed?

We are witnessing a new era of automation – robots can perform not just manual tasks, but also thinking tasks. Where big industrial robots required high production volumes and were hard to re-programme, small robots such as the UR10 can be re-programmed quickly for different tasks and used for smaller production volumes. While only routine tasks could be automated in the past, powerful algorithms and big data today enable machines to perform non-routine cognitive tasks such as pattern recognition.

There is tremendous potential for automation to improve the productivity and competitiveness of firms; however, the effect on jobs is much debated. A survey of experts showed that roughly half (48%) believed machines would displace significant numbers of workers and create high levels of unemployment. The other half (52%) believed that advances in automation would not displace workers, but instead create new categories of jobs and whole new industries, as has been the case historically.[1]

Governments, businesses, and workers will all need to think about how to respond to the opportunities and challenges posed by automation. This essay focuses on the role of governments, specifically, what policy-makers and regulators can do to enable the full benefits of automation to be captured and mitigate the displacement risks.

In 2012, the Centre for Strategic Futures (CSF) undertook the Emerging Strategic Issues project, which identified and prioritised emerging risks and opportunities for the Singapore Government. Over 300 issues were assessed on (a) their impact on public policy, (b) Government's readiness to address the issue, and (c) whether the issue must be addressed urgently, within the next five years. After a voting exercise by decision-makers, automation and jobs emerged as the issue of greatest concern.

Together with Singapore's Ministry of Manpower, we conducted a "deep dive" study on the impact of automation on the Singapore workforce, and how current policy frameworks may need to change. The study was conducted in two phases:

- Phase 1 – Quantitative Analysis. We wanted to understand what types of occupations had a high probability of being automated in the next 20 years. The team cross-referenced two studies. The 2013 study titled "The Future of Employment: How Susceptible are Jobs to Computerisation?" by economist Carl Frey and machine learning expert Michael Osborne rated the technical automatability of occupations in the U.S.[2] The second study by Singapore's Ministry of Manpower rated "good jobs" in Singapore according to how wages progressed along with age. By cross-referencing these studies and adding demographic data on the Singapore workforce, the team identified four groups of workers to examine in depth and draw insights into the ways in which automation would affect workers in Singapore.

  Our study found that more than one-third of the jobs held by Singapore citizens were at risk of automation within 5 to 20 years, based on the methodology Frey and Osborne used. (The Frey and Osborne study found nearly half of U.S. jobs at risk of automation.) Overall, lower-skilled jobs were at the greatest risk of displacement although a significant number of higher-skilled jobs may also be at risk.

- Phase 2 – Qualitative Analysis. We wanted to deepen our understanding of the findings of Phase 1, and verify whether the results of the Frey and Osborne study were applicable to the Singapore context, especially as businesses may choose not to automate even where automation is technically possible. The team studied the impact of automation in four different occupational clusters: (a) manufacturing, (b) professional services, (c) high-touch service jobs, and (d) low-entry-barrier jobs. We selected one occupation for each of these categories for further study as test cases. We then interviewed around 30 business owners, educational institutions, and industry professionals to test our assumptions about how automation would affect these clusters.

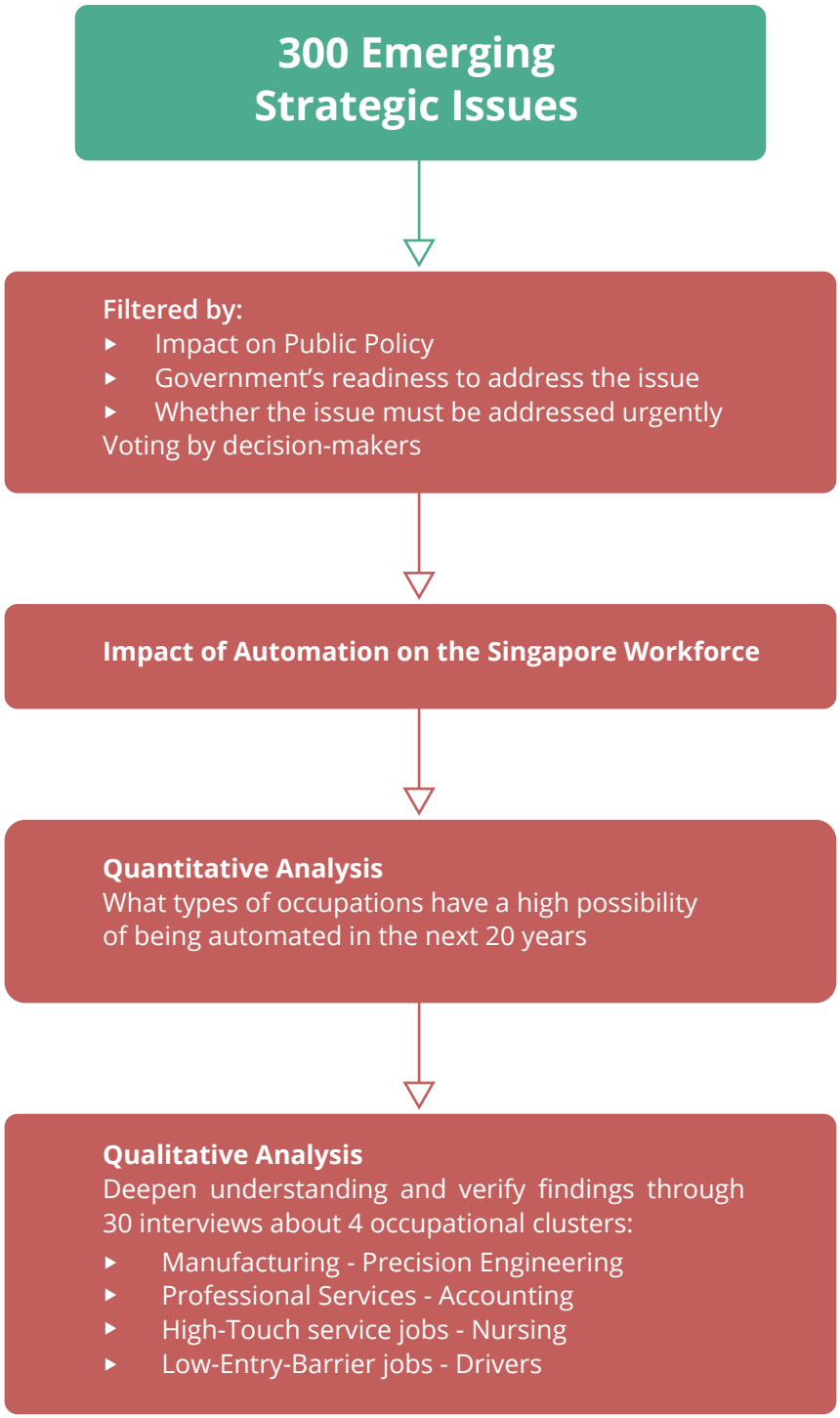

Figure 2: Journey Map of the Project

- Manufacturing. We wanted to verify whether Singaporean firms were indeed adopting advanced robotics, and how automation affected the industry and workers. We chose to focus on precision engineering, because its capabilities are needed across manufacturing sectors.

  We found that flexible and easily re-programmable robots such as the UR10 robotic arms were on the cusp of widespread adoption. While traditional industrial robots suited mass manufacturers, flexible robots enabled high-mix, low-volume industries, such as precision engineering in Singapore, to automate. Because smaller firms were galvanised by labour constraints to invest in flexible robots, we anticipate relatively few job losses in "high-mix, low volume" manufacturing due to automation, at least initially, though over the longer term, there may be displacement risks.

  Overall, advanced robotics held the prospect of boosting the productivity and competitiveness of the manufacturing sector in Singapore. However, based on our interviews with industry professionals, we found several bottle-necks to adoption. Firms reported a lack of services such as systems integration, because there was not yet a critical mass of users to develop the eco-system of automation-related industries. Additionally, there was a shortage of high-skilled technicians able to operate at the man-machine interface.

- Professional Services. Given rising concerns that machine learning and artificial intelligence could displace high-skilled professionals, we wanted to investigate whether early signs of such developments were emerging.[3]

  We chose to focus on accounting, as a major employer amongst these industries. In future, routine tasks such as the preparation of financial statements and tax returns will be automatable. Algorithms will also be able to write basic analytical reports. Such changes, including real-time reporting, will boost the accountancy sector's competitiveness and change the tasks and skills accountants need in 5 to 10 years. Accountants will need to handle both structured and unstructured data, and be able to discern insights and make decisions with the aid of data analytics. Social intelligence will become more critical, as accountants specialise in tasks such as advising clients on taxation matters, handling disputed claims or devising strategies.

- High-Touch Services. For high-touch jobs such as healthcare and pre-school education, we wanted to verify Frey and Osborne's assessment that these jobs cannot be easily automated as they require social intelligence.

  Focusing on nurses, we found that there is tremendous scope for adopting assistive technologies, but there is indeed little risk that such technologies will displace nursing jobs. Assistive technologies will reduce the need for nurses and healthcare assistants to handle tasks such as moving patients and dispensing medicines. However, workers are likely to be redeployed to provide more personal attention to patients, rather than displaced. This will allow for higher standards of care to be delivered. The nature of the impact of automation in high touch services such as nursing suggests that while automation can help better manage the increases in demand for healthcare services in the coming years as the population ages, it is unlikely to result in a significant reduction in labour needs.

- Low-Entry-Barrier Work. The greatest displacement risks were for workers in jobs with low barriers to entry. These are jobs that do not require a polytechnic diploma or college degree, and where the necessary skills can be acquired on the job. Occupations in this category include drivers, retail assistants, clerical workers, and security guards, and all these are at high risk of being automated.

  These jobs play an important role in Singapore's eco-system of work, because they may provide transitory employment for people who have been retrenched. Moreover, a significant proportion of Singaporean workers in jobs with low barriers to entry are mature workers, and this makes the prospect of re-skilling to take on a new type of work more challenging. Looking ahead, the Ministry of Manpower will be conducting a follow-up study on the future of low-entry-barrier jobs and considering the interventions to protect vulnerable workers.

Manufacturing

- Easily re-programmable robots make it more feasible for high-mix, low-volume firms to automate and raise efficiency
- Automation can help advanced economies to raise the competitiveness of their manufacturing sectors
- The development of an industry ecosystem, for example, systems integrators and human capabilities, could encourage adoption

Professional Services

- Algorithms will perform routine tasks, like preparing tax returns, and write basic analytical reports
- They will improve services, for example, using data analytics to make audits more rigorous
- Future accountants will need to re-skill: to be able to use data analytics to discern insights, and rely more on social intelligence in tasks like advising clients, handling disputes or devising strategies

High-Touch Services

- Assistive forms of automation, for example, to move patients, will help healthcare sector cope with rising demand
- Such forms of automation free up nurses to provide personal attention to patients, raising service standards
- Because nurses are redeployed, however, a significant reduction in labour needs is unlikely

Low-Entry-Barrier Work

- Occupational drivers face the greatest displacement risks as cities explore adopting driverless vehicles
- Because there are low barriers to entry in terms of prior skills training and education, drivers may find it harder to re-skill and find other jobs

Figure 3: Key Research Findings

While our study was focused on the Singaporean labour market, there were some observations from our research that apply to the future of work more broadly:

- Jobs Will Be Transformed. With automation, job roles will evolve; people will spend more time on tasks that require social and creative intelligence and that machines are unable to do. For example, in the case of nursing, technologies that allow for wireless monitoring of patients' conditions, automated drug delivery, and that assist patients with movement will allow nurses to spend more time engaging their patients face-to-face. Nurses would have more time to talk to patients about their course of treatment, problem-solve when new symptoms arise, and provide reassurance and company.

- New Jobs Will Be Created. Historically, technological advances initially result in job losses, but over time, new categories of jobs emerge. Many professions that are in demand today did not exist ten years ago, such as user experience designers and social media managers. In the coming years, this trend is expected to continue. For instance, the introduction of autonomous vehicles will result in the loss of driving jobs, but new jobs will be created in fleet management and the production of the electronic components of the vehicle; electronic components have already risen in the past ten years from 20% to 40% of the value of the car.[4] However, the number of new jobs created may be small relative to the number of jobs lost. For example, in 2010, only 0.5% of workers in the U.S. were employed in new industries that did not exist a decade earlier, and the workers in these industries were substantially better educated than the average population.[5]

What Can Governments Do?

Governments are grappling with the question of how to maximise the systems-level benefits for the economy that advances in robotics, big data and artificial intelligence can bring while minimising the individual hardship for workers and firms that may struggle to adapt to these changes:

- Incentivising Automation to Boost Competitiveness. In advanced economies, the adoption of automation will boost competitiveness. Robotics, for instance, could help countries preserve their manufacturing base or even promote re-shoring. Beyond incentivising firms to adopt advanced robotics in manufacturing through grants and subsidies, governments should also explore promoting an eco-system of automation-related industries. Governments could set up platforms – online communities or networking events – for automation designers to understand and meet industry needs, thus starting a cycle of adoption in industry and growth of related businesses, like systems integration. To help diffuse automation technologies, governments could continue to partner individual firms to demonstrate feasibility, catalyse adoption across industry and nurture automation-related businesses. Meanwhile, automation in the professional services industry would raise the productivity and competitiveness of this sector. Local accountants, for example, could use real-time accounting leveraging cloud technology to offer services abroad. Governments can also remove regulatory barriers that may be hindering the adoption of automation within the professional services industry and beyond.

- Preparing Citizens for the Jobs of the Future. Apart from providing a strong grounding in the STEM subjects so students can work in collaboration with machines, schools will need to focus on those skills that are uniquely human and not automatable. These include the social skills of emotional connection, communication, and persuasion, the creative arts and design, as well as teamwork and leadership.[6] Pre-employment education should prepare students for the jobs of the future, not the jobs of the present. Above all, governments will need to invest in equipping workers with new skills so that they can take on the new jobs that are being created, through incentives for continuing education.

- Managing the Emerging Skills Divide. As described by Tyler Cowen in *Average is Over*, our societies are bisecting into a group whose skills are complementary to machines and whose job prospects are bright, and a much larger group whose skills are in competition with machines and whose job prospects are increasingly grim.[7] How do we ensure that every citizen benefits from the advancements of technology? And what can we do for workers who lack the wherewithal to build the skills needed for the new economy, particularly older workers with less formal education?

  Some have suggested shifting taxes from labour towards capital and assets, but this may reduce investment in the new technologies needed to improve the competiveness of the broader economy. Another suggestion is for governments to provide all citizens a basic income, to value the unpaid labour that people can perform, such as caring for family members and contributing to their local communities when not formally employed; however, this would challenge the view held in many societies that there is almost a moral imperative to work. If indeed this phase of technological advancement marks a break with the historical trend, such that fewer jobs are created than are lost, what then is the place of work in the construction of individual identity?

Our study suggests that automation will yield substantial benefits, whether in boosting economic competitiveness or improving services. While the risks are real that workers may be displaced and income disparities may widen, societies can act to influence outcomes, such as by providing subsidised training programmes so that everyone can reap a share of the benefits of technological progress. Countries can also foster resilience by building up a diverse portfolio of skills and capabilities in their workforce, so workers can better transition to working with new technologies and in new roles. And they can retool the social compact, whether it is the notion of work for income or social safety nets, for an era of change in the structure of the economy and the nature of work. It is easy to think of automation as an external force, jolting societies to react. Yet it also offers societies the chance to shape their futures – today.

As part of the Corporate Planning and Management Department in the Ministry of Manpower, the Risk Management and Futures (RMF) unit scans and studies the changing future landscape for trends, opportunities and risks that could impact the well-being of the Singapore workforce over the medium to long term horizon. RMF's areas of research interest include the future of jobs, skills, technology, social norms and expectations, workplace environment, labour marketplace, and regulations. The team develops insights on possible futures, monitors trend developments and builds capacity for change.

Notes

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A New Framework for Thinking about National Identity

Jared Poon

It is almost a truism that Singapore is a young country – turning 50 this year, Singapore is, on the scale of countries, barely in her teens. No surprise, then, that we are facing some of the same deep questions a teenager might. Who are we? What makes us, us? Which directions do we want our lives to go?

These are difficult questions that the Centre for Strategic Futures (CSF) grappled with in 2014. Fortunately for us, we were not alone. Other people, from governments to academics to lay-citizens, had struggled with the same questions of identity and purpose, and so we found ourselves in good company as we explored these issues.

For insights, we cast our net wide. We looked at the future of citizenship, at the narratives governments use in communicating about the future, and at the things people think make Singaporeans Singaporean. We spoke with thinkers from Singapore and abroad who have been researching these issues. But we also spoke with hawkers and businessmen, with physicists and poets and philosophers. We convened workshops bringing together participants from academia to government, from athletes to digital entrepreneurs.

Among the rich tapestry of insights and ideas that was uncovered, two threads showed up again and again, winding their ways through a wide range of thoughts.

Two Threads of Thinking on National Identity

One thread was the search for some trait that is shared among the members of a nation, and unique to those members. In the case of Singaporeans and Singapore, the examples we collected ranged from the positive ("lucky", "patient", "compassionate") to the not-so-positive ("transactional", "parochial", "insecure"), and from the concrete ("likes chicken rice") to the abstract ("identity crisis"). These were, without exception, purported examples of characteristics seen as common to most (or even all) Singaporeans. While there was widespread and explicit disagreement about what such a characteristic might be, there also seemed to be widespread (if implicit) agreement that there existed some such characteristic, if we could only find it. But might this be mistaken? Might our search for such shared features be, upon reflection, misguided?

A second thread was the tension between national identity and cosmopolitanism. In building a national identity, are we building a divide between "us" and "them", thus undermining the very foundations of a cosmopolitan, inclusive Singaporean society? Is greater love for your countrymen necessarily accompanied by lesser love for foreigners?

Is Being Singaporean About Having Shared Characteristics?

One thing that underlies talk about national identities, in many places, is a search for some sort of shared characteristic.[1] Sometimes this shared characteristic is thought to be a necessary condition (for example, "No one can be Singaporean if they don't like chilli!", "He hasn't been through National Service, so he can't be Singaporean!"[2]), and sometimes this shared characteristic is thought to be a sufficient condition (for example, "If you believe in meritocracy and multiculturalism, you're Singaporean", or "If you are committed to Singapore, you're Singaporean".) In either case, the thought is that there are some shared characteristics that will help us decide who's Singaporean and who isn't.[3]

Such a thought might be misguided, for two reasons. First, being "Singaporean" is like being "Canadian" or being "Malaysian", in that it carries the weight of both a certain cultural identity and legal citizenship. That is, saying someone is Singaporean, or Canadian, or Malaysian, could mean that that person behaves and thinks a certain way, or has a certain legal status, or both. Contrast this to being "Malay", for example, which carries the weight of a certain cultural identity and the weight of a racial or ethnic identity, but does not imply any particular legal citizenship status – after all, someone can be Malay-Singaporean, or Malay-Canadian, or Malay-Malaysian.[4]

When the people we spoke with talked about what it means to be Singaporean, they were searching hard for an elusive answer. This suggests that they are not interested in the question of whether someone is Singaporean in the sense of legal citizenship, because such a question is straightforward and fairly easy to answer – just look at the laws and the records! What the question is really about, then, is about the other component of "being Singaporean", which we had conveniently called "cultural identity" above. Put in plainer English, the question is not really about what makes someone Singaporean, but what makes someone *a part of Singapore*.[5]

Reframing the question this way gets us closer to the answers we are actually looking for, but the question may yet turn out to be futile.[6] Singapore has been described as a *rojak*,[7] so let us take inspiration from that for a moment. What characteristics make the components of a *rojak* part of a *rojak*? We suspect there are none, and looking for such characteristics is a (please forgive the pun) fruitless hunt.[8] Looking for characteristics that make someone a part of Singapore might be likewise fruitless, because there are no such characteristics. To see this, permit us to move from talking about food to a brief digression into the philosophy of biology.

> ... the question is not really about what makes someone Singaporean, but what makes someone *a part of Singapore*.

For a long time, people (biologists and philosophers included) thought that species had essences. That is, they thought that for an organism to belong to a particular species, it had to possess some characteristic (perhaps necessary, perhaps sufficient) that gave it membership in that class. For example, to be a member of the species "tiger", one might have to have the characteristic of having four legs and

sharp claws and stripes. Or maybe, one might have to have a certain DNA structure. Whatever the characteristics were, these would be describing the "essence" of tiger-ness.

It took a surprisingly long time for people to realise that this was not a good way to understand what it means for something to belong to a species. A crippled, declawed tiger is still a tiger, as is a tiger with a skin condition that caused its stripes to fade away. Likewise, the presence of regular mutations (from sunlight, from sexual recombination, from exposure to mutagens) means that every tiger has different DNA – there is no such thing as *the* tiger DNA. The lesson that biologists learned from this is that there is no "essence" of tiger-ness. So, if there's no essence, what makes a tiger a member of the "tiger" species?

Figure 1: Even though many families have shared characteristics, membership in a family does not depend on such shared characteristics at all.

One good answer, we think, is that species are like families.[9] To be part of a family requires you to have certain relations with the other members of the family – you have to be someone's child, or someone's sibling, or something like that. The having, or not having, of other sorts of characteristics just don't matter. Your (perhaps hypothetical) adopted son would be part of your family, even if he looks nothing like you and doesn't like the same food. Conversely, it doesn't matter that your brother's friend looks exactly like your brother, and even likes the same food, the same clothes, the same music. He's not your brother, because he's not in the right relation to you. Membership in a family is about relations and certain historical events (for example birth, adoption, marriage), not about what (other) characteristics one might have.[10]

It might make a lot of sense to think of species as families.[11] Likewise, it might make a lot of sense to think of being a part of Singapore in the same way as we think of being part of a family. Being a part of Singapore, just like being a part of a family, isn't dependent on having any particular set of characteristics of the sort usually listed. Someone can be a part of Singapore despite not having done National Service and despite not loving Singapore, just like someone can be part of a family despite not having gone on any family vacations and not loving the family.

Being a part of Singapore, just like being a part of a family, isn't dependent on having any particular set of characteristics of the sort usually listed.

Conversely, someone can do National Service and love Singapore, and yet not be a part of Singapore (someone might emigrate and lose touch), in the same way someone might join in for family vacations and love the family, but turn out to be just the neighbour's kid.

Being a part of a *rojak*, being a tiger, and being a member of a family turn out to potentially involve the same sort of structure, where a sharing of characteristics isn't essential. If being a part of Singapore is like these other sorts of belonging, then we can start to get a grip on what being a part of Singapore is about, and what it's not about. It's not about what food you like, how you speak, what life experiences you have, or even how you feel about the family or about Singapore. It is about relations and certain historical events.

For example, one could be woven into the fabric of the family suddenly, such as by birth or adoption. One could also be woven in slowly, such as by marriage after a long courtship, or by a family retainer's succession of small contributions to the family's health and well-being. Even a piece of jewellery can be part of the family, if it has been in the family for long enough.

The parallels in the case of being a part of a nation are more complex, but worthy of exploration. One might become a part of Singapore suddenly, as with birth or marriage, or one might become a part more slowly, such as by a succession of small contributions to Singapore's health and well-being, or just by being visible in Singapore for long enough. This latter point, we think, is quite interesting – the elderly man who plays the harmonica at the subway station every morning might be known to several generations of people who live in the neighbourhood, and he becomes a part of Singapore simply in virtue of being so visible for so long.

What all this points to is that there is a lot of richness to the concept of belonging to a nation, and our analysis that it depends on relations and certain historical events barely grazes the surface. Further digging to expose just what these relations and historical events are could give us extremely interesting insights.

Can One be Both Nationalistic and Cosmopolitan?

We have so far been focusing on characteristics of a descriptive nature (likes chicken rice, loves Singapore), and argued that it is *not* through possession of such characteristics that someone is part of a family, or part of Singapore. We think, however, that there might nevertheless be *normative* demands upon someone insofar as she is a part of a family, or part of Singapore. While not loving Singapore doesn't disbar you from being a part of Singapore, it could still be the case that being a part of Singapore, you *ought* to love Singapore. Membership does not require *actual* love, but it requires at least that a certain standard (of love) be applicable to you. Consider for a moment a person who is not a part of Singapore – perhaps this person has never even heard of the place. He (probably) doesn't love Singapore, but he's not failing to meet some standard he ought to meet, because the standard of loving Singapore is not a standard that is applicable to him. Consider, on the other hand, a person who is a part of Singapore. She might not love Singapore, but we could reasonably see her as having failed to meet some standard she ought to meet, and this is because loving Singapore is a standard applicable to her.[12]

It is not a trivial point that being a part of Singapore has this normative standard. This suggests that being a part of Singapore is more than about mere cultural membership – after all, you can be a member of a culture without there being normative demands on you. Think, for instance, of "beng" or "fashionista" culture, where there is little group-wide solidarity.[13] Being a part of Singapore, on the other hand, seems to require an (at least minimal) degree of loyalty, of treating the demands of your nation and your countrymen as special in some way.

Consider the patriotic defender of the national culture. She loves her nation, and being a member of that nation is an important part of her identity. Of course, if she had to choose between her country or her children, she'd choose her children every time – her national identity is not her most important identity, but it's fairly high on the list. She identifies with her nation – that is, on some level, she thinks of them as one and the same. To deface her nation's symbols brings the same outrage that slandering her own name might, and she bristles at threats to her nation just as she would at threats to her person.

Compare this to a cosmopolitan dweller of a global city. She does not make friends preferentially with those who share her nationality or ethnicity – her friends, neighbours, lovers, colleagues come from all over the world. Of course, she might prefer to interact with people of her social class, or people with certain personality types or interests. To be cosmopolitan is just to have given up privileging very specific things such as ethnicity and nationality, to not treat the demands of your nation and your countrymen as special in any way.

Understood this way, there is a tension between a strong national identity and being cosmopolitan. It seems like any effort to strengthen people's sense of national identity would necessarily weaken their cosmopolitan sentiments, and vice versa. In encouraging people to love their countrymen more, we also risk having people love foreigners less. If we urge people to feel no qualms about having neighbours of a different nationality, then we also risk people feeling no particularly strong connection to those neighbours of their own nationality. As then Minister of State for Finance and Foreign Affairs Brigadier-General (NS) George Yeo said in 1989,

It seems like any effort to strengthen people's sense of national identity would necessarily weaken their cosmopolitan sentiments, and vice versa. In encouraging people to love their countrymen more, we also risk having people love foreigners less.

> We must balance this contradiction between being cosmopolitan and being nationalistic. We cannot be a trading nation if we are not cosmopolitan. We cannot be a nation if we are not nationalistic. We must be both at the same time.[14]

What Can We Do to Resolve this Tension?

One solution, we think, might lie in our earlier suggestion, that we think of being a part of a nation just as we think of being a part of a family. Consider a family where the members love each other very much, and are very loyal to one another. Yet, we do not usually think that such love and loyalty gets in the way of people in that family building strong friendships or being wonderful neighbours. Why is it that we don't think loving your family more necessarily means that you love non-family less?

The secret, we think, is that we understand there are different kinds of love, and different kinds of commitment. You might love your family very much, and so privilege members of your family, but only in some things. If you were on a hiring committee, refusing to count your nephew's application as special just because he is your nephew does not mean you love your (extended) family any less. Similarly, wanting to spend some time with your buddies or girlfriends once in a while instead of your parents or children does not impugn your love for family.

If being a part of Singapore does indeed work like being a part of a family, then privileging the interests of Singaporeans does not have to come with discounting the interests of non-Singaporeans. Love, commitment and loyalty all come in a variety of flavours, and different flavours might be appropriate for your countrymen and for foreigners, just as different flavours might be appropriate for family and non-family.[15] Our challenge, then, is in figuring out what these flavours are.

Figure 2: Graphic recording from January 2015 CSF Workshop, "SG50: Where To From Here?" Graphic recording: Welenia Studios.

A Sketch of a New Framework for Thinking about National Identity

CSF did a lot of work in 2014 trying to make sense of difficult questions of national identity and belonging, but the depth of the issues means that what conclusions were drawn are still tentative at best. This article represents some of our more interesting thoughts.

We suggested above that the question of national identity is best framed as a question of "what makes someone a part of the nation in question". We suspect that the search for some common characteristic that can help us decide who is part of a nation and who isn't is a misguided search, because it runs the risk of excluding minorities, women and children, and since there might be no such characteristic at all. There is no "essence" to "Singaporeanness", and looking for it is futile.

We also suggested that there is a tension between having a strong national identity and being cosmopolitan, since the former requires you to love your countrymen more than foreigners, and the latter forbids that.

To resolve both of these issues, we offered a framework of thinking of being a part of a nation as akin to being part of a family. There is no "essence" of a family, because families are tied together by relations and certain historical events, not by shared characteristics. Yet members of a family can retain a strong sense of love for and loyalty to one another. Loving one's family does not seem to detract from loving non-family, because the different varieties of love and commitment mean that it is not zero-sum. We think that the analogy between national identity and familial membership is a rich one, and worth further mining and exploration.

Notes

[1]The use (and misuse) of the "No True Scotsman" fallacy is endemic in much social media, and anecdotally outside of social media as well. For example, someone might say "No American hates apple pie", and someone might respond with a counterexample, "My friend hates apple pie, and she's American". The "fallacy" would be to rescue one's original generalization with "Well, no true American hates apple pie". The ubiquity of such arguments on social media suggests that people think of belonging to a certain nationality as having some essential quality or characteristic.

[2]National Service (usually abbreviated to "NS" in Singapore) requires all male Singaporean citizens and second-generation permanent residents to enlist in the armed forces, the police force, or the civil defence force, for up to 24 months.

[3]While the examples in this article will be primarily Singapore-centric, we hope that the points supported by those examples are relevant to any nation concerned with similar sets of issues.

[4]Contrast this to a third class of such concepts – being "Chinese" and being "Indian" might carry the weight of a legal status, national identity and an ethnic, racial identity. These are independent things — one could be ethnically Chinese, but not be a citizen of China nor belong to any form of Chinese cultural traditions, for example. The complexities multiply.

[5]*We leave deliberately vague what it means to be "a part of Singapore", since understanding it well is precisely the task at hand. What we do know is that some people think there are some characteristics the possession of which makes someone a part of Singapore, and the lack of which means some people are not a part of Singapore.*

[6]*Despite the potential futility of this search, the reframing was important. The original way of asking the question had a clear and easy answer, which was to look at the legal citizenship records. This, however, did not quite answer our real question in the right way. This reframing lets us get to the real question being asked, which we can then see is maybe misguided.*

[7]*A rojak is a Southeast Asian salad of fruits and vegetables with a sweet prawn-based dressing.*

[8]*There is one characteristic that all components of a rojak share, and that is the characteristic of "being a component of a rojak". However, we take this to be a trivial and uninteresting characteristic. Note also that we are, for now, only looking at intrinsic, ahistorical characteristics, since the vast majority of the purported characteristics we heard might make someone a part of Singapore were intrinsic ones – liking certain food, having certain experiences, certain beliefs and desires. We will argue later in this article that certain relational and historical characteristics might in fact be necessary and/or sufficient conditions for being a part of Singapore.*

[9]*We took inspiration here from the work of biologists like Michael Ghiselin and philosophers of biology like David Hull, who have argued that, given the nature of the evolutionary process, species are best understood as individuals rather than sets or classes. For some of their seminal work on this, see Ghiselin, M. T. 1974. "A radical solution to the species problem," in Systematic Zoology, 23:536-544, and Hull, D. 1976. "Are Species Really Individuals?" in Systematic Zoology, 25(2):174-191.*

[10]*There are many other examples that behave like that. Being part of an ecosystem, being part of a company, being part of a school – in all these cases, the individual members might well share no characteristics in common. What matters for membership in these cases is not shared characteristic, but relations and certain historical events.*

[11]*We cannot lay out the argument here in a way that will do justice to the work of Ghiselin and Hull. Please look at their work (referenced in footnote 9) for details.*

[12]*Note here that we are not committed to thinking that if one is a part of Singapore, one ought to love Singapore. All we are saying here is that normative standards could apply to you even if our earlier argument is successful, that shared (descriptive) characteristics are not what makes you Singaporean or not.*

[13]*Beng culture, in Singapore, refers to a culture of young men, often working-class, who stereotypically lack cultural refinement; this is (very) roughly analogous to the British "chav". Fashionistas, colloquially, are people who closely follow fashion trends, to a degree verging on obsession.*

[14]*Keynote Address at the Pre-University Students' Seminar at the National University of Singapore Lecture Theatre 27, 19 June 1989.*

[15]*To be clear, these "flavours" are flavours of love that might be a normative demand upon those people who are a part of Singapore. Perhaps one ought to love fellow countrymen in a certain way, and non-countrymen in a certain (but not lesser) way, but failure to do either or both of these does not make one any less of a part of Singapore.*

Trust and the Public Service

Leong Wei Jian and Nicholas Tan

In 2013, the Centre for Strategic Futures (CSF) initiated a study on trust and the public service. We wanted to understand what shaped citizens' confidence and sense of trust towards government and what the role of the public service in building and maintaining trust was.

Our scans suggested that declining trust towards traditional authorities – not just governments, but other institutions like corporations and the media – was an emerging issue with significant implications for governance. Trust is the lubricant in the system that allows governments to play their roles effectively, whether in agenda setting, in decision-making where difficult trade-offs are required, or in crisis management. On a day-to-day basis, the level of trust between citizens and their government shapes whether and how the two parties engage each other and communicate.

Defining our Focus: Studying Trust

Our study began with a series of wide-ranging discussions with thinkers and leaders from different domains – the public sector, private sector and think tanks. CSF Foresight Conference 2013[1] was one major platform we used to spark thinking and discussion on the issue, where one of the focus group discussions with global thought leaders was on the Future of Trust, Well-Being and Power. One participant suggested that the decline in trust in governments was not so much the product of anger and resentment against the government, but was the product of deep anxiety and uncertainty about the future. Until recently, the middle class narrative in developed countries was one of steady progress and affluence. This was no longer the case and people had lost confidence in traditional authorities as a result.

Another participant suggested that we could think of trust being shaped by the following factors, where:

Figure 1: Trust Equation Proposed by Participant at CSF Foresight Conference 2013

This is to say that a government gains the trust of its people not only when it delivers policy results but also when it connects well with the people. In building trust, government agencies and leaders must also demonstrate integrity and public-spiritedness, so they will not be seen to be serving their own interests.

Through further conversations and research, we identified four key elements that shape public trust:

Competence. Whether citizens believe that the government can do its job and solve problems

Integrity. Whether citizens believe that government as an institution is honest, and whether its decision-making processes are fair and for the public good

Authenticity. Whether citizens believe that the government is sincere in seeking to address their concerns

Connection. Whether citizens identify with the goals, values and agenda of the government

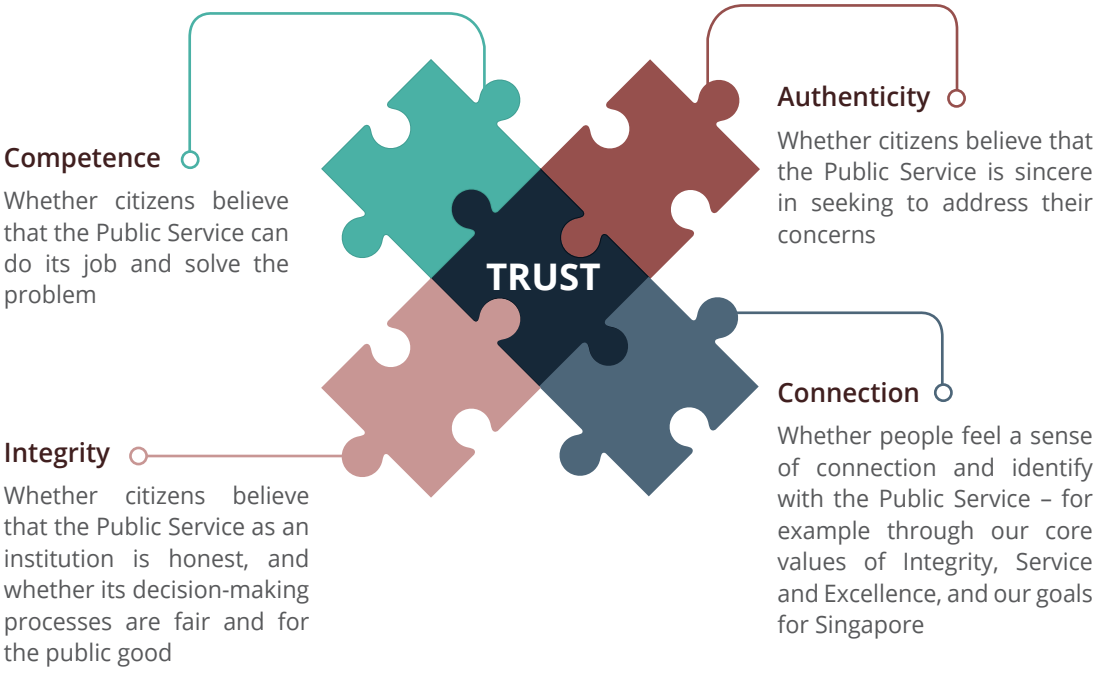


Figure 2: Trust Framework comprising Competence, Integrity, Authenticity and Connection

Trust and the Role of the Public Service

The study of governance issues, including the topic of public trust, can be very conceptual. CSF's objective for our study was to translate our insights into practical measures that would help public officers understand the role of the public service in building and maintaining trust. More importantly, we wanted public officers to understand how, in their respective roles whether in policy-making, enforcement, public communications and engagement, service delivery, etc, they could develop the right reflexes and have a positive impact on public trust.

We worked with the Civil Service College (CSC)[2] to develop real-life case studies that explored how public expectations in each of the four trust elements – competence, integrity, authenticity and connection – were evolving. The case studies provided a platform for public officers to discuss what they observed on the ground in the course of their work and how the four elements related to their work. Several participants noted that trust was not necessarily rational and could not be produced by technocratic approaches alone. Rather, trust was a "two-way street" and resulted from the careful nurturing of relationships. How governments engaged and related to different stakeholders was critical in this respect. Other participants observed that people were concerned not only about the perceived fairness of policy outcomes and decisions, but also wanted the process leading towards those outcomes to be fair. How the government designs and conducts its decision-making processes is therefore as important as the final decision itself.

Developing Trust Reflexes through Policy Gaming

We wanted to find a way to help officers develop not only an intellectual understanding of their role in shaping public trust, but also the reflexes in their daily work through which they could maintain and strengthen public trust. We decided to use policy gaming for this purpose.

Why policy gaming? Most policy games are designed to help participants rehearse their decision-making under game conditions of incomplete information or ambiguity. This develops tacit knowledge and embeds recognisable patterns in complex systems and situations, which could be tapped subsequently for quick decision-making in real-life situations. Gaming also enables us to explore hidden concepts and uncover surprising interactions between causal or symptomatic factors. Robert Gehorsam, Executive Director of the Institute of Play, expressed the power of games pithily in a meeting with CSF, "In games, failure is reframed as iteration." In games, people feel safe to challenge their own assumptions and take on a different point of view.

The Public Service's Journey in Policy Gaming

Education psychologists often emphasise the developmental benefits of play and games for the cognitive and social development of children. Games allow children to explore and construct meaning from the socio-cultural environment around them in an open-ended and self-motivated manner.

These principles of games-based pedagogy apply to adult learners too, as they register higher levels of engagement when they actively discover and explore their circumstances, and formulate appropriate

responses in situ. Riding on the success of military war games and simulations, we are now beginning to introduce games, simulations and exercises in other policy areas to improve the quality of planning and decision-making. In 2012, CSC established a group called CAST – CSC Applied Simulation Training – that seeks to ramp up capabilities in policy gaming within the Public Service.

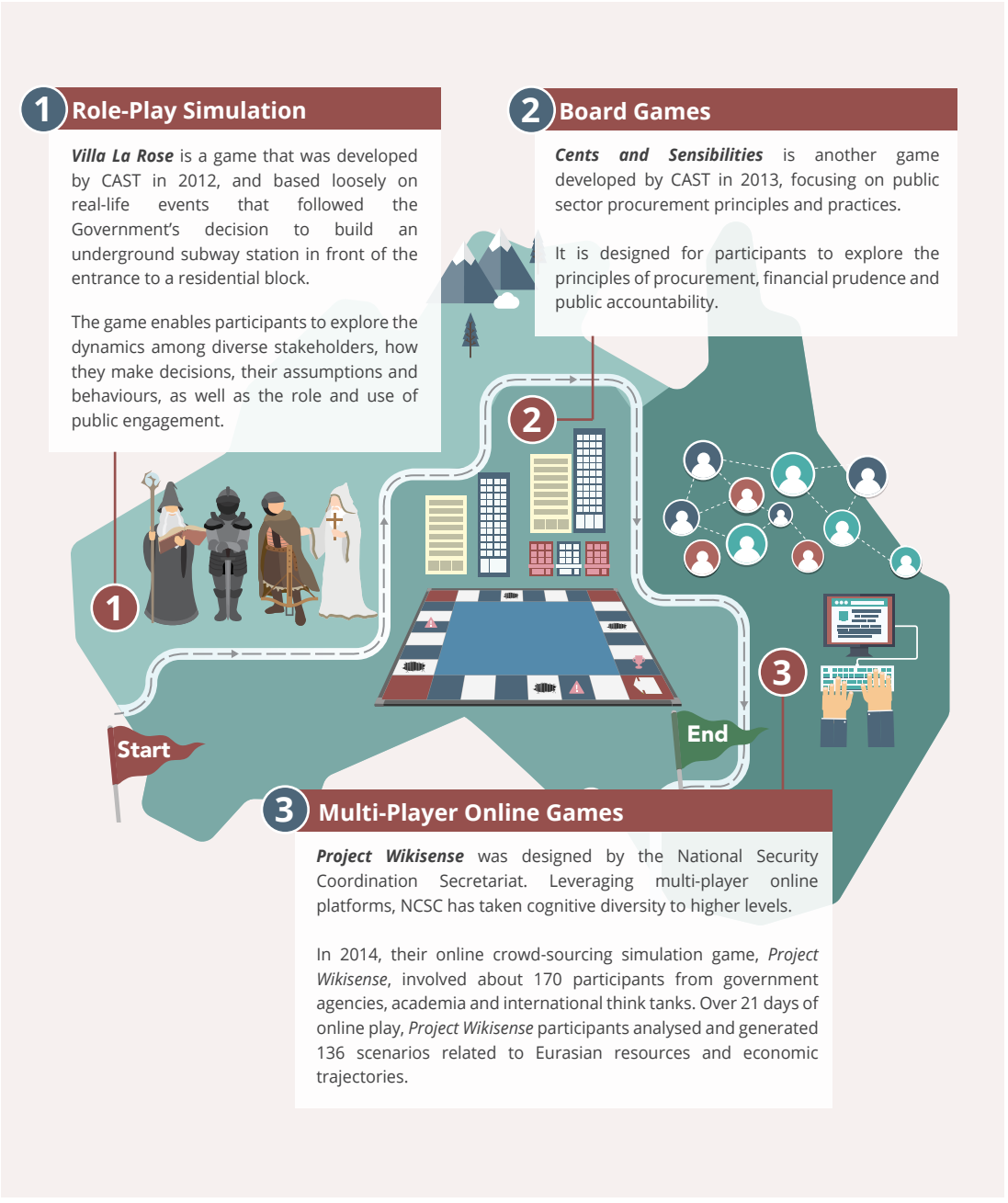


Figure 3: The Public Service's Journey in Policy Gaming

Prototyping a Trust Card Game

In collaboration with CAST and researchers from the Hawaii Research Centre for Futures Studies at the University of Hawaii at Manoa, CSF developed a card game to explore the abstract concept of trust more concretely by having players respond to situations they are placed in. The game has "triggers" for each of the four trust elements that relate to public officers' work – the triggers for competence include infrastructural failure and mismanagement of crises, while those for integrity include corruption scandals. Meanwhile, the triggers for authenticity and connection include social media attacks on the sincerity of the government and poorly-received policy changes respectively.

Players are divided into two teams – the first takes on the role of government agencies who respond to these triggers, while the second team represents members of the public. Based on responses of the government team, the team representing members of the public scores their confidence in the performance of the government. Changes in public trust levels are compounded over multiple rounds of triggers, responses and evaluations thus factoring time effects and complexity into the game play.

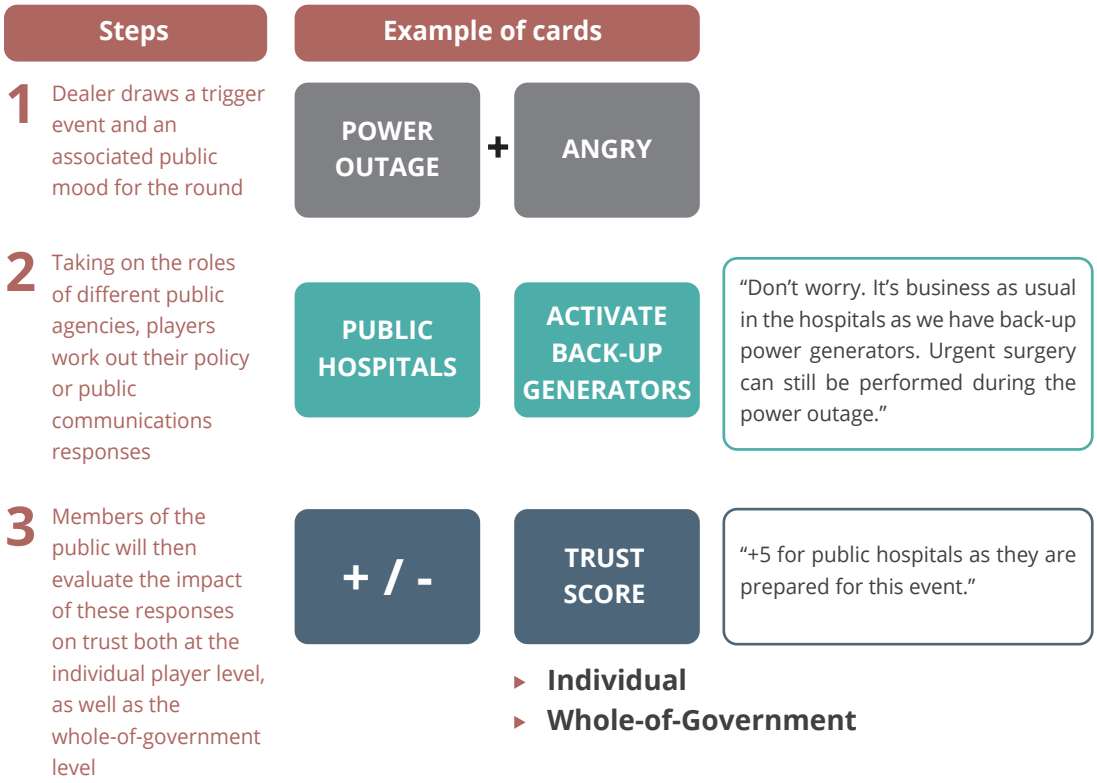


Figure 4: Layout and Scoring of Trust Game

There were two levels of scoring: the agency level, and the whole-of-government level. We hoped that through the scoring design, participants would understand that their actions would not just have an impact on their respective agencies, but for government as a whole as well. In a networked system and for governments in particular, where citizens see "the government" as a single entity rather than a collection of distinct agencies, the actions of officers in individual agencies can have a service-wide impact.

The game is still in prototype form but participants in our play tests gathered a number of useful insights:

- The scores from the team representing the public showed that trust is something that is difficult to build, requiring a series of positively-received actions. Yet, it is easy to lose the game through the mishandling of a single incident. Building a sense of trust and confidence in the government as a whole requires agencies to work across boundaries and collaborate in policy coordination and communications.

- Trust is multi-faceted and many aspects of work in the public service can affect the level of trust enjoyed by the government and vice versa. After the game, a number of players noted that they were undertaking tasks such as public engagement, crisis management and service delivery, and it was valuable to view these tasks through the lens of trust. For instance, even in crisis management such as restoring a steady supply of electricity to an area affected by power outages, the prioritisation of constituencies within the area had to withstand scrutiny, so that the agency would not be seen as favouring some groups of citizens over others.

- Trust is not necessarily built by logic. Throughout the game, players' assumptions of what would build trust with the public were constantly challenged – logical arguments were not always the best way of developing trust. Public sentiment was often unpredictable, and in some cases, well-intentioned agency actions could be taken badly as a result of distrust stemming from another agency's inappropriate move. In other cases, players found that it was better for agencies not directly impacted by the trigger to bide their time in responding in order not to add to the cacophony of public messages.

Based on participants' feedback from the play tests, we think that the card game on trust will be a useful tool to translate our research insights on a conceptual topic into practical measures to strengthen the capabilities of public officers.

Conclusion

In our work, CSF hopes to use foresight methods to explore a broad range of issues relevant to government – not just concrete policy challenges like automation or citizenship, but also broader governance issues. CSF's study on trust illustrates how we have taken an abstract concept like public trust from sense-making to developing a trust framework, and from conceptualising the framework to applying it through case studies and a trust game. It also illustrates how we aim to translate our deep-dive, multi-lens studies into action and strategy.

Notes

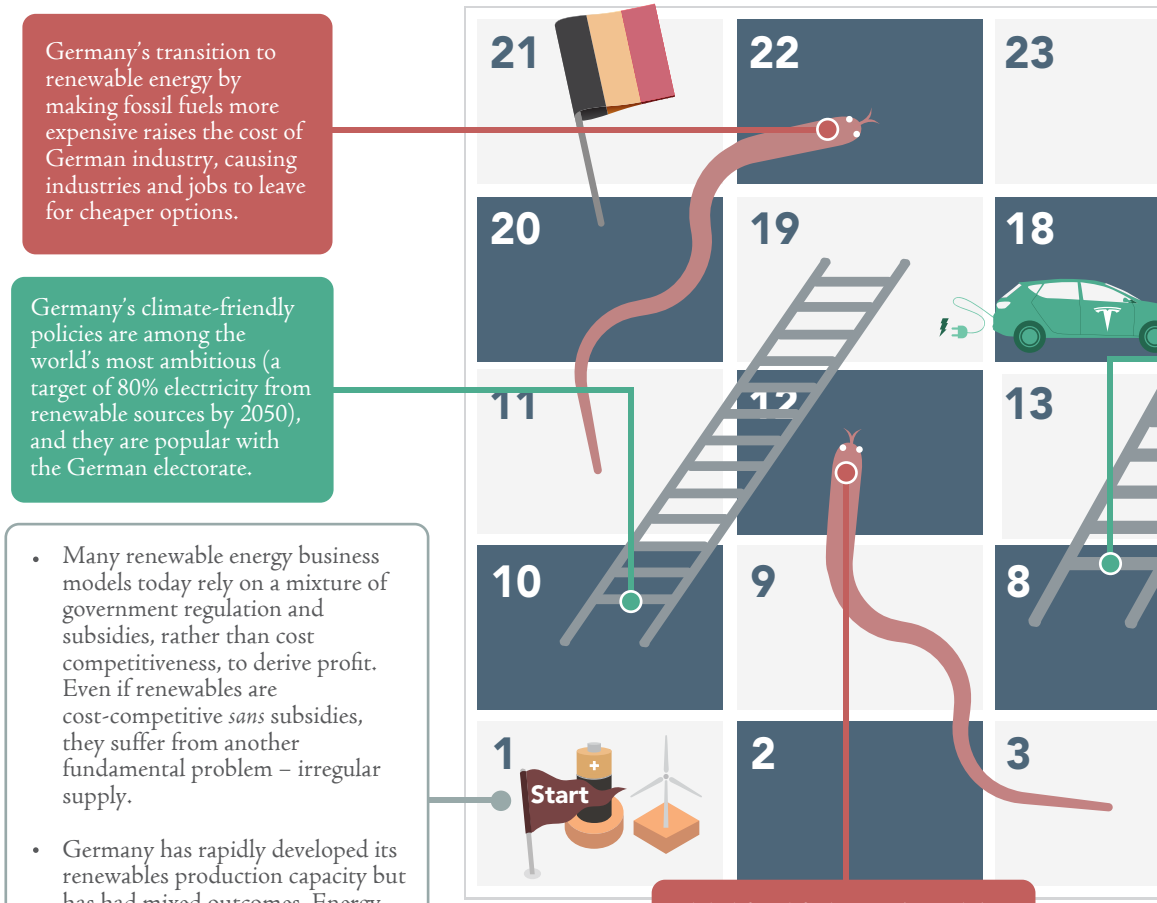
[1]*Since 2011, CSF has organised a Foresight Conference once every two years to gather insights from futures experts and international thinkers on emerging strategic issues, and possible responses to emerging challenges and opportunities.*

[2]*The Civil Service College is a training college for all government employees in Singapore. It is a statutory board under the Public Service Division, Prime Minister's Office of the Government of Singapore.*

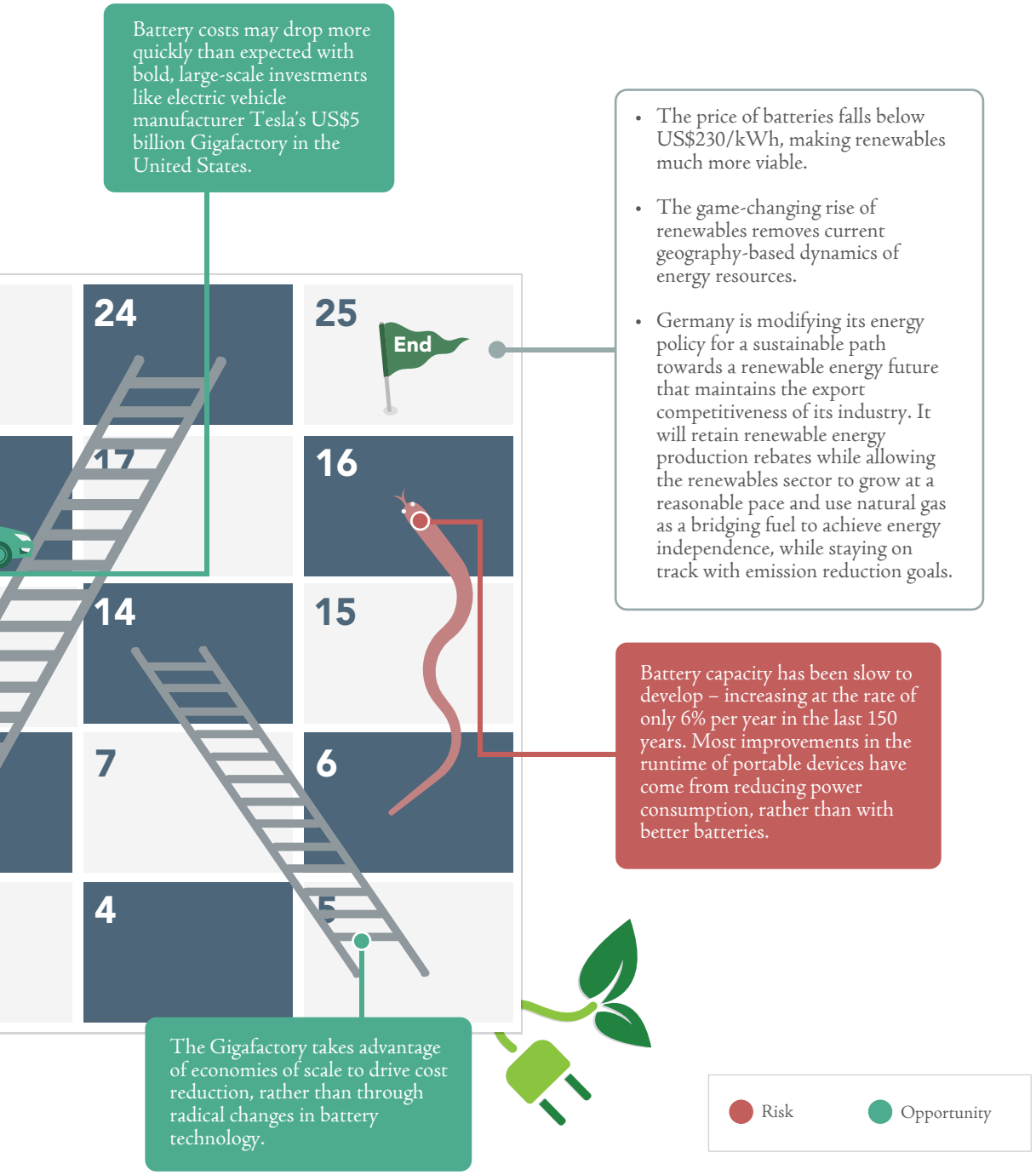
The Ups and Downs of Batteries and Renewable Energy

Rahul Daswani

As part of the Centre for Strategic Futures' (CSF) foresight work, we scan and monitor key trends regularly, and explore different ways in which these trends might play out. Two trends that CSF looked into last year, in partnership with the Ministry of Trade and Industry's Futures Group, were in the areas of renewable energy and battery technology. This infographic outlines the current landscape of



renewable energy and battery technology, and explores the possibilities of where we could get to, what stakeholders such as the private sector and government could do to get to these outcomes more quickly, and some pitfalls that could slow us down.



Complexity and Risk

Using a Risk-Informed Framework to Consider the Role of the State

Terence Poon

The 2008 Global Financial Crisis prompted economists to question how efficiently markets adjust on their own, and governments to rethink how far they should rely on markets to achieve socially optimal outcomes.

After all, it took massive government intervention to stem the crisis – governments took equity stakes in banks like Citigroup and Royal Bank of Scotland, and central banks had to extend credit to banks and inject liquidity into the system. Former United States Federal Reserve Chairman Alan Greenspan acknowledged in 2008 that the crisis had shaken his belief in self-regulating markets. "Those of us who have looked to the self-interest of lending institutions to protect shareholder's equity (myself especially) are in a state of shocked disbelief," he said.[1]

Neoclassical economists had argued that state intervention was warranted only where market failures occurred. In the 1980s, former United Kingdom Prime Minister Margaret Thatcher and former US President Ronald Reagan popularised this view of a minimalist state.

But the financial crisis upended it. Debate raged. Should governments in the United States and Europe spend more or less? Citizens faced risks of job loss and flat wages from the crisis, globalisation and technological changes like automation. And they have pressed governments in advanced economies to do more, not less.

Citizens faced risks of job loss and flat wages from the crisis, globalisation and technological changes like automation.

In this debate, the traditional ways of thinking about the appropriate role of the state have proven less fruitful. Economics remains divided over the efficacy of markets. Political philosophy has become more contested as societies have grown more diverse. To help assess whether governments should do more or less amid mounting pressures, this essay explores a third way of considering the role of the state – a risk-informed framework.

From Each According to His Risk-Bearing Capacity

Whether it is government, private business or social organisations, whichever entity has the greater capacity to bear certain risks ought to take on those risks. A greater capacity to bear risks may result from ***any one*** of these three factors:[2]

- Access to information. Entities that can access more information can assess risks more thoroughly, improving their decisions and capacity to bear risks. For example, community leaders better understand pedestrian flows than federal leaders. They are best able to make informed decisions about where to site local infrastructure, like cycle paths and community gardens, and to manage the risk of the infrastructure potentially becoming a white elephant.

- Influence over outcomes. Entities that have greater influence over outcomes can cut the likelihood that risks occur or the impact, enhancing the entities' capacity to bear risks. For example, a local company may exert greater influence over sales than a foreign company because of its distribution network. A multinational company may form a joint venture with a local company to access this network rather than trying to set up its own distribution network. In this approach, the multinational company may take on the risk of product development, while the local company may take on the risk of marketing.

- Ability to diversify risks. Entities that can diversify risks more widely can cope better when individual risks materialise, bolstering their ability to tide over rough times and enhancing their risk-bearing capacity. For example, a life insurer is unlikely to receive claims from all policyholders simultaneously, enabling it to use premiums from surviving policyholders to pay the beneficiaries of claimants.

Figure 1: Risk-bearing capacity

The allocation of risks based on risk-bearing capacity represents a form of specialisation and partnership based on comparative advantage. Within a basket of risks that affect stakeholders, the stakeholder best able to bear a particular risk should take on that risk. Another stakeholder who is in a better position to bear another risk should bear that. This approach creates value overall. For example, under the idea of Total Defence in Singapore, everyone plays his part in defending the country; individuals can watch out for suspicious individuals and activity in their neighbourhoods that the security agencies may not pick up. Meanwhile, the armed forces focus on larger-scale threats. By contrast, misallocating risks to the wrong parties wastes resources and undermines value. Security agencies cannot deploy resources to every neighbourhood to monitor potentially suspicious activity, for instance.

Figure 2: In Total Defence, everyone plays his part in defending the country, showing how risks can be allocated based on risk-bearing capacity. For example, individuals can watch out for suspicious people and activity in their neighbourhoods that the security agencies may not pick up, while the armed forces focus on larger-scale threats. Value is created overall.

Looking Through the Risk Lens

To illustrate how this risk-informed framework can facilitate discussions about the role of the state, this essay turns now to three test cases, or issues where there has been debate about the role of private enterprise, individuals and government: Innovation, flood management, and financial crises.

Test Case 1: What role should the state play in driving innovation?

There is substantial debate about the role of the state in driving innovation, with two main points of view:

- Meddlesome state. The thinking here is that the state should support innovation only where there are market failures: Fund basic scientific research as a public good or use tax rebates to encourage research and development with spillover benefits, or positive externalities. The *Economist* wrote: "Governments have always been lousy at picking winners, and they are likely to become more so, as legions of entrepreneurs and tinkerers swap designs online, turn them into products at home and market them globally from a garage. As the revolution rages, governments should stick to the basics: better schools for a skilled workforce, clear rules and a level playing field for enterprises of all kinds. Leave the rest to the revolutionaries."[3]

- Developmental state. Others argue that the state should actively support innovation, nudging businesses to develop and adopt new technologies. Political economist Robert Wade said that the government in Taiwan used promises of goodwill for future ventures to nudge established industries to buy from innovative ones.[4] It funded research in biotechnology, subsidised infrastructure to encourage biotechnology clusters and ran research institutes to translate science into commercial products. In this view, the government went beyond establishing and enforcing rules, then getting out of the way of innovative private companies, toward "governing the market" and nudging it.

The risk-informed framework sheds light on the state's role in driving innovation.[5]

- Types of innovations. Disruptive innovations entail greater uncertainty than recombinant innovations. Disruptive innovators imagine and create markets, such as how the Internet economy resulted from protocols for transmitting information over a decentralised network of computers. Recombinant innovators integrate existing technologies into new products, such as cellular technologies and multi-touch screens into smartphones.

- Capacity to bear risks. The state arguably has greater influence over the outcomes of disruptive innovations because it can set a vision for society – land a man on Mars or develop "orphan drugs" for rare diseases affecting fewer than 200,000 people – galvanising research labs, private businesses and bureaucrats to work together toward that vision. The state, moreover, has a longer time horizon than private companies accountable to shareholders. By contrast, the private sector arguably has greater access to information about how consumers may respond to recombinant innovations because it is more familiar with market dynamics than the state.

- State and private entrepreneurs. In this view, the state ought to drive disruptive innovations that further social goals and create new markets, such as green technologies for environmental sustainbility. The private sector ought to drive recombinant technologies, such as smartphones or hybrid vehicles.

Rather than simply allocate innovation risks to private business or state, the risk-informed framework suggests that it may be more fruitful to consider the types of innovations. Some, like disruptive innovations, may benefit more from the state. Others, like recombinant innovations, may benefit more from private businesses.

Test Case 2: How much risk should the state bear in dealing with floods?

With climate change, the risks are rising that floods will grow more frequent and intense. Flood insurance helps policyholders cope with the impact when prevention, e.g. preserving wetlands as a water sponge, and mitigation, e.g. elevating buildings, have failed. The debate about the role of the state in dealing with the impact of floods through insurance pits efficiency against solidarity.

- Efficiency view. One criticism of state-run flood insurance is that the state underprices the likelihood and impact of floods, encouraging citizens to build in areas that face flood risks, while generating insufficient revenue to cover the payouts when floods occur. The National Flood Insurance Programme in the US, for example, owed the US government US$23 billion at the end of 2014 after borrowing to cover its losses, which resulted partly from subsidising premiums for around one-fifth of policyholders.[6] The *Economist* writes: "Instead of discouraging the building of flood-prone houses, governments are unwittingly encouraging homeowners to flush money down the drain."[7]

- Solidarity view. Some argue that subsidies are warranted on the grounds of solidarity as one part of society helps another. Cautioning against imposing risks on the poor, the Associated Programme on Flood Management writes that "a transfer of burden to an already vulnerable population cannot be justified through an argument for efficiency and loss reduction".[8]

The risk-informed framework suggests the roles that the state can play in dealing with the impact of floods through insurance.

- Capacity to bear risks. Individual homeowners have a greater influence over outcomes with regards to resilience to floods. By elevating houses, for instance, they reduce damage. The state, however, has greater influence over outcomes with regards to a region's exposure to floods. Through land-use policies that conserve wetlands or building dams, it can reduce the likelihood that the region will be flooded. Through risk pooling, the state has greater ability to diversify risks more widely than individual homeowners. It is unlikely that all homes will be flooded across the country at the same time; the state uses premiums collected from unflooded parts of the country to help flooded ones.

- Principles for flood insurance. Given that the state has greater influence over a region's exposure to floods and can diversify more widely, the state can play a role in organising flood insurance. Given that individual homeowners have greater influence over their resilience to floods, state-run flood insurance needs to encourage individuals to mitigate the impact of floods and discourage them from placing themselves in harm's way.

- Skeleton design for flood insurance. In their recommendations to fix the National Flood Insurance Programme, University of Pennsylvania Professors Erwann Michel-Kerjan and Howard Kunreuther recommended pricing premiums to reflect risks: No subsidies. When individuals mitigate risks by elevating their houses, cut their premiums. And if individuals cannot afford market-rate premiums, offer insurance vouchers to those already living in flood-prone areas – not to those moving into flood-prone areas – thus providing some form of solidarity while discouraging people from placing themselves in harm's way.[9]

This test case suggests that discussions need to go beyond risk allocation toward how the state and other stakeholders can work together, tapping into each other's respective capacities to bear risk. The state can organise flood insurance in a way that encourages individuals to exercise their influence over their own resilience to floods.

Test Case 3: How far should the state rescue banks in crises?

The 2008 Financial Crisis provoked considerable debate about how far the state should rescue banks in crises:

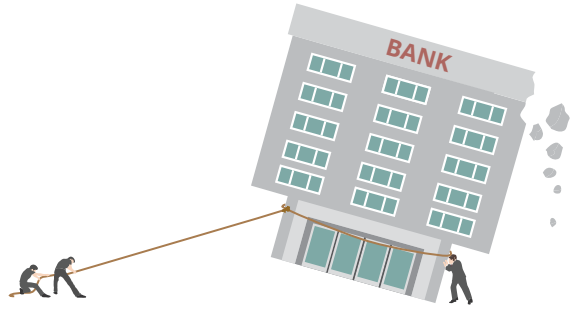


Figure 3: Role of state in financial crises: Some are concerned that state rescue of banks creates moral hazard, while others are concerned that a crisis will escalate without state intervention.

- Moral hazard. On the one hand, some criticised the US response to the 2008 Financial Crisis for creating moral hazard: When the financial institutions made money in the boom, they retained earnings. When they failed, the government rescued them through a mix of measures that included liquidity injections and credit from the US Federal Reserve and capital injections from the US Treasury. As Richard Kovacevich, chairman of US bank Wells Fargo from 2001–2009, put it: "In the effort to bail everybody out, we not only didn't solve this problem, I think we made it worse…you're setting it up for even a bigger problem next time, because of moral hazard and everyone believes that everyone's going to get bailed out".[10] The broader point is that intervention changes the operating environment for the industry, and is not simply a targeted one-time action.

- Stemming systemic crises. Others have argued that the government's massive interventions staved off a deeper financial and economic crisis. "To solve a major financial crisis," former US Treasury Secretary Timothy Geithner writes, "you have to do things you would never do in normal times or even in a modest crisis…What feels just and fair is often the opposite of what's required for a just and fair outcome".[11]

The risk-informed framework suggests an alternative way to consider the role of the state in a financial crisis, especially in calming financial markets.

- Fire sales in crises. Financial crises escalate. When a financial institution sells assets to pay short-term loans, it causes asset prices to fall, which in turn pushes it to sell yet more assets to raise money. A fire sale results. A financial crisis may start with an unhealthy firm, but often spreads to otherwise healthy firms, for example, because their own assets fall in value or because confidence plummets and firms refuse to trade with each other.

- Capacity to bear risks. The state and state-backed investors arguably have greater influence over outcomes because they have a longer investment horizon than most private financial institutions. They are better able to wait out short-term frenzies and counter the instinct to sell and raise funds during crises, thus stemming crises. Because banks park reserves with central banks, central banks have a greater ability to diversify their sources of reserves, enabling them to use those reserves to lend and buy assets during crises.[12]

- Liquidity provider of last resort. Richard Bookstaber, an expert on risk management in the financial sector and author of *A Demon of Our Own Design*, argues that the state can act as a "liquidity provider of last resort" to calm markets. By providing liquidity, whether by extending credit or buying assets, the government can prevent the crisis from deepening. If the government considers formalising a role as liquidity provider of last resort, "will not be stepping into the business of bailouts…But the collateral damage will be contained," said Bookstaber.[13] (See "Complexity, Creativity, and Cockroaches – A Conversation with Richard Bookstaber".)

While the US government played a major role in stemming the 2008 financial crisis, a risk-informed framework need not always point to the state acting as a backstop. Bookstaber, for example, said that hedge fund Citadel Investment Group acted as a liquidity provider of last resort by buying assets from distressed hedge funds – Amaranth Advisors in 2006 and Sowood Capital Management in 2007. Its actions prevented contagion.[14] Similarly, in the 1997 Asian Financial Crisis and 2010 Euro crisis, certain states had weaker influence over outcomes because of their parlous finances. They received help from supranational entities like the International Monetary Fund. Such assistance came with conditions and socio-political impact.

Conclusion

As governments face greater pressure to take up greater responsibility, given the loss of faith in the efficacy of markets, they will increasingly need principles to figure out what constitutes an appropriate role for government. The discussion about the role of government has traditionally been in the domain of political philosophy – a subject on which the consensus is fraying and debate is becoming more contentious. A risk-informed perspective provides a framework to think through the appropriate role of the government – clarifying not just what constitutes too much or too little, but also suggesting how government, businesses and society can work together to manage the risks they face and create value.

Notes

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[12]*In Lombard Street: A Description of the Money Market (1873), Walter Bagehot argues that since "the Bank [of England] hold out ultimate banking reserve, they will recognise and act on the obligations which this implies; that they will replenish it in times of foreign demand as fully, and Lend it in times of internal panic as freely and readily, as plain principles of banking require". Text available in http://www.gutenberg.org/cache/epub/4359/pg4359-images.html.*

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Complexity, Creativity, and Cockroaches – A Conversation with Richard Bookstaber

In recent years, the theory and practice of strategic foresight have drawn on concepts from the study of complex systems. Terms like "emergence", "adaptability" and "resilience" are now commonplace among foresight practitioners. The Centre for Strategic Futures (CSF) has been exploring such concepts in its strategic foresight work, and is privileged to be able to consult complexity experts from all over the world. One such expert is Richard Bookstaber.

Bookstaber is the author of *A Demon of Our Own Design*, a book that chronicled major financial collapses and weaknesses that led to the 2008 Global Financial Crisis. In it, he argues that the very mechanisms introduced to make markets safer have, in fact, caused markets to become more vulnerable due to greater leverage and complexity. Currently, he is Research Principal in the Office of Financial Research at the United States Department of Treasury, where he develops agent-based models to assess systemic financial vulnerabilities.[1] CSF hosted Bookstaber, in his personal capacity, in Singapore for a week in 2014 under its Distinguished Visitor's Programme. He speaks with **Dr Adrian Kuah** of CSF in a wide-ranging interview. The views expressed in the interview are his own, and do not reflect those of the US Department of Treasury or the Office of Financial Research.

Complexity expert Richard Bookstaber has been there, done that, and yet remains ever restless in questioning the status quo and pushing the boundaries of conventional wisdom. Having been both in the trenches of Wall Street and a financial regulator, Bookstaber approaches the world with a blend of pragmatism and creativity – both of which, as it turns out, lie at the heart of complexity science.

In this interview with CSF, Bookstaber recounts how he got into the complexity game, how he sees the theory and practice of economics evolving, and the types of strategies that could help organisations and individuals navigate an increasingly complex world.

How did you get interested in complexity?

Sometime in 1992, Peter Muller, a friend who worked with me at the investment bank Morgan Stanley, was invited to a conference at the non-profit theoretical research organisation Santa Fe Institute out in New Mexico in the US. He asked if I wanted to come along, and I said yes.

That conference turned out to be a critical event in the development of complexity science, or the study of complex systems, especially complexity economics. It was a meeting of minds between top economists and scientists from various disciplines interested in this thing called "complexity". It brought together people like physicist Murray Gell-Mann, complexity theorist W. Brian Arthur and computer

scientist John Holland. And in my view it was the birthplace of using agent-based modelling to address complexity in economics, which has been an interest of mine ever since.

That conference opened up new perspectives for me. I had already been dissatisfied with some of the central assumptions of economics during my doctoral studies. The rational expectations hypothesis, which is the idea that people make optimal choices based on rationality, available information and past experiences, was so deeply embedded in economics. Yet I found myself starting to ask what might happen to decision-making in the presence of Knightian uncertainty, or risks that cannot be quantified or calculated. The complexity perspective, which was introduced and explored at the conference, allows you to begin to address such questions. Most importantly, it made you ask, "Well, what strategies do you adopt when you not only do not have complete information, but also when you don't even know what complete information looks like?"

What are your thoughts on the revolution that behavioural science is creating in economics?

You're talking about Kahneman and Tversky's work, aren't you? Of course, just about everyone has read *Thinking, Fast and Slow*, written by psychologist Daniel Kahneman, who collaborated with cognitive psychologist Amos Tversky and others to establish a cognitive basis for common human errors. No doubt they contributed a great deal to understanding how people make decisions. But behavioural economics, or more broadly neuroeconomics, cannot get away from the fundamental assumptions of rationality and optimising behaviour. Years ago, economist Herbert Simon already made great strides with his work on bounded rationality, where people were still "maximisers" – that is, they sought the best possible outcomes, but were simply subjected to boundaries (such as the information that they had). Essentially, rationality for mortals.

Figure 1: Pictorial Illustration of an Agent-based Model

In a sense, the behavioural approach is still an apologist for mainstream economics, but with adjustments for abnormalities. To me, the biggest problem remains the twin assumptions of rationality and optimising behaviour. Let me put it another way: how do you optimise when you don't even know what "optimal" is?

So what can complexity science do then?

Well, first of all, the term "science" is misleading, because it gives the impression that there is a unified body of theories at the heart of complexity. There isn't. Not yet, anyway. It is probably more accurate to talk about a complexity perspective.

A complexity-based approach shifts the focus away from the question "what is optimal?" to "what is resilient?" Through tools like agent-based modelling, there is an acknowledgement that different people operate according to different decision rules, which brings back the heterogeneity that mainstream economics sets aside.

Agent-based models then allow you to simulate how events in a system might unfold, where there are different agents operating according to different decision rules, so that you can tease out certain insights. But let's be very clear about what agent-based models do: they do not predict, but rather, show possible patterns of how behaviours in a system might play out, and how even simple rules of behaviour can lead to complex results.

Is complexity a fad? How does it compare to chaos, cybernetics, catastrophe theory?

Well, as I said earlier, complexity is barely a theory, but it is not a fad. Don't forget that the complexity perspective destabilises a lot of what economics faculties hold dear, so I am sure there are those who would want it to fade away. Complexity is something that we paradoxically had to ignore because we simply did not have the computing power to put it into practice. Now that such tools are available to us, complexity is not something we can ignore anymore.

Complexity is different in that it takes a fallibilistic (from the philosophical doctrine that absolute certainty about knowledge is impossible) and experimental approach. Though it is a valuable tool for complexity-based analysis, agent-based modelling is not universally applicable, and the point of it isn't to crank out a number that is a basis for action. The point of it is to set up a model to see if it can, firstly, shed light on a real-world problem, and secondly, to see if agent-based models fit a larger, intuitive narrative about what is going on.

During a crisis, what the important decision-makers are doing is essentially telling stories. They pose a narrative and then test it for believability – is the plot line a reasonable one. In a sense, every time we run the model, we are generating a possible, plausible story of how a crisis might unfold. And in a crisis, when clearly the engineering mindset no longer serves, more information isn't necessarily better. Instead, what matters is if the story makes sense. The point about agent-based modelling, despite the mathematics involved, is not to throw out a number, but to support the collective narrative.

What is your advice for navigating an increasingly complex world?

Don't get me wrong, I'm not opposed to the engineering mindset. My point, however, is that you need to know what the situation is before you apply either the engineering solution or the complexity perspective. And that itself is more an art than anything else.

For an engineering problem, you can add information, rules and regulations in order to better understand it, so that you can solve it efficiently.

In a complex situation, which most crises tend to be, adding to the complexity increases the odds of "normal accidents", which is a term coined by sociologist Charles Perrow to describe how multiple and unexpected failures are near-inevitable in complex and tightly-coupled systems, such as chemical plants, dams and so forth. Instead, what is called for are coarse strategies, which are not overly detailed but versatile enough to adapt to a wide range of possible patterns. I have written about this, drawing on the survival strategy of the cockroach. Here's a creature which is not optimised for any particular environment, and whose survival strategy is simply to move in the opposite direction to the air currents it detects. In other words, to move away from potential threats. Is it the best suited to any particular environment? Probably not. But it seems to have thrived, at least it has done well enough, in a range of changing environments.

Figure 2: Adding to the complexity of complex situations increases the odds of "normal accidents", where multiple and unexpected failures are near-inevitable in tightly-coupled systems.

From what I've read about Singapore, and having been here for the past week or so, what comes across is its efficiency. In an engineering system, the more information you have, the better the policy you're going to make. But if you accept that society is complex, and that Singapore is headed that way, then the focus may need to shift from efficiency to also consider the robustness, or coarseness, of your strategies.

Now, a complexity perspective, along with coarse strategies, requires a baseline level of creativity. Remember that the purpose of agent-based modelling isn't to close things off with a number, but to open up discussions. This requires a culture where people are prepared to entertain ideas that might end up being stupid ones. Pitch meetings must be more open, rather than binary yes/no meetings which end up becoming very adversarial.

And above all, never underestimate the importance of doing things for the fun of it! It spurs creativity and curiosity, and opens up possibilities, as opposed to closing them off, and that is how useful insights come about.

This interview was conducted by Dr Adrian Kuah, former Lead Strategist, CSF.

Note

[1]*More information about Richard Bookstaber's work on agent-based models can be found in the 2014 Annual Report of the Office of Financial Research, Pg 73-78, http://www.treasury.gov/initiatives/ofr/about/Documents/OFR_AnnualReport2014_FINAL_12-1-2014.pdf*

The Foresight Process

Evolving Role of the State – From Concept to Conversation

Bai Huifen and Leong Wei Jian

By definition, institutions are persistent patterns of behaviour that are created in response to the needs of a particular historical moment. But societies, especially those experiencing rapid economic growth, do not stand still. They create new social classes, educate their citizens, and employ new technology that shuffles the social deck. Existing institutions often fail to accommodate these new actors and, as a result, come under pressure to change.

Francis Fukuyama, *Political Order and Political Decay*

The role of the state is not a static one. It has to continually evolve in order to adapt to its changing operating environment. In a study that the Centre for Strategic Futures (CSF) did in 2014[1], we looked into the dynamics that are affecting the role of the state, and the types of responses that governments need to take. This article discusses how we have sought to translate insights from that project to facilitate constructive conversation in the Singapore Government and spur action.

A Recap

In our study last year, we identified four dynamics that are affecting the role of the state. First, networks are replacing institutions as the dominant organisational form. New information and communication technologies have enabled dispersed, often small, actors to connect, coordinate and act jointly as never before. This growth of network organisations has the potential to challenge prevailing leadership hierarchies. Second, the influence of non-state actors like multinational corporations is growing. Such non-state actors are assuming more state-like functions and may even perform some of these functions better because they are more innovative and nimble. Third, emerging issues and problems may transcend the boundaries and jurisdiction of the state, resisting state-centric approaches. Fourth, technology is changing faster than society. Technological changes, such as the rise of social media, surveillance technologies, robotics and automation, pose serious challenges to social mobility, government legitimacy and regulatory frameworks.

Faced with such challenges, we concluded that the state would need to increase its "supply" in some cases, for instance, by partnering new providers of public services and building new capabilities and networks to ensure the relevance of the state in an increasingly crowded governance marketplace. On the other hand, given that resources are finite, the state would need to manage the "demand" for its services. For instance, to operate effectively in a networked structure, the government needs to build a sense of trust among stakeholders through strategies such as participation, reciprocity and openness. Facilitating access to information can also create opportunities for citizens to collaborate and generate solutions.

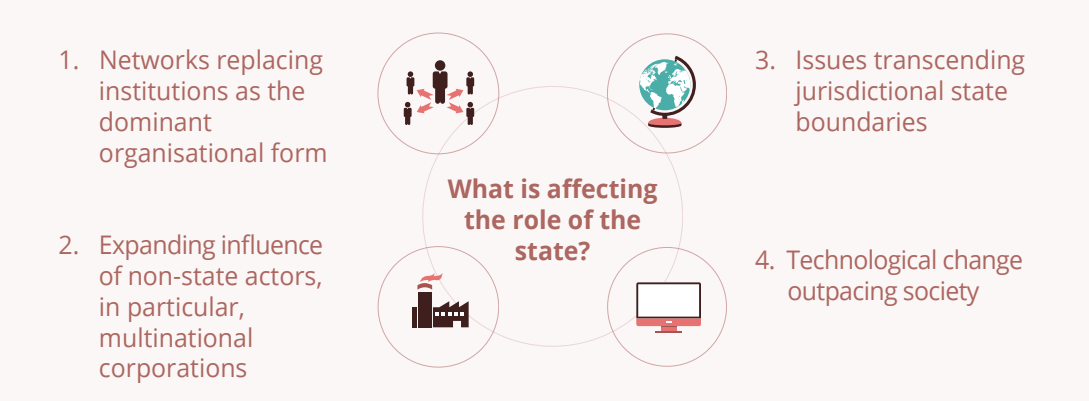

Figure 1: Dynamics Affecting the Role of the State

The Challenge

Most public officers would agree that the role of the state has to evolve. However, how it should evolve and how officers' roles and day-to-day work may need to change are harder questions to grapple with. In 2014, CSF explored how we might develop a toolkit to facilitate a structured 'change' conversation that would help organisations question their current operating assumptions, and review the relevance of their current role and business model in a changing operating context.

The 3"C"s Toolkit – Cards, Chips and Cues

We developed the Strategic Levers of Government Toolkit comprising three elements: Cards, Chips and Cues. These are intended to be used in an interview or a workshop setting. In designing this "change" conversation, we wanted public officers in government agencies to think through three key questions:

Why evolve?
How has your operating context changed?
What are the drivers of change in your work?

What needs to evolve?
How is your work affected by these changes?
How would you re-prioritise your core work and goals?

How to evolve?
What are the practical steps you would take?
How would you manage potential trade-offs resulting from your decisions?

Figure 2: Key Questions in a Change Conversation

Cards

To help participants discuss these questions in concrete, non-conceptual, terms, we created 10 "Lever" cards that represented the most common levers that agencies would use to achieve their strategic priorities. Participants were given the flexibility to create additional lever cards if necessary. We also created a deck of "Governance" cards, each with a key question to prompt thinking on the impact of decisions on the different actors in the ecosystem.

Why did we use cards? We have found that cards are handy, visual prompts for participants to consider the range of levers they have at their disposal. Cards are flexible and can be arranged in different patterns to explore different connections and relationships, or to illustrate a certain sequence or logic. Having cards represent a different range of levers helps make a discussion on a fairly conceptual topic more tangible. It also helps minimise bias by presenting people with levers they may be less familiar with or which they had not previously considered.

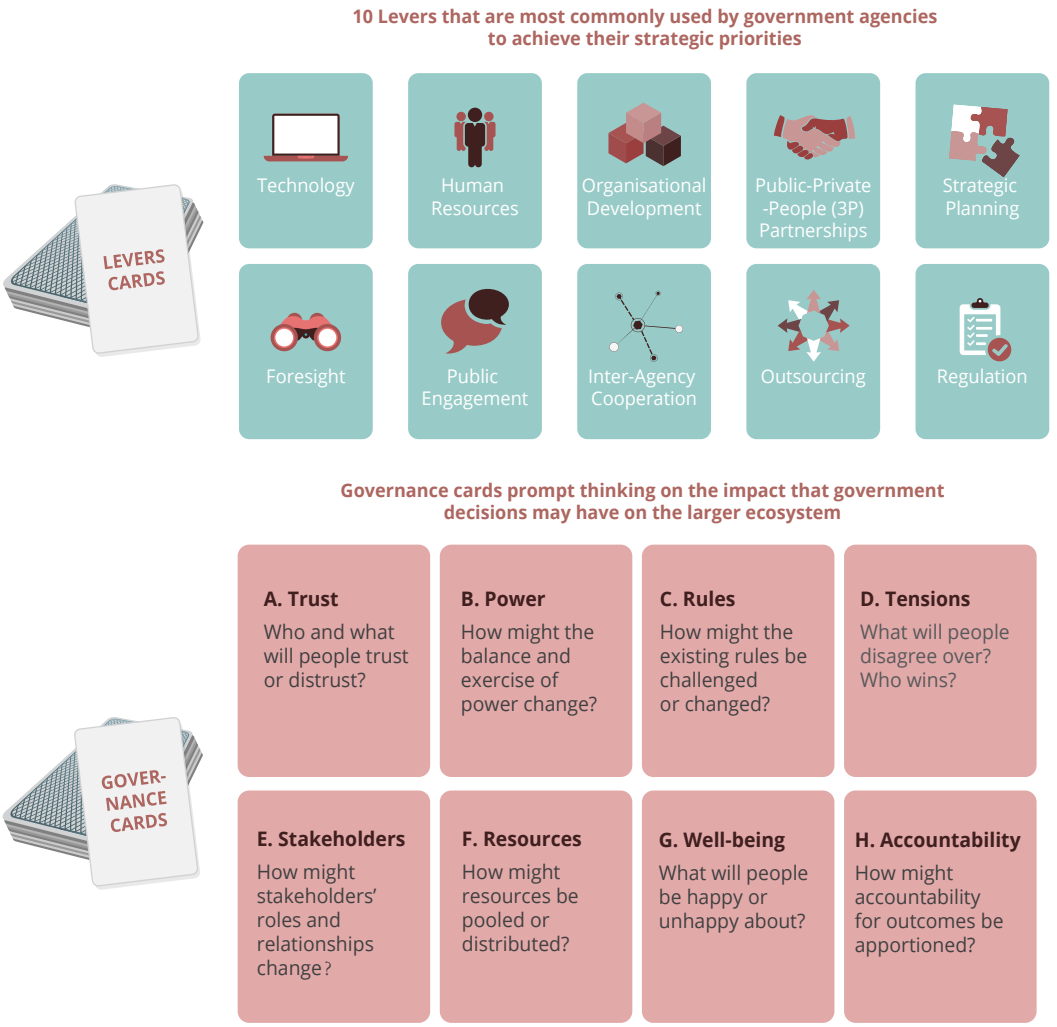

Figure 3: Levers and Governance Cards in the Strategic Levers of Government Toolkit

Chips

We used chips to represent the finite pool of arbitrary resources organisations have at their disposal to achieve their strategic objectives. These resources can be tangible ones like budgets and human resources, to less tangible ones like management attention and bandwidth.

We designed a two-step exercise – first, the participant allocates the chips across the levers based on their current operating approach. The participant is prompted to articulate the rationale underpinning the organisation's current business model and the assumptions that might be in this business model. The participant is then presented with mini-scenarios that challenge the status quo, and asked how he would reallocate his chips. Each mini-scenario highlights drivers that affect either resource availability or demands in a three- to five-year time frame, for example resource cuts amidst increasing expectations of service delivery.

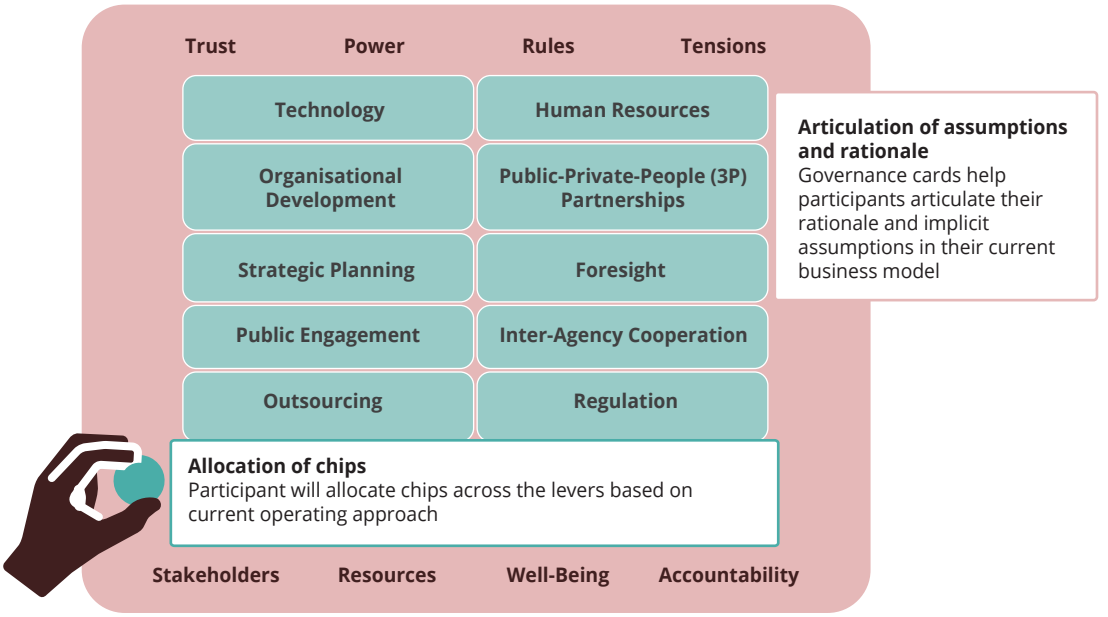

Figure 4: How Cards and Chips are Used in the Conversation

The focus of this two-step conversation process is not the amount of resources allocated across the different levers, but the shifts in allocation as prompted by the mini-scenarios, as well as their underlying rationale and assumptions. Since most changes are not frictionless, we also ask participants to outline practical steps that they would take as priorities shift. Organisations are also asked to evaluate the potential governance implications arising from their reallocation.

Cues

Conversation cues, in the form of a facilitation guide, were designed to enhance the quality of the conversation. Classified into six themes, the questions help leaders in organisations reflect on their leadership and their organisational transformation journey:

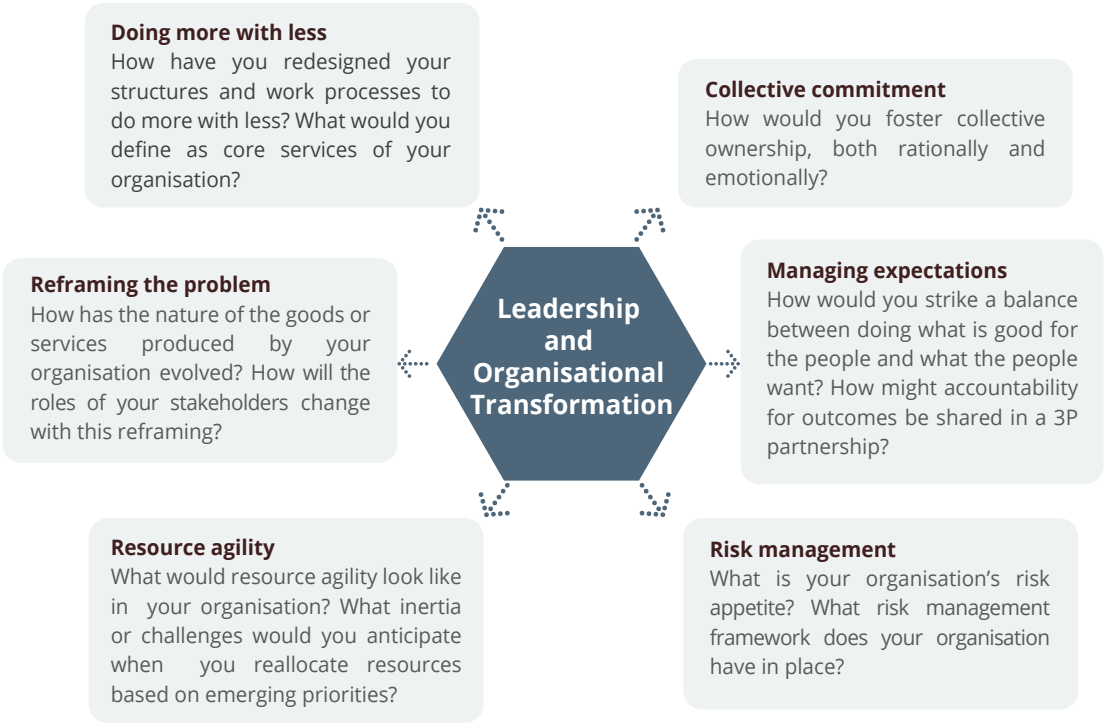

Figure 5: Six Themes of Conversational Cues for Reflection on Leadership and Organisational Transformation

Experience with the Toolkit

We have experimented with the toolkit in two types of settings – in one-on-one conversations and in workshops. The toolkit was well-received and participants found that it enabled them to articulate their mental models of their organisation's strategies. The cards helped them to visualise how resource allocation ought to shift within their agencies as well as across the government. In some cases, the cards prompted agencies to consider levers that they had not been actively considering. In workshop settings involving officers from different agencies, by comparing and contrasting one agency's allocation with another's, public officers saw new opportunities for inter-agency collaboration.

Leveraging Networks Effectively

A theme that came up more than once in the conversations was the need for the government agencies to leverage on networks more effectively. Many saw the need for the government to develop the ability to navigate non-hierarchical environments and to engage and collaborate across the private, public and social sectors.

- Agencies need to strategically decide on their roles within the ecosystem and appreciate how their choices can open up or close off the operating space for other parties. In the case of the infocomm sector in Singapore, the government has focused on developing baseline infrastructure such as fibre-optic cables to support a nationwide broadband network. Private sector operators work off this infrastructure to provide a range of broadband services and develop spin-off applications. The operators do not need to make significant investments to set up the baseline infrastructure but instead can focus on creating innovative services and applications. The government's role in this instance has created space for private sector innovation.

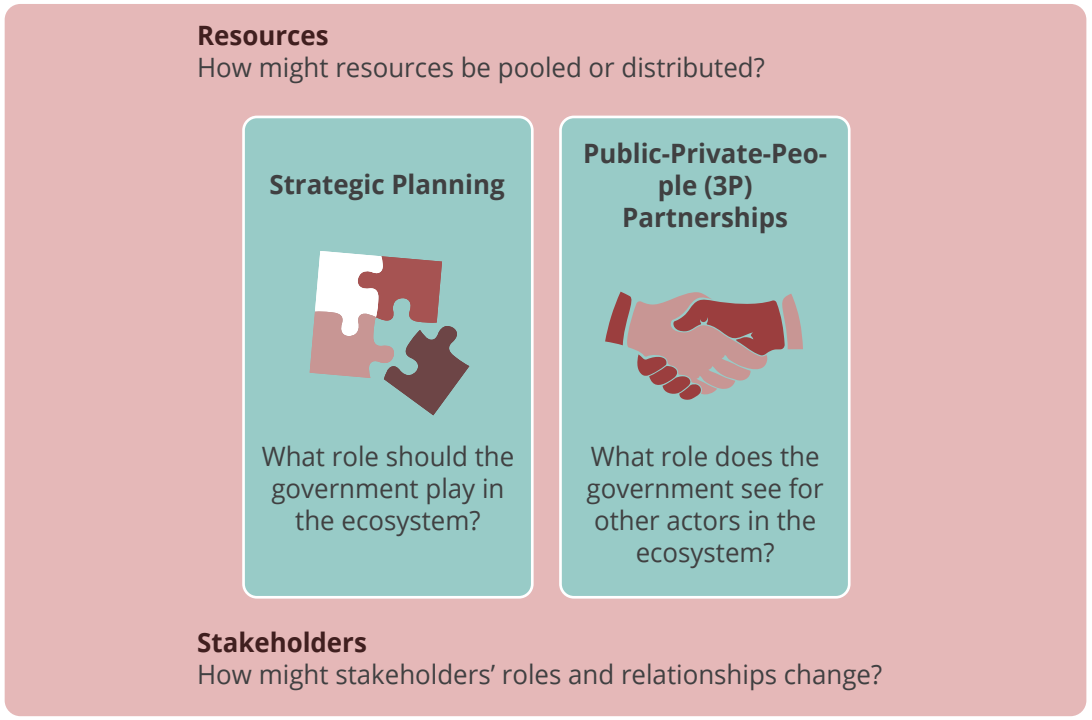

Figure 6: Re-defining Roles to Better Leverage Existing Networks

- The concept of using technology as a force multiplier in the security sphere is not new, but there is significant potential in using technology as a network multiplier. During the 2011 London riots, the London police tapped on the photos uploaded on websites and Facebook pages to identify looters. Given the high uptake of mobile communications and social media in Singapore, it is quite conceivable that social media postings can be scanned using technology to pick up incident reports, say of fires or traffic accidents, to alert emergency response agencies such as the civil defence forces even before actual reports from citizens. The balance between providing timely, anticipatory services to citizens and not being overly intrusive will need to be struck. In the case of Amsterdam, concerns about the collection of individual household-level energy usage data delayed the deployment of smart meters for five years.

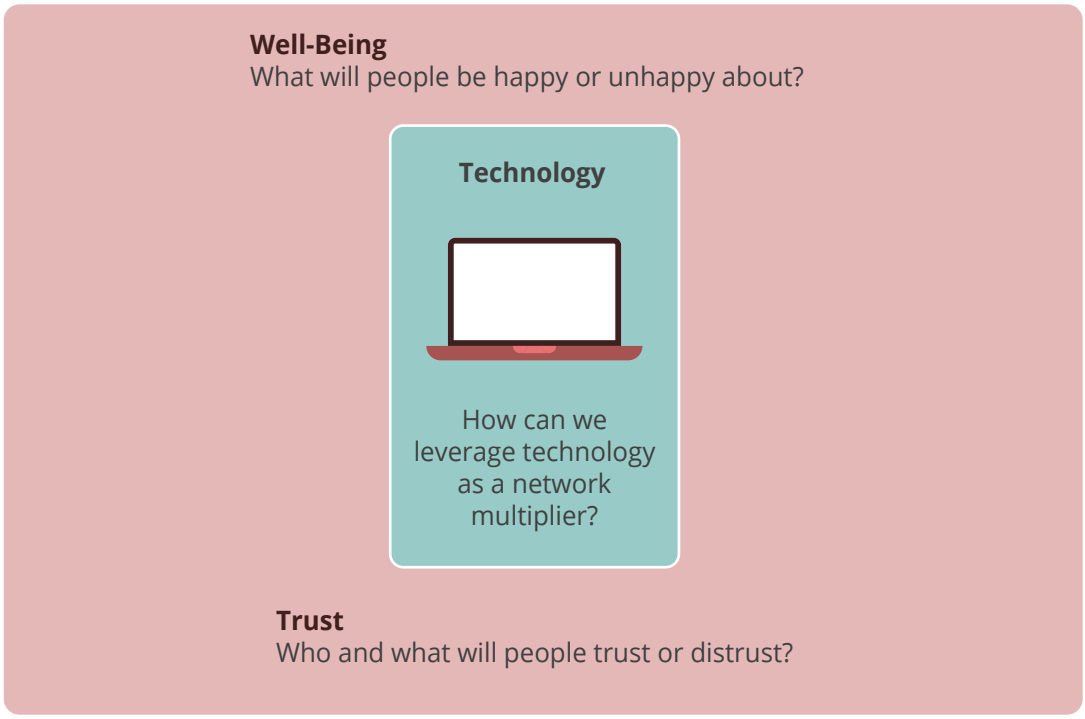

Figure 7: Addressing Privacy Concerns to Better Harness Technology as a Network Multiplier

Conclusion

The discussion on the evolving role of the state was timely. Not only are there external shifts affecting the operating context of public agencies, but there are internal shifts taking place as well. In 2013, the Singapore Public Service embarked on a public sector transformation initiative. This transformation initiative has as its goal a public service that operates as one integrated whole, with citizens at the heart of what it does, and that does so by upholding the highest levels of integrity. Recognising that it is not business as usual, many agencies have started internal conversations to reframe their roles and functions.

For CSF, we set out on this second phase in an effort to use foresight to influence policy action in the area of organisational development. This has meant translating the conceptual content into a conversation format where agencies can meaningfully discuss the shifts that their organisations will have to make as the operating environment evolves. We have found the structured conversation process and toolkit to be effective in creating a safe space for participants to challenge their existing mental models and explore alternatives. The insights we have gleaned from this process will help CSF in our subsequent efforts to translate our subsequent foresight research into products that support learning, reflection and action for public agencies.

Note

[1]*The findings were published in our last report,* Foresight 2014.

Communicating Futures: Stories Are Not Just for Bedtime

Chew Lin Kay

How does one start a community conversation about death and dying? In Singapore, as in many parts of the world, this is a challenging conversation. The community arts project Both Sides Now decided to create a series of stories to invite the public into the conversation. One of the stories took the form of a puppet show: characters were made from household items such as kettles and mops, and acted out a couple's care for each other as they struggled through dementia (her) and terminal cancer (him). The audience were able to relate the couple's experiences to similar stories they may have heard or experienced; a simple piece of entertainment then became an invitation to think about the choices they might have wanted to make in their own lives. We have a way of finding ourselves in stories, and of using them to unlock connections with each other as well as the world. Might storytelling be useful in policymaking?

Create: We Are All Storytellers

It is through stories that we make ourselves understood, and that we understand the world. One way that the Singapore Government has been collecting stories is through the Singapore Memory Project. This is an active and ongoing effort spearheaded by the National Library Board to encourage Singaporeans to share their stories. The stories tend to be collected around themes such as personal milestones or shared spaces. Shared on the Singapore Memory Project website and through travelling exhibitions, these memories become points of common experience that can connect Singaporeans in different generations. For example, the website is now hosting the "Singapore Family Writing Competition". Participants are encouraged to first map out their family tree, and then to collect stories from members of the family. In an earlier project, students interviewed residents and shopkeepers at Rochor Centre, an old housing development slated for demolition; other than collecting the histories of the people who lived and worked there, this project also connected a younger generation to the stories of a place they might otherwise not visit. As self-generated and self-collected stories, there is a sense of authenticity and connectedness that may be absent in official accounts.

Another powerful example of storytelling can be observed in the forum theatre method[1]. A major innovation lies in eliminating the distance between the audience and the actors, director and playwright by inviting the audience to participate in shaping the stories. This creates an opportunity for more stories to be heard, and empowers previously-passive audience members to solve challenges. In community-based arts project Both Sides Now, one of the stories presented was that of a family whose father had been incapacitated in an accident. While the original story removed his son from the decision making process, in the forum theatre method, family members could actively explore alternative storylines based on suggestions from members of the audience. Rather than directing the story to what the playwright or director considers to be an ideal outcome, forum theatre achieves resolution

Both Sides Now

Both Sides Now (www.bothsidesnow.sg) is a community-based arts project aimed at raising awareness on the importance of end-of-life care planning. The first phase in 2013 consisted of installations at Khoo Teck Puat Hospital, inspired by conversations with people who were terminally ill, their family members and caregivers, as well as medical staff. The main exhibition space was taken up by objects that were meaningful to the people interviewed (for example, a religious amulet, a phone that a foreign-born member of medical staff would use to talk to his/her children). Some of the interviews were also adapted into animated films. One part of the exhibition was dedicated to a short film, *Ah Ma*. While fictional, this film drew much on the director Anthony Chan's experiences of the death of his own grandmother.

The second phase in 2014 consisted of a travelling exhibition to two community locations in busy town centres. The exhibitions included an installation of everyday locations (for example, a living room, a coffee shop) where the public could "eavesdrop" on others' reflections and experiences of death and terminal illness. There were also interactive stations where the public could take part in activities to create "timelines" of the ups and downs of their own lives, and to make handicrafts to help them reflect on what death meant to them. Apart from the puppet show, there was also a forum theatre piece written for this project.

Photo 1: Visitors were encouraged to share their experiences and stories about death. They could use the paper coffin (right) to share what their own coffin meant to them, while the pinwheel (left) contained a series of guided reflections of what they were grateful for in their lives. Photo: Chew Lin Kay.

only with the help of audience (and sometimes not at all). This less-directive approach also respects the principles of adult learning, that adult learners tend to be self-directed (that is, they must want to learn) and problem-solving in orientation. The invitation to audience members to suggest possible alternatives acknowledges participants' own experience; in drawing from their own experience, audience members are able to make the "problem" relevant to their own lives in a way that a more directed question may not have the flexibility to accommodate.

Sense-make: Stories as a Way of Collecting Information

Stories are spacious in a way that surveys and other quantitative methods are not: quantitative surveys are limited by the questions that we can think of, which may not touch on what the truly pertinent issues are. The Singapore Government attempted its own exercise to develop skills and norms for storytelling and listening (amongst and between members of the public and civil servants) through small group dialogues. Called Our Singapore Conversation, the dialogues created the space for participants to talk about their concerns: in the first phase of the conversations, the question on the table was simply, "What would you like to see in the Singapore of the future?"

Figures 1 and 2: Posters based on the discussions during Our Singapore Conversation. Credit: Welenia Studios.

The sessions were safe spaces for individual participants to share their experiences – since these were individual stories, there was no sense that each story was right or wrong, or that any individual story was more or less valid than another. This open sharing also allowed participants who may have come from different backgrounds to find points of connection.

This two-year exercise has had impact on policymaking in a number of ways: most directly, hearing so many stories together allowed the Government to identify what Singaporeans were concerned about (for example, desire for a slower pace of life, rising costs of living, the pressures students faced in education, the affordability of housing, interest in contributing to society). This in turn led the Government to consider how our policies might address some of these concerns, or, at least better

appreciate the tensions and concerns certain policy measures might spark. For example, it is in response to the desire to give back to society that there was further action to develop a volunteer youth corps as well as an armed forces volunteer corps.

Perhaps more significantly, this exercise demonstrated to government agencies the power of small-group conversations to garner feedback and to disseminate information. There is now more interest by public agencies to use this form of public engagement. For example, retirement adequacy emerged as a major concern during the conversations. What has happened since Our Singapore Conversation is that the Ministry of Health and the Central Provident Fund Board[2] have continued to use the small-group method to communicate public education messages about retirement adequacy and to garner feedback about a new universal health insurance scheme.

Our Singapore Conversation also demonstrated the power of people-to-people engagement. Tradeoffs are a reality in policymaking; while agencies do make every effort to explain the rationale behind the decisions made, those adversely affected by those decisions will naturally be dissatisfied. Dialogues can present an opportunity for people differently-affected by a policy to encounter each other's point of view; this can create a level of understanding that no amount of speechmaking can achieve. For example, one of the key issues relating to the affordability of housing is whether public housing should be considered a home or an asset. Dialogue participants were better able to appreciate the competing concerns when groups included a wide range of perspectives, such as older participants who were more likely to consider their houses as an investment towards their retirement funds, and young people who consider the high cost of housing to be impediments towards marriage and starting families.

Invite: Bringing a Range of Perspectives to "Make It Real"

If the purpose of gathering stories is to understand what is presumably a diverse population, then it behooves the gatherer of stories to reach out to as diverse a group as possible.

Figures 3 and 4: The icons depict characters built from the interviews that the Project Flightpath team conducted.

Reaching out to a diverse audience does not necessarily require a survey with a large sample size. For example, in Project Flightpath, a project undertaken by the Public Service to study Singaporeans' career aspirations, the researchers made a conscious decision to conduct only 40 interviews. However, the researchers made a conscious effort to make sure they reached out to as many profiles as possible. In their invitation to the public to participate in the conversation, they identified 24 preliminary profiles (based on broad markers such as life-stage, education, etc) that they were interested in reaching out to, which helped the team ensure that they reached out to a broad enough range of people.[3] The project team also ensured that there was diversity in the stories represented when they shared their findings. They created six "career personas" or archetypes to organise the insights they had gathered through the interviews. "Steady Sally" and "Ambitious Alex" were realistic characters built out of the interviews the team conducted, and were easy for readers to identify with. In this case, the personas also served as a convenient shorthand for policymakers who may not necessarily have been involved in Project Flightpath to talk about groups of concerns or aspirations. More than that, personas bring life to abstract ideas and make them easier to engage with.

Imagine: Stories for Future Scenarios

In the same way that characters and stories can be used to engage the policymaker, they can also be used to immerse members of the public in new ideas. In 2012, the Institute of Policy Studies (IPS) undertook the PRISM project to explore the future of governance in Singapore. Instead of presenting the topic as abstractions, IPS wrote a series of scenario stories. There was also a forum theatre piece which presented the country in crisis. In considering what they would have each character do in that situation, audience members were also assessing for themselves the values and direction they wanted Singapore to take. Another part of the PRISM project was an "exhibition of useless objects", which the public were invited to contribute artefacts to. The objects were displayed with stories about why they would have become obsolete. For instance, one member of the public submitted a report card, expressing the hope that records of one's academic results would become useless once Singaporeans no longer defined success largely in terms of academic achievement.

In her poem *The Speed of Darkness*, poet Muriel Rukeyser writes, "The Universe is made up of stories, not of atoms." We are storytellers and story-listeners. The stories we tell reflect our worldview and our aspirations. The stories we hear help us to make sense of the world around us, and to find points of connection. What are the stories that we, as public officers, are telling and hearing?

Notes

[1]*Augusto Boal devised the forum theatre method as a way to demonstrate how it is possible for people to make changes or improvements to their surroundings. A typical exercise involves a skit on a pre-set theme (for example, bullying in school). Audience members are encouraged to interrupt the "action" at any point and suggest lines or actions for any of the actors. This allows the spec-actors to insert their own experiences and to learn from others' thoughts and experiences in order to solve the challenge presented through the skit.*

[2] *The Central Provident Fund Board (CPFB) administers the Central Provident Fund (CPF), which is a social security system that enables Singaporeans and Permanent Residents to set aside funds for retirement. Both employees and employers make monthly contributions to the individual's CPF account. Other than to meet retirement expenses, CPF funds can also be used to meet healthcare costs, purchase housing and fund higher education.*

[3] *For the list of preliminary profiles, see: http://gssq.blogspot.sg/2012/09/conversations-about-singaporeans-career.html. To get a copy of the report, please write to leon_voon@psd.gov.sg.*

Meet the Team

We welcome your opinions, thoughts and insights on this publication.
Please visit our website, www.csf.sg, for additional contact information.

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Huifen loves breakfast and thinks that foresight work is as important as the first cuppa of the day. Coming from an engineering and med-tech background, she wonders what Nature and Science hold for the future and enjoys experimenting with foresight methodologies with her two children.

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Senior Strategist

Cassandra has co-authored two books about Singapore's first prime minister Lee Kuan Yew as well as covered both local and foreign politics over a six-year stint at The Straits Times – where she has travelled far and wide: from the housing estates in Moulmein-Kallang GRC to the slums of Jakarta, and Melbourne's city centre, among other places, for news assignments. But close friends and family know she is happiest baking in the kitchen or painting in her makeshift art studio at home.

Gunathilakan DARMALINGAM
Senior Assistant Executive

Gunathilakan, or Guna as he's affectionately known, is the office's resident swami. After spending each workday bailing his colleagues out of trouble, Guna goes home to his three kids, two nephews, an amazing cook-of-a-wife and their veritable assortment of adorable pets. He loves airplane models and has a collection to rival the best of them.

Rahul DASWANI
Senior Strategist

Rahul's life is filled with adventure. Having lived and worked in Indonesia, Papua New Guinea and Ethiopia, he has moved his exploration to the world of ideas. He is keeping his goal of an annual dive trip alive, with previous destinations of Zanzibar, the Great Barrier Reef and Fiji (just off the island where Cast Away was filmed). A practitioner of mindfulness and meditation, Rahul's zen state provides a tranquil energy for the office to launch into discoveries of a wide array of possible futures.

Tiana DESKER-TORVINEN
Deputy Head, CSF / Senior Assistant Director

Tiana has an interest in both methodologies for the study of history, or historiography, and futures. She spent seven years in the defence sector, in a policy and strategy role, and enjoys the challenge of translating insights from futures research into actionable policy recommendations.

Audrey HO
Strategist

Audrey loves learning new things, and is excited by different cultures and fresh ideas. As she dreams of a future where there is peace between divergent groups and all may flourish, she is hopeful that futures work can bring different people together in conversation. In her spare time, she likes travelling and exploring nature.

Chew Lin KAY
Strategist

Chew Lin enjoys meeting interesting people, and believes that every person has a story to share. She also believes that good conversations and the cross-pollination of ideas can lead to new collaborations. Sometimes, she even succeeds in matchmaking ideas! She is also interested in how facilitation can help to uncover insights. To support her interests, Chew Lin shows a frankly unhealthy interest in tea.

Leon KONG
Senior Strategist

Leon is drawn to eclecticism. He joined CSF after a stint at a headhunting firm in New York, and close to three years with the Ministry of Finance working on social policy. His hobbies, too, are catholic, including such activities as riding his KTM motorcycle and scouring the Esplanade library for obscure movies from remote times and places. These developments were, admittedly, not immediately anticipated. Yet, they had always been there, concealed in time present, past and future. We see through a glass, darkly; Leon looks forward to doing so full-time and on a national scale.

Shashikalah KRISHNAN
Strategist

Shashikalah enjoys understanding and debating issues/policies that would shape Singapore's future. Therefore, she values interactions with citizens to understand their concerns and perspectives to not just learn of their perspectives but also shape the future with them. She is fascinated by history, culture and religion, and makes time to read up on these areas of interest and explore interesting places in Singapore (especially gothic and neo-classical buildings).

Wei Jian LEONG
Lead Strategist

Reactants Products. A chemist by training, Wei Jian has always been fascinated by reactions. Since joining CSF, he spends a good part of his time thinking about how to balance the equation of governance, as reactions on the ground are more volatile than before. Wei Jian is also the office's human-jukebox.

Joan MOH
Head, CSF/Deputy Director

Joan's foray into the wonderful world of futures has so far been an exhilarating ride, and she is constantly amazed by the new ideas and connections that she encounters. An engineer by training, she has embraced the diverse, multi-disciplinary good folk of CSF and restrained herself to only occasionally reciting pi to twenty digits. She takes photographs in her free time, which mainly entails running after her toddler, camera in hand.

Jared POON
Senior Strategist

Jared likes ideas, and likes helping ideas interact and reproduce. He loves both the a priori analysis of concepts as well as the empirical studies on how we think and feel, and is trying to build a better life and a better world through reason and research. To this day, he denies being a superhero, and all reports of him fighting crime in spandex are probably just anecdotal, and to be disregarded.

Terence POON
Lead Strategist

Terence spent seven years in Beijing where he reported on the Chinese economy, arranged training for Chinese government officials to learn about trade and economic regulation from the European Union during the worst of the Euro crisis, and breathed the polluted Beijing air in preparation for the yearly haze in Singapore. Terence is enjoying the adjustment from writing in journalese to writing in bureaucratese, as he tries to think beyond the confines of his messy desk, a symbol of the complicated and sometimes complex world in which we live.

Li Sheng TAN
Senior Assistant Director

A historian and philosopher by training, Li Sheng dreams about someday writing a new history of Singapore. He wishes to thank the futures community for making him a better person in two ways: first, patiently listening to and helping to improve his ideas, and secondly, providing him with so many new experiences and friends around Singapore and the world. He hopes that he has been able to reciprocate in kind to some small degree over the past two years, and to have more opportunities to do so in the future.

Nicholas TAN
Senior Strategist

Nicholas is an English major who used to teach language, literature and drama at a high school. These days, while dabbling in the arts has become more of a luxury, he enjoys meeting new people and new ideas, and feels most alive when facilitating and participating in workshops. Nicholas is also the self-professed "feeder" for the office, as catering is his other passion.

Jill WONG
Director, Strategic Policy Office

Jill enjoys exploring. At SPO, she enjoys exploring the connections between ideas and their potential impact on policy and daily life. On weekends, Jill can usually be found exploring various parts of Singapore on foot or by bike, learning new things about the small city-state that she's called home for most of her life.

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