Issue 7 | JANUARY 2010

ETHOS

Civil Service College
Singapore

05 Serving Beyond the Predictable
Jocelyne Bourgon

19 Looking for Trouble
Gary Klein

54 Thinking About the Future: What the Public Service Can Do
Peter Ho

63 Singapore: The Apple of Nations—A Conversation with
Peter Schwartz

69 In Search of the New Public Leader
Claudio Fernández-Aráoz

Leaders in Governance Programme

22 - 30 March 2010
Singapore

Good leadership and trusted governance institutions are critical for growth and stability. The current crisis has magnified the importance of good governance and sound regulatory frameworks. More so than ever, government leaders need to find the right balance between state and markets, between regulation and enterprise.

Immerse yourself in a programme which offers practical insights into how sound regulations, innovative policies, long-range planning and effective implementation can promote economic stability and create long-term competitive advantage.

The Leaders in Governance Programme offers you unrivalled access to Singapore's policymakers. It has attracted government leaders from East Asia, Southeast Asia, the Middle East and international organisations. To find out more about this opportunity to understand Singapore's leadership and governance system, visit us at www.cscollege.gov.sg/lgp or email kelvin_chai@cscollege.gov.sg.

Civil Service College
Singapore

ETHOS

Advisory Board
Lionel Yeo – CEO and Dean, Civil Service College
Chan Lai Fung – Permanent Secretary, Ministry of Law
Chew Hock Yong – Deputy Secretary,
Ministry of Community Development, Youth and Sports
Loh Khum Yean – Deputy Secretary (Industry), Ministry of Trade and Industry
Ow Foong Pheng – Chief Executive Officer, JTC Corporation
Andrew Tan – Chief Executive Officer,
National Environment Agency

Editorial Team
Alvin Pang – Editor • Sheila Ng – Assistant Editor
Liza Lee • Yee Ping Yi

We welcome contributions, suggestions and letters to the Editor.
The editorial team reserves the right to select, edit and publish articles according to its editorial policy. All correspondence should be directed to:

The Editor, ETHOS
Centre for Governance and Leadership
Civil Service College
31 North Buona Vista Road
Singapore 275983
Fax: +65 6775 8207
Email: ethos@cscollege.gov.sg

©2010 Centre for Governance and Leadership, Civil Service College

Published by the Civil Service College
The Civil Service College (CSC) is a statutory board under the purview of the Public Service Division (Prime Minister's Office). Established in 1971, the College is an integrated learning institution comprising the Centre for Governance and Leadership, Centre for Public Economics, Centre for Public Communications, the Institute of Policy Development, the Institute of Public Administration, Public Service Centre of Organisational Excellence, CSC Consultants and CSC International. Its vision is to be the Heart of Learning Excellence and Development for the Singapore Public Service.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Editor and the Centre for Governance and Leadership, CSC. The opinions and views expressed in Ethos are those of the authors, and do not necessarily reflect those of the Centre for Governance and Leadership, the Civil Service College or the Public Service Division.

ISSN: 1793-3773

Website: http://www.cscollege.gov.sg/ethos

CONTENTS

Issue 7, January 2010

03 **Editorial**

05 **Serving Beyond the Predictable**
Jocelyne Bourgon

12 **Thinking through Complexity, Managing for Uncertainty**
Lam Chuan Leong

19 **Opinion: Looking for Trouble**
Gary Klein

24 **Opinion: The Future of Futures**
Devadas Krishnadas

31 **Opinion: Mainstreaming the Praxis of Foresight: The UK Example**
Calvin Chong and Jeremy Tan

37 **Enterprise Risk Management: Strengthening Singapore's Competitive Advantage**
Ang Hak Seng

46 **Rethinking Recovery: Possible Discontinuities and Domestic Implications**
Godwin Tang and Valerie Yuen

54 **Thinking About the Future: What the Public Service Can Do**
Peter Ho

63 **Singapore: The Apple of Nations—A Conversation with Peter Schwartz**

69 **Opinion: In Search of the New Public Leader**
Claudio Fernández-Aráoz

74 **Phases of Singapore's Demographic Development Post-World War II**
Koh Eng Chuan

81 **Sustainable Development: Challenges and Opportunities**
Tan Yong Soon

EDITORIAL

The future remains humanity's most enduring dilemma. The survival and success—or failure and decline—of ventures, organisations and nations have always depended on how present actions might be expected to play out down the road; it is for this reason that those who govern or lead are tasked with the responsibility for foresight. After several decades of consolidated quantitative control and efficiency gains in public administration, it has now become a given in governance to regard the environment as ever more complex and turbulent, in which the most carefully considered policies are subject to the vagaries of unpredictable forces.

This is partly the result of deeper learning and also of relative success. The price of complacency has become much steeper, while it has become easier to fall into a false sense of security because things have been going well. Despite recent crises, the world has by and large become less, not more hazardous, than in the historical past. The advancements that have made this possible—from maps, medicine and media to commuting, communications, and computers—are the outcome of an exponential explosion in our understanding of causes and effects. Ironically, these technologies also serve as the medium through which shockwaves of change can now resonate well beyond their points of origin. But by the same measure, our means to anticipate and prepare for the future have also grown, assuming we are inclined to pay attention.

In Singapore, scenario planning has been practised at the national level for over a decade; the expertise driving its use as a foresight tool has steadily matured. New platforms and strategies, such as risk management (page 37) and horizon scanning, are yielding promising results. Since the mid-1990s, the PS21 movement and other initiatives have advocated a mindset prepared for continual uncertainty and change. Given Singapore's exposure and constraints, this integrated, disciplined approach to thinking about our future is a dire necessity. It is also a strategic advantage, if it means shifting the odds in our favour and being able to compete not on absolute resources, but on initiative, agility and canny choices in the face of murky prospects.

Those who consulted the ancient oracles understood that their fate was not determined by the auguries they received, but by how they chose

to act upon them (page 24). Canada's Jocelyne Bourgon seeks a public sector framework able to achieve superior collective results, through collaboration, communal resilience and a capacity to explore options beyond the predictable (page 5). She attributes to government the mandate and responsibility to take a broader view of shared problems, convene interconnecting ideas and opportunities, and enable synergistic solutions. This "many helping eyes" approach to dealing with complexity may also serve to overcome the cognitive failures and behavioural biases highlighted by our Senior Fellows, Lam Chuan Leong (page 12) and Gary Klein (page 19), who are well aware of the obstacles that hinder genuine insight in large organisations. Forewarned is unfortunately not always forearmed. Head of Civil Service Peter Ho has defined concrete steps that the Public Service should take to anticipate strategic surprises, and announced the formation of a Centre for Strategic Futures (page 54).

Pioneering futurist Peter Schwartz sees in Singapore the potential to be a global trendsetter and leader in practice (page 63), but believes there must first be a culture willing to embrace diversity, ambiguity and new ideas. The consensus is that enlightened, confident leadership will be needed: to consider a wide range of data sources and divergent views; experiment intelligently with untested ideas; convert foresight into decisive fore-action; and most critically, to make corrections when necessary. The resilience of tomorrow's societies will not rest on new technologies and management techniques, but in these future-oriented habits of mind, distributed across a wider and more connected network.

Other contributors in this issue suggest developments that may go against prevailing wisdom; the Strategic Policy Office highlights possible discontinuities in the post-crisis global economy, while the Permanent Secretary for the Environment and Water Resources Tan Yong Soon argues that Singapore's early foresight and counter-conventional policies have given it a leading position in environmental development that may pay off in a carbon-constrained future.

I wish you a fruitful read.

Alvin Pang
Editor, ETHOS

Jocelyne Bourgon

Serving Beyond the Predictable

The public sector needs a unifying framework to reconcile the efficiency gains of the past with the participative, explorative and adaptive strategies needed to address tomorrow's complex challenges, argues Jocelyne Bourgon, President of Public Governance International and President Emeritus of the Canada School of Public Service.

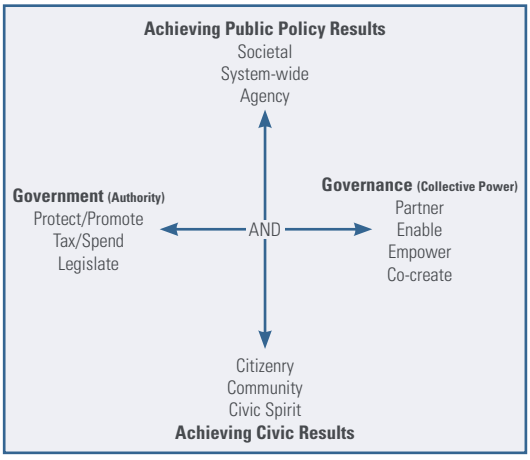
Even though the reforms they have undertaken since the 1980s are strikingly similar, public administrations vary from country to country, reflecting different histories, circumstances and philosophies on the role of government in society. Generally speaking, public administration lacks a unifying framework to help practitioners reconcile what was and integrate what is, as they forge what might be. Public organisations are not yet aligned with the complex issues they have to address[1] or with the unpredictable nature of the global economy, networked society and fragile biosphere.[2] This article outlines some potential directions for reform to help address this misalignment.

ACHIEVING PUBLIC RESULTS

To serve "*beyond the predictable*", public organisations must embrace a broader definition of public results, an expanded understanding of the role

of government and a dynamic view of public administration. Their role is to achieve *public policy results* and *civic results*. To do this, public administrators must explore how to move results up the value-added chain and balance better policy results in the short term, with the need to engage citizens to achieve better results in the long term.

FIGURE 1. EXPANDED VIEW OF PUBLIC RESULTS AND ROLE OF GOVERNMENT



© J Bourgon 2009. Reproduced with permission.

SERVING BEYOND THE PREDICTABLE

The work of government extends beyond achieving public results in a relatively stable environment, to dealing with complex issues in a volatile environment.

The term "*emergence*" reflects the fact that new patterns arise from a vast array of interactions, and seemingly out of nowhere.[3-5] Conventional government approaches were conceived to break down difficult undertakings into simpler tasks,[6] not to deal with complexity and uncertainties. This linear approach leaves government in a reactive position, unable to *detect* emerging trends or *intervene* ahead of time.

Governments need alternatives. Complex problems cannot be solved by breaking them apart. They require a systemic or *holistic approach*.[7] More knowledge does not resolve complex issues since problem definitions and the solutions are contested, and positions entrenched.[8,9] Complex issues call for a *participative approach* to create a shared view of a given issue, opening up the possibility of concerted actions.[10] Complex problems cannot be solved by replicating standardised actions of the past.[9] New, *emergent solutions* must be grown to address them.

Governments acting alone cannot address an increasing number of *complex policy issues* ranging from public health and safety to environmental protection. These issues require active citizen participation and the contribution of multiple stakeholders.[11] As governments start producing results *with* others, their options widen.[12] Government can act as a partner, responsible contributor, facilitator or leader. Seen in this light, public administration is a *dynamic system* where the authority of the state is used in different ways to achieve different results.

Serving beyond the predictable renders traditional action antiquated and requires new capacities.

Improving the Capacity for Public Results

To achieve public results, the state apparatus must have strong *institutional capacity*. This ensures respect for the rule of law, checks and balances in the exercise of powers, accountability for the use of public funds, and respect for public sector values.

To achieve system-wide results, support government-wide priorities and work across borders, governments must have strong *inter-organisational capacity*.

Institutional and inter-organisational capacities give governments a solid foundation. To achieve results of high public value, we must take a fresh look at the administrative systems we have inherited.

TRANSFORMING OLD WAYS: COMPLIANCE AND PERFORMANCE

For instance, well-performing public organisations require strong *control systems* and effective *performance management systems*.

An effective *control function* is necessary to prevent corruption, ensure accountability for the exercise of delegated authority and the use of public funds, all of which are enforced through audit and compliance regimes. Control systems *reduce the risk of mismanagement*. Non-compliance must be verifiable and may lead to sanctions.

Performance management systems, on the other hand, are needed to achieve better results and improve decision-making at all levels. They help remove barriers to better results. The purpose of performance measurement and management systems is to *accelerate the learning necessary for better results*.

No system can be all things to all people. Over the last 25 years, the progressive integration of the two systems has impeded innovation in a number of countries. Negative effects include gaming of performance systems, excessive collection of data and general misuse of performance measurement information. A commitment to achieving public results provides an opportunity to reconsider the approach to date. Administrations can either eliminate the negative effects of an integrated regime or disentangle the control and performance management functions while still ensuring their mutual synergy.

~ *Continued overleaf*

DEVELOPING NEW WAYS: MACHINERY OF GOVERNMENT

A focus on *system-wide results* foreshadows the importance of modernising line departments, from vertical hierarchies to *hubs of vast networks* of organisations working to achieve common public results. In this context, the role of departments is to convene, facilitate and ensure a coordinated approach to improving the performance of the whole network—a role akin to that played by central agencies today. This means that *vertical delegated authority and shared accountability for results must be reconciled*.

Administrations must also modernise their concept of the role of the "*centre of government*". The most important role of central agencies is to ensure coherence in the inter-departmental and inter-governmental areas of modern governance.

Successful horizontal management requires easy access to decision makers, regular monitoring and reporting and the alignment of incentives, rewards and performance pay in support of the collective results. Central agencies have a special responsibility for ensuring that *general accounting and reporting systems* reflect today's reality, that an increasing level of departmental resources are used to achieve system-wide results and to support government-wide priorities.

~ Jocelyne Bourgon

Transforming Old Ways: Policy Units

Most governments have a strong internal policy capacity. Some have gained much experience in intelligence-gathering, scenario-planning or guiding public policy debates about strategic priorities. These are valuable assets for improving their *anticipative capacity*. The Netherlands, Singapore and the UK have much to share in this regard.

The challenge is not so much to gather more information or to build more powerful analytical tools (although more of both are needed); the challenge is to focus on extracting meaning and detecting probable patterns where none were seen before. Interpretation is key.

Developing New Ways: Explorative Capacity

Irrespective of efforts to improve *anticipative capacity* within government, the best knowledge about emerging patterns is in the minds of people, in the networks of inter-relationships in their community or in their global community of interests, and may lie beyond its grasp. In spite of a growing body of literature on collective intelligence,[13,14] not enough is known about how governments can best extract knowledge and meaning on emerging patterns, how they can channel the efforts of many minds towards tackling complex public issues or how they can leverage the power of

networks to connect actors, problems and solutions in new ways to achieve public results.

The challenge will be to integrate the findings of collective intelligence research and network theory into the intellectual framework of public administration, to help government anticipate, prevent and act to increase the likelihood of positive results.

BUILDING RESILIENCE

Where shocks can be reasonably foreseen, it is the role of government to anticipate, initiate pre-emptive action and mitigate key vulnerabilities.[15,16]

FIGURE 2. DYNAMIC CYCLE OF SERVING BEYOND THE PREDICTABLE

© J Bourgon 2009. Reproduced with permission.

However, where shocks cannot be foreseen or prevented, the role of government is to promote the *resilience* of society, ensure a more equitable distribution of risks and reduce the impact on its most vulnerable. This means building the *adaptive capacity* of society.[17]

> Complex issues call for a participative approach to create a shared view of a given issue, opening up the possibility of concerted actions.

Individuals, organisations or government working alone cannot achieve resilience.[16] It requires an *active citizenry* with the skills and confidence to act. It relies on *strong communities* with the capacity to mobilise resources and co-ordinate action that leads to common solutions.[18]

Changing Old Ways: Redundancy and Contingency

Redundancy refers to resources that can be deployed easily to explore emergent situations, experiment to enhance collective learning, and perform other functions to promote exploration, experimentation and innovation. Redundancy builds resilient organisations and improves their adaptive capacity.

Contingent capacity, a related concept, is the concept of building resources in

areas of greatest vulnerability, allowing resources to be deployed rapidly in these areas. Public organisations that push aggressively for efficiency gains may erode their adaptive capacity.

Developing New Ways: Participative Approaches

A *participative approach* to public policy and policy implementation is not a luxury. It reinforces resilience and the adaptive capacity of society, particularly when it allows decision making and action at the community level.[19]

> Where shocks cannot be foreseen or prevented, the role of government is to promote the resilience of society.

Complex issues can be large or small[20] and governments must intervene appropriately to achieve the desired outcome.[17,20] Small-scale interventions are a powerful way to gain insights on preferences, potential outcomes and unintended consequences, and micro interventions can accelerate collective learning, deflect risks and increase resilience.

CONCLUSION

Building on the strength of public institutions and organisations, governments are called upon to address complex issues in the unpredictable nature of the global economy, networked society and fragile biosphere. They are called upon to serve "*beyond the predictable*".

This role transforms the systems and structures that served us well in the past. It requires new capacities. Future public sector reforms entail improving the anticipative capacity of government and building the innovative and adaptive capacity of society.

As a result of a number of global failures and crises, a search for balance is under way to reconcile the private, public and civil society spheres. The need for a new balance reveals more clearly than ever the need for an *affirmative state* able to provide services of high public value, promote and defend the collective interest in all circumstances and also to serve *beyond the predictable*.

As a Senior Visiting Fellow at the Civil Service College, Singapore, the Honourable Jocelyne Bourgon spoke on "New Governance and Public Administration: A Dynamic Synthesis" in June 2009. Madame Bourgon is President of Public Governance International, an organisation dedicated to advancing good public governance, and President Emeritus of the Canada School of Public Service, where she is project leader of the NS6, an International Research Network that is exploring the challenges of public

administration in the 21st century. She is also Distinguished Visiting Professor of Public Administration at the University of Waterloo, and Distinguished Fellow of the Centre for International Governance Innovation.

These positions follow an extensive career in the public sector where she led the Public Service of Canada through some of its most important reforms since the 1940s. Selected positions include: Ambassador to the Organisation of Economic Cooperation and Development (2003-2007), Clerk of the Privy Council and Secretary to the Cabinet (1994-1999), Queen's Privy Council of Canada (1998-present), and Deputy Minister in various departments: Transport, Canadian International Development Agency, Consumer and Corporate Affairs, and the Canadian Center for Management Development.

NOTES

1. Bourgon, J. "Responsive, responsible and respected government: Towards a New Public Administration Theory." *International Institute of Administrative Sciences* 73 (2007): 7-26.

2. Bourgon, J. "Performance Management: It's the results that count." *The Asia Pacific Journal of Public Administration* 30 (2008): 41-58.

3. Bovaird, T. "Emergent Strategic Management and Planning Mechanisms in Complex Adaptive Systems." *Public Management Review* 10 (2008): 319-40.

4. Holland, J.H. *Emergence: From Chaos to Order* (Reading, MA: Helix Books, 1998).

5. Westley, F., et al. *Getting to Maybe: How the World is Changed* (Toronto: Random House, 2006).

6. Wagenaar, H. "Governance, Complexity, and Democratic Participation: How Citizens and Public Officials Harness the Complexities of Neighborhood Decline." *The American Review of Public Administration* 37 (2007): 17-50.

7. Senge, P. *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York: Doubleday, 1990).

8. Haveri, A. "Complexity in Local Government Change: Limits to Rational Reforming." *Public Management Review* 1 (2006): 31-46.

9. Kahane, A. *Solving Tough Problems: An Open Way of Talking, Listening and Creating New Realities*. (San Francisco: Berrett-Koehler Publishers, 2004).

10. Senge, P. Preface. In *Solving Tough Problems: An Open Way of Talking, Listening and Creating New Realities*, A. Kahane (San Francisco: Berrett-Koehler Publishers, 2004).

11. Kettl, D. *The Transformation of Governance: Public Administration for Twenty-First Century America* (Baltimore: The Johns Hopkins University Press, 2002).

12. Lenihan, D., et al. *Progressive Governance for Canadians: What You Need to Know* (Ottawa: Public Policy Forum, 2007).

13. Surowiecki, J. *The Wisdom of Crowds: Why The Many Are Smarter Than The Few And How Collective Wisdom Shapes Business, Economies, Societies, And Nations* (New York: Doubleday, 2004).

14. Tovey, M. *Collective Intelligence: Creating a Prosperous World at Peace* (Oakton, VA: Earth Intelligence Network, 2008).

15. Berkes, F. "Understanding Uncertainty and Reducing Vulnerability: Lessons from Resilience Thinking." *Natural Hazards* 41 (2007): 283-95.

16. McManus S., et al. *Resilience Management: A Framework for assessing and improving the resilience of organizations*. Resilient organizations research programme. University of Canterbury: Christchurch, New Zealand. Retrieved 2 January 2009 from http://www.resorgs.org.nz/pubs.shtml.

17. Berkes, F. and Folke, C. "Back to the Future: Ecosystem Dynamics and Local Knowledge." In *Panarchy: Understanding Transformations in Human and Natural Systems*, ed. L.H. Gunderson and C.S. Holling (Washington: Island Press, 2002): pp. 121-146 .

18. Dale, A., and Onyx, J. *A Dynamic Balance: Social Capital and Sustainable Community Development* (Vancouver, BC: UBC Press, 2005).

19. Lebel, L., et al. "Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems." *Ecology and Society* 11 (2006):19-37.

20. Holling, C.S. "Understanding the complexity of economic, ecological, and social systems." *Ecosystems* 4 (2001):390–405.

FURTHER READINGS

Habegger, B. *Horizon Scanning in Government*. Zurich: Centre for Security Studies. Retrieved 17 June 2009 from http://se2.isn.ch/serviceengine/FileContent?serviceID=11&fileid=3D89E3D1-55A8-8622-F380-69C677A36478&lng=en

Koppenjan, J. and Klijn, E-H. *Managing Uncertainties in Networks: A Network Approach to Problem-Solving and Decision-Making* (London: Routledge, 2004).

Mahbubani (2009). The Dangers of Democratic Delusions. *Ethics and International Affairs*, (1)23, 19-25.

Salamon, L. *The Tools of Government: A Guide to the New Governance* (Oxford: Oxford University Press, 2002).

Lam Chuan Leong

Thinking through Complexity, Managing for Uncertainty

Our thinking is less rational than we'd like to believe, but can we learn to outsmart our own cognitive biases?

INTRODUCTION

Recent events suggest that we are experiencing a period of increased "turbulence": take for example, the wide-ranging impact of the South-east Asian Tsunami in 2004, the September 11, 2001 incident, the 1998 Asian Financial Crisis, the 2003 Severe Acute Respiratory Syndrome (SARS) epidemic and the 2008 Financial Crisis. Many organisations are asking why these severe crises were not detected sufficiently early by their risk management systems.

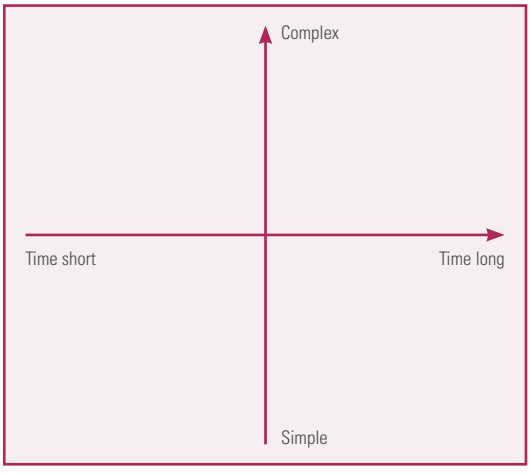
One reason is that the world is becoming more complex and therefore, more unpredictable.

The second reason is that current risk management systems and other attempts to predict the future are based too much upon linear relationships derived from past experience. They fail to take into account our behavioural limitations in handling probabilities, and also the nature of complex non-linear systems which do not always have a definite or repeatable cause and

effect relationship. We need, therefore, to consider a new way of looking at the world around us and a new way of thinking about issues instead of the traditional "Rational Man" model.

Combining the findings from Behavioural Economics and Complex Systems points of view, we can classify the way we think and manage events in a two-by-two matrix as follows:

FIGURE 1. HOW WE THINK AND MANAGE BASED ON AVAILABLE TIME AND COMPLEXITY OF THE PROBLEM



Behavioural economists have shown that when confronted with decisions in a short time interval, we think in ways that are different than if we were given more time to make decisions. We use the *Automatic System* to deal with matters that require very fast decisions. The Automatic System, as the name suggests, controls our intuitive, automatic responses. It is typically uncontrolled, effortless, associate, fast, unconscious and based on practised skills. This is the system of thinking we tend to use in our day-to-day activities, and when we have only a short time in which to make decisions.[1]

> Current risk management systems and other attempts to predict the future are based too much upon linear relationships derived from past experience.

When adequate time is available for reflection, we use the *Reflective System*. This mode of thinking is controlled, effortful, deductive, slow, self-aware and rule-following. Most of what we are taught in schools, our reasoning and analysis and the rational method are based on the Reflective System. In particular, the great advances in science and technology can be attributed to the use of the rational method. Most economic analysis now is based on the so-called "Rational Man Model". This rational method has served us well so far, but may no longer be sufficient in solving some complex problems.

THE EMERGENCE OF COMPLEXITY

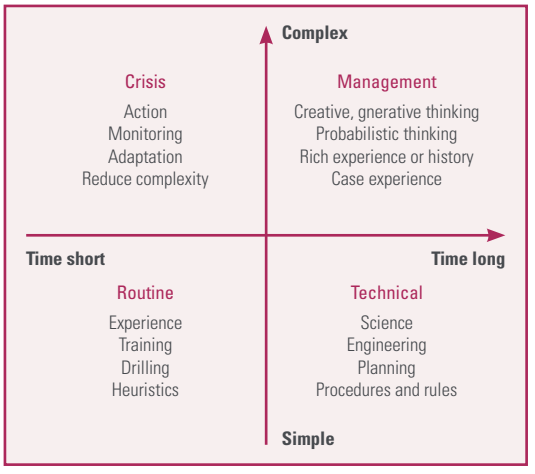
It used to be thought that if we could just collect enough data, if we had enough computing power, we could model any system, such as the weather or the

economy. Complexity theory has demonstrated that non-linear effects, when amplified over a sufficiently long period of time, can upset all our predictions. The weather and the economy are examples of complex systems. Such systems exhibit regularity in behaviour without being completely predictable. They are therefore capable of creating entirely unexpected new forms of behaviour. In other words, the relationship between cause and effect in complex systems is not as consistent as the regular, predictable simple systems we are familiar in dealing with.

DIFFERENT MANAGEMENT STYLES FOR DIFFERENT CONTEXTS

Combining these two dimensions gives us the following matrix to classify the mode of thinking appropriate for different situations.

FIGURE 2. TIME-COMPLEXITY MATRIX OF MODES OF THINKING



In the Routine quadrant, where time is short and the task is simple, we rely upon past experience, learned heuristics, and rules of thumb. Skill in this area can be gained through training and drilling, and the creation of rules or protocols.

In the Technical quadrant, there is time for planning ahead and using elaborate analysis relying on acquired codified knowledge. There is no need to reinvent the wheel because there are clear cause-effect relationships here that allow us to project ahead quite precisely based upon previously discovered "laws", such as mathematical rules or scientific formulae. Much of conventional education is focused on the acquisition of competencies necessary to operate in this quadrant.

In the Management quadrant, we are concerned with subjects that are complex and lack a clear-cut link between cause and effect. We cannot proceed confidently on the basis of past knowledge to predict the consequences of our actions, nor the evolution of events around us. Rational models are therefore less useful as a guide. We need to be prepared for surprises. Here, the more appropriate strategies are creative thinking, experimenting with new ideas, observing their effects and increasing the probability of outcomes favourable to us.

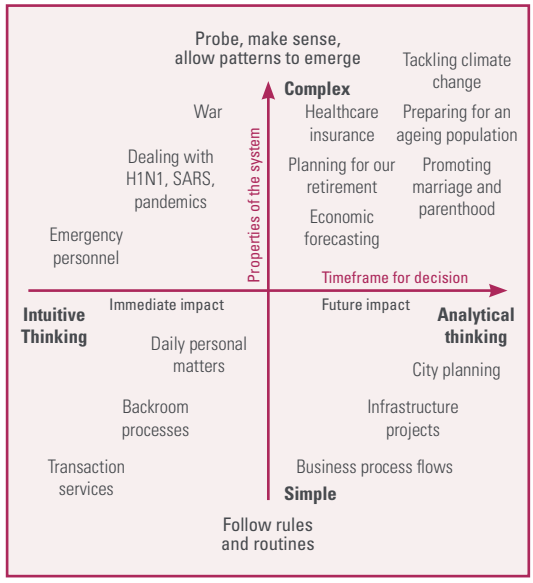
Finally, in the Crisis quadrant, we are faced with matters that are highly complex, unpredictable and which give us little time to react. This calls for another style of management thinking and intervention aimed at restoring the situation to one that is more manageable: that is, one of the other three quadrants.

Since our interest is how best to operate in a complex and uncertain environment, we will focus our analysis on the Management quadrant.

MANAGING COMPLEXITY IN GOVERNANCE

If we apply this matrix to Singapore, we can describe the issues we faced from the 1960s to the 1980s as falling into a relatively simple set, which can be satisfactorily resolved by the application of the rational method. The characteristic problems of that time were quite straightforward—to build excellent infrastructure, schools and housing, and to create jobs. As Singapore evolves from a third-world to a first-world economy, there is a corresponding rise in the complexity of our problems. Issues such as a declining and ageing population, climate change and rising healthcare costs do not have obvious or straightforward answers. Greater calls for consultation, participation and variation from Singaporeans today can be seen as both symptom and cause of the complexity of our environment. The types of problems can be positioned on the time-complexity matrix as shown in Figure 3.

FIGURE 3. POSITION OF ISSUES IN THE TIME-COMPLEXITY MATRIX



The strength of the Singapore Civil Service is, arguably, in the technical quadrant. Simple environments are generally amenable to what are essentially engineering solutions—solutions which depend on repeatable causes and effects (or at most on probabilistic or stochastic models). The problems of the 1960s to 1980s in Singapore fall into this quadrant.

However, many of our most pressing policy problems now fall in the top right quadrant, in the context of management. Take climate change, for example: governments have to

juggle the competing concerns of environmental sustainability, economic competitiveness and national welfare to arrive at the most appropriate policy responses for their country—there are few certainties and no right answers. We have to make sense of the problem by probing, experimenting, creating environments conducive to the generation of new ideas and new interactions, and responding to emerging patterns and behaviours.

Over the last forty years, we have seen a trend of increasing complexity in public issues, and this is reflected in the response in the manner of our public administration as summarised in Figure 4.

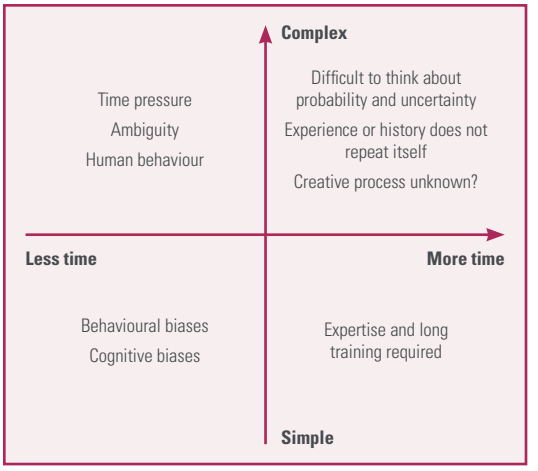
FIGURE 4. CHANGING MANAGEMENT STYLES

SIMPLE 1960s to 1980s	COMPLEX 1990s onwards
• Analyse	• Probe, sense and respond
• Identify the risks and opportunities	• Create environment and experiments for innovative patterns to emerge
• Set corporate objectives	• Increase levels of interaction and communication
• Make a plan to achieve the objectives	• Generate ideas, options
• Execute the plan	• Set the right boundaries, barriers and incentives to encourage patterns to grow into coherence and general acceptance
• Sometimes call in the experts	• Risk management

COGNITIVE AND BEHAVIOURAL CHALLENGES

Challenges to thinking exist in all four contexts:

FIGURE 5. CHALLENGES TO THINKING APPROPRIATELY



For example, one challenge for managing in an inherently uncertain and complex environment is how we deal with cognitive and behavioural biases. These biases can skew our judgements of probability and uncertainty, especially when we rely on our Automatic System. The following is a short list of the key biases we need to be aware of.

- **The great rationaliser:** Our left brain is the great "rationaliser" or story-teller. Emotions are needed for decision-making, but we often invent stories to explain our decisions to others and ourselves—stories which may vary greatly from our actual deliberations.

- **Anchoring:** Experiments have demonstrated the importance of anchoring effects. For example, if a subject is exposed to a large number just before you make a purchase, he tends to be willing to pay a higher price—even if the number has nothing to do with the object of purchase.

> Confronted with decisions in a short time interval, we think in ways that are different than if we were given more time to make decisions.

- **Confirmation bias:** The mind tends to see what it wants to see, which means we often, perhaps unconsciously, ignore evidence that contradicts our beliefs.
- **Framing effects:** How problems or options are framed can have different effects on people's responses. This is especially important to policymaking—for policymakers to avoid being misled by framing effects, and to frame problems carefully to elicit the desired responses in their target audience.[2]

CONCLUSION

Our education system has done a wonderful job in teaching the analytical thinking we need for most problem-solving. The new thinking for managing complex systems is relatively new. The first lesson we draw from the arguments above is that in the past, we could rely on analysis and control. In the future, we are looking for innovative solutions, or to generate new ideas. The second lesson is that we must remember the motto of Delphi—"Know Thyself"—when we think about issues. In other words, we need to learn to make sense of the environment in which we operate and recognise its inherent uncertainty and complexity. We need to understand the role that emotions play in our decision-making process.[3] We need to recognise the behavioural and cognitive biases we are subject to; the time constraints that we act under, and the system of thinking we rely on. Above all, **we need to adopt a model of critical thinking that challenges rules established from prior observation** because complex systems do not necessarily have repeatable and enduring cause-and-effect relationships.

Mr Lam Chuan Leong is Senior Fellow of the Civil Service College, Ambassador-at-Large with the Ministry of Foreign Affairs and Chairman of the Competition Commission of Singapore. Mr Lam's key areas of interest and expertise are in the application of general management theories, particularly in the context of complex systems. His career

background has been in macro-economic management, trade and investment and science and technology policies. In the course of this, he has worked on micro-economic issues, particularly in regard to regulation, monopolies, competition policy, pricing and market efficiency, privatisation of government services, transport economics, and the relationship between the public and private sectors on key projects.

NOTES

1. Thaler, Richard and Sunstein, Cass. *Nudge* (USA: Yale University Press, 2008).

2. For more detailed discussion of the biases, see Daniel Kahneman and Amos Tversky, "Judgement under Uncertainty: Heuristics and Biases", *Science*, New Series, Vol. 185, No. 4157 (Sep. 27, 1974), pp. 1124-1131.

3. For role of emotions in decision-making, see Morse Gardiner, "Decisions and Desires," *Harvard Business Review* (January 2006).

Opinion

Gary Klein

Looking for Trouble

It is not just that weak signals are hard to detect and understand. They are also hard to communicate and difficult to take seriously, warns naturalistic decision making guru Gary Klein.

Every government has a responsibility to identify potential crises in order to avoid them or ameliorate their effects. The sooner a government can identify a problem, the easier the job of avoiding or containing it because fewer resources will be needed, and more time will be available to mobilise those resources.

Therefore, government agencies may attempt to pick up the weak signals that indicate that a crisis may be brewing. They may develop systematic methods and technologies for scanning more and more data, and for connecting the dots. They may strive for higher levels of accuracy, seeking to root out errors that might lead to mistakes of omission (failing to spot weak signals) or commission (crying wolf). A metaphor would be the use of space-based telescopes to spot asteroids that might be heading towards our planet, in the hope that with enough time we might find a way to deflect the orbit of such asteroids away from us.

While I think that all of these steps are valuable, I have some concerns with each of them. I worry that the way an agency pursues each of these steps can increase its vulnerability, if it is not careful. The steps I have described above emphasise the gathering of information over analysis. They emphasise technology and procedures over expertise. They are best suited for recurring crises, rather than a first-of-a-kind crisis.

Returning to the metaphor of a killer asteroid, the threat of asteroids is not new. It is a recurrent crisis. Our planet has been shaken by asteroids in the past. They are cited as a likely reason for the extinction of dinosaurs, and for a massive explosion in Siberia in 1908. Asteroid-hunting is a poor metaphor for the challenge of detecting first-of-a-kind crises such as the airborne suicide attacks of 9/11, Pearl Harbor,

the collapse of Enron, and the current global economic meltdown. First-of-a-kind crises correspond to the black swans that Taleb has discussed.[1] Thus, in hindsight, the weak signals were there in plain view for 9/11, for Pearl Harbor, for the collapse of Enron, for the US economic crisis in the fall of 2007.

> Using computational models to spot weak signals is like driving a car by looking in the rear-view mirror.

Most people missed the weak signals because, as Karl Weick has pointed out in his book *Sensemaking in Organizations*,[2] we understand the significance of the weak signals only in hindsight. Weak signals do not announce themselves, particularly for first-of-a-kind crises. In hindsight, we can see the signs of the US housing bubble several years ago. We can shake our heads at the granting of home loans to people with limited resources. But there have been bubbles before this. What made this bubble so devastating was that it was associated with lax regulations, insufficient risk analyses by the Wall Street investment banks, infusion of capital from thriving Asian economies, a perversion of the loan insurance practices for mortgage-backed securities so that they accelerated risk rather than dampened it, loss of transparency for financial instruments, and so forth. Each of these signals was commented on at the time, but it was the *combination* of these factors that led to the crisis.

In *The March of Folly*, Barbara Tuchman described a number of world events that seem inevitable in hindsight, but were invisible to the decision makers at the time.[3] Gathering more data would not help decision makers who cannot understand what the data mean, and computational models work best by extrapolating from previous events and historical trends. Computational models assume continuity with the past and are even less sensitive to first-of-a-kind events than people are. Using these models is like driving a car by looking in one's rear-view mirror. The sophisticated computational models used by Wall Street were no match for the realities of the fall of 2007.

Not only are weak signals hard to spot, but when keen observers do pick them up they usually have trouble convincing others to pay attention. In each of the cases I listed above—Pearl Harbor, 9/11, the economic meltdown—a few people identified the weak signals and tried to warn others. In each case, the warning was ignored. It is not just that weak signals are hard to detect and hard to understand. They are hard to

communicate because they are so unusual and unlikely that they do not fit the mindset of the decision makers.

TOO MUCH INFORMATION GATHERING CAN OBSCURE ANALYSIS

Government agencies may attempt to pick up the weak signals that indicate that a crisis may be brewing, but the signals only make sense in context, in relation to the rest of the situation. Thus, each of the forces that led to the financial crisis that hit the US in the fall of 2007 were fairly visible (excepting the deceptions practised by Bear Stearns and others), but there was little government enthusiasm for reining in the low-inflation growth that seemed to be generating such prosperity, until it was too late.

> Reducing mistakes is not the same thing as fostering insights.

Agencies may develop systematic methods and technologies for scanning more and more data, but a point is soon reached where more data results in more ambiguity. The Japanese attack on Pearl Harbor was fairly obvious, in hindsight, but the plethora of signals made it easier to anticipate a Japanese attack on Russia, or a bold move to the south to ensure a supply of oil. Besides, decision makers are very good at explaining away data that they do not like. Analysts may be encouraged to "connect the dots", but the dots are only clear in hindsight; the skill of analysts is in judging what counts as a dot in the first place.[4]

Agencies that feel themselves to be under pressure often become risk-averse. They may adopt a zero-deficit mindset, adding all kinds of practices to increase accuracy and reduce mistakes, but reducing mistakes is not the same thing as fostering insights. If we try to reduce mistakes by having people document all of their assumptions and areas of uncertainty, we may instil a passive attitude that gets in the way of actively searching for potential crises. We see some evidence of this in the intelligence community, where new analysts are assured that if they just follow proper tradecraft (for example, document assumptions and areas of uncertainty), no one will blame them if they make a mistake. If we try to reduce mistakes by directing people to consider more hypotheses, we may interfere with their ability to use their intuitions. If we persuade people to look for historical trends, and force them to use statistics to justify their judgments, we risk missing the first-of-a-kind crises. Thus, during the Cuban missile crisis in October 1962, the advocates of tradecraft assured

President Kennedy that the USSR would not try to put ballistic missiles in Cuba because their entire history showed an avoidance of risk. Afterwards, when it was clear that this assessment was incorrect, the explanation was that Khrushchev had acted irrationally, not that their tradecraft had failed.

HOW TO LOOK FOR TROUBLE

Therefore, in addition to the usual steps, we can take the following actions: Encourage people to look into the anomalies they notice rather than passively keeping an open mind. Maintain a variety of perspectives and backgrounds. Help people to see situations from different perspectives. Rotate in people who have fresh eyes and haven't been part of the prevailing wisdom. These suggestions are reasonably obvious, along with the advice to increase openness and adaptation.

However, organisations incur a cost when they become less predictable and run into coordination difficulties. Predictability is essential for organisational coordination. Perhaps what is needed is a split-level organisational style in which the leader is responsible for consistent performance and mature oversight, but can draw on subordinates who are speculative, reacting or even over-reacting to potential trends and threats. If the leader shows this type of variability, the organisation may suffer. Better to depend on subordinates who are free to speculate. This advice comes with a catch—subordinates who do their job of freely speculating will often be wrong, which will likely reduce their credibility. It is hard to regain credibility. Therefore, when leaders find themselves dismissing comments from the speculators, it may be time to rotate in some new warning officers.

> Perhaps what is needed are leaders responsible for performance and oversight, with subordinates who are speculative.

One way to see if an organisation is harvesting the worries of people trying to pick up weak signals is to look at the products they generate. Imagine a continuum from statements that are very likely to be true, to statements that might well be wrong. And imagine

a boundary line, separating the region of true statements from the region of possible errors.

> The harder challenge is getting higher ups in the organisation to take these early indications seriously.

In a risk-averse environment, analysts will be very reluctant to offer opinions that might be wrong. They will avoid the boundary line, moving as far to the accurate pole as possible. That is fine—except that their statements and observations will carry very little information value. More desirable is a situation where people go in the opposite direction. They migrate to the boundary line, trying to make the most extreme observations that they believe they can defend. These are the insights, the risky predictions, the disruptive opinions that can be so valuable.

There do not seem to be any special skills for spotting weak signals, other than a contrarian attitude. However, by encouraging speculation rather than conformity, curiosity rather than avoidance of mistakes, disagreement over harmony, we may be able to increase success in noticing the early indications of threats.

The harder challenge is getting higher ups in the organisation to take these early indications seriously. Efforts here will involve breaking them out of their fixations. They will have to give up their old mindsets before they can seriously entertain new ways of viewing events and threats.

Dr Gary Klein, a Senior Visiting Fellow of the Civil Service College since 2007, last visited Singapore in September 2009, during which he conducted a series of workshops for our public officers. A Senior Scientist at MacroCognition, LLC and at Applied Research Associates, Inc., Dr Klein was instrumental in founding the field of Naturalistic Decision Making and helped to initiate the new discipline of macrocognition. More recently, he has been investigating sensemaking, replanning, and anticipatory thinking.

NOTES

1. Taleb, Nassim N., *The Black Swan: The Impact of the Highly Improbable* (USA: Random House, 2007).
2. Weick, Karl E., *Sensemaking in Organizations* (USA: Sage Publications, Inc., 1995).
3. Tuchman, Barbara W., *The March of Folly* (USA: Ballantine Books, 1985).
4. Klein, G., *Streetlights and shadows: Searching for the keys to adaptive decision making* (USA: MIT Press, 2009).

Opinion

Devadas Krishnadas

The Future of Futures

The next stage in the evolution of futures thinking could come from coordination across multiple domains, with a careful mix of capabilities.

FUTURES TODAY

Futures thinking is not new to the Singapore Government. Scenario planning was first introduced in the 1990s. Since then, the discipline and practice of futures thinking has become more sophisticated and populated. A much wider range of futures methodologies have been considered and applied. The public sector's understanding of the challenges and complexities of futures analysis has grown with experience; so have the resources committed to futures thinking.

Two decades ago, futures thinking in the Public Service was the function of one central unit employing primarily one methodology—scenario planning. Futures thinking at that time was talent-centred: a group of officers were systematically trained and grouped together in the Scenario Planning Office to carry out scenario planning from a national perspective. The clients of futures thinking were the top management in the public sector. The goal of futures thinking (scenario planning) was to help catalyse the framing of new perspectives.

Today, there are several futures units within government (see sidebar on page 28). Each focuses on its own band of issues and serves the strategic needs of its respective organisational management.

Our repertoire of futures thinking tools has also grown. In the recent past, we can be said to have moved from risk management at the single-issue level to organisational level considerations. The framing of risk takes in a wide band of associated issues and policies of concern to the client agency. We have also complemented the traditional talent-centred model with systems such as risk assessment and horizon scanning (RAHS). More is expected of futures units today. They are expected to also be thought facilitators. They deploy their skills and systems to help management

What the Delphi Oracle can Tell Us about Futures

The desire to know the future has been a preoccupation of humankind since time immemorial, along with its attendant culture and processes. Those who sought the wisdom of the Greek oracle at Delphi, for instance, had to deliberate carefully on what to ask and how to phrase the question they would pose to the sacred oracle.[1] Such queries had to be accompanied by substantial payment and any pronouncements were regarded as divine, so this was a serious business. The "clients" who sought wisdom at Delphi were trying to manage the uncertainty which they felt hazarded their futures. Their consultations were made with *a view to action*.

The most famous example of a Delphic consultation was that which led to the Battle of Salamis in 480 B.C. The Athenians were fearful of invasion by the Persians and they consulted at Delphi. The three-part forecast they received was hardly comforting. First, they were told there would be a "wooden wall" which would remain unconquered. Second, the Athenians were told to flee their city. Third, it was pronounced that many young men would die near the island of Salamis.

The Athenian leaders were dejected with this prophecy, which seemed to conclusively portend their defeat. However, rather than despair, they engaged in debate on what to make of this news. Finally, one of their statesmen, Themistocles, made the case that the "wooden wall" referred not to the city walls but to the massed wooden ships of the Athenian navy. He pointed out that the prophecy of "many young men will die" did not necessarily mean many *Greek* men. He took the view that in the face of a larger opposing army, it was only sensible for the people to flee the city: the Athenians would fight the Persians at sea in the narrow straits off the Salamis and cut their lines of communication. This is what they proceeded to do and the Persians were defeated in the ensuing sea battle.

This legendary episode suggests that *futures thinking is never a single event but a process*, and one which involves a serious commitment from the seekers of foresight in reviewing their strategic priorities even before embarking on such an attempt. Furthermore, the burden is on the "client", in this case the Athenians, to do most of the work

and not on the "consultant" futurist (the oracle of Delphi). Three stages which define the futures process can be identified.

Stage 1: Strategic Inquiry

An organisation that intends to employ futures thinking should be clear about its strategic priorities and concerns. The Athenians had to consider the threat to them, their own strengths and weaknesses and their objectives. This calculation allowed them to arrive at a decision to temporarily sacrifice their city for the greater strategic result of decisively defeating the Persians. Management must have some normative sense of direction for the organisation. Through a process of strategic inquiry, an organisation's futures team should be given clear questions to consider. Muddy or ambiguous scoping will almost certainly lead to vague or irrelevant futures products.

Stage 2: Strategic Debate

Organisations sometimes expect their futures teams to deliver "turnkey" solutions or recommendations. This is tantamount to futurists telling management what to do, which is not their appropriate role. Their processes can lead to rethinking, strategic reframing or fresh insights, but not prescriptions for action. Instead, the task of *interpreting and analysing futures products is the job of management.* The Athenians struggled to interpret Delphi's pronouncements, but ultimately, it was by reframing their analysis through debate and lateral thinking that they arrived at a more promising strategic perspective than the bleak outlook they had originally confronted.

Stage 3: Strategic Decision

By combining the Delphic pronouncement and Themistocles' strategic thinking, the Athenians reframed their perspective from one of despair to one of initiative. But the Athenians also followed through this strategic process with decisive action. Decision encompasses action, but management needs to also take responsibility for the consequences of their actions. The longevity of the Delphi oracle was not because her prophecies always led to positive results, but because her clients accepted that they were owners of the eventual outcomes.

~ Devadas Krishnadas

NOTE

1. The modern parallel might be the use of a focal question to scope scenario thinking.

think through issues thrown up by futures thinking in some detail and with texture and nuance.

THE FUTURE OF FUTURES

There are several ways in which futures thinking in government might usefully evolve from this point forward.

First, we should complete the move toward *risk management at the systems level*. This approach will permit us to accept tradeoffs in higher risk in order to take advantage of greater opportunities. Systems level risk management makes us aware of complexities and brings to light hidden dimensions left undiscovered by lower levels of analysis. A systems level risk management model operates best at the Whole-of-Government (WOG) level.

Second, we should recognise the importance of *communicating the rationale* for direction in strategy to an increasingly well-educated and informed executive layer in our organisations. Consequently, we should reframe our consideration of who the clients of futures products are—and consider including a wider span of management levels. The increasing pace of world events and technological change legitimises lowering the range limit on what constitutes relevant futures thinking.

Third, futures units should be prepared to consider *shorter term outlooks* of perhaps three to five years when the degree of uncertainty warrants it, where once their domain was more naturally geared towards the 30- to 50-year range.

Finally, there are benefits in *coordinating the activity of futures units* that have proliferated across different segments of government. Futures units in the public sector today differ widely in terms of their competency, capability and capacity, as well as in their degree of organisational maturity. While the different units started out from different policy mandates, there is growing recognition that every major issue has dimensions which interface with others. For instance, social issues should take into consideration economics

PAST	PRESENT	FUTURE
✓ Centralised futures thinking ✓ Mono method i.e., scenario planning ✓ Risk management (operational) ✓ People dependent ✓ Apex clients ✓ Thought catalyst	✓ Distributed futures thinking across different agencies ✓ Poly method (e.g., scenario planning, RAHS) ✓ Risk management (organisational) ✓ Systems complement ✓ Long run ✓ Apex clients ✓ Thought facilitation	✓ Coordinated futures thinking ✓ Poly method ✓ Risk management (systems) ✓ Systems complement ✓ Short & long run ✓ Span of clients ✓ Thought leadership ✓ Corporate cycle geared

and industrial organisational futures, as these will have impact on wages and composition of the labour force which, in turn, will potentially modify assumptions about the distribution of income and shape of the social needs picture. This can allow for a customised packaging of skills, methods and systems to deal with specific questions or problems, as well as reap inter-agency or WOG synergies.

THE POWER OF MULTIPLE FUTURES

Coordinating and optimising futures thinking resources across the different futures units in the public sector have several implications.

3C Mapping

A mapping of the distribution of the carrying competencies, capabilities and capacities of futures units within government might be needed. Competency refers to skill sets, capability to systems and capacity to size and budgets. This will permit an informed approach to coordinating collaboration in order to reach scale for complex futures challenges. A working principle should be adopted, which requires futures units to be mutually supportive. Such an arrangement would also obviate the need for each unit to acquire similar systems or grow capacity to ensure a wide range of in-house capabilities.

Public Sector Futurists

Over the past decade, new futures units have been set up and legacy ones modified. Futures units in the Singapore Public Service now straddle a wide range of policy domains:

- The **Strategic Policy Office** (formerly the Scenario Planning Office) develops strategic planning and policy capabilities at the national level and across the whole of government.

- The **Risk Assessment and Horizon Scanning** (RAHS) programme within the National Security Coordination Secretariat oversees all security issues.

- The **Ministry of Trade and Industry Futures Group** monitors the economic, trade and industrial landscape.

- A **Futures Group** within the **Future Systems Directorate in the Ministry of Defence** studies the future operating environment of the armed forces, and identifies defence-related challenges, opportunities and threats.

- A **Futures Team** at **the Ministry of Community, Youth and Sports** studies the application of futures thinking to the social policy domain on a project basis.

The establishment of the Centre for Strategic Futures is a step in this direction and further consolidates the whole-of-government spirit necessary to tackle complex futures.

Tractability

Futures units should offer *thought leadership* by *proactively* and *independently* providing new ideas and perspectives to senior management. Futures products should also ideally be delivered within the context of corporate strategy and budget cycles. This is to ensure that they are channelled to the attention of senior management at key decision-making junctions, when major commitments are about to be made.

Discrete Channels

Not all forms of futures thinking are the same. We have matured from a single methodology to multiple methodologies, yet this could lead to a misplaced assumption that the various futures thinking processes and products are interchangeable. A distinction should be made as to which processes and systems, and which combinations thereof, are best suited for particular tasks.

A distinction should also be made of the varying purposes of futures thinking. There may be three discrete strategic purposes:

Normative Strategies

Futures thinking attempts that posit long-range possible futures, or *visioning*, may be best suited to generating normative strategies. Such strategies are intended to realise desirable futures or avoid undesirable ones. They tend to be complex and slow-moving in execution, but have long-lasting effects and involve sticky, usually major, commitments, such as structural changes to the education system or economy.

Opportunistic Strategies

Strategies which can be rapidly executed and can involve reversible commitments may benefit most from horizon scanning—shorter range focused studies that throw up new variables and new relationships between known variables. An example could be a revision in investment strategies for sovereign wealth funds to take advantage of growth sectors, new resource discoveries or changing consumer patterns.

Contingency Strategies

Efforts to detect Black Swans and Wild Cards[1] can usefully lead to the generation of contingency strategies. These are deferred or conditional strategies aimed at coping with Black Swans or Wild Cards by negating or moderating the causal factors of Black Swans and by creating strategic buffers to absorb the shock of Wild Cards.

CHOICES

Singapore has a maturing community of futures thinkers in government and considerable experience with the processes of futures thinking. We also continue to push forward with experimentation and new learning. A relatively early investment in futures thinking capability means the Singapore Public Service now has the luxury of refining its choices as to how to organise, process, and use futures thinking. It is up to us to make these decisions thoughtfully, even if only the future will tell if we have made them wisely.

Devadas Krishnadas is Assistant Director (Strategic Planning) in the Strategic Planning and Research Division of the Ministry of Community Development, Youth and Sports. The views expressed in this article are his own.

NOTE

1. Based on ideas popularised by Nassim Taleb, Black Swans can be defined as high impact but low probability events that are very difficult to detect in advance because of preconceptions. Wild Cards are potential events which may be tangential to strategic priorities but whose occurrence would have disruptive consequences, such as pandemics and game-changing technological breakthroughs.

Opinion

Calvin Chong and Jeremy Tan

Mainstreaming the Praxis of Foresight: The UK Example

The UK Government's approach to futures thinking emphasises communication, engagement and broad application.

Foresight is not prediction; it is a natural human faculty used in everyday decision-making. It involves understanding how past and current events can inform decisions taken in the present, to reach desired outcomes in the future.

At the organisational level, foresight is more than simply a long-term work plan. It involves the gathering and synthesising of a variety of individual assessments to make strategic decisions that create the best possible outcomes for all stakeholders, across multiple domains and time frames.

Foresight has to be practised; to this end, governments and private organisations have embarked on widespread foresight programmes and activities varying in breadth, depth and sophistication (see Table 1).

The UK Foresight Programme, with its stated role "to help government think systematically about the future", is an example of an established approach to the praxis of foresight in the public sector.[1] Observation of the UK Programme reveals four useful insights:

1. BUILD A ROBUST ANALYTICAL FRAMEWORK

Foresight activities have to be aligned towards clear strategic anticipatory goals. This orientation can be towards downstream activities or specific to a narrow time frame—this was the case with the UK Civil Contingencies Secretariat's (CCS) risk register, which assesses the most significant emergencies the country will face over the next five years.[2] The CCS uses the document as a basis for monitoring partner agencies' risk mitigation efforts, and as part of its efforts in public education and outreach.

Foresight work can also be oriented upstream towards more open-ended parameters with a longer time frame, as evinced by the UK's Sigma Scan, which

TABLE 1. FORESIGHT PROGRAMMES AND ACTIVITIES IN SINGAPORE AND THE UK

	SINGAPORE
Institutions	**Centre for Strategic Futures (CSF)** - Dedicated centre looking at the development of key capabilities in futures methods and process within the Singapore government - Builds on scenario planning as the foundational methodology to promote a Whole-of-Government (WOG) approach to thinking about both nearer-term and longer-term strategic issues **Horizon Scanning Centre (HSC), National Security Coordination Centre (NSCC)** - Central agency for WOG environmental scanning efforts - Part of CSF to develop and implement the SP+ framework - Coordinates with the Risk Assessment Horizon Scanning (RAHS) Experimentation Centre to develop and deliver capabilities such as the RAHS 2.0 system to enhance strategic anticipation - Promotes active outreach and collaboration with univerisities, think-tanks and international partners **Strategic Policy Office** - Manages the WOG strategic planning cycle with the Ministry of Finance - Runs national-level scenario planning exercises every two to three years, and also leads smaller-scale scenario studies on more focused topics - Provides training and consultancy services to public sector agencies who wish to use scenario planning as a tool for long-term policy and strategy development - Facilitates collaboration through cross-agency studies and drives WOG initiatives. One of the key initiatives currently being pursued is the World•Singapore movement.
Networks	**Intra-Government Platforms** - Formal and informal platforms such as inter-agency project teams and discussion forums, e.g., Futures Network (a content-based grouping of practitioners) and Complexity Circle (focused around methodology, expertise and pedagogy) **International Networks** - Hosts the International Risk Assessment and Horizon Scanning Symposium (IRAHSS) - Participates in activities organised by Global Futures Forum, Wilton Park Conference, OECD, etc.
Methodology and Processes	Uses SP+ and environmental scanning to question assumptions and examine cross-cutting challenges to cultivate the instinct to think "Whole-Of-Government" **Scenario Planning Plus (SP+)** - Methodology that builds on scenario planning, RAHS tools and its attendant products - Explores inter-connections between tools and processes, synthesising them in a way that would be relevant to agencies' exploration of complex issues **Environmental Scanning** - HSC conducts systematic, domain-specific scanning from various open sources for government-wide dissemination **Annual Emerging Strategic Issues Process** - Scans and assesses the risk and effects of nearer-term emerging issues on a WOG basis - Results are used to enrich the strategic planning process for the Government's budget
Products	**Scenarios** - Strategic Policy Office produces broad-based scenarios such as the National Scenarios, covering longer-term strategic challenges to Singapore and partners relevant government agencies for issue-specific projects, such as scenarios on the impact of New Media on Singapore society. **HSC Skan & Vanguard** - Skan is a daily compilation of horizon scanning news - Vanguard is a bi-monthly foresight publication - Distributed to about 2,500 officers, mainly those in strategic planning and policy functions **HSC Case Studies** - HSC works with partner agencies on specific engagements - Focus on RAHS methodologies and horizon scanning expertise to address complex issues

TABLE 1. FORESIGHT PROGRAMMES AND ACTIVITIES IN SINGAPORE AND THE UK (cont'd)

	UK
Institutions	**Horizon Scanning Centre (HSC) at the Department for Business, Innovation & Skills (BIS)** - Part of the UK Foresight Programme - Advises government departments on the use of horizon scanning - Supports departments in creating their own horizon scanning capabilities and projects - Centre of expertise for the use of tools for futures analysis and strategic policy development **National Security Secretariat, Strategic Horizons Unit and Civil Contingencies Secretariat** - Based in the UK Cabinet Office, these three agencies adopt foresight work for their specific domains. Their work includes elements of horizon scanning, strategic planning and risk assessment. They maintain separate programmes from UK Foresight.
Networks	**Futures Analysts' Network (FAN Club)** - Part of the UK HSC's outreach programme - Builds networks of futures thinkers and practitioners in the public, private, academic and other sectors - Forum where those who have an interest in horizon scanning and futures analysis can meet to exchange new ideas, innovative thinking, and good practice **International Networks** - Hosts the Wilton Park Conference - Participates in activities organised by Global Futures Forum, Singapore Government agencies, etc.
Methodology and Processes	Uses Foresight projects and horizon scanning products to tackle complex issues and help policymakers make decisions about the future **The UK Foresight Programme** - Employs a futures techniques toolkit of 24 methods, including scenario planning and horizon scanning - Oversees a rolling schedule of Foresight projects; each project examines a key interdisciplinary issue, and is overseen by a high-level stakeholder group - Covers Sigma Scan, Wider Implications for Science and Technology (WIST) and other environmental scanning initiatives
Products	**Foresight Project Reports** - Updates and progress reports from each Foresight project are published online for public viewing **HSC Sigma Scan** - Looks ahead over a range of up to 50 years to provide an intersectoral informational bias for all foresight activities across government - Results consist of a set of over 200 issues that briefly describe identified trends and how they may unfold in the future - Published online for public viewing

collates future issues and trends for the next 20 to 80 years as identified by various horizon scanning sources.[3] The UK Horizon Scanning Centre uses the material in case studies, workshops and programmes to work towards better strategic planning and policy-making.

Regardless of the strategic anticipatory orientation chosen, the methodologies employed need to be robust and credible. The UK emphasises an evidence-based approach that anchors foresight work on quality research and sources, clear and quantifiable indicators, and empirical data. The UK Government, by engaging a lead expert group for each project and allowing the public online access to their material, helps to ensure that their foresight work holds up to the analytical scrutiny of a wider community of experts and non-experts alike.

2. NETWORKS ARE IMPORTANT

The UK Government's emphasis on wider engagement stands in contrast to the common notion that foresight is best suited to mavericks and contrarians, who can spot strategic issues ahead of others. On the contrary, it is crucial for foresight work to harness inputs and opinions as broadly as possible. In this sense, picking the right *mix* of persons to contribute to a project is just as important as their area and level of expertise. This involves maintaining good working relationships through networks that are built laterally across agencies, and also with individuals and organisations outside of government. These networks serve as intellectual checks and balances, and allow for assumptions to be challenged and strategies to be stress-tested.

For example, each UK Foresight project leverages a variety of networks: other than its lead expert group, the project also answers to a high-level stakeholder group, and consults with think-tanks, universities and private sector stakeholders when drawing up inputs and shaping findings.

Furthermore, the UK Horizon Scanning Centre also functions as the government's hub for horizon scanning and foresight expertise, providing information and capability building services to other agencies. Besides conferences, seminars and international collaboration, the Centre also runs the Futures Analysts' Network, which is a forum for people with an interest in futures analysis, from both the public and private sectors, to exchange ideas and good practices.

3. ENSURE POLICY RELEVANCE

Robust and credible foresight work has to be relevant to policy and invested with sufficient management buy-in to ensure that findings and recommendations

are given due consideration and followed through. Foresight projects in the UK are carefully chosen to address cross-departmental policy issues with action-oriented outcomes. Each project has to be supported by a lead government department and its Minister must agree to chair a high-level stakeholder group of senior decision-makers and budget-holders from relevant departments, research councils and other organisations. The government's Chief Scientific Adviser sits on each of these stakeholder groups as well.

Once buy-in from higher management and stakeholders is secured, attention has to be given to communicating of foresight products in effective ways. Heavily researched analysis and complex scenarios need to be presented in a detailed yet incisive manner for decision makers to understand and subsequently take action. To this end, the UK foresight projects are crafted to be well signposted, monitored and regularly updated within the stakeholders' communities as part of the implementation process.

4. MAKE FORESIGHT MAINSTREAM

The praxis of foresight in an organisation extends beyond the nuts and bolts of its research activities and even its integration with strategic planning processes. Instead, it should be seen as part of a larger endeavour to institutionalise and make mainstream habits of mind that challenge prevailing assumptions, recognise cognitive biases and examine issues with a wide horizontal impact across multiple domains.

> A foresight programme should be seen as part of a larger endeavour to institutionalise and make mainstream habits of mind that challenge prevailing assumptions.

The UK's networked approach is illustrative of the principle that the responsibility for foresight should not fall solely on a dedicated group of strategic thinkers, practitioners and horizon scanners; nor should it be assumed that foresight work would gain traction without any institutional backing or centre of expertise.

Cultivating an appreciation of strategic futures methodologies in departments has built a stronger culture of foresight in the UK government. This is seen in the Foreign and Commonwealth Office's (FCO) use of complexity science in their analyses, and in other agencies building their own research and horizon scanning capabilities.

As observed from the UK's experience, the explicit goal of a foresight programme is for public officials to think systematically about the future. Given the need for public policymaking to become ever more adroit, adaptive and astute, such an endeavour is nothing short of a transformative process to institutionalise the praxis of foresight at all levels of government.

Calvin Chong is Assistant Director (Policy and International Relations) and Jeremy Tan is Executive (Horizon Scanning Centre) at the National Security Coordination Centre, Prime Minister's Office. This article was the result of a study trip to the United Kingdom in February 2009.

NOTES

1. http://www.foresight.gov.uk/index.asp
2. http://www.cabinetoffice.gov.uk/reports/national_risk_register.aspx
3. http://www.sigmascan.org/Live/

Ang Hak Seng

Enterprise Risk Management: Strengthening Singapore's Advantage

ERM could serve as a shared platform for understanding complexity and assessing trade-offs at the whole-of-government level.

The concept of Enterprise Risk Management (ERM) is not new to the Singapore Government. Many public sector organisations already implement risk management, either as a deliberate initiative or as part of the inherent nature of their work. However, ERM has much more to offer the public service as a whole, because of its two key value propositions: its ability to serve as a unifying framework for strategic planning and the opportunity it offers to enhance Singapore's competitive advantage in an ever more complex and turbulent future.

ERM AS UNIFYING PLATFORM

ERM recognises uncertainty as the fundamental driver of strategy

At its heart, ERM is a way of thinking that recognises uncertainty as a fundamental driver of strategy. As a concept, it can be applied to all levels in an organisation or across agencies, yet is scalable enough to engender thinking about key strategic challenges at the sectoral or national

level. One fundamental strength of ERM, as opposed to many other strategic planning methods, is that it avoids over-reliance on past data as the basis of decision-making.

ERM highlights multi-agency trade-offs, and therefore motivates a WOG approach

At a strategic level, the sources of uncertainty are complex and intertwined. A risk-driven approach lends itself to framing issues in a Whole-of-Government (WOG) context. By moving away from outcomes and intents of individual government organisations and looking upstream to consider risks and their drivers, ERM helps to transcend the traditional demarcations and roles that separate government organisations.

ERM unifies strategic planning tools

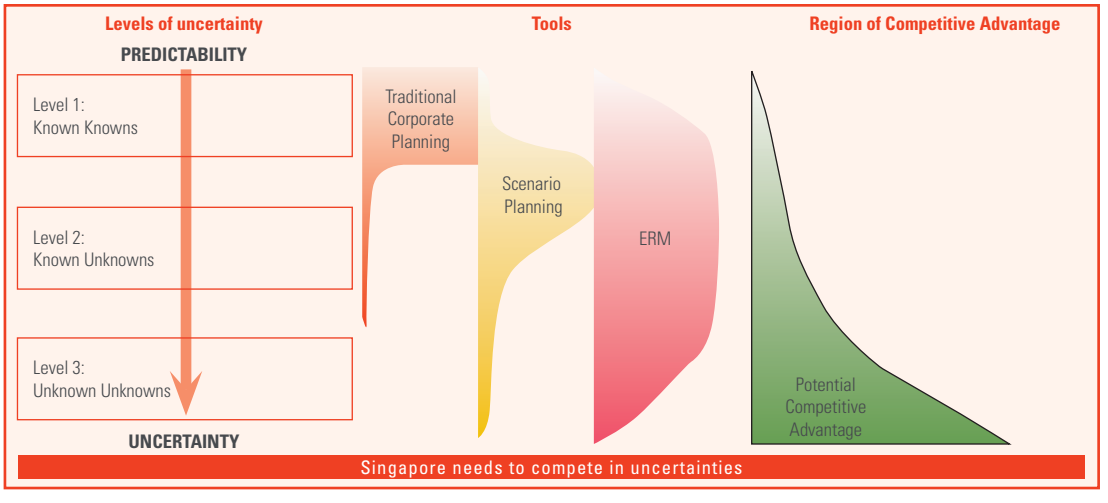
Different types of strategic planning tools are more suited to different levels of uncertainty.[1]

Traditional planning tools which project only one state of the future can be grossly inadequate in the face of deeper uncertainty. To address this inadequacy, scenario planning tools were developed. The scenario planning approach, which describes discrete (and sometimes artificial-seeming) future states of the world, copes best with up to "Level 2" states of uncertainty. ERM, by helping planners to better appreciate the level of uncertainty at which a risk resides and applying the appropriate tools, offers a way to think about issues more holistically and at different levels of predictability, thereby deriving more calibrated and thorough plans.

STRENGTHENING SINGAPORE'S COMPETITIVE ADVANTAGE

The realm of greater uncertainty is also a source of greater opportunity. In a predictable environment, Singapore

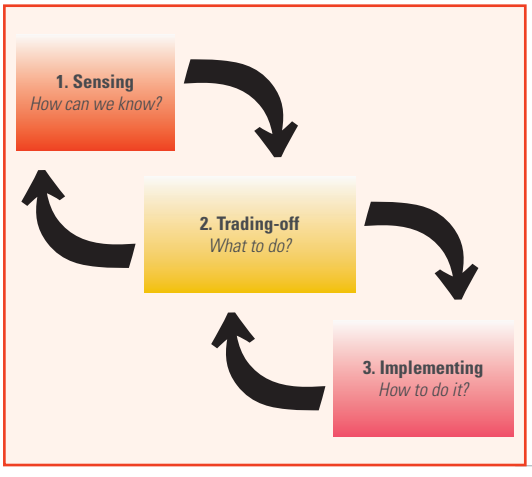
FIGURE 1. UNIFYING POWER OF ENTERPRISE RISK MANAGEMENT



must compete with other countries on known terms and resources. However, in a world where turbulent events are becoming more frequent and intense, a key competitive advantage will reside in Singapore's ability to compete in terms of speculative capabilities—making successful strategic bets despite limited or imperfect information. As countries continue to grapple with how best to deal with great uncertainty, Singapore can seize the initiative by leveraging on its small size, networked government and future-oriented outlook to tackle issues head on and in advance.

The work of any effective government involves sensing, strategy-making and implementation. Individually, these elements may at best be adequate in an uncertain environment. The value of ERM is in providing a framework that exploits the synergy and feedback between these mechanisms.

FIGURE 2. ENTERPRISE RISK MANAGEMENT IN A TURBULENT ENVIRONMENT

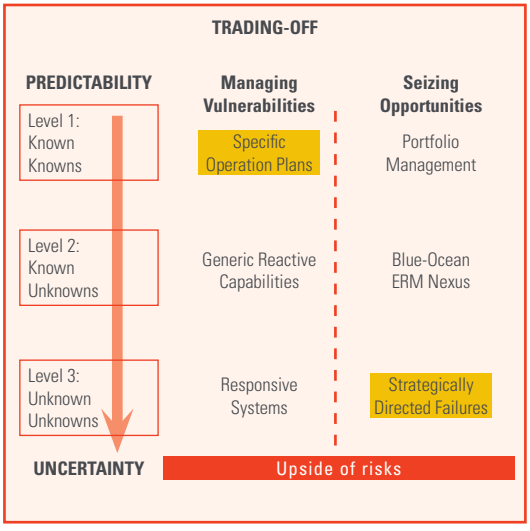


Sensing

In a volatile environment, it is imperative to have the capacity to process information and make sense of the surrounding events. Sensing is about detecting the weak signals presaging turbulent events. To find these weak signals requires not only sound hypothesis-making and insightful analytics, but also a culture that allows pertinent signals to bubble up to top management.

Strategy-Making

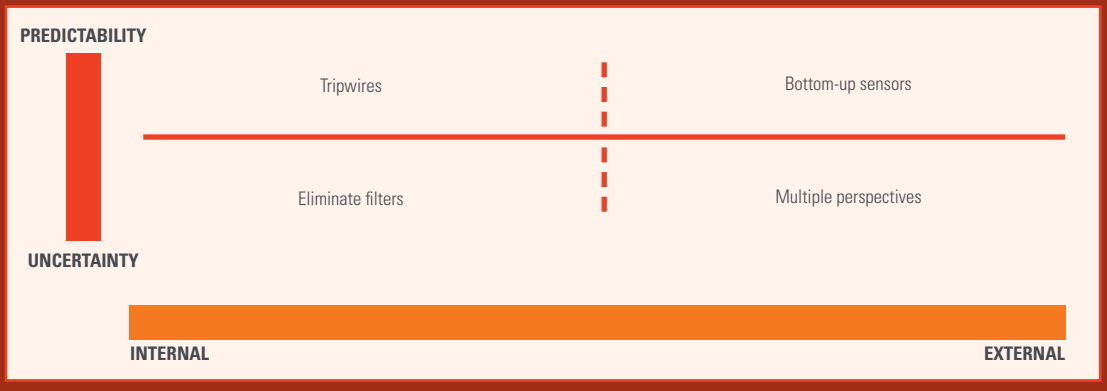
FIGURE 3. STRATEGY MAPPING



For each level of uncertainty, there are tools available to manage vulnerabilities (the downside of risks) and seek opportunities (the upside of risks). Clearly, it is important to first appreciate at which level of uncertainty an identified risk resides, since to underestimate a risk is to potentially be exposed to its

Sensing in the Singapore Police Force

FIGURE 4. EARLY WARNING SYSTEMS



TRIPWIRES

The information technology revolution means that management is inundated with information and news. To ensure proper management of the vast amount of information, prior hypotheses must be made, which will also specify triggers to alert management to major systemic issues ahead of time.

BOTTOM-UP SENSORS

In the Singapore Police Force (SPF), a Learning Organisation culture facilitates the exchange of ideas and surfacing of ground issues. Internally, the Leadership Group (which includes ground commanders) gathers regularly to exchange ideas, insights and new risks in a collegial atmosphere. A "near miss" mechanism allows ground officers to surface incidents that could have occurred, but were narrowly avoided. Adequate channels to reflect ground realities to senior management ensure that policies made are fully cognisant of the ground situation. For example, during the recently concluded APEC operations, SPF deployed morale sensing teams to obtain important ground realities, resulting in important adjustments to deployment plans.

ELIMINATE FILTERS

To facilitate a healthy culture of empowerment, a "Management of Mistakes" framework was introduced to promote an environment in which it is "safe to talk" and "safe to take risk". The framework provides a safety net for officers who have committed honest, non-malicious mistakes.

MULTIPLE PERSPECTIVES

Externally, stakeholders play an ever larger role in the decision-making process of any organisation. In SPF's context, interaction with the community over a variety of platforms gives rise to new risks to be placed on the radar. For example, the National Crime Prevention Council has traditionally been a valuable sensing source. Next year, a Citizen's Academy will be established to further engage influential thought-leaders in the community. With the gradual erosion of transnational borders, events happening in another part of the world may have a huge impact on local outcomes. It is hence vital for any organisation to gain multiple perspectives by plugging itself into an international network. The Risk Assessment Horizon Scanning framework, for instance, can be used to this end. ~ Ang Hak Seng

unmitigated effects. For instance, an investor who relied solely on historic market data would probably have had a rude shock when the financial crisis struck.

Managing Vulnerabilities

At the first level of predictability ("Known Knowns"), one has high confidence that the future is known and looks very much like the past. Therefore, strategic planning simply involves allocating resources based on extrapolating from past events. Such environments are now very rare. Even when it occurs, it can be dealt with using Specific Operation Plans (SOPs). Since scenarios have been pre-specified, specific contingency plans may be put in place, with actions specified in each scenario.

At Level 2 ("Known Unknowns"), plausible scenarios are presumed to be known, so resources may be applied directly to lower the risk at source. For major contingencies, scenarios can be plentiful—the key to managing such a broad range of possibilities is not to create individual response plans, but to develop deep pockets of capabilities. When necessary, these capabilities can be applied to manage any fallout.

The risk incurred by organisations that have become very adept at scenario-based vulnerability management, and which then cease to plan beyond Level 2, is to be blindsided by inadequate scenarios or unforeseen circumstances. For example, assuming a discrete number of terrorist tactics will blind security forces to terrorist innovations such as the September 11 attacks. Therefore, effective strategies should not rely on knowing the specific source or nature of a risk, only its dimension of operation. Approaches to managing such vulnerabilities include diffused

capacity building, de-correlation of risks, business continuity plans and resilience plans.

Finally, at Level 3 ("Unknown Unknowns"), even the dimension of risk is unknown. Besides building strong sensing mechanisms to give some early warning, organisations need to be able to react quickly to events. Therefore, the ability to assemble emergency response teams on the fly and subsequently dissolve them quickly to restore normalcy is crucial in dealing with strategic surprises and black swans.

Such "Hastily Formed Networks" or HFNs are a key to systemic responsiveness. This capability to group and ungroup task forces swiftly was an important factor in Singapore's successful battle with SARS in 2004. Similarly, when the financial crisis struck in late 2008, governments which had the ability to react quickly saw better outcomes than those where bureaucratic obstacles slowed down decision-making and response. By the same token, enhancing flexibility in planning (for example, adopting quarter-to-quarter planning frameworks) and flexibility in problem solving (e.g., developing HFNs) would allow better preparation for such uncertainty. This has implications on the way government organises itself. There could be a lot more organically and spontaneously formed need-based groupings, rather than more rigid structures that are costly to maintain.

Seizing Opportunities

Implementations of ERM that focus solely on managing vulnerabilities fail to recognise the value of a risk-oriented approach in seizing opportunities.

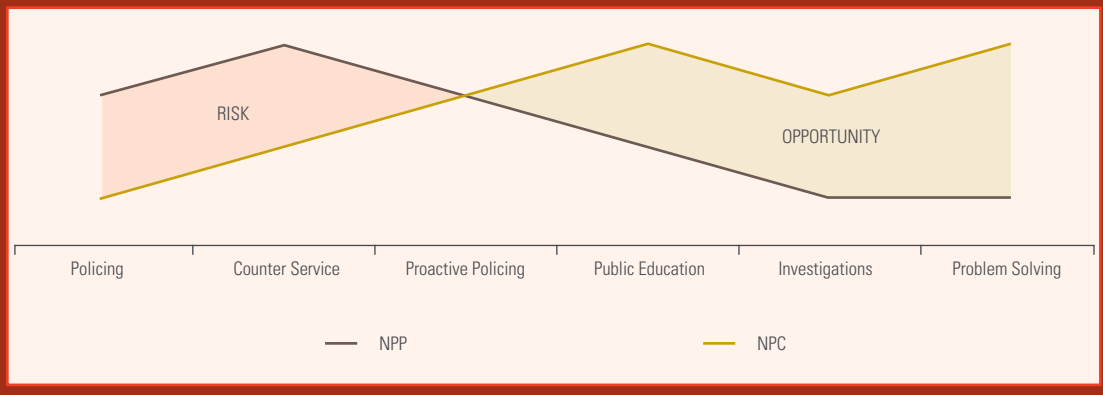
Traditional cost-benefit analysis would suffice to analyse opportunities at relatively low levels of uncertainty (Level 1). Given discrete options, portfolio management and game theory may shed light on the best set of opportunities to pursue.

However, true opportunities begin to reveal themselves in regions of greater uncertainty (Level 2). Here, Blue Ocean thinking[2] helps to systematically explore new opportunities. The value innovator is the person who is able to make smart trade-offs, sensing where risk must be taken to exploit new opportunities. Conversely, there must be significant uncertainty for such strategies to prevail.

In Level 3, where even the dimensions of risk cannot be fathomed, seizing opportunities no longer relies on a specific *framework*. Instead, opportunities are best sought through an appropriate market *system* which encourages experimentation and accepts failure. By the law of large numbers, a small number of entrepreneurs will find

Strategy Canvas: From Police to Policing

FIGURE 5. STRATEGY CANVAS: TRADING-OFF RISKS AND OPPORTUNITIES



In the chart above, the areas in which value is given up represent the risk which is taken, given limited resources, in order to create value in other areas.

In the example of the Singapore Police Force, the entire frontline policing system was overhauled in the late 1990s and upgraded in the mid 2000s. While the iconic Neighbour Police Post system[1] was working well, SPF decided that the future would not be reached through perfecting past approaches, and it deliberately reduced counter services to redirect resources to areas such as public education and problem-solving capabilities. In doing so, instead of only having 13,000 full-time police officers to safeguard Singapore, the SPF potentially recruited all 5 million Singaporeans in the fight against crime and terrorism.

~ Ang Hak Seng

NOTE

1. The Neighbourhood Police Post (NPP) system was implemented by the Singapore Police Force in 1983 as part of its community policing strategy. This was re-engineered in 1997 with the introduction of the Neighbourhood Police Centre (NPC) system to provide one-stop services for members of the public, integrating service delivery, response and investigation functions.

breakthrough opportunities. Such market systems require government action to promote free market forces: by providing accessible infrastructure, making available seed funding and removing market entry barriers. In Singapore, however, given our small size, it may be necessary to "strategically direct" innovation by identifying a promising industry, sector or research area. The performance of these attempts should not be measured only by the number and value of

successes, but also the learning value that we extract from each experiment.

Good ERM measures can themselves become opportunities. For example, Singapore's approach to managing its risks and vulnerabilities with respect to water supply has led to its being recognised as a world leader in water management and technology.

MAKING THE MOST OF ERM: GUIDING PRINCIPLES

In order to fully exploit the value proposition of ERM as a unifying platform for strategic thinking, planning and advantage, three guiding principles are proposed:

1. Develop the common language of ERM

Effective dialogue is founded on a common language. Although risk management is a mature concept, ERM has taken on several different manifestations. To effectively work across ministries and departments, we need to decide on a common language and a unified process. A forthcoming manual created by the ERM workgroup will provide the initial basis for just such a common language for the Singapore Public Service.

2. Link ERM with resource planning and allocation and decide trade-offs at the highest levels

In every resource planning and allocation exercise, ERM should feature as a key framework in management decision-making. This will also link background thinking and considerations to actual policy and planning, in a coherent manner that facilitates future thinking and review.

3. Implement ERM through WOG groups, but these groups should change periodically

Across ministries and departments, there is no natural platform best suited to considering the cross-cutting issues raised by risk scanning or assessment. Therefore, ERM groups need to be deliberately formed for this task. Given the diversity of issues and players, there is no one correct way to organise these groups. Nonetheless, to facilitate work, some logical groupings will need to be established. However, these groupings should not be permanent, to avoid hardening of perspectives or bureaucratic constraints. One possible option could be a central Risk Office to coordinate efforts of different groups and ensure alignment with strategic WOG objectives.

CONCLUSION

The ability of ERM to raise issues that cut across organisational boundaries and unify by offering a common platform for analysis and discussion makes it a very useful framework for the WOG strategic planning process, across different levels of organisation and

layers of uncertainty. ERM also focuses attention on possible turbulent events: offering a powerful strategic edge to any country that has to navigate an ever more unpredictable and complex world. Singapore, with a nimble, integrated and able Government, can seize this initiative to position itself as a leading country at the global forefront of coping with Turbulence.

Senior Assistant Commissioner Ang Hak Seng joined the Singapore Police Force in 1986 and has assumed leadership positions in units involved in operations, intelligence and frontline policing. He is the current Senior Director of Planning and Development and Director of International Cooperation. Senior Assistant Commissioner Ang holds a M.Sc (MOT) from the Massachusetts Institute of Technology and attended the Advanced Management Program at Harvard University. He is also a chartered accountant by training. He is leading a Civil Service project team commissioned by the Organisational Excellence Committee (OEC) on enterprise risk management. The views expressed in this article are his own.

NOTES

1. The four levels of uncertainty in Figure 1 are drawn from "Strategy under Uncertainty" by Hugh G. Courtney, Jane Kirkland and S. Patrick Viguerie, McKinsey Quarterly (June 2000). For the purposes of this article, we have aggregated the risks into three classes: "Known Knowns", "Known Unknowns" and "Unknown Unknowns".

2. Blue Ocean thinking, coined by W. Chan Kim and Renee Mauborgne, refers to challenging the norm, moving out of one's comfort zone and exploring uncharted space so as to spur creative and intellectual breakthroughs.

Godwin Tang and Valerie Yuen

Rethinking Recovery: Possible Discontinuities and Implications for Singapore

Analysts from the Strategic Policy Office consider how the global economy might evolve in the next decade.

INTRODUCTION: THE FATE OF GLOBALISATION

The US sub-prime crisis of 2008 and its aftermath presents a timely reminder that globalisation brings both opportunities and threats. Over the years, Singapore has benefited from global economic integration, particularly in international trade and finance. At the same time, we have realised that greater integration means greater exposure to a variety of "imported threats", like the Asian Financial Crisis, September 11 attacks and the SARS and H1N1 pandemics.

While some analysts argue that the worst of the global financial crisis appears to be over, there are reasons to remain cautious. Apart from the recent Dubai credit crisis, anxieties about the mounting national debt and high unemployment rate in the US indicate that the prospects of recovery are still

relatively fragile. More importantly, the scale and magnitude of this crisis suggest that post-recovery, there could be some substantial discontinuities—highly disruptive changes from current circumstances—in Singapore's future external operating environment. Commentators such as Joseph S. Nye and Dani Rodrik have written about how the edifice of globalisation could eventually unravel, due to severe long-term effects of the crisis.[1]

This article discusses two related questions: What possible discontinuities can Singapore expect in the next 10 to 15 years, after a decade of mostly unfettered globalisation? How could our domestic priorities be affected?

POSSIBLE DISCONTINUITY 1: BEYOND US / CHINA-DRIVEN GROWTH

Since the 1990s, the symbiotic relationship of China and the US (or "Chimerica", to use historian Niall Ferguson's term) has been the global economy's main growth engine.[2] "Chimerica" accounts for 13% of the world's land surface, 25% of its population, 30% of world GDP and 50% of global growth over the last six years.

> Singapore will have to move into new markets that serve as alternative sources of demand.

The magnitude of this financial crisis, having put a substantial dent on "Chimerica", is likely to usher in a new global growth model as both countries continue to recover. Already, China has led the way in the global economy's resurgence in spite of the US' sluggish recovery, by spending far more to stimulate domestic demand. In addition, bigger and less-indebted emerging economies such as Brazil appear to be less dependent on US consumption than commonly believed, and could "democratise" global growth further.[3]

Implications for Singapore

Export-reliant economies like Singapore will have to move into new markets that serve as alternative sources of demand. Currently, 61% of Asia's exports, including those of China and India, have final consumers in the G-3 economies of US, Japan and the European Union.[4] The burgeoning urban middle-class in emerging markets will likely provide a new source of demand, due to higher untapped consumption potential.[5] In addition, a geo-economic axis between Middle Eastern and North African (MENA) and Asian economies, based on complementary factors of production, could develop.[6] Furthermore, the long-term trend of much higher energy costs in the future will reduce the competitiveness of manufactured products in Asia for shipment to distant markets,

such as Europe or the Americas,[7] and precipitate the development of new trade alliances.

Apart from opportunities, Singapore will also need to operate in an environment with greater resource constraints. Notwithstanding the shift away from "Chimerica-driven" growth, the global economy is likely to remain volatile in the short term as major industrialised and emerging economies restructure. In addition, the risk of certain economies pursuing protectionist trade policies, plunging the global economy into a period of prolonged stagnation, remains very real.[8] In such a world, we may have to continually prioritise and re-prioritise the way in which resources are allocated—difficult trade-offs may have to be made across competing priorities, with emphasis on, for example, social assistance programmes.

POSSIBLE DISCONTINUITY 2: THE RISE OF STATE CAPITALISM

Since the end of the Cold War, Anglo-Saxon free-market capitalism has been the dominant economic model. Over the years, developed and emerging economies alike have engaged in a series of privatisation and deregulation exercises to shift the ownership of industries from the public to private sectors, albeit at different paces and with differing intensities.[9]

This trend of privatisation has been reversed with the current crisis. The governments of the US and other developed economies have been intervening directly to bail out troubled financial institutions and big corporations. Simultaneously, the governments of emerging economies, facing increased uncertainty about their growth prospects (and political longevity) due to the current crisis, have increased direct intervention to prop up domestic demand by investing more heavily in state-owned enterprises and government-linked private companies.[10]

Prolonged state interventionism, due to the current crisis, may inadvertently lead to free-market capitalism being replaced by state capitalism.

While the governments of developed and emerging economies may not intend to directly manage their respective economies indefinitely, it is uncertain when they will eventually withdraw their direct involvement. Prolonged state interventionism, due to the current crisis, may inadvertently lead to free-market capitalism being replaced by state capitalism—an economic model where the state functions as the leading

economic actor and uses markets primarily for political gain—as the new dominant model. Already, in sectors as diverse as petrochemicals, power generation and port management, a growing number of governments are no longer content with simply regulating the market, and instead use the market to bolster their domestic political positions.[10]

Implications for Singapore

While state capitalism is not a new historical development, its possible displacement of free-market capitalism as the dominant economic model presents several uncertainties for Singapore's open and globalised economy. Under the model of state capitalism, business and politics are intimately linked, such that access to markets, resource allocation and trade incentives would be decided more on the grounds of political considerations (for example, privileging local over foreign companies) than that of principles of economic efficiency or profit maximisation. For example, China recently imposed anti-monopoly laws aimed at curbing the influence of large foreign companies in its domestic markets.[11]

Should governments feel a greater need to make stronger protectionist gestures, as proof of their commitment to their respective economies, Singapore could also face greater uncertainty in terms of international trade and investment opportunities. More government investment by emerging economies, such as China, to build up domestic consumption levels could lead to the "crowding-out" of private investments or foreign capital. In addition, domestically, we could also see more populist calls to prioritise the building up of local enterprises and industries instead of leveraging multinational corporations, foreign direct investments and global markets.

POSSIBLE DISCONTINUITY 3: DAWN OF A NEW FINANCIAL ARCHITECTURE

For decades, the international monetary and financial systems have been loosely regulated and based on the US dollar as the reserve currency.[12] The historical roots of this system lie in the Bretton Woods architecture, established in a world where most major economies had been decimated by World War II and the US was the only power capable of providing a reserve currency.

However, the scale of the financial crisis could possibly lead to the creation of new supranational regulatory bodies, measures and currencies. At the international level, the G-20 London Summit in April 2009 saw the creation of a new Financial Stability Board

dedicated to monitoring leverage and inter-connectedness of international financial institutions.[13] In addition, prominent members of the G-20 have proposed the implementation of a "Tobin Tax" on financial transactions,[14] to guard against excessive risk-taking behaviour—a measure that Brazil recently implemented.[15] At the regional level, China, Japan and South Korea have agreed to enhance existing cooperation and led the setting up of a regional pool of reserves under the "ASEAN + 3" grouping, to protect the region against speculative attacks and provide countries in crisis with liquidity.[16]

> Future financial innovation will most probably come at a higher cost, contributing towards slowed growth for financial sectors.

There have also been growing calls for the world to be less dependent on the US dollar. China has suggested that US dollar-denominated assets could be exchanged for more Special Drawing Rights from the International Monetary Fund (IMF), while Japan and Russia have respectively voiced their support for the yen and the rouble to be the base unit of currency exchange in Asia and the ex-Soviet Union states, replacing the US dollar. At the same time, economic historian Barry Eichengreen suggests that the Yuan may become an important international currency alongside the US dollar sooner than expected.[17]

Implications for Singapore

The prospects of increased regulation suggest that future financial innovation will most probably come at a higher cost, contributing towards slowed growth for financial sectors. In other words, investors will be primarily attracted to stable and secure markets to store capital, rather than risk investing in new and emerging markets or industries. Hence, a country's international reputation and standing will factor more prominently as criteria for attracting capital inflows.

The creation of supranational regulatory bodies will place increased pressure on member countries to conform to new and stricter international standards and protocols. While this may create opportunities for Singapore to leverage its reputation for clean government and high performance standards, it could also limit our financial policy options. In addition, our financial regulators and institutions may need to address further uncertainty in managing monetary and exchange rate policies, or investment portfolios, should new currencies arise to either complement or even displace the US dollar.

POSSIBLE DISCONTINUITY 4: FROM US UNILATERALISM TO GLOBAL MULTILATERALISM

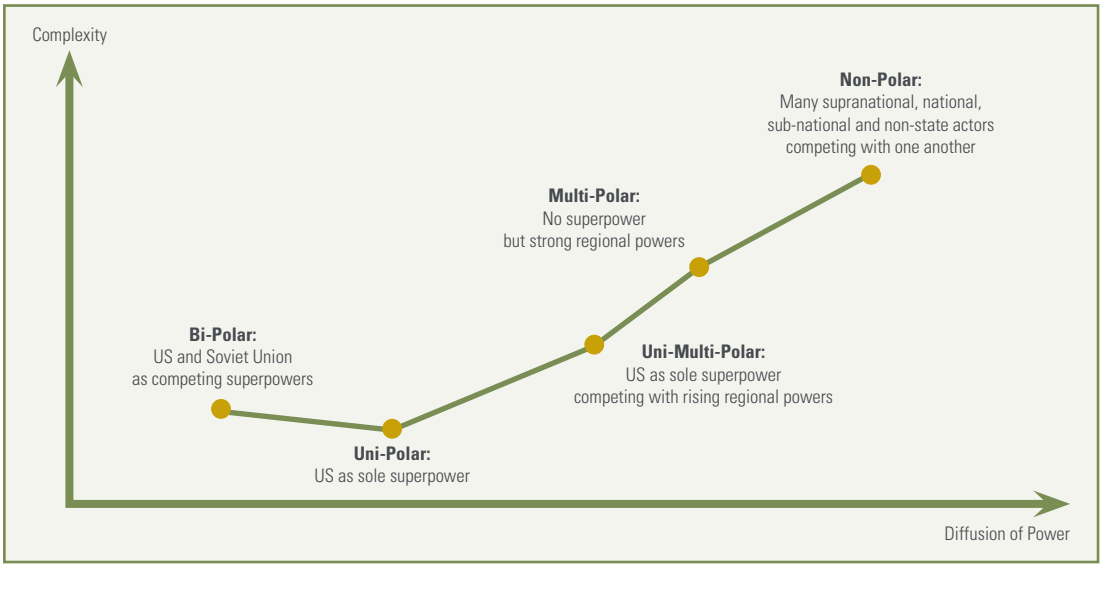
Based on current trends, the international geo-political system is projected to be markedly different in 2025 compared to today.[18] This can be seen as the latest development in the evolution of an increasingly complex world order, driven by greater diffusion of power. After the Cold War, the international system evolved over time to become "uni-multi-polar",[19] where the US remained the only superpower, but steadily counterbalanced by the gradual "rise of the rest"—regional powers such as China, India, Russia and, to a lesser extent, Brazil and Iran.[20]

Following the severity of the financial crisis, the world is likely to become increasingly "multi-polar", where strong regional nations compete, conflict and coalesce with each other and alongside influential non-state actors, such as multinational corporations, in the absence of a "global policeman".[21] Should more supranational and sub-national entities (i.e., influential city-states) emerge to contest for power and influence in the international arena, the world could even be shifting towards an era of "non-polarity", where power is even more diffused.[22]

Implications for Singapore

As one of the most globalised countries in the world, Singapore will have to be prepared for an increasingly fragmented and chaotic world order as multi-polar systems have historically tended to be unstable. We may have to consider whether there is a need to augment our

FIGURE 1. EMERGING NON-POLARITY—INCREASING COMPLEXITY AND DIFFUSION OF POWER



strategic alliances by establishing even closer ties with China—by 2025, China is projected to overtake Japan as the world's second largest economy.[20] At the same time, there may be value in continuing our current pro-ASEAN-integration stance, to compete effectively against the increasingly influential East Asian bloc.

CONCLUSION

Singapore has experienced both the benefits and ill-effects of globalisation, and must continue to navigate the uncharted territory ahead. The world's ability to digest and adapt to these key discontinuities will determine whether the next phase of development will be characterised by a different form of globalisation or a dark period of de-globalisation. As always, Singapore will have to stay nimble and adapt to global changes, given its size and lack of natural resources. In the face of possible drastic discontinuities, a strategic rethink of the Government's fundamental roles, strategies and internal capabilities may be in order. This may include honing in public officers the instinct to identify and anticipate critical uncertainties and their potential implications for our operating environment.

Godwin Tang graduated from the University Scholars Programme at the National University of Singapore, with an honours degree in Philosophy. He was previously a Policy Officer in the Ministry of Community Development, Youth and Sports, overseeing social policies in the area of marriage and parenthood.

Valerie Yuen graduated from the National University of Singapore with an honours degree in History. She was previously a Senior Executive in the Civil Service College's Centre for Governance and Leadership, working primarily on programmes and research in the areas of complexity science and behavioural economics.

They are both Senior Strategists in the Strategic Policy Office of the Public Service Division, Prime Minister's Office. The views expressed in this article are their own.

NOTES

1. Nye, Joseph S., "Which Globalisation Will Survive?", *Project Syndicate*, 2009 and Rodrik, Dani, "A De-Globalised World?", Project Syndicate, 2009.

2. Ferguson cites how China is the net lender to the US' debts, which in turn allows the US to support China's export-dependent economy. Ferguson, N., "What Chimerica Hath Wrought", *The American Interest*, January–February 2009.

3. "Decoupling 2.0", *The Economist*, May 2009.

4. "Uncoupling Asia: Myth and Reality", *Asian Development Outlook 2007* (Philippines: Asian Development Bank, 2007).

5. "Searching for a new source of global demand growth", *Deutsche Bank Global Markets Research*, December 2008.

6. MENA economies are rich with capital and feedstock (oil, gas, petrochemicals and basic inputs for heavy industry) but lack labour, whereas Asian economies have abundant labour, less capital and scarce feedstock. In addition, Gulf States have also been slowly developing state-owned multinational enterprises aimed at Asian markets in sectors such as logistics, heavy industry and telecommunications. See Hertog S., "Secular Trends in Gulf Geo-Economics",

presented at the Second Franco-Singapore Conference on the Impact of the Middle East on Southeast Asia and Europe, December 2008. http://www.mei.nus.edu.sg

7. Bhaskaran, M., "The Crisis and Beyond", *Asian Economic Outlook*, December 2008.

8. The risk of protectionism, albeit in the guise of environmental or other well-meaning laws, is also likely due to projected higher energy costs and scarce strategic resources.

9. Notwithstanding the dominance of free-market capitalism, privatisation had been practised unevenly across developed and emerging economies. While developed economies such as the US and Europe had been much more aggressive in adopting free-market capitalism, emerging economies such as China, Russia and India were operating economies which had relatively more direct state influence alongside privatisation efforts.

10. Bremmer, I., "State Capitalism Comes of Age: The End of the Free Market?", *Foreign Affairs*, May/June 2009.

11. "Hard to Swallow—Coca Cola and China", *The Economist*, March 2009.

12. Gilpin, R., *Global Political Economy—Understanding the International Economic Order* (New Jersey, USA: Princeton University Press, 2001).

13. "G20 Summit: Global Financial Crackdown is Cost of Solving Crisis", *The Telegraph*, April 2009.

14. "G20 tasks IMF to probe 'Tobin Tax'", *Reuters*, September 2009.

15. Brazil had imposed a 2% tax on foreign portfolio investments in October 2009 to guard against excessive speculative behaviour.

16. "Asian Monetary Fund, Take Two", *Far Eastern Economic Review*, 2008.

17. Eichengreen, B., "The Irresistible Rise of the Renminbi", *Project Syndicate*, 2009.

18. "Global Trends 2025: A Transformed Word", National Intelligence Council, 2008.

19. Huntington, S., "Global Perspectives on War and Peace or, Transiting a Uni-Multi-Polar World", American Enterprise Institute for Public Policy Research Bradley Lecture Series.

20. The phrase, "the rise of the rest", is used by Fareed Zakaria in his book *The Post-American World* (New York, W. W. Norton & Co, Inc., 2008) to describe the "catching up" of emerging powers such as China, Russia and India.

21. Haass, Richard N., *The Reluctant Sheriff: The United States after the Cold War* (New York, USA: Council on Foreign Relations, 1997).

22. Haass, Richard N., "The Age of Non-Polarity", *Foreign Affairs*, June 2008.

Peter Ho

Thinking About the Future: What the Public Service Can Do

How can the Public Service overcome cognitive and institutional hindrances to anticipating strategic surprises? In the following excerpt from his 2009 Strategic Perspectives Conference keynote address, Head of Civil Service Peter Ho charts the way forward.

It is fair to say that Singapore recognises the need for decision-makers to prepare for the future. Our efforts to understand and plan for the future have evolved and improved over the years. Scenario planning is now a key part of the Government's strategic planning process, and has proven useful in surfacing otherwise hidden assumptions and mental models about the world. More importantly, the scenario planning process has helped to inculcate an "anticipatory" mindset in many of our civil servants by getting them to raise "what if" questions on the issues that they deal with. The Risk Assessment and Horizon Scanning programme (or RAHS), launched in 2004 as a complementary capability to scenario planning, is being used to examine complex issues in which cause and effect are not easily discerned; it

also serves as a shared platform for analysts from different agencies to collaborate on perspective-sharing, modelling and research.[1]

Yet why do decision-makers, who have ready access to ample information, fail to respond to warning signals of imminent crises? Why, despite support from the public sector leadership, and years of scenario planning workshops, and with new tools like RAHS, are we still not fully adept in anticipating the future? How can government agencies better organise their strategic thinking about the future?

> We miss out on signals not only because of the limitations of our tools and methods, but also because of the nature of human cognition.

OBSTACLES IN ANTICIPATING STRATEGIC SURPRISES

The human mind can play tricks on us. We see what we want to see, and sometimes miss out the glaringly obvious. So it is with thinking about the future. We miss out on signals not only because of the limitations of our tools and methods, but also because of the nature of human cognition. Many surprises that governments have to deal with—natural disasters, pandemics, even financial crises and political upheavals—can often be assigned probabilities, or anticipated through the "stories" or "narratives" that scenario planners use. This should lead governments to take precautionary measures. The reality is that we often do not.

The reasons why we do not are several. These include confirmation biases, groupthink and other cognitive failures; our inability to make sense of complexity; the problem of retrospective coherence; poor or missing incentives to prepare for strategic surprises; and fragmentation of risk (see box story on page 56).

WHAT THE SINGAPORE PUBLIC SERVICE CAN DO

Over the years, I have become increasingly convinced that thinking about the future and strategic surprises will remain a messy business. If we try to get precise predictions, we are pursuing the wrong aim. We cannot predict the future. As futurist Peter Schwartz noted, "the objective is not to get a more accurate picture of the world around us".[2] Rather, we should seek to provide input for decision makers to make informed assessments. His colleague from Royal Dutch/Shell, Pierre Wack, added that scenarios should "help change assumptions about how the world works" and "compel people

Why We Fail to Anticipate the Future

COGNITIVE FAILURES

Decision makers tend to discount *future* risks and contingencies, and place too much weight on *present* costs and benefits. Governments are also prone to *confirmation bias*, which is the tendency to pay attention only to data which is consistent with existing mental models. For example, during the boom years before the current financial crisis, most experts dismissed the risks of a major financial or economic crisis. The few who foresaw an impending crisis—like Nouriel Roubini and Nassim Taleb—were roundly ignored.

Social networks and groupthink are also a source of confirmation bias. Mavericks—whose views do not conform to group opinions—tend to be rejected; they will disappear over time unless a mechanism is set up to protect them. Crises can also break outdated mental models, but they are an expensive way to force recognition of confirmation biases.

What can be done: Well-crafted, challenging scenarios that articulate imaginative yet plausible ways in which the future could evolve, can prompt management to think the unthinkable and consider radical approaches and circumstances.

INABILITY TO MAKE SENSE OF COMPLEXITY

There is a tendency to focus on what can be modelled or extrapolated from today's trends; what is not modelled is discounted or assumed away. As a result, scenario planners often concentrate on "known unknowns" rather than on "unknown unknowns". But future states of the world can emerge from parallel developments whose interactions are unforeseeable, unforeseen, or unseen, and cannot be predicted from a linear extrapolation of past developments.

Rational, quantitative thinking is easier to deal with than complex, open-ended reasoning. However, the metrics used can fail to reflect reality, and worse, inhibit thinking about underlying complexities in the operating environment.

What can be done: Scenario planning should not be reduced to a simplistic engineering exercise in which driving forces are the inputs, and scenarios, the outputs. Instead, these raw ingredients can interact in bewildering ways to produce unpredictable outcomes and patterns in the eco-system. So in addition to driving forces, look out for potential discontinuities, emerging issues, black swans, wild cards and other strategic surprises.

THE PROBLEM OF RETROSPECTIVE COHERENCE

The current state of affairs always makes sense, but only in hindsight. The current pattern, while logical, is only one of many patterns that could have formed, any one of which would

have been equally logical. While the present situation is the result of many decisions taken along the way, retrospective coherence says that even if we were to start again and take the same decisions, there is no certainty we would end up in the same situation.

What can be done: Be aware that the lessons of history are not enough to guide us down the right path into the future. Furthermore, approaches and policies that have worked well in the past may actually prove dysfunctional when applied to the future.

POOR OR MISSING INCENTIVES

Even if individuals and organisations are mentally prepared for a future contingency, they often do not have the incentives to hedge against it. Hedging is costly, and risks—as the global financial crisis shows—spill across boundaries in ways that make it impossible for a single country to hedge against fully. In the financial crisis, some participants were even incentivised, on a local basis, towards risky behaviour that contributed to the crash. So it was much easier for observers who were not beneficiaries of bank bonuses, such as economist Nouriel Roubini, to contemplate and anticipate a crisis.

The strategic planner often has a hard time challenging the official future, especially when that future is consistent with an organisation's biases and preconceptions. The planner who brings up radical alternatives risks being branded as lacking a sense of reality; he has a real incentive to make scenarios more palatable. But in so doing, he also reduces the impetus for the organisation to confront its uncomfortable futures and prepare for them.

What can be done: Futurist Peter Schwartz once said that the scenario planner should aim to be a court jester—he must be able to say the most ridiculous things and get away with it. The scenario planner is supposed to help us suspend our disbelief.

FRAGMENTATION OF RISK

Hierarchies tend to optimise at the agency level, sometimes at the expense of global optimisation, because information flows most efficiently within vertical silos, rather than horizontally across organisational boundaries. Ministries will tend to have tunnel vision in the way they look at risk. But one arm of government doing something that perfectly matches its "local" performance goals can create a big downside for the rest of the larger system.

What can be done: Take a whole-of-government view and ensure that incentives do not result in perverse behaviour. Avoid the fragmentation of risk by breaking down vertical organisational silos, promoting the horizontal flow of information, and encouraging whole-of-government strategic conversations. ~ Peter Ho

to reorganise their mental models of reality".[3] Good scenarios should facilitate better decisions, not better predictions.

The challenge for us is how we can find a better approach to anticipating strategic surprises. Let me outline five key ideas for our Public Service.

First, we need to acknowledge that we will always face limitations in anticipating strategic surprises. Even in the most forward-looking government, leaders and officials will have their own mental models and cognitive biases, and seek confirmation for them. Being aware that we have biases is already a step forward. When we started scenario planning nearly two decades ago, we were not as sensitised to cognitive biases as we are today. Knowing what we know today, we can take a number of deliberate steps to compensate for our consistency biases.

We should take steps to inject much more real diversity into our strategic conversations. In the United States, the Defense Science Board is commissioned by the Department of Defense to consider strategic issues. Besides bringing experts, academics and professionals to the table, the Board sometimes includes in its discussions people with no defence background at all—artists, actors, musicians. But there is method in this seeming madness. By gathering a diverse group of people, the Board hopes to garner insights that would not be achievable from a team comprising only professionals and experts with similar backgrounds.

In Singapore, we probably have more think-tanks *per capita* than anywhere else in the world. They ought to be tapped more systematically, because they can be a rich source of fresh insights that can better inform policymaking and planning. Conversing with think-tanks, like engaging in public consultation, should be seen as part of the effort to operate in a complex, inter-connected and non-linear world, in which insight and good ideas are not the monopoly of government.

Networked government does not just mean networking among government agencies. It means networking with individuals and organisations outside government as well, locally and internationally. It is through such ways that we can avoid the trap of groupthink. We should actively organise our strategic conversations to keep an open mind, by encouraging a range of perspectives that do not conform to our own mental models, and by challenging our thinking with contrarian and diverse views. This does not mean we must agree with every view. But we should give each a hearing so as to honestly and objectively test our own ideas.

Second, we should recognise that the cost of responding to some strategic surprises can be just too high politically, especially if governments will be perceived to be allocating an inordinate amount of resources to prepare for eventualities that may never happen. For instance, there is a possibility of the earth being destroyed by a planet-killing asteroid, but this is probably not a risk that we (in Singapore) can meaningfully prepare for, given the prohibitive costs today. We cannot eliminate every risk, but we need to manage them in such a way that strategies and their premiums are not front-loaded.

Third, we have to calibrate strategic thinking processes around the psychological and practical challenges of policy implementation. In addressing these "downstream" issues, methods matter, but psychology matters as well. We will have to harness the relative strengths of the scenario planning and RAHS to mitigate issues of cognitive dissonance and consistency biases.

> Insight and good ideas are not the monopoly of government.

Fourth, it is important to engage and communicate with decision-makers. Their support and active involvement are crucial in achieving better decisions and strategic outcomes. For a message to resonate strongly with decision-makers, the work should be presented in distilled forms, with sufficient detail, using creative expressions and relevant, compelling graphics or visual aids. In addition, complex scenarios and strategies can be broken down into smaller "bite-sized" pieces. These are more easily digested by decision-makers who, in turn, are more likely to recall and apply these insights.

Fifth, we have to recognise that even as we endeavour to avoid being surprised, we should still expect to be surprised. To mitigate this, governments should build some resilience into the system. Among other things, resilience is the ability to address issues with multiple possible trajectories. It is also the ability to adjust to rapid and turbulent change. It is going about our daily business while operating in an environment of near-continuous flux.

Resilience will be an increasingly important driver of competitive advantage in the future. In a world of growing volatility and uncertainty, our approach to policymaking needs to go beyond an emphasis on efficiency, towards building resilience. Indeed, lean systems that are purely focused on only efficiency are unlikely to have sufficient resources to deal with shocks. Of course, this is not an argument for establishing

bloated and sluggish bureaucracies. If there is to be "fat", it must be directed to specific purposes.

In this regard, one important idea is to have a small but dedicated group of people to think about the future. The skill-sets needed for long-term policy planning are different from those needed to deal with more immediate volatility and crisis. Both are important. But those charged with thinking about the future should be given the freedom and allocated the bandwidth to focus on this important role without getting bogged down in day-to-day routines. These people will become repositories of patterns that can be used to facilitate decision-making, and especially to prepare for "unknown unknowns". What we need from this small group of people is the capacity to conduct strategic thinking about future possibilities to facilitate more considered decision-making, perhaps even to conduct policy experiments on possible alternative futures, or policymaking by discovery.

> In a world of growing volatility and uncertainty, our approach to policymaking needs to go beyond an emphasis on efficiency, towards building resilience.

A CENTRE FOR STRATEGIC FUTURES

In order to put these principles into operation and strengthen our capacity to think about the future, we have set up a "Centre for Strategic Futures" (CSF) in PSD (see box story on page 61). Over time, together with the Strategic Policy Office and supported by RAHS, the CSF will become the focal point of futures-related work in the Singapore Government. It will work towards promoting whole-of-government thinking on the key strategic issues of the day. It will support the development of capabilities within the Singapore Government in futures methodologies through its core functions.

The Civil Service College will play an important and complementary role to the CSF, by helping civil servants develop the competencies, instincts and habits of mind to tackle uncertainties and manage complexity. This will be done through seminars, programmes and courses on complexity as well as futures thinking and tools, and the documentation of case studies on how the civil service has applied futures work.

While the CSF will play a role in the cultivation of the Government's preparedness for the future, every ministry will also need to build up its individual capability. To facilitate this,

Roles of the Centre for Strategic Futures

CHALLENGE CONFORMIST THINKING

- build networks with diverse perspectives within and outside Singapore
- engage local think-tanks and universities, international counterparts and global thought leaders
- conferences on futures-related issues

IDENTIFY EMERGENT RISKS

- communicate emerging issues, wildcards and strategies to decision makers
- in parallel with an integrated WOG Risk Map and Risk Register

CALIBRATE STRATEGIC THINKING PROCESSES

- focus on practical policy development and implementation
- Scenario Planning Plus: integrated framework together with RAHS, WOG Risk Management
- coordinated platform for inter-agency discussion
- develop new capabilities and a core group of facilitators

CULTIVATE CAPACITIES, INSTINCTS AND HABITS

- mindsets and HR capability for dealing with uncertainty and disruptive shocks
- promote strategic conversations among public servants
- nurture WOG-level strategic thinking and sharing across agency lines on "what if" questions

we have just established a "Strategic Futures Network", to be made up of Deputy Secretaries from each Ministry. We expect that the Network will play a catalytic role in promoting futures work within the civil service, by expanding the reach of the CSF into the ministries and agencies. The Network will have a key role in establishing a common vocabulary for strategic planning, and nurturing the instincts and habits of strategic whole-of-government thinking about the future.

CONCLUSION

Overall, the CSF will seek to build on the work of scenario planning in facilitating a common, whole-of-

government vocabulary for strategic planning. This is important not just to analyse the future, but also to understand the present.

To deal with consistency bias and cognitive dissonance is to nurture in our people the instincts and skills to be sensitive to discontinuities. In an increasingly uncertain and complex environment, it is imperative that we have the courage to open our minds and take bold but pragmatic steps forward. The CSF is an important step in building capability in futures work, and to develop and strengthen inter-agency collaboration for networked government. The CSF will play a key part in keeping us at the leading edge of governance, enhancing our decision-making capability and the service that we provide to Singaporeans.

Mr Peter Ho is Head of the Singapore Civil Service. This article was adapted from a longer speech delivered at the Strategic Perspectives Conference on 23 November 2009.

NOTES

1. RAHS incorporates into a computer-based platform a suite of methods and software designed to help analysts detect and investigate emerging strategic threats and opportunities. For more information, see http://www.rahs.org.sg

2. Dearlove, D., "The Thought Leadership Series Peter Schwartz Thinking the Unthinkable: an interview with Peter Schwartz, scenario planning futurist," *The Business*, September 2002:22-23.

3. Wack, P., "Scenarios: Uncharted Waters Ahead," *Harvard Business Review*, 63 (1985):72-79.

The ETHOS Roundtable

Singapore: The Apple of Nations—A Conversation with Peter Schwartz

The ETHOS Roundtable brings together thought leaders and practitioners to discuss key issues of interest to the public service. In this session, renowned futurist and Global Business Network cofounder Peter Schwartz discusses Singapore's prospects as a young city-state in a future where talent and innovation will determine success.

Participants: **MR PETER SCHWARTZ**, Futurist and cofounder of Global Business Network
MS QUAH LEY HOON, former Director, National Population Secretariat, Prime Minister's Office
MR KWEK MEAN LUCK, Deputy Secretary (Industry), Ministry of Trade and Industry (then Director, Industry Division)

ON SINGAPORE'S PASSION AND PROSPECTS

SCHWARTZ: Can a place or an organisation that is new and self-created have what I think of as soul—the kind of soul you find in Paris, with its thousand-year history, or even New York, with several hundred years of layered development and immigration?

There was a book published a number of years ago called *The Soul of a New Machine* by Tracy Kidder, about a group of engineers trying to build a new computer a day with an enormous sense of passion. In the new and self-made world of high tech, that passion is the equivalent of soul. There are clearly analogues to Singapore.

In my view, Singapore is the Apple Computer of nations. You go to Apple headquarters and you feel their passion for building something astonishing that will transform the world. If you go to an Apple store, it hums, it's electric, there's passion, there's juice. Everybody who works there *wants* to be there. Apple reinvented the computer and then the music and telephone industries. The CEO, Steve Jobs is a brilliant leader, reputed to be irascible and difficult to work for, but with a very clear sense of vision and purpose.

The difference between Apple and Singapore is that the people of Singapore don't know how good they have it. They don't know just what a remarkable entity has been created here. They don't share yet that sense of passion that the people at Apple do.

You have to convey to your people, and to your customers and visitors, that you share the same sense of passion for your country. And this is an astonishing country. It is the city of the future, but you need to tell the world. You want people going home from Singapore and say "I want my city to be like Singapore!"

> The civil service embodies the values, dynamism and behaviour that make Singapore succeed.

There is a sense that what is possible here is not yet fully realised. It isn't that people are unhappy. Instead, there is the sense that not only are things good, but they have to be better. That is also true at Apple. They keep pushing the frontiers, like in Singapore.

The passion of the people of Singapore is an underutilised resource. Part of the brilliance of your founders is the creation of the civil service, which embodies and keeps alive the values, dynamism and behaviour that make Singapore succeed. In that sense, the single most important institution in your future is the Civil Service College.

In many ways, I think city-states are the future of the world. It doesn't have to be a formal arrangement. The San Francisco Bay Area and New York City are quasi city-states, with a life and management of their own. The great cities of the world are really the engines of change. Already, eight of the ten biggest cities are now in Asia, which is the way it was a thousand years ago. This is where the juice is.

KWEK: Can Singapore be the Apple of commerce and industrial economies, particularly in terms of design and attractiveness? We are building up Singapore not just for tourism but also to draw people, particularly high-end global talent, for at least one to two years and, if possible, to anchor some of them for the long term. Related to this and the question of soul is whether Singapore is importing too many ideas from overseas: Formula One, Integrated Resorts, the Singapore Flyer, attractions which are not intrinsically Singaporean. Do we need our own intellectual property (IP), so to speak, perhaps something that represents the best of both Asia and the West?

SCHWARTZ: But you do have the IP: You know how to run a country! Singapore is a made-up country with a colonial past and without much deep history, unlike many countries in the region. Up until independence, this place was only moderately interesting; it was not by any means the centre of things. Since

independence, however, it has become incredibly interesting because of what you've done here. But the thing about great world cities is that they bring the world into the city.

> Size should not be a factor in accommodating diversity: Singapore is about the same size as the San Francisco Bay Area.

New York is one of the best examples. You find the whole world represented on almost every street of New York in one way or another. Tokyo, on the other hand, is not a world city: it is Japanese through and through. Shanghai is well on its way to becoming a world city. Beijing is not. Hong Kong is, and Singapore is becoming ever more so. I see this as a distinguishing characteristic of the great cities of the future.

If you look around the world, there are no great modern cities in the tropics except for Singapore. So from that point of view, you have demonstrated that tropical cultures can have highly sophisticated cities. So I think you have a huge opportunity to sell your know-how in managing urban environments. You will be sending your very skilled, able people to manage other cities in the world. You are already doing some of that for your ports and airports. This is also how Singapore will extend its reach; you will be the hub of a network of cities.

ON DIVERSITY, BELONGING AND INNOVATION

QUAH: If Singapore, like Apple, is founded on a clear vision and direction, what happens to those who don't fit into the package or share the particulars of the vision? There will always be a population who cannot leave or be exportable. At the same time, every world city will be bringing in the best people in the world. How do we distinguish Singapore? We do hear a lot, for example, about some who want to stay in Singapore because this is a clean and safe environment for their children, and the country is well managed.

SCHWARTZ: There are a lot of people who do not like a place that is too perfect, too neat, too clean. Creative people want something different. Utopias are boring—they would rather be in some other place that is a little rougher and that's fine. Right now, as a young person growing up somewhere else in the world, you don't think about Singapore as a destination. You think about Shanghai and New York or the Bay Area and maybe London as the place you want to be.

Singapore is not the best place in the world for a single male who would rather be in Amsterdam or somewhere similar. But it is a great place for a family with children and most of the talent of the world is the latter. These are people for whom the opportunities—resources, capability, talent, and the standard of living for them and their family—are vastly better here than anywhere else. They are less interested in New York's East Village. They need a good laboratory and a decent place for their graduate students to work, to meet and so on.

KWEK: We recognise that we are decent at making life good for families. However, we may not be so good at appealing to the creative class that Richard Florida highlights. How critical is it for us to be a home for all these different demographics?

SCHWARTZ: If you're going to be a centre for creativity, you're going to have to be more tolerant of creative people, and they are incredibly diverse. From my point of view, this is a critical weakness in Singapore, whether it be in terms of gay rights or tolerance of physical difference and appearance. Creativity and diversity go hand in hand. Part of what makes the San Francisco Bay Area work is its cultural diversity. If you've got a family with children, you'll probably live in Palo Alto or Atherton and so on. On the other hand, if you're a hip young person, you'll probably live in San Francisco, as that's where the juice is, where the night life is, where your friends hang out.

Singapore is about the same size as the Bay Area, which has a range of manufacturing, services, banking, tourism, and perfectly ordinary middle-class activities; the area covers San Francisco, Silicon Valley and Berkley. So your size should not be a factor in terms of accommodating diversity.

> You need to open up the dense middle and give the bottom, particularly young people, an opportunity to participate.

You have done a good job of engaging and attracting talent from elsewhere, particularly in science and technology. But I think part of the strength of Singapore is how deeply engrained the founding values of the country are, including a profound sense of insecurity: the recognition that Singapore is fundamentally vulnerable and that you have to survive on your wits alone. I think this is a profound motivator, and makes people willing to do things they might otherwise not do. People coming to Singapore, such as myself, can never

feel that. We come with a different psychology. We think "What a cool and interesting place to be!", and not "What an insecure place to be".

One emerging issue we have identified is the possibility of a sixties-style youth revival in Asia that will challenge the establishment. We see signs of this in China and India. The next generation in Singapore and in Asia could turn out to be very rebellious and progressively stranger.

QUAH: There are home-grown pockets of creativity in Singapore, some of whom have done well around the world. How can we retain, nurture and develop our own distinctive creative talent and innovation, going forward?

SCHWARTZ: You already have the scientists and the engineers, there's no question. The issue is whether you have the next layer of marketing and design—this is where creative culture and the question of tolerance and diversity come into play.

There is also a sense that Singapore is still run with a corporate mentality: top-down, not bottom-up and not highly participatory. There is still energy at the top, but there is a big thick middle that has become conservative, bureaucratic and risk averse, because all the incentives are against rocking the boat. They play by the rules and enforce the rules, and make it hard for anyone at the bottom to find their way or contribute. The high quality of governance and an honest system also means things sometimes get slowed down. More people, more rules, more density leads to the accumulation of a dense fibre of constraint. At the same time, because you have done well, you now have a lot of talent and capability looking for something to do and wanting to make a difference, in a system that already works extremely well. This is a problem of success, not failure. Many big companies have exactly the same issues.

The challenge is to bring back some of the bright young talent who see exciting things happening around the world, and do not have the patience to plod through the bureaucracy for twenty years to get things done. So you need to open up the dense middle and give the bottom, particularly young people, an opportunity to participate.

One idea is to create a Defense Advanced Research Projects Agency (DARPA)-like outfit to allow for innovation outside the usual stream, where you can experiment and be allowed to fail, which is critical. Create a mini ministry to conduct experiments in governance: How would we run things differently? How would we organise things differently? If you were to invent Singapore today, what

would you do? How would you build it? This could be used as a nucleus for innovation elsewhere.

> The next generation in Singapore and in Asia could turn out to be very rebellious and progressively stranger.

EDITOR: Does it make sense for Singapore to sponsor something like the Ansari X Prize,[1] where we attract innovative solutions to tricky problems? The ideas may not come from us but they come to us because we're the ones who issue the challenge.

SCHWARTZ: It's a good idea and could lead to something. I'm on the board of the Auto X Prize and it's a powerful mechanism to stimulate creativity.

Another useful idea is the MacArthur Fellows Program,[2] which are commonly called the Genius Awards. Every year, a secret committee picks 20 to 30 talented individuals who exhibit unusual creativity relatively early in their career, although some are as late as 50, and gives them US$100,000 a year for five years, with no strings attached. Over 800 Fellows have been named since 1981; interestingly enough, there is no common trend in terms of their background or formative environment. The impact of this award has been disproportionately large, in terms of its second order effect and on the creative culture. Singapore could set up something like this award for its own citizens as a low-cost tool to draw out talent.

The ETHOS Roundtable was hosted by Alvin Pang, Editor of ETHOS, in July 2009. Peter Schwartz was in Singapore for a month-long sabbatical, during which he delivered a New Insights Lecture on "Emerging Strategic Issues and Wild Cards" at the Civil Service College and conducted a number of workshops for scenario planners in the Public Service.

NOTES

1. Twenty-six teams from seven countries competed for the US$10 million Ansari X Prize, which in October 2004 was awarded to aerospace designer Burt Rutan and financier Paul Allen for building and launching a private spacecraft capable of carrying three people to 100 kilometres above the earth's surface, twice within two weeks. Since then, there has been more than US$1.5 billion dollars in public and private expenditure in support of the private spaceflight industry. See http://space.xprize.org/ansari-x-prize

2. For more details, see http://www.macfound.org/fellows

Opinion

Claudio Fernández-Aráoz

In Search of the New Public Leader

What can a Portuguese prince from the Age of Exploration teach us about the search for leadership in an Age of Uncertainty?

SUCCESSFUL EXPLORATION

While thinking about the exploratory capacity of government, I could not help but recall an extraordinary example of foresighted leadership from centuries ago. At a recent business event in Lisbon, I became familiar with the story of Prince Henry, born in 1394 as the third son of King John I of Portugal. At the age of 24, realising that his country had no coast along the Mediterranean Sea, Prince Henry devoted his passion towards worldwide exploration. This visionary man founded his institute in Sagres on the south-western-most point of Portugal, Cape Saint Vincent—a place ancient geographers referred to as the western edge of the earth. The institute, best described as a fifteenth century research and development facility, included libraries, an astronomical observatory, ship-building facilities, a chapel, and housing for staff.

The institute was designed to teach navigational techniques to Portuguese sailors, to collect and disseminate geographical information about the world, to invent and improve navigational and seafaring equipment, to sponsor expeditions, and to spread Christianity around the world. In order to fulfil his dream, Prince Henry brought together some of the leading geographers, cartographers, astronomers, and mathematicians from across Europe and the Arab world. He invested heavily in them. Likewise, he also brought into the country some of the best sailors, many of whom he found in Italy.

The institute's primary goal was to explore the western coast of Africa in order to locate a route to Asia. One of its innovations included a new type of ship, called a caravel, faster and much more manoeuvrable than prior types of boats and quite functional despite its small size (two of Christopher Columbus' ships, the Niña and the Pinta, were caravels).

TALENT AS THE KEY

Although Prince Henry never sailed on any of these expeditions and rarely left Portugal, he became known as "Prince Henry the Navigator". The successful expeditions he sponsored were key to many discoveries in Portugal, which, as a result, became an extremely powerful nation, with an extraordinary impact on the rest of the world. Although some people believe that Portugal's discoveries happened by chance, as Peter Drucker has put it, "nothing good happens by accident".[1]

The key to these extraordinary feats of exploration was Prince Henry's investment in talent, which represented not only an enormous financial commitment but also a remarkable degree of openness in bringing on board key scientists from the Arab world, given the conflict between Christians and Muslims at the time.

Like Henry the Navigator, Singapore has created an economic miracle by investing in talent. Its leaders, realising that the only way for Singapore to grow without natural resources or scale was to invest in talent, systematically attracted the best people, both to key political appointments and its civil service, and have been doing so for well over four decades. As a result, Singapore's gross domestic product (GDP) per capita has multiplied by a factor of eight in real terms (constant dollars) since 1965, while GDP per capita in the US, the UK and several other highly developed nations has multiplied by a factor of less than three.[2]

> Evidence suggests that an unprecedented war for talent will take place in Asia for at least the next two decades.

Singapore's economic achievements can be credited to the integrity of its leaders and their long-term vision, its ability to reinvent itself, and its global outlook. As Neo Boon Siong has described, Singapore's unique form of "dynamic governance", based on the principles of incorruptibility, meritocracy, markets, pragmatism, and multi-racialism, has given it an extraordinary capacity to think ahead, to think again, and to think across.[3] A continual flow of able, honest people has allowed Singapore to become one of the world's most competitive nations.

THE NEW LEADERSHIP CHALLENGES

Like Portugal at the time of Henry the Navigator, the world (and Singapore along with it) is once again entering an era of unchartered waters, with many major challenges ahead.

While Singapore's traditional form of "dynamic governance" will be even more

essential in an environment of greater uncertainty, the flow of outstanding talent into its public sector will be much harder to sustain.

The traditional source of talent for public leaders—under the scholarship system—will no longer be as reliable as in the past. Ironically, Singapore's success at wealth creation has made its people so affluent that scholarships no longer represent the unique opportunities they once were. Talented individuals are now much more able to afford a good education overseas, while maintaining the freedom to work either for the public or the private sector.

Furthermore, evidence suggests that an unprecedented war for talent will take place in Asia for at least the next two decades.[4] The public sector in Singapore will increasingly be competing for talent with the private sector both in its home country and abroad. Indirectly, other governments in the world will also be competing for some of the best talent in the private sector, generating in turn an additional demand over the potential leaders that the Singapore public sector will need.

TOWARDS THE NEW PUBLIC LEADERSHIP: FIVE PRIORITIES

Looking ahead, I see five priorities in enhancing Singapore's capacity to find and develop the next wave of public leadership:

1. **Adjust the screening process.** Singapore has been uniquely disciplined and effective at bringing in top talent to its public sector. However, I believe that Singapore's screening process is still too biased towards academic criteria and indirectly IQ, while not giving enough weight to emotional intelligence-based competencies related to our ability to manage ourselves, and our relationships with others. The problem with the screening process involves two types of errors. First, there is the risk of hiring the wrong managers who, despite their academic brilliance, do not demonstrate the required leadership abilities. This "type I" error, *hiring or promoting the wrong candidate*, is obviously to be avoided. However in today's world, where talent is becoming increasingly scarce, the "type II" error should also be avoided, which is the probability of *rejecting the right candidate for the wrong reasons*. I believe that, by adjusting the screening process, Singapore will not only be able to avoid hiring or appointing the wrong candidates, but also able to attract a larger number of highly effective (and

in some cases even more capable) public leaders.

2. **Source more openly.** As in the case of Henry the Navigator, Singapore should realise that some of its best potential public leaders may not necessarily come from internal promotion, but might also be brought in from outside. Sources may include the private sector within Singapore, repatriated Singaporeans and, eventually for some roles, perhaps even foreign nationals. This practice will not only allow for better appointments (since research clearly shows that considering a wide pool of internal and external candidates significantly increases the chances of successful selection), but may even become a necessity if, as I believe, the traditional scholarship process becomes an insufficient or much less reliable source of talent.

3. **Avoid becoming mechanical.** Singapore has led the way in implementing advanced and disciplined people management systems, including the early measurement of potential. At the same time, as Singapore maintains its discipline in these processes and constantly updates them, care should also be taken to avoid the risk of becoming too mechanical in implementation. Singapore has benefited from two generations of dynamic leadership who have demonstrated high levels of purpose and passion. It should now avoid falling into the same trap as some organisations, which fill themselves with brilliant people who carry impressive double degrees yet lack the soul and passion of the foundational leaders. No Human Resource process will work if those at the top lack the highest motivation for making great people decisions. Vision, courage, determination and passion are more important for building human capital than the most clinical, advanced model of best practice.

4. **Make better appointments.** While Singapore is a prime example of what capable leadership can achieve, I believe that the public sector may be better at developing people in their initial career steps than at making great appointments at more senior levels, taking into account the specific challenges of each job and the required fit in terms of competence. Whenever we make an appointment, we need to make a trade-off between the immediate *performance* needs (for which a very significant degree of competence for the specific job is paramount) and the *development*

of the individual (in which case the challenge becomes more important, which implies that there will be a competency gap). Investing too much in the development of individuals at the expense of not making the right appointments in terms of competence has a large opportunity cost, especially at senior levels.

5. **Educate senior leaders for making great people decisions.** Finally, Singapore should also lead the way when it comes to educating their senior leaders for making great people decisions. Great people decisions do not just happen by chance, but by following a proven process to decide when a people change is needed, what to look for in a candidate, where and how to find the best candidates (inside and out), how to assess them, how to attract them, and how to integrate them into the new job. My evidence indicates that most senior leaders in Singapore have not been trained in this key discipline. This is not a problem unique to Singapore, but a telling blind spot in educational systems all over the world, and in most organisations both public and private. When 70% of the value of a typical large organisation comes from intangibles, and knowledge and talent are the most important assets in today's economy, the ability to make great people decisions becomes the key for career success, organisational value, and for building a powerful nation. In spite of what most people think, making great appointments is not an art, the result of an intuition or a gut feeling. Making great people decisions is a craft and a discipline that can be learned and should be learned by the new public leaders in Singapore.

Claudio Fernández-Aráoz is the author of *Great People Decisions* (NJ: Wiley 2007). A Senior Adviser of the executive search firm Egon Zehnder International, he was a member of its Global Executive Committee for over ten years, as well as the leader of its Management Appraisal practice, Professional Development, and the development of the firm's Intellectual Capital. An advisor to several progressive governments, he is a frequent keynote speaker at major business gatherings globally.

NOTES

1. Cited in Blanchard, K. et al., *The One Minute Entrepreneur: The Secret to Creating and Sustaining a Successful Business* (New York: Doubleday, 2008).
2. Fernández-Aráoz, Claudio, "Obama's First Priority: Hiring the Right People", BusinessWeek online, 7 November 2008
3. Neo, B. S. and Chen, G. *Dynamic Governance: Embedding Culture, Capabilities and Change in Singapore* (Singapore: World Scientific Publishing, 2007): 13.
4. Black, J. Stewart, "Waging and Winning the War for Talent in Asia", in *Leadership in Asia: Challenges and Opportunities* (Singapore: McGraw-Hill, 2010).

Koh Eng Chuan

Phases of Singapore's Demographic Development Post-World War II

An emerging phase of demographic development brings new challenges for Singapore.

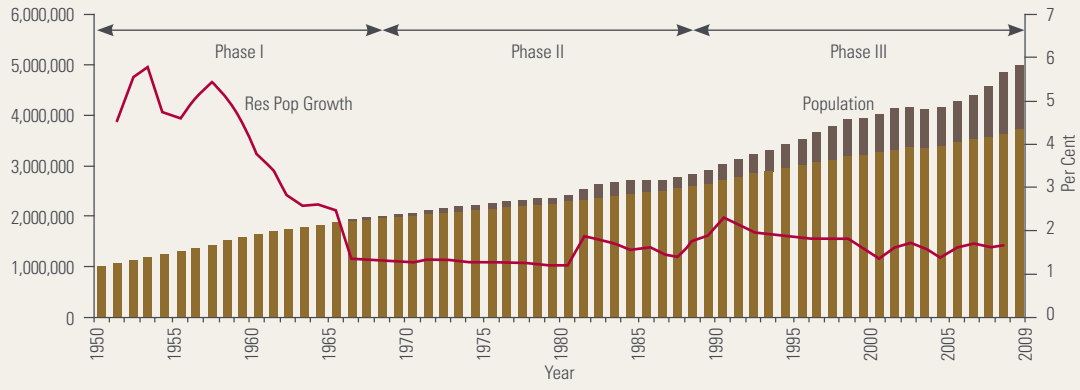
INTRODUCTION

From a population of 1 million in 1950, Singapore's resident population, comprising citizens and permanent migrants, has grown more than three and a half times to 3.7 million in 2009 (5.0 million, if foreigners with permits[1] are included). Singapore's demographic change from the late 1940s can be differentiated into *three phases*

TABLE 1. CHARACTERISTICS OF SINGAPORE'S DEMOGRAPHIC PHASES

	PHASE 1	PHASE 2	PHASE 3	PHASE 4
	1940s–1960s	1970s–1980s	1990s–2000s	Current
Fertility	High	Declining	Low	Lowest low
Mortality	High	Declining	Low	Lowest low
Migration	High	Low	High	High
Population Growth	From births and migration	From births	From births and migration	From migration
Population Policy	None	Anti-natalist	Pro-natalist	Pro-natalist

FIGURE 1. POPULATION AND GROWTH, 1950-2009



Resident Population

Foreign Population (i.e., non-Singapore citizens and non-PRs)

1990 and onwards refer to de jure population. 1991 and onwards refer to de jure growth. 2003 de jure population revised, 2003 population growth rate refers to unrevised growth rate.

Source: Report of Births and Deaths 2008, Immigration and Checkpoints Authority.
Population Trends 2009, Singapore Department of Statistics.
Author's estimations of foreign population from 1965-1980, using 1965, 1970 and 1980 as benchmark years.

characterised by distinct population trends and socioeconomic developments, with a fourth phase now emerging.

FERTILITY DECLINE REGARDLESS OF POLICY

Throughout Singapore's various demographic phases, direct measures had been put in place to modify fertility behaviour. Some have contended that the anti-natalist policies carried out by the Singapore Family Planning and Population Board played an important role behind our sharply falling fertility,[2,3] and some have noted that Singapore was seen as a "role model for government fertility control" programmes[4] in the days when the global attention was on reducing fertility for the sake of sustainable development. Yet others have viewed Singapore as having "succeeded too well", with "unintended consequences".[5] While selected individuals might have been influenced in their fertility decisions, it was more likely that government policies had acted as a catalyst in hastening a fertility transition which would have taken place even without direct intervention.

> Fertility had begun to fall even before the family planning measures were put in place.

Three observations support this view. Firstly, *fertility had begun to fall even*

before the family planning measures were put in place.[6,7] Total Fertility Rate (TFR) had fallen from a peak of 6.56 in 1957 to 4.62 in 1965, before the government set up the Singapore Family Planning and Population Board in 1966. This suggests that even prior to Independence, women were already making a conscious decision to reduce fertility either through traditional family planning methods, or through the limited family planning services made available by the voluntary Singapore Family Planning Association.

Secondly, *even with the reversal to a pro-natalist policy supporting childbearing from the late 1980s, fertility did not rise from its low levels*. The socioeconomic case for having a small family had become so strong that despite three rounds of measures by the Government,[8] fertility remained below 1.3 from 2003 to 2008. A well-educated population, ample job opportunities and expectations to work hard in a highly competitive environment had created strong forces making small families advantageous. Actualising any desire for a large family remained impractical for most.

Changes in the population, society and economy were already leading to a reduction in the number of children couples would have.

Thirdly, we observe that *most low fertility societies around the world* (for example, Spain, Italy, Germany, but also Hong Kong and Japan) *did not have anti-natalist population policies to push fertility down*. What most of these societies had in common were a well-educated population or a rapid rise in the education profile of women, increasing ages at marriage and childbearing, and an economy that had been successful in creating jobs for its people.[9] Observers[10,11] have noted that socioeconomic conditions could already have provided a favourable basis to the success of family planning programmes. While family planning policies are likely to have contributed to Singapore's pace of fertility decline, they are secondary to the fact that changes in the population, society and economy were already leading to a reduction in the number of children couples would have.

Lesthaeghe[12] has suggested that the post-modernist values of industrialised countries have resulted in an environment favouring continued low fertility, leading such countries into a Second Demographic Transition.[13] Lesthaeghe emphasises ideational changes—society and individuals influencing one another—that affect demographic behaviour related to the formation/dissolution of unions, marital/non-marital fertility behaviour; shifts towards individualism and self-

fulfilment as higher order needs; and the formation of new societal norms. The role of men and women as economic agents in the commercial economy are not directly compatible with the role of mothers and fathers at home.[14] With demands on limited time, trade-offs have to be made.

Singapore appears to have entered this Second Demographic Transition. With lifestyle changes, employment opportunities, economic progress and social development, couples *have* fewer children, no matter how much they *desire* children. Fertility is unlikely to rise now or in the future without some fundamental and large-scale changes.

A FOURTH PHASE: NET MIGRATION TAKING OVER NATURAL INCREASE AS THE MAIN SOURCE OF POPULATION GROWTH

Arising from a rapidly ageing population, continued low fertility and need for migrants,[15] a fourth phase of Singapore's demographic development is emerging. A key characteristic of the fourth phase is that the main source of population growth in Singapore will shift more and more from natural increase to net migration.[16] This is to be expected, as the Crude Death Rate is also likely to increase in the coming years as the baby boomers reach age 65 and above, and mortality starts to set in. Natural increase (i.e., births minus deaths) would fall towards zero with Singapore's below-replacement fertility, and migrant inflows will be needed to maintain population growth. The implications are discussed below.

> Net migration will take over natural increase as the main source of population growth.

Addressing Lowest Low Fertility

Comparing attempts to address low fertility, one key difference between the experiences of East Asian countries and the Nordic countries, is the availability of comprehensive and quality state-provided childcare in the Nordic states. Arguments have already been made in Singapore to lower the formal age of education. As well as promoting early childhood educational development, this also reduces parents' burden in raising children and frees them to pursue careers, personal interests, and have more time with each other. One way to implement this is to take an opt-out approach, so that state-provided childcare becomes a societal norm rather than an exception. Opting-out also allows flexibility for some families who may prefer themselves or grandparents as primary caregivers.

Moving towards comprehensive, accessible and quality childcare for all

will take time and resources, and will require a full review of current pro-natalist incentives and initiatives. It is worth considering how else the state can help working parents to reduce the burden of childrearing, given that ideal family size is in fact much higher than total fertility rate.[17]

Immigration

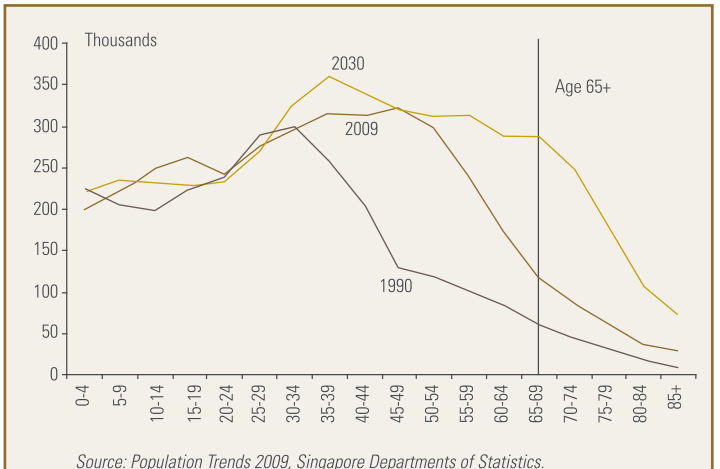
In the third phase of demographic development, both permanent and temporary migration had been utilised to supplement the local population and workforce in the form of "replacement migration".[18] This strategy will continue into the fourth phase, even if the inflow of foreign workers and immigrants is expected to be moderated.

Integration of migrants will be a key area of focus in the coming years,[19] particularly if Singapore will have to depend more and more on migrants for population growth with natural increase declining. While it has been argued before that Singapore was a migrant society to begin with, it should be noted that there were communal goals among the diverse population at the time of Independence, and some sense of shared identity today after 44 years as a nation. This is an important difference from the migrants of today, who may be entering society without the same sense of shared communal values.[20] Do they integrate and adapt; do they preserve their own immigrant identity and work within their enclaves; do they change the current shared values; do they enrich Singapore as a cultural melting pot—these are issues which need to be further reviewed.

Social and Age Structural Shift

The combined effect of low fertility and sustained migration will also mean that Singapore will undergo a huge age structure shift in the population. While this has been in the background for the third phase of demographic development, pronounced changes

FIGURE 2. POPULATION AGE STRUCTURE, 1990, 2009 AND 2030



Source: Population Trends 2009, Singapore Departments of Statistics.
Figures for 2030 based on correspondence with Singapore Department of Statistics

would only come after the post-war baby boomers reach age 65 years (Figure 2). The intake of permanent migrants in working ages from 1990 (third phase of demographic development) onwards will also start to reach age 65 from about year 2030, and will further raise the numbers of elderly in the population.

> Permanent migrants in working ages from 1990 will start to reach age 65 from year 2030 and will further raise the numbers of elderly in the population.

With fertility below 1.3 and the new birth cohorts in the current 35,000 to 40,000 in the foreseeable future, the age structure imbalance will be accentuated. Singapore's dependency ratio will rise quickly in the near future, with the old dependency ratio overtaking the young dependency ratio in the future.

Singlehood proportions are high at about 13% to 15% for residents aged 40–44 years.[21] Proportions of those with zero or one child among ever-married resident females are rising. In 2008, 8% of those aged 40–49 years have no children, while 18% have only one child. The large increase in the elderly and the low numbers of children in the local population will eventually cause strains at the family level and add pressure to current social structures. Single or widowed elderly without children or near kin may have difficulty even in engaging and managing domestic helpers to look after them. The State may have to be prepared to come in on a larger scale at some point.

RAISING FERTILITY IS THE MORE SUSTAINABLE SOLUTION

As with the other earlier phases, the fourth phase of demographic development in Singapore will bring new challenges to policymakers. Raising fertility would solve its own problems, and would be a more sustainable long-term solution. The Prime Minister announced additional procreation incentives during the National Day Rally in August 2008. While a large increase in fertility to 1.5 remains an optimistic target, it remains to be seen how much the population will respond to the additional procreation incentives, and whether further measures or social trade-offs will have to be made.

Dr Koh Eng Chuan is Director of the Income, Expenditure and Population Statistics Division in the Department of Statistics, Ministry of Trade and Industry. He has a PhD in Demography from the Australian National University. His areas of interest are in marriage and fertility studies, as well as population trends and movements. He is also a visiting affiliate of the Asia Research Institute, National University of Singapore. The views expressed in this article are his own.

NOTES

1. Includes temporary professional and skilled workers, domestic workers, foreign students and social visitors with permits who stay for certain periods of time.

2. Wan, F. K. and Saw, S. H. "Knowledge, Attitudes and Practice of Family Planning in Singapore." *Studies in Family Planning* 6 (1975):109-112.

3. Yap, M. T. "Fertility and Population Policy: The Singapore Experience." *Journal of Population and Social Security (Population)*, Supplement to Volume 1 (2003): 643-658.

4. Lee, S. M., et al. "Fertility Decline and Pronatalist Policy in Singapore." *International Family Planning Perspectives* 17 (1991): 65-69+73.

5. Anderson, B. "Unintended Population Consequences of Policies." *Population and Environment* 25 (2004): 377-390.

6. Chang, C. T. *Fertility Transition in Singapore* (Singapore: Singapore University Press, 1974).

7. Fawcett, J. T. and Khoo, S E. "Singapore: Rapid Fertility Transition in a Compact Society." *Population and Development Review* 6 (1980): 549-579.

8. Including tax reliefs and rebates, baby bonuses, paternity leave, increases in childcare places and subsidies, paid maternity leave for the third child, increases in the length of maternity leave, etc. in 1987, 2001 and 2004.

9. Atoh, M., et al. "The Second Demographic Transition in Asia? Comparative Analysis of the Low Fertility Situation in East and South-East Asian Countries." *The Japanese Journal of Population* 2 (2004): 42-75.

10. Fawcett and Khoo (1980), and similarly Atoh, et al. (2004:47).

11. Ridker, R. G. "Desired Family Size and the Efficacy of Current Family Planning Programmes." *Population Studies* 23 (1969): 279-284.

12. Lesthaeghe, R. "The Second Demographic Transition in Western Countries: an Interpretation," in *Gender and Family Change in Industrialised Countries*, eds. K. Mason and A. Jensen (UK: Oxford Clarendon Press, 1995): 17-62.

13. Van de Kaa, D. J. "Europe's Second Demographic Transition." *Population Bulletin* 42 (1987): 1–57.

14. McDonald, P. "Theories Pertaining to Low Fertility." International Union for the Scientific Study of Population Working Group on Low Fertility. Tokyo, 21-23 March 2001.

15. Wong, K. S. "DPM's Speech at the Committee of Supply. Prime Minister's Office, Sep 2004. http://www.mha.gov.sg/news_details.aspx?nid=NDU1-7sGu7w8ImQU%3d, accessed 28 November 2009.

16. In the period 2000-2008, Net Migration (187,400) balanced Natural Increase (181,900). In the near future, net migration would take over natural increase as the main source of population growth. Author's computations of estimates based on Saw, S. H. *Singapore Population in Transition* (Philadelphia: University of Pennsylvania Press, 1970) and *Reports on Births and Deaths*, various years, Immigration and Checkpoints Authority.

17. Sources: *Reports on Births and Deaths*, Immigration and Checkpoints Authority. Reference to "Ideal Family Size" from Yap, M.T., "Population Policies and Programs in Singapore" in *Population Policies and Programs in East Asia*, ed. Andrew Mason (Hawaii: East-West Centre, 2001); reference to "Ideal Family Size 2007" based author's survey results based on 754 respondents aged 25 to 39 years.

18. United Nations Population Division. *Replacement Migration: Is It a Solution to Declining and Ageing Populations?* (New York: UNDP, 2000).

19. Ministry of Community Development, Youth and Sports (MCYS). *National Integration Council to Foster Social Integration*. http://www.mcys.gov.sg/MCDSFiles/Press/Articles/15-2009.pdf, accessed 31 August 2009.

20. Yeoh noted that social integration concerns may arise from differences within racial categories as it becomes "inflected by differences in nationality and history". For example, the Chinese community now is not going to be the same as the Chinese community a generation later with the migrants coming in. Yeoh, B. "Migration, International Labour and Multicultural Policies in Singapore." Asia Research Institute Working Paper No 19. February 2004. http://www.ari.nus.edu.sg/pub/wps.htm

21. Singapore Department of Statistics 2009. Population Trends 2009. http://www.singstat.gov.sg/pubn/catalogue.html#demo, accessed 30 November 2009.

Tan Yong Soon

Sustainable Development: Challenges and Opportunities

Singapore should continue to invest in sustainable development to ensure dynamic growth and a liveable environment for the future, argues the Permanent Secretary for the Environment and Water Resources.

Given our inherent land and resource constraints, few might have expected Singapore to successfully support the population and economy we have today, much less sustain a city that is modern in infrastructure and function, yet clean and green in character. That we have been able to do so is the outcome of deliberate and forward-looking policies and the adoption of sustainable development principles from the very start of our development.

BALANCING GROWTH AND THE ENVIRONMENT[1]

Although economic development was a key national priority during Singapore's early post-independence years, it was never a case of pursuing growth at all costs and cleaning up afterwards. We realised at the same time that

development should not come at the expense of the environment, which is also integral to our quality of life. Despite competing demands for funding, Singapore made early investments in environmental infrastructure—even borrowing US$25 million from the World Bank to build its first incineration plant in 1973. We adopted a long-term horizon for planning and integrated environmental considerations upfront into our development and building control processes.

> The debate between economic development and environment protection is outdated: cities need to pursue both.

Singapore has also been prepared to make hard policy decisions to uphold environmental standards, sometimes even risking foreign direct investment. When the former Head of the Civil Service, Mr Lee Ek Tieng, was head of the Anti-Pollution Unit (APU), there was a case where a large multinational corporation (MNC) wanted to build a petrochemical facility in Singapore, but was not prepared to pay for a ground furnace to reduce pollution. The MNC appealed to the Economic Development Board against APU's policy, but the Prime Minister concurred with APU that preventive measures were better than cleaning up retroactively. The appeal was rejected and the company had to install the ground furnace.

Singapore's environmental achievements would also not have been possible without a search for innovative solutions to stay ahead of fresh challenges. Our first water reclamation pilot plant, built in 1974, established that high-quality drinking water could be produced from treating used water. As membrane technologies were in the early stages of development, the pilot plant was subsequently decommissioned. Nevertheless, the Environment Ministry and the Public Utilities Board continued to keep tabs on the technology, and this paved the way for the launch of the successful NEWater demonstration plant in 2000.

Our commitment to environmental protection extends to the shared global environment. Since 1989, Singapore has been a party to the 1987 Montreal Protocol, which aims to protect the ozone layer by eliminating the production and use of ozone-depleting substances (ODS). We acceded to the Protocol despite significant trade implications on our economy (which was dependent on chemical industries—relatively large users of ODS), even though our geographical location meant we would not have been directly impacted by the ozone problem.[2]

Reaping the Benefits

We have reaped the benefits of our early actions and consistent efforts. Today, Singapore is ranked Asia's most competitive economy[3] and the most liveable city in Asia,[4] an example of a city that is both economically vibrant and environmentally liveable. We continue to harvest more gains from foresighted long-term environmental investments in the past. Singapore's S$300 million, 10-year programme in 1977 to clean up the polluted Singapore River has led to a vibrant, revitalised waterfront, which laid the foundations for the development of the Marina Barrage and an urban reservoir.

> As the world turns towards a low-carbon growth path, new business opportunities, jobs and technology spin-offs will open up.

We have also been able to share our environmental expertise with others. For instance, China is now collaborating with Singapore to build an Eco-city in Tianjin, China, which aims to be a model of sustainable development for other cities in China. The goal is to transform an otherwise sterile site into a thriving and vibrant city, where ecological rehabilitation is sensitively balanced with urban development. Singapore's proven successes in water management and recycling will allow us to contribute to devising water solutions for the Eco-city.[5]

SUSTAINABLE DEVELOPMENT: CHALLENGES AND OPPORTUNITIES

Singapore has been practising sustainable development before the Brundtland Commission[6] coined the now oft-quoted phrase. Since the release of the Brundtland Report in 1987, however, sustainable development has become a central issue in global discourse, due to several emerging challenges.

First, the world's population is growing rapidly and most of this growth will take place in cities.[7] Cities are particularly vulnerable to environmental challenges due to their high population density. Singapore's own population also grew from 4 to 4.84 million in less than a decade, and is set to grow further in the future. Such growth will place heavier demands on limited resources, and increase the potential for pollution if development is not managed well.

Second, increased demand and competition for scarce resources such as energy, water and food will put upward pressure on resource prices. Singapore is highly dependent on imported resources and has to be able to do more with less if we want to continue to grow in the future.

Third, climate change and its potential impact[8] is a phenomenon that Singapore cannot afford to take lightly, since it will not be spared from its direct or indirect effects. As a responsible member of the international community, Singapore must contribute to collective efforts to fight climate change.

While these present significant challenges to sustainable development in Singapore and around the world, there are also opportunities. As the world turns towards a low-carbon growth path, new business opportunities, jobs and technology spin-offs will open up. HSBC estimates that low-carbon products and services[9] already generated more revenue than the global aerospace and defence sectors in 2008, and that revenue from the low-carbon sector could exceed US$2 trillion by 2020. A 2009 report by the PEW Charitable Trusts indicated that the growth of green jobs outstripped overall jobs by over 5% in the US.[10] The Harvard Business Review's September 2009 issue[11] also makes the case for businesses to focus on sustainability, noting that by treating sustainability as a driver of innovation, companies can reap both bottom- and top-line returns.

THE WAY FORWARD

How can countries and cities address the challenges to sustainable development while making the most of its opportunities? One key strategy is to conserve resources and use them efficiently, since resources will get scarcer and more expensive. Resource efficiency also boosts economic competitiveness since it reduces costs for businesses in the long run. Singapore has had to become a pioneer in making the most of limited resources, because of our physical constraints. In many ways, we are ahead of the learning curve.

Water

Today, one out of six people—more than a billion—do not have adequate access to safe water. The UN projects that, by 2050, as many as three out of four people around the globe could be affected by water scarcity. Water security has always been a key concern for Singapore. While we receive 2,400 mm of rainfall a year, our small land area limits the amount of rainwater we can collect and store. As such, Singapore is classified as water-scarce by the UN.

This disadvantage has compelled us to maximise the sustainability of our limited water resources. Today, we have an adequate and diversified supply to meet the long-term needs of Singapore through our four National Taps—water from local catchments, imported water, NEWater and desalinated water—and we are continually seeking out ways to augment our water resources. For example, the Marina Barrage creates a

reservoir with a catchment of one-sixth the total land area of Singapore. We are also damming up two other rivers in the north-eastern part of Singapore and two-thirds of Singapore's land area will be water catchment by 2011. NEWater closes the water loop and "multiplies" our water supply by producing clean water from treated used water that would otherwise have been discharged into the sea.

NEWater is an example of how leveraging technology has helped Singapore to overcome our resource bottleneck. Our investments in water R&D and technology over the years have nurtured a vibrant water sector in Singapore. We have identified the clean water sector as a growth area and have committed S$330 million to build further capabilities in this sector. This is expected to create S$1.7 billion of value-add and to support 11,000 jobs by 2015. Through our investments, we also hope to catalyse new solutions to address new challenges. For instance, we are seeking to reduce the energy consumption of desalination to support both water sustainability and energy efficiency efforts.

Energy

Looking ahead, Singapore needs to manage energy with the same attention we have paid to water. Global concern over climate change will increasingly see the emergence of a carbon-constrained world. The exploitation of traditional energy sources such as oil and gas could be curtailed by various geo-political and economic considerations. Many countries are today exploring the development of alternative energy sources such as hydro, geothermal, wind and solar. Although Singapore is also exploring clean or renewable energy, we face many constraints in exploiting alternative energy sources. Most forms of alternative energy are generated in situ. Unfortunately, Singapore's wind speed is too low for viability, and we lack access to either hydro or geothermal sources.

> Singapore needs to manage energy with the same attention we have paid to water.

Solar energy is the most promising renewable resource for Singapore. However, the cost of solar-generated electricity is still about twice that of grid electricity generated from fossil fuels. Our approach is therefore to invest in solar research and test-bedding, to prepare for wider deployment when the cost of solar electricity falls. For example, the Housing and Development Board is embarking on a S$30 million project to test solar technology on the roofs of our public housing developments island-

wide. The National Research Foundation has also allocated S$170 million to build up R&D and manpower capabilities in clean energy. In addition to providing solutions for Singapore's energy needs, the clean energy sector is projected to add S$1.7 billion to GDP and create 7,000 jobs by 2015.

Deploying renewable energy resources is not the only tool to mitigate energy constraints. For an alternative energy disadvantaged country like Singapore, using energy more efficiently is as, if not more, important. By optimising energy use and conserving energy where we can, we reduce costs and increase overall competitiveness. Energy efficiency is also a key means to reduce greenhouse gas emissions. An International Energy Agency study showed that 11 member countries, which engaged in energy efficiency initiatives, achieved US$1.1 trillion (based on 2006 prices) of energy cost savings in 2006 alone.[12]

> Cities that are good homes for their residents are also attractive to mobile global talent and investments.

Singapore has ramped up efforts to improve national energy efficiency. Our target is to improve our energy intensity by 35% from 2005 levels, by 2030. As energy use is pervasive, we have adopted a holistic approach to improve energy efficiency across all key sectors of energy use—buildings, households, transport, industry and power generation. Thus far, we have focused on raising awareness of the benefits of energy efficiency, incentivising the adoption of energy efficient practices and building expertise in energy management. Going forward, we will need to do more by setting higher standards and leveraging fiscal tools to encourage energy conservation. For instance, the experiences of countries like Japan and Denmark are instructive: they attained high levels of energy efficiency and conservation through a holistic suite of policies including legislation, which sets minimum standards and requires the monitoring and reporting of energy data, energy taxes and the provision of incentives to kick-start industry development and R&D.

A SUSTAINABLE SINGAPORE

Singapore's broad strategies to ensure sustainable development for future decades have been set out in the Sustainable Singapore Blueprint,[13] which was released in April 2009. To continue to sustain both a dynamic economy and a liveable environment, improving resource efficiency and

building capability are key. In addition, we must continue to invest in enhancing our environment and build an environmentally responsible community.

Cities that are good homes for their residents are also attractive to mobile global talent and investments. International quality of life and employment conditions surveys highlight that environmental factors such as air quality and water potability are key considerations for talent. As such, the debate between economic development and environment protection is outdated: cities need to pursue both. Recognising this, leading cities around the world, such as New York and London, have embarked on plans to improve their environment and develop more sustainably.

Singapore must likewise continue to improve our environment, by investing in improvements in our air and water quality, as well as cleanliness and hygiene standards—the fundamental building blocks of a good quality of life—especially as our population and economy continue to grow. While emissions standards must be set, taking into consideration the availability and cost of measures to reduce pollution, the short-term cost of abatement measures must be compared to the long-term repercussions of environmental degradation and our economic competitiveness.

The Blueprint sets the roadmap for our sustainability efforts ahead and is a work-in-progress. It represents the government's efforts to catalyse change in the public, private and people sectors. We are currently studying enhanced measures to reach our targets more quickly and, if possible, to do more. However, investing in hardware, such as technology and infrastructure, and putting in place supporting policies can only carry us to a certain point.

Achieving our sustainable development goals requires adjustments in lifestyles and industry practices: individuals must embrace more environmentally responsible habits as a way of life, while businesses must improve resource efficiency by adopting new systems and processes, which reduce the environmental impact of their operations where possible. The public sector also has a role to play in setting the pace and demonstrating the benefits of environmental sustainability.

As a land- and water-scarce city-state, Singapore has had to overcome many constraints to enjoy the clean environment and quality of life we have today. With the continued growth of the global economy and population, and our own domestic growth, ever-increasing resource pressures necessitate a renewed emphasis on sustainable development. We do not have all the answers; there

will be trade-offs to be made and dilemmas to be faced. These will require more creative management of resources and the development of more innovative solutions. While there may be some cost to conserving and improving the environment, there is a greater cost to inaction. Our collective efforts towards a more sustainable Singapore are crucial to fuel new areas of economic growth and secure a better home for future generations.

Tan Yong Soon is the Permanent Secretary of the Ministry of the Environment and Water Resources, Singapore. He has served as Principal Private Secretary to the Prime Minister, Deputy Secretary in the Ministry of Defence and the Ministry of Finance, and CEO of the Urban Redevelopment Authority. Mr Tan holds a BA (Hons) and an MA in engineering from Cambridge University, an MBA from the National University of Singapore and an MPA from Harvard University.

The author would like to thank his Ministry colleagues Karen Tan and Diana Ng for their assistance in the preparation and research for the article.

NOTES

1. This section draws from the book: Tan, Y. S., Lee, T. J. and Tan, K. *Clean, Green and Blue: Singapore's Journey Towards Environmental and Water Sustainability* (Singapore: Institute of Southeast Asian Studies, 2008).

2. Singapore managed to phase out the use of ODS by 1996, ahead of the schedule prescribed by the Montreal Protocol, and was presented the Outstanding National Ozone Unit Award by the United Nations Environment Programme (UNEP) in 1997.

3. World Economic Forum Global Competitiveness Report 2009.

4. Mercer Quality of Living Survey 2009.

5. The site chosen for the Eco-city is in an area consisting largely non-arable land, including salt farms and vacant land, and experiencing water shortages and low rainfall. To overcome these constraints, the Eco-city will have to draw a significant part of its water supply (the target is at least 50%) from non-traditional sources such as recycled water and desalination.

6. The Brundtland Commission (or the World Commission on Environment and Development) was convened by the United Nations in 1983 amidst growing concerns about environmental deterioration and the impact of this on economic and social development. It defined the term "sustainable development" as that which "meets the needs of the present without compromising the ability of future generations to meet their own needs" in their 1987 Report.

7. More than half the world's population already lives in cities and the United Nations (UN) estimates that between 2007 and 2050, our population will increase by 2.5 billion to reach 9.2 billion, with almost all the growth accounted for by urban areas (World Urbanisation Prospects, 2007 Revision, UN.)

8. The Intergovernmental Panel on Climate Change (IPCC)'s 4th Assessment Report projects that global temperature could increase by up to 6.4°C, and global mean sea level could rise by up to 59 cm by 2100 (from globally averaged levels between 1980 and 1999). Some experts suggest that these scenarios understate the worst-case possibilities since the Report excludes the impact of melting ice sheets.

9. HSBC includes renewable energy, nuclear energy, energy management, waste and water companies in the sector. See "Low-carbon industries come of age", Financial Times, 17 Sept 2009, http://cachef.ft.com/cms/s/0/1860382a-a3b0-11de-9fed-00144feabdc0.html.

10. Clean energy economy jobs in the US grew by 9.1% between 1998 and 2007, compared to total job growth of 3.7% in the same period. The clean energy economy is defined by the PEW report to include clean energy, energy efficiency, environmentally friendly production, conservation and pollution mitigation as well as training and support. See "The Clean Energy Economy—Repowering Jobs, Businesses and Investments Across America," PEW Charitable Trusts, 2009.

11. Nidumolu, R., Prahalad, C. K. and Rangaswami, M. R. "Why Sustainability Is Now the Key Driver of Innovation", *Harvard Business Review,* September 2009.

12. These countries also avoided about 5 Gt of CO_2 emissions in 2006, equivalent to global emissions from the industrial sector (not including the energy supply sector) in that year. See "Towards A More Energy Efficient Future—Applying indicators to enhance energy policy," International Energy Agency, 2009.

13. The Blueprint was issued by the Inter-Ministerial Committee on Sustainable Development, which comprises Ministers from the Ministries of National Development, Environment and Water Resources, Finance, Transport and Trade & Industry. The Blueprint can be downloaded at www.sustainablesingapore.gov.sg.

Erratum

In "Staying Ahead of the Game" by Bernard Nee and Julia Yap published in ETHOS Issue 6, July 2007, Note 2 on page 47 should read "2. All quotes are from Mr Lim Siong Guan, Chairman of EDB from October 2006 to June 2009" instead of "June 2006".

The publisher apologises for the error.

Ethos is a biannual publication of the Centre for Governance and Leadership, Civil Service College.

It aims to provide thought leadership, insight and context on a wide range of public policy issues of interest to Singapore.

Ethos is circulated to the policy-making community in Singapore as well as to a select international readership.

It is also available online at: **www.cscollege.gov.sg/ethos**

Centre for Governance and Leadership
31 North Buona Vista Road
Singapore 275983

WORLD CITIES SUMMIT

World Cities Summit 2010

Liveable & Sustainable Cities for the Future

28 – 30 June 2010 • Singapore
www.worldcities.com.sg

World Cities Summit is a premier event that brings together practitioners and policy makers with leading experts in their field to identify innovative solutions to the most pressing challenges facing cities today. The inaugural Summit in June 2008 brought together 800 senior delegates including leaders, mayors, policy makers and the civil society. To build on its success, the next Summit in 2010 will offer a strategic platform comprising a high-level summit, plenary sessions and technical workshops.

For more information on World Cities Summit 2010 conference and exhibition, please visit www.worldcities.com.sg, email info@worldcities.com.sg or call +65 3106 7168 / 7268 / 7152

Organised by:

CENTRE for LiveableCities SINGAPORE

Civil Service College Singapore

Supporting Singapore Government Agencies:

A*STAR, Building and Construction Authority, Economic Development Board, Housing and Development Board, International Enterprise Singapore, Land Transport Authority, Lee Kuan Yew School of Public Policy, Ministry of Foreign Affairs, Ministry of Information, Communications and the Arts, Ministry of National Development, National Environment Agency, National Parks Board, PUB – The National Water Agency, Singapore Tourism Board and Urban Redevelopment Authority

Highlights of World Cities Summit 2010

The **Lee Kuan Yew World City Prize** is a biennial international award to recognise individuals and organisations that have made outstanding contributions to the creation of vibrant, liveable and sustainable urban communities around the world. It seeks to recognise individuals and organisations responsible for urban initiatives that display foresight, good governance or innovation in tackling the many urban challenges faced by cities.

The **World Cities Summit Expo**, from 28 June to 1 July 2010, is a new platform to showcase model cities and innovative urban solutions that enhance economic value whilst addressing environmental challenges. Over 2,000 trade visitors are expected to attend the cities expo which is a global marketplace for urban solutions.

Learning Journeys are interesting site visits that highlight in-depth perspectives on how policies and ideas can be implemented successfully. Hosted by diverse public sector agencies in Singapore, these visits will give a behind-the-scenes look at specific issues while providing unique, practical learning experiences for delegates.

World Cities Summit 2010 is co-located with the **Singapore International Water Week 2010** that runs from 28 June to 2 July 2010 and the **World Urban Transport Leaders Summit** happening from 30 June to 1 July 2010.