Features of effective systemic foresight in governments around the world

SCHOOL OF INTERNATIONAL FUTURES

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Executive Summary

Background

Strategic foresight, or foresight, is an organised, systematic way of looking beyond the expected trajectory towards the future to engage with uncertainty and complexity. It is one of a number of approaches that can help decision-makers to create better policy and strategy in the face of unpredictable change and evolution.

Foresight is not new, governments, private sector and non-profit organisations have been using foresight approaches for many decades. However, there is a limited evidence base on the impact of foresight work. The majority of case studies that are available focus on how specific projects or units have used foresight rather than how governments as a whole have done this.

This project has taken a broader approach to explore how different governments have developed their foresight ecosystems over time and to map the features that can support integration of long-term thinking into policy-making at the most strategic level.

It aims to provide a guiding framework to build and sustain foresight in policy-making and to do so in a way that creates long-term impact from futures work.

It builds on work undertaken by the School of International Futures (SOIF) on behalf of the Government Office for Science, in particular:

- case studies of how eight countries integrate foresight in a comprehensive way across policy-making, drawing on a high-level literature review and semi-structured interviews: Canada, Finland, Malaysia, Netherlands, New Zealand, Singapore, the United Arab Emirates and the United States

- a workshop with leading foresight practitioners from across the world, including those that have built and led systems within the policy-making sphere

- SOIF's own knowledge and expertise working to deliver foresight with impact across more than 50 organisations including multiple international bodies such as the UN, WHO and EU.

This project focused on how to ensure a sustainable, effective system of strategic foresight within a government. It is not a toolkit or guidance note for the methods and approaches to take in a foresight project. There are a number of resources for this, including GO Science's own Futures Toolkit.

[1] Government Office for Science (2017) Futures Toolkit: tools for strategic futures for policy-makers and analysts. Edition 1.0.

Key findings

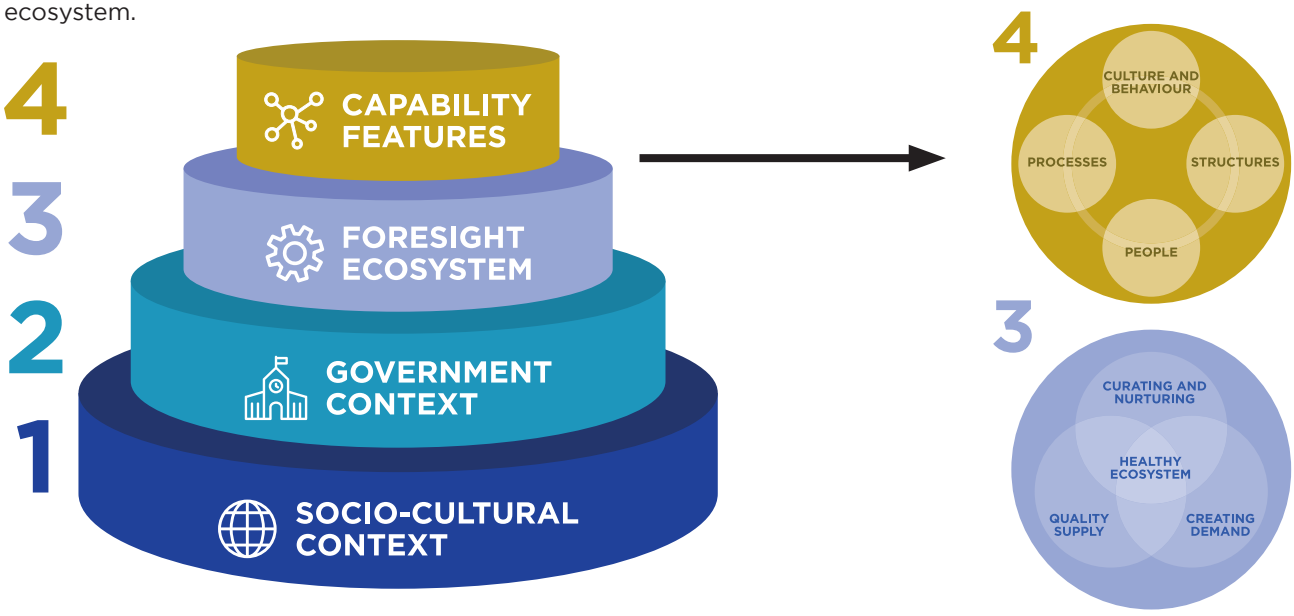
There is no silver bullet for creating effective sustainable foresight in government. Considering foresight as an "ecosystem" that includes the socio-cultural and political context of that nation is critical to ensure lasting integration into policy-making (see figure 1). Focusing on a unit or department can enhance the value of specific projects or teams. Our research suggests that more needs to be done to create sustainable long-standing foresight capability that ensures foresight work makes the strategic contribution that it can.

There is a common set of features that have helped countries to build future-oriented, resilient and adaptable foresight ecosystems. These features need to be seen as mutually reinforcing and reliant ingredients that together provide the type of ongoing, long-term thinking required of today's policy-making. They include culture and behaviours, systems, processes and people.

Different countries have experimented with investment across these features to build healthy foresight ecosystems. No one nation has all of these features and none on its own is sufficient for a sustainable foresight ecosystem. The best mix for any particular country will depend on what is already in place, where there is appetite for activity and which aspects of the foresight ecosystem are most in need of development.

A healthy foresight ecosystem creates demand for futures work, ensures quality supply, and nurtures itself. The research suggests that this requires coordination between all of the actors in a government system; gaps between parts of the foresight ecosystem undermines its strength and sustainability. Developing the ecosystem can, and should be, done in phases. Those seeking to develop or enhance foresight capacity do not need to tackle the whole ecosystem at once. Instead, the ecosystems approach allows for policy-makers working across government, or within particular units to make strategic and culturally appropriate choices about where to intervene or invest in what is often a long journey to sustainable, impactful foresight work.

Figure 1. An ecosystems approach to foresight. The foresight ecosystem (light blue) is nested in the government and socio-cultural contexts. This ecosystem is enabled through a set of capability features that can be considered at all levels: at the system level, the department, team or individual levels, to help build and sustain the foresight ecosystem.



Features of an effective foresight ecosystem

The four capability features are summarised in this section and in figure 2. Section 4 explores each of these in much more detail, including providing examples drawn from the case studies, the UK and elsewhere. They should evolve unique to the political and social context of a given nation.

1. Culture and behaviour

Culturally, effective foresight ecosystems and their leaders focus on creating commitment to their work from within their own field and from the wider policy landscape. One of the most effective ways to do this is by bringing policy-makers into foresight activities to engender shared buy-in and ownership.

2. Processes

Effective foresight ecosystems have a (small) number of set piece activities that tend to articulate a range of cross-cutting trends and their macro impact, providing policy-makers with a common framework from which to start. They develop their own work, bringing new ideas into the discussion and they work across all the levers in a government system to encourage and at times demand long-term thinking, including using legislation and legal precedence. They draw on diverse methods and involve a wide range of disciplines in the work for diversity of thinking and variety in engagement and participation. They invest in ongoing research and innovation around tools, techniques and methods for foresight, especially participatory and voice-based approaches that enhance the involvement of the public.

3. Structures

All of the systems we looked at, with the exception of the United States, have central units as part of their ecosystem (and the US government is so big that units within departments or branches of government play this role). They also have capacity in departments, including most frequently the defence departments and in science and technology. More developed systems engage beyond the executive, but in all nations there is still more to do here.

There are few examples of structures in the legislative branches of government and even fewer in the audit arena, although more attention is being paid to how these functions can be leveraged to encourage the use of foresight in policy-making. In some countries, the judiciary is becoming more activist about the future in what it adjudicates on and what decisions it takes. Successful foresight ecosystems also resource foresight capability inside the system and in arm's length bodies.

4. People

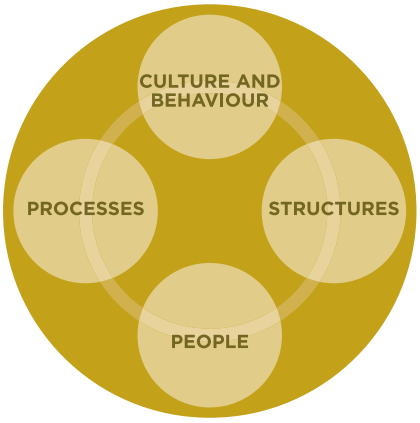
Effective foresight ecosystems ensure they have the right skills and resources. Some systems invest in the development of the next generation of long-term thinking policy-makers both in their pre-employment education and in their on-the-job training. Sometimes champions with visible single leadership are critical to sustained foresight activity. This has provided support, drive and cover in systems which otherwise may have had limited demand, or an inability to connect supply with demand.

Building effective ecosystems

As noted above, these features never exist all at the same time in one system. The context changes, the priorities of governments change over time. For those interested in ensuring that foresight is – and remains – integrated into a policy-making process, these features above are choices about where to focus and should be framed by the wider context of that government and nation. Collectively they can help build capacity and sustain foresight activity through cycles of interest and promote long-term decision-making.

This review took place during the COVID-19 pandemic, which formed an unavoidable backdrop to considerations about where next for foresight in government. In the case studies and workshop we found a mix of assessments of the pandemic's impact on foresight ecosystems. These ranged from a radical increase in demand for foresight work to a significant retrenchment at the expense of long-term planning. It was noted that despite pandemics being identified as a key issue in many foresight and other planning exercises, there was a failure to integrate, act or sustain attention with their implications not fully understood or integrated into policy. By building out the foresight ecosystem, the ambition is to institutionalise the capacity to both detect and critically to act on signals about the future.

Figure 2. Capability features of an effective foresight system. This list is provided as a quick summary of the four features of an effective foresight ecosystem. Section 4 explores each of these in much more detail, including examples drawn from the case studies, the UK and elsewhere.



Culture and behaviour

- focus on creating commitment
- bring policy-makers into foresight
- meet policy-makers where they are
- support short-term work with long-term perspective
- generate shared ownership and buy-in

Structures

- have central units sitting in or near the heart of government
- build and foster capacity in departments and agencies
- work to have courts, elected officials and audit officials involved
- put in place coordinating and sharing groups

People

- make sure that there are in-house skills and capacity
- invest in the development of the next generation
- have visible consistent champions
- support and nurture people working in strategic foresight
- build local and international experts

Processes

- work across all of government and use all government levers
- deliver a small number of set piece activities
- develop their own work
- draw on diverse methods and disciplines
- invest in ongoing research and innovation around strategic foresight

Main report

The rest of the document sets out

Section 1 Why consider strategic foresight now

Section 2 Background to the project and the case study approach

Section 3 A foresight ecosystem approach

Section 4 The context for effective foresight work

Section 5 Considerations for the UK government

Section 6 COVID-19 and foresight ecosystems

Annex 1 Contains the case studies.

Annex 2 Lists colleagues who were generous with their time, insight and experience.

Annex 3 Sets out a timeline of UK foresight

Annex 4 Lists the full set of case studies that were considered.

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Section 1. Why strategic foresight, why now?

Strategic foresight is an organised, systematic way of looking beyond the expected to engage with uncertainty and complexity (see Box 1). It is one of a number of approaches that embrace complexity, simplify uncertainty, explore disruption and bring external forces into a policy or strategy frame.

Thinking about the future has always been an implicit part of strategy and policy-making. However, doing so in a structured, comprehensive, participatory way using the proven tools of strategic foresight is less widespread. Historically, foresight was a more niche practice, largely inaccessible to non-experts. Over the last 20 years, its visibility and credibility has been growing, adopted by governments from Finland to Singapore (see case studies), international organisations such as the United Nations, as well as third and private sector organisations such as the International Federation of the Red Cross, Siemens and Shell.

What is strategic foresight?

Strategic foresight facilitates a systematic engagement with the future which embraces complexity and uncertainty. It can also enable communities to shape that same future, while increasing their resilience and adaptability to external shocks. This is true whether a foresight practitioner is working on a single policy area or project, or whether they are seeking to build organisations and systems that can act effectively on the insights provided by a foresight process. It can be used to support policy-making throughout the policy-making cycle. The key difference between more traditional approaches to strategic planning and strategic foresight is one of perspective. Strategic plans typically take the present as their starting point and extrapolate into the future. Strategic foresight starts by exploring the future before thinking about implications for the present. This is a very simple but powerful reframing that disrupts and opens up people's perspectives.

Box 1: Definitions of strategic foresight terms[2]

Foresight: the capacity to think systematically about the future to inform decision making today. It is a cognitive capacity that we need to develop as individuals, as organisations and as a society.

Strategic foresight: an organisational foresight capacity that informs the development of strategy, the development of which happens when there is a critical mass of foresight-aware individuals in organisations.

Futures: an organisational foresight capacity that informs the development of strategy, the development of which happens when there is a critical mass of foresight-aware individuals in organisations.

[2] Adapted from:Maree Conway (2015), Foresight: an introduction A Thinking Futures Reference Guide, Thinking Futures.

While strategies do set long-term targets and project into the future, these tend not to reflect the dynamic, unpredictable and surprising nature of future events. Such strategies also often accept these projections and predictions as necessary outcomes, rather than considering a desirable future and then making decisions today about how to achieve this in the context of emerging trends. Strategic foresight offers valuable methods for exploring potential disruptions, external forces and alternative futures. Importantly they allow leaders to take account of uncertainty and to make plans in the face of what is known and what might be.

The tools, processes, methods and mindsets that form the practice of strategic foresight are varied, but there are some essential elements that are key to an effective exploration of the future: understanding the building blocks of the future (emerging signals, drivers of change, trends, disruptions and shocks), understanding how these interrelate in a system, developing alternative futures and investigating their implications for policy, strategy and decision-making today.

Growing interest in strategic foresight

Strategic foresight is being promoted as an essential capability with growing frequency in publications such as the Harvard Business Review,[3] and by multilateral institutions, such as its use by the OECD to support policy coherence,[4] and by the European Commission, whose 2020 Strategic Foresight Report charts how it is using foresight to support policy-making.[5]

During our research we looked for evidence of the impact of strategic foresight specifically on the policy process. Our interviews suggested that policy-makers themselves can see the value of integrating strategic foresight into their work – but that it is much harder to show direct causal links between a piece of foresight work and a specific policy change. Almost by definition the impact of integrating long-term thinking is felt later, well after the specific work has taken place.

That said, many governments do see the value of foresight in their processes. (see Box 2). For example, Singapore, with one of the longest-standing foresight government capacities, weathered and recovered from the global financial crisis more quickly and fully than other nations. In the private sector, there have also been recent studies that suggest causal links between the maturity of an organisation's foresight capability and its financial sustainability and growth.[6]

And now, the public and private sectors are, understandably, turning to foresight as part of making their strategies and policy decisions more robust and resilient to what comes in the future.

There is much more to be done to integrate strategic foresight into the policy process

In most governments, even those with longer-standing processes, the impact of strategic foresight falls short of its potential.

Demand for long-term thinking is drowned out by the pressures of the day to day. The incentives are not there to think long-term. Those we spoke to

[3] Scoblic, Harvard Business Revier (2020), Learning from the future. How to make robust strategy in times of deep uncertainty.

[4] OECD (2019), Recommendation of the Council on Policy Coherence for Sustainable Development. Legal Instruments.

[5] European Comission (2020), Strategic Foresight – Charting the course towards a more resilient Europe.

[6] Rohrbeck (2017), Corporate foresight and its impact on firm performance: A longitudinal analaysis. doi.org/10.1016/j.techfore.2017.12.013

Box 2: Examples of foresight

The Mont Fleur scenarios Against the backdrop of deep conflict, the Mont Fleur scenario exercise of 1991-2 in South Africa took place at a moment of unification and fear, as South Africans and global observers asked whether the abolition of apartheid would engender civil war, economic populism, or a new beginning. The participants explored 10-year-out scenarios and glide paths, learning from experience in other countries. A cross-party stakeholder group shared the desired vision of the "flight of the flamingo" with wider society through dissemination in newspapers. This scenario described a future where the government's policies were sustainable and the country took a path of inclusive growth and democracy.

UNICEF Child in 2030 UNICEF was a driver for strategic foresight work which was cascaded through country offices and tailored to local circumstances. UNICEF analysed five megatrends with the potential to significantly impact the future for children and the work of UNICEF and its partners. These were: global health crises; inequality and the middle-income trap; the changing nature and scale of conflict; global migration; and the effects of technology on work and education. UNICEF also asked "what if?" questions, including "What if we're wrong?" This "child-centred foresight" practice has been taken out to UNICEF locations worldwide, including in India, where a selection of the key trends was used to create three contextual scenarios presented for discussion. Seventeen important themes were highlighted and distilled into a forward-looking, medium-term action plan in the context of the country programme.

Finland In Finland, the process builds on previous national vision and strategic planning work and is led by the Prime Minister, ensuring buy-in from across the governance system. The Finnish approach looks broadly across the domestic and external policy horizons, internalising the Sustainable Development Goals as a national strategy matter, rather than an issue for developing countries. Sustainable development is seen as a means to engage the whole of society: the public sector, businesses, civil society and citizens. Parliament is involved through the Committee on the Future, a standing committee which has overall responsibility for Finland's contribution to the realization of the Agenda 2030. Since 2017, the Government included the promotion of sustainable development in its Annual Report to the Parliament and established an annual public discussion forum for measuring and taking stock of progress in implementing the 2030 Agenda.

Shell At Royal Dutch Shell, early use of foresight techniques, including scenarios, meant Shell was resilient and prepared for shocks to the market from 1970s onwards, leading to a competitive edge. The key to their success was that the findings fed into decision-making (symbolised by the effective relationship of Ted Newbold and Pierre Wack). The utility of strategic foresight at an organisational level is not only in detecting the signal, but in institutionalising the ability to act on that signal.

suggested that most policy-makers are aware of the need to think long-term, but that this fails to translate into integrating long-term thinking into policy-making for a number of reasons.

The interviews and roundtable suggested a few reasons (See Box 3 for quotes), including:

- The pull of thinking short-term to meet political pressures is often much stronger than the expectation to consider the long-term.
- The forms of data and evidence used in foresight are often different to those that policy-makers are used to. In addition to trends and other quantitative data, foresight often makes use of narrative, qualitative data and other approaches which policy-makers may be less familiar with.
- Long-term thinking requires connected, collective thinking which often cuts across departments and policy areas. Most policy systems operate in relative silos of work and focus on their specific areas of interest. Ownership or leadership of cross-cutting agendas is often unclear or hard to define.
- Policy-makers are often more comfortable with projecting from the past rather than imagining into the future. This is not unique to that profession. In general, people feel more comfortable and able to consider more of what has come before, than they do exploring and integrating new possibilities.

The appetite for long-term thinking is not the only challenge that foresight ecosystems face. Even with an appetite for foresight, there is still the need to integrate insight into the policy process, whether by considering multiple potential futures or making changes to policy to take account of long-term implications.

Long-term existential threats such as climate change are also starting to bring about some changes in the way that policy-makers encounter the future. After significant investment and time by those in the climate change space, a clearer picture of potential futures 20-30 years from today is prompting action now and not just in the climate change space.

It is one thing to talk about foresight and the future – and even to conduct research, produce reports and develop insights. But acting on it is often hard. The nature of policy-making often demands that decisions are taken about today, with an understanding of what is happening now and – if anything – a projection of that into an unexamined future.

A resurgence of interest

The gaps in most nations' preparedness to respond to the COVID-19 pandemic, an event which had been described on foresight risk registers and in scenario planning exercises for some time, is just one example of how foresight practice needs to increase its effective uptake and translation into policy.

Outside of COVID-19, there is growing awareness that the context for policies changes rapidly, regularly and unpredictably. While there is debate about whether or not the pace of change is actually increasing, there is a sense of uncertainty and lack of clarity about where the world is going.

This presents a new and real opportunity for proponents of strategic foresight to achieve more impact and become more embedded in the mainstream policy process. Demand for the capabilities and expertise of foresight units and practitioners is growing.

Box 3: The pull of short-termism. Statements from the workshop

- The problem with foresight and futures is that people think its “only useful later”
- Policy-makers don’t have time to engage with complex tools
- Governments change, our responsibility is to make them aware that this is an issue
- COVID has exposed demand for our ability to live in ambiguity – an adjacent skill to foresight
- Scenarios are only a bridge to policy, the recommendations live on, the scenarios fall aside
- We face a risk of crises distracting from foresight. Diverting money away.
- People overload the unit with other capabilities, paralysing the foresight
- There must be an effort to translate foresight into the language of the decision-maker
- There is a responsibility to make sure politicians concentrate on the long-term
- The language of uncertainty can be paralysing to many
- What’s missing is the mindset, skills and culture to make this work
- The human brain tends to lean towards the certain
- Foresight needs to be connected more to different actors, including across academia
- We need to introduce futures thinking into the budget
- Get things embedded into parliament and formalised as part of a practical solution
- On the political side, approaches to foresight can take different forms – the rights of future people, the rights of the world, guardians, citizens assemblies
- There is a barrier in the lack of flexibility with how it's talked about.

Section 2. Approach to the project

The Government Office for Science (GOS) works to embed futures work in policy-making across UK government. Its foresight team supports this activity through a dual focus on supply and demand, in line with its four priorities:

1. Culture: *consideration of future challenges, opportunities and uncertainties is embedded in every government department's standard approach to policy*

2. Capability: *every department has access to the skills, knowledge and resources to consider future issues effectively*

3. Evidence: *government can draw on the best possible evidence on the key cross-cutting future issues and emerging technologies*

4.Impact: *visible influence from all of our pro-active and demand-led science advice, meaning more future-proofed policy.*

As part of a wider ecosystem, GOS is often asked for advice on how to improve the integration of long-term thinking into policy-making at the most strategic level. There is likely to be a growing appetite to achieve a step change in how the UK government integrates foresight into strategy and policy-making, the resources associated with it and the unique role for a unit like the existing foresight team in GOS.

Given this, GOS wanted to further develop an evidence base of how different governments use foresight across their whole system in order to improve the quality and efficacy of policies and strategies. In particular, it is seeking to understand how different governments use foresight to support decision-making, to draw lessons for the UK ecosystem.

In this context, SOIF was commissioned to develop a set of eight case studies that would provide context and insights into how different countries have developed their ecosystems, and to surface insights for how GOS and the wider UK system may want to develop their capacity and capability.

Our approach

To provide the GOS team with an evidence-based assessment of where the UK government may want to make changes to the existing foresight ecosystem in the UK, SOIF has worked with GOS to:

- Identify and develop a set of eight case studies of individual countries to provide insights into the strengths and the impact of their strategic foresight work in the policy arena
- Host a shared learning workshop event with more than 30 experts from across the international foresight community, with an emphasis on those who have led foresight at a system level
- Use these inputs, alongside SOIF's own expertise and knowledge from more than 20 years of work in strategic foresight, to develop a framework to surface comparative insights that can inform GOS and UK perspectives.

Case study selection

In discussion with GOS, a shortlist of eight countries (see Table 1) was selected from a longer list of 16 international governments and the European Union (see Annex 4) based on four criteria:

1. Comparability to the UK government / political system. How similar the governance structure and the social context are to where the UK is today. High (5) is very similar while Low (1) has some significant differences.

2. Level of activity across the ecosystem. The extent to which foresight work takes place across the whole of government (executive, parliamentary, legislature, non-governmental entities). High (5) reflects a foresight ecosystem where multiple parts of government play a part while Low (1) means that most foresight activity is located in one or two specific parts of government.

3. Impact at a system level. Impact on individual policy is hard to determine for a number of reasons; this assesses the extent to which the foresight ecosystem is influencing policy-making more broadly. High (5) means that the foresight ecosystem has significant influence on policy-making while Low (1) means that there is still a lot of work to do to influence policy.

4. Level of innovation. The extent to which the country is testing new methods and evolving its approach to foresight. High (5) suggests either multiple innovations or significant innovation in one area and Low (1) suggests a stasis in the methods and approaches.

The initial selection was based on existing awareness and knowledge of the countries. It does not reflect an absolute judgement of the country's foresight ecosystem or capability.

In addition to the international case studies, a high-level review was conducted of the UK government's foresight ecosystem including GOS's role within this. This was conducted through a mix of interviews and desk research and was also informed by interviews held as part of the international case studies.

For the shared learning event, SOIF drew on our network of more than 500 leading foresight practitioners and 300 next generation foresight practitioners to convene a workshop of more than thirty of the world's most experienced international leaders in driving impact from foresight at a systemic level. This was held under the Chatham House rule. It included representatives from national, multilateral and international organisations and one supranational organisation.

Where we have focused

Any foresight ecosystem is surrounded by multiple commentators and stakeholders, often pushing their own agendas and priorities, encouraging and influencing approaches to foresight. This report focused specifically on the work inside government; it has not delved into the specifics of how foresight teams and ecosystems are using that wider ecosystem.

Section 3. A foresight ecosystem approach

Delivery of foresight is often thought about in terms of individual structures, processes and tools. However, to embed strategic foresight into policy requires a set of mutually reinforcing and reliant ingredients that together provide the type of ongoing, long-term thinking required of today's policy-making. And so, an ecosystemic approach, needs to be taken to building and sustaining this capacity. Interventions designed to develop or sustain the foresight ecosystem need to address multiple features at the same time for strategic foresight to take hold and remain relevant in the wider policy process.

The ecosystem model (Figure 3) used in this study has been refined and developed based on the case studies, a multi-national workshop. It builds on the work and expertise in the wider strategic foresight community, including work that SOIF has done.

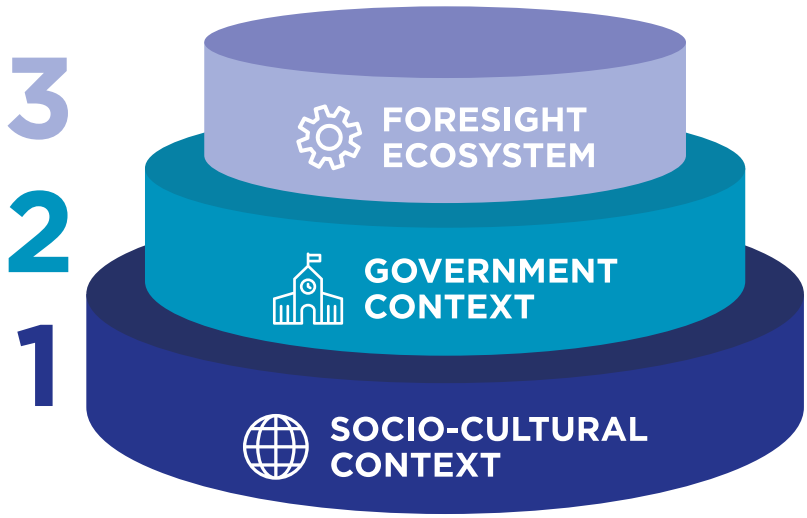
Layer 1: The socio-cultural context

The socio-cultural context comprises the history, geography and indigenous cultures of their relevant local or national environments. Effective government foresight ecosystems need to be designed in this context.

This is no surprise: all systems work best when shaped around their context. However, as we were asked to consider elements of good practice from across the world that the UK might adopt, it is worth understanding the nature of this context when making comparisons or drawing conclusions. The forms of the future, the way of thinking about the future and the nature of the foresight ecosystem will stem from the socio-cultural layer.

In looking across the systems we found that successful foresight ecosystems are culturally relevant. Infrastructure, practices and ways of

Figure 3. An ecosystems approach to foresight. (Layer 1) The foresight ecosystem (light blue) is nested in (Layer 2) the government context which sits within the (layer 3) socio-cultural context.



working are attuned to the wider national cultural context, taking into account the way in which this culture translates into and informs the nature of the relevant civil service.

We also found a correlation between the extent to which foresight was introduced in response to a specific shift or schism (e.g. the end of colonisation) and the potential to explore new methods, approaches and ways of working cohesively and collectively. It is not clear why this is the case. It may be that these systems are newer than others and able to start with the learning of the past; that schism creates permission and appetite for new approaches.

This context can have a significant impact on the nature of foresight. As one interviewee said from Singapore:

"Because of what we are – we can't afford to turn inward, we have to remain connected to the world because of how we live...the income and the prosperity of our people depend on remaining open and part of a global system that allows cities like us to flourish - so some are driven by fear and vulnerability and we have to know what is coming before it is too late, to adapt before it is too late... Ingrained in generation after generation of public servants until it has become 'habit of mind'"

Layer 2: The government context

The institutions of government and how they function also inform the nature of a fit-for-purpose foresight ecosystem. This includes the politics of a given nation, politics that evolve and change over time, sometimes without clear warning or prediction. These institutions include the executive, legislature, judiciary, audit bodies, arm's length bodies and the public. The nature of the civil service, how it operates within the government, how it relates to the public and how it relates to the political class also informs the shape of the specific foresight ecosystem.

In a healthy system, these players are also themselves part of the foresight ecosystem. Each may have their own strategic foresight capacity or they may be advocates for, assurers of or even require the use of strategic foresight as part of their role in the government context.

In the case studies, we did not find a specific definitive recipe for success. What was clear was that sustained political leadership or champions were often a major driver of foresight ecosystems particularly in governments where power is more centralised. In more decentralised systems, power and leadership needed to be more distributed.

Both types of systems could experience cyclical interest in foresight and long-term policy-making; the response to that challenge was unique to each case. Long-standing foresight ecosystems notice and then respond to peaks and troughs in interest to remain relevant and necessary. See Box 4 for examples of how bodies of government can play a role in foresight.

Different countries have experimented with investment in foresight across the ecosystem. The hypothesis is that by developing approaches to sustain long-term thinking across the different branches of government, it will become easier to sustain and ensure long-term thinking: to build resilience in the foresight ecosystem.

Box 4: Examples of players in a foresight ecosystem

Legislature Finland: Committee of the Future

Set up in 1993, the Finnish parliament's Committee for the Future considers future trends, particularly around science and technology policy. 17 Members of the Finnish Parliament sit on the committee and work to "generate dialogue with the government on major future problems and opportunities. The committee also responds to the Government's Future Report produced by the civil service each term.

Executive Singapore

The Centre for Strategic Futures (CSF) and Strategic Foresight Unit (SFU) were both established in 2010. The former, has a remit to coordinate foresight across public and non-governmental sectors to promote dialogue and the pursuit of mutual interests. It works on the supply side, generating products, tools, training and assets for Singapore and runs the Strategic Foresight Network to bring together different units. The SFU, meanwhile was established under the Ministry of Finance with a mandate to ensure that government futures work is built into the ministries' budgeting work in a way that provides other departments with independence to pursue foresight work.

Judiciary Netherlands

In the Netherlands the court is an activist player and dynamic driver towards long-termism in the system. The Oslo Principles on Global Climate Change Obligations were a landmark set of obligations which called for government responses to climate change be mandated both morally and legally. More recently in the Netherlands young people sued government for a lack of consideration about the future. The court can be seen to be taking a more hardline approach to the responsibilities for today's adults vis-à-vis younger generations.

Audit United States

The Government Accountability Office (GAO) established the Center for Strategic Foresight in 2018 to support "identifying, monitoring, and analyzing emerging issues facing policy-makers". The GAO has a role to both to audit US decision-making and to make recommendations to Congress to support them to oversee other federal agencies.

Public and arm's length bodies Finland

In Finland, Sitra is an independent futures organisation and fund that is responsible for promoting the wellbeing of Finland. Sitra reports to Parliament and is not responsible to any particular governmental party. The structure of Sitra ensures financial and political independence. The impact of Sitra's work is measured for Parliament but also "for the people of Finland" for whom the work was created, developed and distributed.

Citizens and Media Singapore

Our Singapore Conversation (2012) facilitated dialogue with citizens around their fears, hopes and aspirations. It included 47,000 participants in 660 sessions at 75 locations and in 7 languages to include as many Singaporeans as possible from all walks of life.

Layer 3: The foresight ecosystem

Within this government context, itself shaped by the socio-cultural context, the foresight ecosystem functions. It iterates and evolves over time, working to be sustained and relevant as these contexts shift. Any foresight system has three functions (see figure 4):

1. Create demand for foresight work and its integration into policy-making

This is about making sure that across the government there is the real desire to integrate thinking about a dynamic uncertain future into policy choices and strategic decisions. This includes:

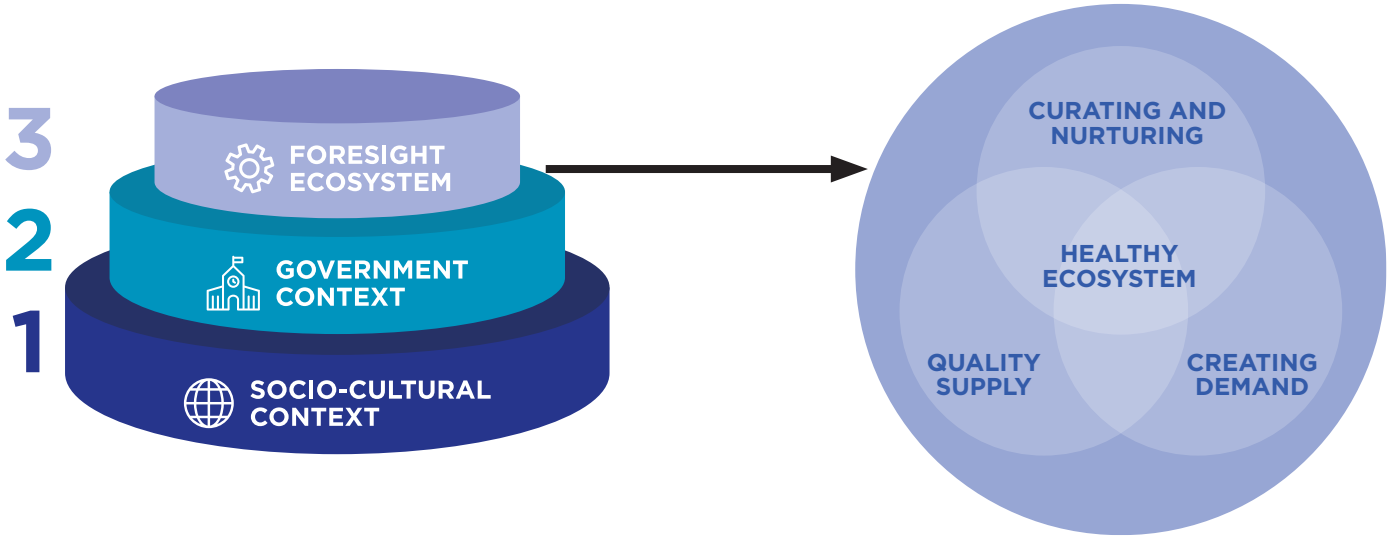
- Building the appetite and expectation for strategic foresight from decision-makers, leaders, policy officials
- Creating expectation in the public that their political representatives and their policy-makers are considering what might or could happen in the future when making choices today
- Supporting people across government to become intelligent users and commissioners of strategic foresight so they know what questions to ask, when and how to use the answers.

2. Ensure the supply of high quality strategic foresight – both the content and the insights and the capabilities to produce and apply this information

Foresight ecosystems need to mirror the work to create demand with the provision of insight and capability needed to engage with uncertainty and to respond with policies that take this uncertainty and lack of clarity into account. This includes building the capabilities needed to do and apply strategic foresight – and to identify when it has not been incorporated. Some of the functions are:

- Delivery of timely, accessible, relevant insights to support decision-making
- Ensure access to necessary skillsets and expertise around strategic foresight methods, communication and integration into policy.

Figure 4. The foresight ecosystem (Layer 3) A healthy ecosystem will (1) create demand for foresight work and its integration into policymaking, (2) ensure the supply of high quality strategic foresight and (3) curate and nurture itself to build resilience.



This is often a balance between developing internal capabilities and growing a robust market of provision

- Create and secure the time and space to deliver strategic foresight work that responds to what policy-makers are asking for and leaves capacity to develop, to identify and explore new topics and areas of interest and relevance.

3. Curate and nurture itself to build resilience

Sustaining the demand for and the supply of strategic foresight requires the people, systems and structures within the foresight ecosystem to be long-standing, resilient and robust. The work to integrate strategic foresight into policy-making and governing is not simple or quick so effort needs to be made to nurture the system itself. This includes:

- Attention to the changing contexts and the health of the ecosystem including constituent parts in order to take advantage of opportunities as they arise and respond when risks or weaknesses occur. This includes the nature of the politics in the system
- Fostering connections across parts of the foresight ecosystem, between practitioners, structures and systems and between policy-makers who are integrating strategic foresight into their work to continue to increase the community of practice and proponents
- Developing relationships and connections with others internationally to learn, share best practice and, in some instances, broker links between policy-makers in similar fields and content areas
- Capturing impact, even if this is qualitative and narrative, to continue to build the case and show the value of strategic foresight even when it is hard or uncomfortable.

The balance of these is unique to each government – although all are important. A healthy foresight ecosystem will be able to match supply and demand, but it will also cultivate and nurture the foresight ecosystem, paying attention to the changing context and to the health of constituent parts of the ecosystem. This requires developing systems and processes that will sustain and build resilience over time, as well as building connections across parts of the foresight ecosystem. We have also found that the people who work within foresight across government benefit from nurturing. This includes being connected to each other and to others outside their national government who are trying to support their policy colleagues to grapple with uncertainty, to imagine and dream rather than project and predict and to be comfortable with the unknown and the potentially possible.

Section 4. The necessary ingredients for effective strategic foresight

What is clear from our work is that there is no single silver bullet or set of bullets that create the perfect sustainable foresight ecosystem. What we have identified from the case studies, the research, the workshop and our own experience, is a set of features that can enable strategic foresight to be integrated into policy-making in a regular and sustained way. These allow the foresight ecosystem to carry out its three roles above – to build demand, provide expertise and to survive and thrive.

These features need to manifest in the most appropriate way for the national context. So no one foresight ecosystem is like another.

The features apply at multiple levels, whether looking at the a systems / whole-of-government level, or focusing on particular departments, units, or even teams.

Making use of the features as a foresight ecosystem advocate or leader

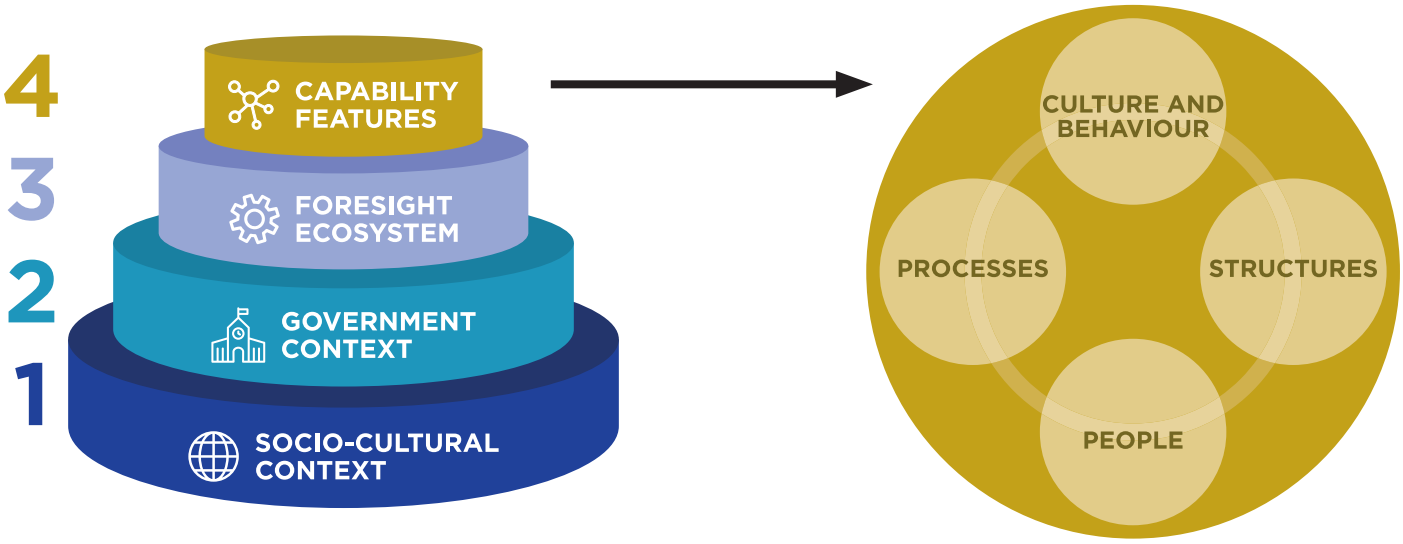
This report is written in part for those who are considering how to cultivate strategic foresight in their system – at any level. The key here is that there is no right answer; each of these features is worthy of attention and action. What is important is that any intervention made across one or more of these areas should be seen as part of a collective set of actions that are influencing and responding to the needs of the particular government.

The options available to leaders and others who want to create a sustainable practice of long-termism in their governments will depend on the position they occupy within the government landscape. Successful foresight ecosystems are built through a series of actions that cover all four of the features (Culture and behaviour, Processes, Structures and People) over time (see Figure 5). The priority and phasing for any one foresight ecosystem is shaped by the context described in Section 3 – and is a product of the ecosystem's development at any particular point of action. The system and its context will continue to develop and evolve.

Drawing on our case studies, our workshop and our experience, the insights below are structured against the capability features outlined in Section 3. Specific examples are given from the case studies to illustrate each point.

We encourage readers to situate the insights in the context of each case study (see Annex 1), which provides additional context into the features and evolution of each country's foresight ecosystem, including the unique mix that each country has used to build its capacity and capability.

Figure 5. Capability features of an effective foresight system. This list is provided as a quick summary of the four features of an effective foresight ecosystem explored in this section.



Culture and behaviour

- focus on creating commitment
- bring policy-makers into foresight
- meet policy-makers where they are
- support short-term work with long-term perspective
- generate shared ownership and buy-in

Structures

- have central units sitting in or near the heart of government
- build and foster capacity in departments and agencies
- work to have courts, elected officials and audit officials involved
- put in place coordinating and sharing groups

People

- make sure that there are in-house skills and capacity
- invest in the development of the next generation
- have visible consistent champions
- support and nurture people working in strategic foresight
- build local and international experts

Processes

- work across all of government and use all government levers
- deliver a small number of set piece activities
- develop their own work
- draw on diverse methods and disciplines
- invest in ongoing research and innovation around strategic foresight

1 Culture and behaviour

Effective foresight ecosystems cultivate and build allies in their government and with international bodies.

Successful foresight ecosystems build alliances of distributed support and interconnectivity across endeavours in public / semi-public bodies (including networks across the civil service/ executive, checks and balances across legislature, audit bodies, judiciary, connectivity into local authorities/civil society/universities).

Our work found that the most effective foresight ecosystems often have purposeful ways of engaging with their stakeholders to secure buy-in. They are focused on impact and influence rather than on the concept of the future itself. And these foresight ecosystems are clear that what they bring is long-term thinking and a foresight lens to all work, even if it has short horizons for impact or implementation. For example, they will support projects that are thinking about short-term policy decisions by bringing a wider context to the work. It aims to give context and framing to the decision-making rather than necessarily reframe the time horizon being considered.

The foresight practitioners we spoke to want to bring an understanding of the potential futures into the choices being made today so that these choices are alert to the twists and turns that may take place as the policies come into fruition.

*In **Singapore**, the Centre for Strategic Futures works with policy-makers who are focused on short, medium and long-term time horizons. They know that working with policy-makers on the questions that they are facing creates support, buy-in and endorsement for the work that they and their colleagues do.*

*In **Canada**, foresight leaders in ministries work closely with their policy colleagues to support long-term thinking as part of the wider context in which they frame decisions about today.*

*In the **United Arab Emirates** the foresight leadership team cultivate the right relationships and invest significant effort into ensuring that these relationships remain strong and resilient.*

International bodies like the World Economic Forum, European Union and its constituent bodies and the United Nations all undertake foresight activities and invest in long-term thinking work. These organisations often bring visibility, credibility and heft to an internal foresight capacity and can catch the attention of senior policy officials in a way that bottom-up internal approaches may not. Partnerships are also practically useful in that they connect countries with new and emerging practice. They provide the opportunity to develop, prototype and apply new approaches.

***Malaysia** has partnered with UNESCO in a number of ways including having the first UNESCO Chair in Futures Studies, which is hosted at the Universiti Sains Malaysia*

*Since 2016, the **United Arab Emirates** has partnered with the World Economic Forum to host the Centre for the Fourth Industrial Revolution (*C4IR UAE*) and to run the Annual Meeting for Shaping the Future which brings together countries from across the world to consider the future governance. The relationship supports the UAE to strengthen networks, experiment and test emerging technologies, as well as to learn from international best practice.*

They focus on engagement of policy-makers, taking them through a foresight journey

From the outside a lot of foresight work can be seen to be about producing reports for a range of audiences, with a view that reading these reports will influence policy. However, as one interviewee said, "reports are what you see on the outside but it's a very limited part of what we are doing". For most foresight ecosystems the aim is to change the way that policy is made; to have mainstream policy-makers thinking long-term and looking at a wide range of data, including qualitative and narrative information, and for governments to become more adept at anticipating and responding to risk and opportunity.

*Policy Horizons in **Canada** has three roles: analyzing the emerging policy landscape, engaging in conversations with public servants to inform policy and decision-making, and building foresight literacy and capacity across the federal public service. Most recent work has included foresight on COVID-19, biodigital convergence, the Next Digital Economy and social futures, which are newer areas of focus for the team and for policy-makers.*

They connect practitioners, building networks across government and beyond

In our interviews, a number of foresight practitioners said that their role can be challenging and lonely, with at times a sense of 'them and us' between policy-makers and foresight proponents. The fact that in most of the case studies these remain two distinct groups suggests a lingering disconnect or outsourcing of long-term thinking to the specific roles. Foresight methods, time horizons and forms of evidence can be at odds with how mainstream policy-making is done. So, networks of like-minded colleagues are critical for morale, development and resilience. Networks like the 'Heads of Horizon Scanning' in the UK were regularly cited as supportive and enabling, giving foresight leads a chance to share practice, collaborate on work and bolster each other's efforts.

*In the **United States** the Public Sector Foresight Network is one of a number of networks that foster exchange of knowledge and best practice in government at all levels.*

*In **Singapore**, the Strategic Futures Network (SFN), brings together different government units to coordinate activity across ministries. By ensuring a sort of division of labour in situational futures work across units while encouraging critical thinking and learning in a shared space, SFN has proven useful in terms of structuring foresight coordination across the government. By allowing collaboration on projects, SFN is able to coordinate activities in a way that brings different interests, perspectives and thus critical thinking into foresight work.*

In our interviews, there was some caution that these networks can sometimes feel cliquey and unwelcoming to some – this is something to be mindful of in developing them. As one interviewee shared, *"it can be difficult to fit in with [the foresight] culture".*

Some governments have used foresight to create cohesion through big national conversations

Some governments have used foresight as a way to bring their country together in a participative, national conversation. This is primarily about creating a national vision and cohesion around the direction of travel for the country, with a focus on economic ambition. In the cases we saw, much of this was about technological innovation and building human capital as a national resource.

These conversations are big exercises, undertaken often over a number of years. The extent to which they achieve this ambition of common and shared purpose varies depending on the audience you speak to – but in many ways they create a guiding path for all parts of the economy and society.

Malaysia *has undertaken several national visioning exercises: notably Wawasan 2020 or Vision 2020 which was launched in 1991 and Malaysia 2050: A Foresight Narrative started in 2017. Both processes were born of individuals wanting to make long standing indelible marks on the shape of their nation. Both projects also created underpinning narratives that drove the priorities, decisions and choices of representatives from across all of the sectors in Malaysia including government, civil society, the private sector and universities to co-create a preferred future and agree the pathway to success. Early visions were aspirational, but not linked to action. More recent visions have had a stronger focus on prioritisation and action including the Academy of Sciences Malaysia's Envisioning Malaysia 2050: A Foresight Narrative, and Malaysia 2050 - Emerging Science, Engineering & Technology (ESET) report.*

2 Processes

The case studies show that robust foresight ecosystems use multiple processes to integrate long-term thinking into policy-making and to secure commitment to this on an ongoing basis. They all play a role in building resilience into the foresight ecosystem.

Effective foresight ecosystems have set piece projects that include engagement

Requirements and expectations of regular horizon scanning reports act as ballast for long-term thinking. Our case studies suggest that these types of activities give mainstream policy-makers something to engage with – and provide foresight leads with a hook to engage their policy colleagues.

One example is the 'Global Strategic Trends', produced by the UK's Ministry of Defence. In our interviews, it was suggested that these reports often focus on emerging mega-trends that span policy areas and then consider what they mean for the local context. In many cases our interviewees welcomed the framework these types of programmes create for engagement, collaboration and a collective future or potential futures against which to make choices today.

Those that have an explicit agenda to inform policy are often timed to provide a mechanism to sustain futures thinking beyond the election cycle.

*In **Finland**, the Prime Minister's Office's Police Analysis Unit produces a 'Government Report on the Future' each term of government. The report is produced through a process that includes public engagement and input from experts at research institutes and from across government and a review by the Finnish Parliament's Committee for the Future. It informs ministerial programming and reporting, providing a common framework and context for policy-making during that term.*

The Finnish Policy Making Environment report is prepared by the Government Foresight Network and the Ministries' Future Reviews. In it, each of Finland's 12 ministries looks at the emerging problems and solutions within their domains. This is done a year before term elections.

*In the **United States**, the 'Global Trends report' is developed by the National Intelligence Council, located in the Office of the Director of National Intelligence and reporting to the Director. The report is published during the period between election and inauguration of incoming Presidents (including those entering a second term).*

They develop their own work, creating demand for it as part of the process

In many foresight ecosystems, the central foresight capacity produces its own work, as well as responding to requests from policy-makers. This can bring insights and topics into policy discussions that may not have been there previously. Foresight ecosystems undertaking this kind of work will often invite policy-makers into the process and use the process itself to develop demand, understanding and interest in the content being explored.

*In **Canada**, Policy Horizons began work on social trends and their potential implications long before the demand was there for this knowledge. While the economy and national security remained the areas where policy-makers showed interest, Policy Horizons invested in developing a framework for*

considering social trends, the right language and a useful framework. When policy-makers began to realise the potential risks of social trends, Policy Horizons was ready to step in with insight, advice and evidence that was of real value.

Independence was seen to be an important aspect for successful units. In Finland, the independent body Sitra has both financial and political independence, while in many other countries there is more dependence on the legislature or the executive.

The use of legislation to drive long-term thinking is growing

Legislative processes are starting to play a role in setting requirements for long-term thinking. They are being used to exert pressure on other parts of the policy-making landscape (i.e., beyond the foresight ecosystem) to think long-term. These then need to be overseen and adhered to. From our interviews, this is particularly evident in the area of climate change – or has been driven by climate change and expanded to other aspects of the future.

*In **New Zealand**, the Public Service Act 2020 requires long-term insight briefings be produced by the chief executive of each government department every three years. The briefing, which is unclassified, is to address medium and long-term threats and opportunities related to New Zealand.*

*While **Wales** was not one of our case studies, it is a leading example of the use of legislation and then oversight to promote the integration of foresight into policy-making and decision-making at all levels. The Well-being of Future Generations (Wales) Act 2015 enshrines in law the requirement for all public bodies to think about the long-term impact of their decisions, to work better with people, communities and each other, and to prevent persistent problems such as poverty, health inequalities and climate change. It established established a 5 yearly mechanism to publish a government report on the future (Future Trends Report).*

*In 1974, the **United States** House of Representatives created a rule that nearly all standing committees of the House must undertake forecasting efforts on "matters within the jurisdiction of that committee." However, there are mixed views on the efficacy of this as some we spoke to reflect that committees were not held to account if / when they did not carry out this foresight work – and that as a result very few actually do it.*

They draw on diverse methods and embrace innovative practice and communities to help drive long-term thinking

In our interviews and case studies, as well as our workshop, we heard that deploying a diversity of methods brought about greater engagement in the process of foresight as well as more influence and impact derived from the outputs of specific activities. While there were no linear causal relationships, the discussions suggested the value of diversity of approaches, reflecting the different ways that people engage with complexity and uncertainty, particularly when they are not used to doing so on a regular basis.

Foresight work often uses approaches, methods and ways of working that may be new or different to what policy-makers are used to. Qualitative data, including narrative and storytelling, are used as much if not more than quantitative forms of data. Weak signals, a core feature of foresight

work, are often drawn from qualitative datapoints, narratives and stories rather than from numbers and more mainstream quantitative data.

This can pose a challenge to those trying to influence for the long-term. A number of people interviewed reflected that policy-makers have a greater comfort with quantitative rationalist forms of evidence; they can be dismissive of what might be considered anecdotal or individualised views.

From our discussions, foresight practitioners are becoming more and more comfortable experimenting with innovative ways to expose policy-makers to thinking about uncertainty and possible / probable futures. Equally importantly, new forms of engagement are being used to share and convey insights and findings in a way that enables integration into policy-making.

*In the **United Arab Emirates**, an experiential project on climate and climate change included a mask that allowed people to smell what a high-smog future might smell like. This experience was credited with having a significant impact on policy decisions around climate change.*

*In **New Zealand**, foresight proponents in the Inland Revenue made videos that they used to showcase their methods and approaches to others. They engaged in marketing foresight as a methodology and used the video to engage with policy-makers. More recently they used social media to showcase particularly interesting points and create interest in their work. The team produces reports that are less formal and very accessible to policy-makers, although there is a recognition that policy-makers were often pressing for 'hard' data.*

*Also in **New Zealand**, indigenous practices and orientations held by Maori are being integrated into policy-making. Commitment to stewardship of the land and earth is shaping some of the thinking about how policy should be formed. A recent project by the New Zealand Defence Force drew on traditional Maori approaches, using the concept of a braided river where different actors either come together or go separately but ultimately travel in the same direction.*

*In the **Netherlands** the Ministry of Foreign Affairs used a 'think the unthinkable' game to explore futures, which was found to help policy-makers break away from the current moment and think about the future.*

Ambitious foresight ecosystems seek to learn from and integrate these evolutions. By docking into diverse communities internationally, countries have tried to learn from emerging insights and emerging methodologies.

*In the **United States**, this is one of the drivers of the NIC's Global Strategic Trends work, which includes outreach and engagement internationally with experts, universities, think tanks, science labs, businesses and government institutions.*

*In **Singapore**, this is one of the drivers behind the biennial Foresight Week and International Risk Assessment and Horizon Scanning Symposium (IRAHSS). It involves a combination of network building and identification of emerging issues.*

They have financial incentives, but there are few examples of this at the moment

In our case studies and our workshop, it was evident that most treasuries engage in some form of long-term thinking based primarily on the long-term implications of spending decisions, as well as making economic projections. This is different to the work of the foresight ecosystem

which is about developing variations on the future and then considering policy through those different future lenses. While many treasury departments, including the UK's, promote the use of projections and calculations involved in cost-benefit analysis, this is usually oriented around a specific project or programme. We did not find examples of treasury functions using their levers to encourage governments to look long-term in order to determine where to invest and focus in the first place.

*In **New Zealand**, the treasury is required to periodically produce long-term fiscal statements, looking out 40 years in terms of fiscal challenges and the likely impact of trends in the population such as aging and environmental degradation. These reports are then made public.*

Systems are starting to learn to measure impact on policy-making

Foresight ecosystems are often asked to evidence their impact on both the policy-making process and the success of policies. This is very difficult. Foresight is not a practice where one can identify a specific foresight intervention and link this to a definable outcome. The policy process is sometimes too complicated to attribute causality to any one input; the very nature of foresight work – considering implications of multiple futures – means that these futures need to arrive before the implications are realised.

Instead, foresight advocates can develop proxies for the features of successful interventions. For some we interviewed, ongoing and increasing demand are a proxy for impact; the thinking is that if long-term thinking was not felt to be useful then it would not be requested.

*In **Canada**, Policy Horizons measures its influence through its continued existence, through feedback from the Steering Committee members and users in line ministries on how they value the foresight work. It also looks at the level of demand and the types of asks that come from departments and agencies within the public service, including senior leaders within those organisations.*

*In **Malaysia**, success is measured by how insights and recommendations are taken up across departments.*

3 Structures

Infrastructure is of course fundamental to long-term thinking in government. As the length of this section suggests, it is also where it is easiest to describe what is happening. This does not, however, mean it is the most important. It reflects the fact that investment in units and structures is often how governments respond to an ambition to think long-term. As the sections above discuss, culture, policy, leadership and language are all critical to making long-term thinking happen.

Specific units charged with thinking about the long-term sit at the heart of most countries' foresight capability. Most foresight ecosystems have one in the centre, either within the offices serving the head of the government or close to it. There are then other units within government departments, including very often within the defence ministry. Setting up or restructuring these units is often where foresight ecosystems start in their foresight journey.

All but one of the systems we looked at have some unit that is the centre of strategic foresight for that government. Those that sit in the executive are in the centre, close to the main locus of power in that system. Those that are at arm's length have some partner organisation inside the executive, also close to the centre of power. While there is no one preferred model of core units, closeness to that government's power base informed impact and influence.

In all cases a broker was needed between the unit and the wider policy environment. In some instances (e.g., Singapore, Malaysia) this was a visible and powerful champion. In others (e.g., Canada) it was another unit in the foresight ecosystem.

Central units were also felt by other departments and agencies to be somewhat disconnected from the reality of policy-making. While their contribution to cross-cutting insight and thought was welcome, there was a sense that the outputs were often too far from the day-to-day pressures of line ministry policy-makers and not particularly aware of or live to implementation challenges.

These units do not therefore on their own secure resilience in a foresight ecosystem. Effective foresight ecosystems also invest in and resource structures in other parts of the government. Together these are the structures of the foresight ecosystem.

In some foresight ecosystems there are structures to bring multiple departments or ministries together

Some foresight ecosystems have structures to bring departments together around long-term thinking, similar to the UK Cabinet Secretary Advisory Group. These have evolved into Cabinet Office strategy seminars. These serve to reinforce the need to think long-term, to keep long-term thinking at the forefront of policy leaders' work and to develop cross-cutting policy.

Finland's *Government Foresight Group promotes foresight at a national and network-wide level to link foresight and decision-making processes. Its Government Foresight Network has two members from each of the ministries and the secretaries. Through the Network, leaders support the development of the Government Foresight Report, sharing a view of potential futures, priority trends and policies in response*

Political infrastructure can play a role, although this is not particularly well used at the moment

In some foresight ecosystems, political structures play a role in the foresight ecosystem. This raises the level of attention on foresight to the political tier, helping to create visibility and more importantly ensure that line ministries' activities are directed at shared opportunities and risks.

*Set up in 1993, the **Finnish** parliament's Committee for the Future considers future trends, particularly around science and technology policy. 17 Members of the Finnish Parliament sit on the committee and work to "generate dialogue with the government on major future problems and opportunities". The committee also responds to the Government's Future Report, produced by the civil service each term.*

Some foresight ecosystems explicitly fund supply side foresight activities

Some of the governments we considered also invest in supply side capacity in their foresight ecosystem. This is about protecting the permission to research and explore future trends, often with capacity to test and prototype what might happen. This allows what might be possible to be explored and learned about quickly, early and without major financial or political investment.

*Established in 1993, the **Malaysian** Industry-Government Group for High Technology (MIGHT) is one of the most long-standing independent foresight capabilities funded by governments. The Governance Board of MIGHT spans academia, public sector and private industry. MIGHT also hosts MyForesight which is a unit that provides capability training in futures across government as well as delivering on specific projects. It is also a platform that is the result of consultations with experts, practitioners in scenario development, executives and other leaders and highlights common themes that are believed to be relevant to Malaysia's future.*

*Sitra is an independent organisation funded by the **Finnish** government to undertake research in future trends, fund exploration and innovation and to bring together public, private, third and university sectors to tackle future challenges.*

*The Museum of the Future, opening in **Dubai*** in 2021*, aims to help individuals engage with the future and vanguard technologies. The museum aims to be a hub of futures initiatives and ideas, housing a research centre and classrooms. It builds on a series of public-facing, immersive exhibitions since 2015, held around and designed for the World Government Summit.*

*In the **Netherlands**, the Organisation for Applied Scientific Research (TNO) is an advisory body that consults, supports and tests technologies, such as software, for government ministries. The Netherlands Institute of International Relations Clingendael explores emerging and upcoming issues, often related to security and international relations.*

*Also, in the **Netherlands**, the Central Planning Bureau conducts foresight research and testing of new ideas on behalf of political parties (those sitting and those in opposition), government ministers, parliamentary members and factions and the Dutch Cabinet. Some of the main ministries involved include the Ministry of Agriculture, the Ministry of Housing and the Ministry for Traffic, Public Works and Water Management. Amongst other clients are the Social Economic Council and employees' organisations.*

In many foresight ecosystems there is growing involvement from structures beyond the executive and legislature

Other institutions are starting to play a more active role in the work of foresight and in building the resilience of foresight ecosystems. This is primarily about securing ongoing long-term thinking (i.e., a resilient foresight ecosystem) by creating pressure from other actors in this foresight ecosystem. This is happening in two ways.

Courts are becoming more activist and creating requirements through their jurisprudence for long-term thinking. This is happening primarily in the environmental space, where legal challenges are being brought around the impact of short-term policy choices on the long-term life expectancy and life quality of young people in particular.

*In the **Netherlands**, the court is becoming an activist player and dynamic driver towards long-termism across policy-makers. The Oslo Principles on Global Climate Change Obligations were a landmark set of obligations which call for responding to climate change to be mandated both morally and legally. More recently in the case of the young people suing for lack of consideration about the future, the court can be seen to be taking a more hard-line approach to the responsibilities of today's adults vis a vis the younger generations.*

It is also happening through the creation of actors to hold the wider policy-making landscape to account for using foresight, usually through legislation that creates different forms of commissioners charged with reviewing government's delivery on some form of long-term work and then reporting back to the legislature with an assessment and recommendations.

*In **New Zealand**, the Parliamentary Commissioner for the Environment regularly reports to parliament on the extent to which policies are taking into account their short, medium and long-term environmental impacts. Also in New Zealand, the Office of the Children's Commissioner looks at the lives of children today and how this will help them thrive in the future.*

*In **Wales**, the Future Generations Commissioner assesses both the implementation of the Future Generations Act and ensures that policy more generally takes into account the future generations of Wales.*

There are also foresight ecosystems that are creating infrastructure outside of the legislative or executive branches to ensure long-term thinking.

Successful foresight ecosystems create visible and meaningful mechanisms of accountability that include, but do not depend on, specific individuals to ensure delivery. Some of this accountability is cultural; having an expectation that policy is framed by an understanding of the long-term. But some foresight ecosystems are also building accountability into their structures.

*In the **Finnish** foresight ecosystem, Parliament plays an audit and oversight role. Sitra (the independent futures organisation and fund that is responsible for promoting the wellbeing of Finland) reports to Parliament. The impact of Sitra's work is measured for Parliament but also "for the people of Finland" for whom the work was created, developed and distributed.*

*In the **United States**, the Government Accountability Office (GAO), which is the supreme audit institution for US government, houses the Center for Strategic Foresight which serves to coordinate research on emerging trends relevant for policy-makers. The GAO is there "to provide Congress with reliable, fact-based information for overseeing federal agencies and programs". The GAO integrates foresight into its technology assessment, as well as using it as a guiding principle to inform its audit practice.*

They provide funding for long-term thinking

Foresight ecosystems require money – for people, for projects, to build expertise etc. The case studies we explored do this in one of two ways:

1. Line-item funding: in this instance the resources for units, for training and for projects are regularly considered as part of cyclical budget processes. This means that advocates for long-term thinking need to regularly evidence the value of the work. Given the challenges associated with impact discussed above, this can be challenging if the appetite for long-term thinking wanes.

This is the funding model followed in the **UK***, as well as in places like the **United states, Canada, New Zealand** and **Singapore**. The frequency of review varies and does not need to happen annually.*

2. Large funds administered by specific organisations at arm's length to government: in some foresight ecosystems large funds have been established for long-term thinking. These sit outside of government, are overseen by boards and often require some sort of report back into the parliament or the legislature. These funds can be more secure than line-item funding, although they are not immune to being either increased or decreased depending on political appetite and resources.

***Finland, Malaysia** and the **United Arab Emirates** are all examples of foresight ecosystems that have effectively created endowments used to bring long-term thinking into policy-making and policy development. The funds are also used to develop and test innovations, particularly in technology and science.*

In most foresight ecosystems the integration of public voices is growing

Involving the public in the practice of foresight is not new. The public is often seen as a source of weak signals and as nodes of intelligence for the direction of trends. However, in some foresight ecosystems foresight processes involve the public to create consensus around national visions and priorities and increasingly to co-create insights and policy.

*Long-term vision setting has been used by a number of leaders in **Malaysia** to bring disparate people together and create a national narrative. A focus on technological innovation and future need has provided a focal point for national economic development, innovation and investment.*

*Leaders in the **United Arab Emirates** have used foresight and futures work to create collaborations between industry, government and the public in a drive to broaden its economic resilience and strengthen its global presence. Visible investment in local foresight activities and high-profile international partnerships have put the UAE on the map as leaders in innovation, particularly in health and technology.*

Public engagement in more of the foresight process is now growing, particularly around setting visions and agreeing priorities for further focus. Work by organisations like NESTA and others considers the impact of digital innovation on public involvement in foresight approaches.

New Zealand *is, more than any other Euro-centric nation, working to integrate indigenous cultures into the mainstream. Many indigenous cultures have long-term thinking built into their practices and philosophies. While no colonising peoples are particularly good at respecting and integrating these approaches into ongoing social norms, there is some correlation between openness and inclusivity of indigenous tenets with long-term thinking. There is still of course a long way to go and benefit to be had from this diversity of perspective and cultural framing.*

In ***Wales****, a futures project on legislating for sustainable development engaged citizens through a national conversation (Wales We Want). The project engaged the public by "taking the conversation where the conversation is happening", including book clubs, schools and organisations. This informed a set of legislative goals and it was explained that "it is not the output that will drive the change, [rather], it is the values and behavioural change of decision makers and the engagement with people about the future".*

There is much more that can be done to engage the public in foresight, to develop foresight literacy amongst the population and to harness data that has been created for non-foresight purposes as indications of trends, weak signals and emerging changes.

4 People

The right people with the right knowledge are fundamental to any human system and foresight is no different. In many cases, this means access to a variety of skills and expertise, with attention paid to being multidisciplinary and bringing in many forms of information sharing, information gathering and insight creation.

*For example, in the **United Arab Emirates**, the formal foresight resource has drawn on a range of approaches, particularly new methods of gathering and sharing information that focus on the experiential and the visceral. In the **Netherlands** small behaviours are having an impact. In one example a small chair is placed in a room where a meeting is being held. The chair 'sits' at the table as a reminder of future generations.*

Champions develop and build foresight ecosystems, but can also lead to fragility

From the case studies we conducted, there are some foresight ecosystems where the longevity of that ecosystem sits on the shoulders of a single champion. This is not by design of the ecosystem itself but more the driver for its existence and resilience. The champion has leveraged his (it was always his in those cases where a single individual was cited as central to development) leadership into the creation of a culture that supports long-term thinking and has secured ongoing resource for structures that ensure long-term thinking takes place. These leaders have also created networks, collaborations and connections across the various foresight ecosystem players to shore up and distribute the commitment to long-term thinking.

***Singapore**, under the leadership of Peter Ho, is the most famous of the examples of the impact of someone who retains a focus on long-term thinking throughout all the posts and roles they play in government. Over 34 years Mr Ho held multiple positions across government, sat on (and continues to sit on) boards across a broad range of themes and created new organisations within and outside the Singaporean government. He and his colleagues have also documented their journey in a series of publications reflecting on the development of foresight in Singapore.*

*In the **United Arab Emirates**, Sheikh Mohammed bin Rashid Al Maktoum, ruler of Dubai, Prime Minister and Vice President of the UAE, vocally supports and resources futures work. His sponsorship gives impetus for others to engage with and support futures work.*

*In **Malaysia**, Tan Sri Dr. Omar Abdul Rahman, former Science Advisor to the Prime Minister, was and remains a proponent of long-term thinking. Having held a number of roles in the Malay government he has created commitment and resource for long-term thinking.*

This type of foresight ecosystem seems to emerge in places where self-governance is relatively young and where the end of a colonial regime has required rapid and focused leadership to move into self-governance.

Investment and reward of long-term thinking can help secure sustainability

Foresight ecosystems with robust long-term thinking capacity invest in the development of these skills. They also recognise and value

foresight / long-term thinking skills in the capabilities that are considered in promotions and career advancement.

Malaysia *has established a Futures Club, a group of undergraduate students that use foresight metrics in their final theses. MIGHT select their interns from this group of students; and these students are felt to then go on to succeed in part due to their capacity to undertake futures work. Once in the civil service, training models are available for policy-makers, beyond the Futures Club. There is a sense that these courses are well received and individuals who have these courses often reach more senior positions. Civil servants who want to learn more about foresight are also able to learn informally through experience and through best practice sharing.*

In ***Singapore****, foresight skills are a core part of promotion. Civil servants are trained in foresight as part of the curriculum in the Civil Service College, which is a statutory board under the Public Service Division. They all have foresight training in their early careers. The attributes related to foresight are core to promotion and senior civil servants get further training when promoted.*

In 1994, the ***Canadian*** *Department of Foreign Affairs and International Trade (DFAIT, now Global Affairs Canada) launched a competitive intelligence training programme that includes foresight.*

In contrast, in some of the systems we explored, interviewees felt that their skills were only recognised by other foresight or futures practitioners and the attributes that made them particularly adept at long-term thinking were often not valued or in some cases seen as contrary to what policy-making requires. For some this made the policy environment an uncomfortable place.

Diversity of expertise can support diversity of thinking and insight

In innovative organisations outside of government (e.g., the Turing Institute and Crick Institute as well as private sector bodies such as Google DeepMind), diverse expertise spanning multiple disciplines comes together around shared content challenges. This includes the physical and social sciences, the arts and ethics. In our interviews for this project, as well as our discussions with the institutes mentioned above, there is a recognition, based on experience, that diversity of skills, approaches and knowledge enables more comprehensive thinking about the long-term, including identifying and understanding weak signals, developing possible futures and considering the implications for policy.

COVID-19 and foresight ecosystems

This review took place during the COVID-19 pandemic. It was part of every conversation that was undertaken and forms an unavoidable backdrop to considerations about next steps. In our work we found a mix of assessments of the pandemic's impact on foresight ecosystems.

It has raised again the need to focus as much on impact and adoption as on the exercise of imagining potential futures and the associated implications. It has also brought a renewed attention to long-term thinking as views of the near future are now being challenged on an ongoing basis, since daily life has changed so radically. For some foresight units, there has been

a renewed demand for their skills as complexity thinkers rather than for foresight specifically.

In some countries, COVID-19 and pandemics were seen to be a validation of foresight work, even where action had not been taken to prepare.

*In **Canada**, Policy Horizons is responding to growing demand for their work, an experience which had started before the COVID-19 pandemic and was accelerated by the uncertainty of the future that it pointed to.*

*In **Malaysia**, MIGHT focuses on the relationship between translating "interest in the anticipation and preparedness" and "willingness to act." Those we interviewed reflected that the COVID-19 pandemic might provide an opportunity to bridge the gap between the capacity to generate foresight and the willingness to act on what is identified. Pandemics had previously been identified in foresight work in Malaysia and now, retrospectively, this is seen as a demonstration of the value of foresight with strategy.*

*In **New Zealand**, the assignment of a lead agency for particular threats and hazards was seen to have supported New Zealand's ability to respond quickly and efficiently to the pandemic, coupled with its cultural response to risk.*

*In **Singapore**, previous foresight work around pandemics was seen to have helped the government prepare. However, even where government is prepared, the population may be less prepared. The difference in response between SARS and COVID, when COVID first hit, was that people remembered SARS even if they hadn't lived through it and therefore had something to relate it to.*

The long-term implications of the pandemic are of course not known. The priority for foresight leaders is to understand the potential futures for their foresight ecosystems and keep a watchful eye on indicators of the direction of travel, in order to respond most effectively to ensure resilience and sustainability.

Section 5. The UK context

As part of mapping the landscape to allow the UK foresight ecosystem to make choices about where next, we also provide a high-level overview of the UK's journey.

Below is a narrative description of foresight in the UK based on a small number of interviews and SOIF's own knowledge and involvement in the UK foresight ecosystem. It focuses at the UK level; there is a lot of activity also underway in the devolved nations, particularly in Wales where the Wellbeing of Future Generations Act is a particularly strong example of how legislation is being used to bolster a foresight ecosystem.

The UK foresight ecosystem and its origins

The origins of strategic foresight in UK government can be traced to the post World War II period when nations sought to rebuild themselves and avoid repeating the mistakes of the past, and the threat of nuclear war moved preparing for the worst higher up the political agenda. It is hard to pinpoint a precise starting date — the story is one of evolution not creation — but the milestones include:

- William Beveridge's 1942 post-war reconstruction plan. Future-facing by nature, this tackled what Beveridge called the "five giants on the road to reconstruction", want, disease, ignorance, squalor and idleness, and asked the question, 'What kind of a country do we want to be?'

- The creation of the UK Policy Planning Staff (UKPPS) at the Foreign and Commonwealth Office in 1962. Based on the model set up by George Kennan and George Marshall at the US State Department in 1947, the UKPPS was to be a separate entity but work with planners in other Whitehall departments, and draft and distribute planning papers

- The setting up, in 1971, of the Central Policy Review Staff (CPRS) by Conservative Prime Minister Edward Heath. Led, in its early years, by Lord Rothschild, former research director of Shell, a pioneer of strategic foresight and futures work in the private sector, the CPRS created a strategic think-tank at the centre of government

- The announcement in 1993 of a foresight programme in the Office for Science and Technology, part of what was then the DTI (Department for Trade and Industry). This unit has evolved into the current GOS Foresight team.

Tony Blair created units for innovation and strategic thinking when he first came to power in 1997, and by 2002 two of these had morphed into the Prime Minister's Strategy Unit (PMSU). The successor to Heath's CPRS, the PMSU created a standing capability for long-term thinking at the heart of government, looking beyond the parliamentary term to emerging policy developments — in health, transport, education, welfare, etc — 10, 25, and even 50, years out.

The 2000s also saw a re-focusing of the GOS Foresight programme to all the 'big issues' affecting the future, beyond just science and technology. This included the creation of the

cross-departmental Horizon Scanning Centre (HSC) inside GO-Science.

Just as importantly, in parallel there was a significant 'distribution' of foresight work — to local government and the public sector more generally. Three 'events' in particular stand out. In 2000, the Local Government Act included a statutory requirement for local authorities to develop a 20-year community strategy to promote and improve the economic, social and environmental well-being of their areas. Five years later, the Scottish Parliament established Scotland's Futures Forum, a think-tank looking "beyond the electoral cycle" to enable MSPs to "consider the effects of decisions taken today on Scotland's long-term future". In 2015, the Welsh Assembly passed the Well-being of Future Generations (Wales) Act, establishing the Office of the Future Generations Commissioner.

Meanwhile, non-departmental public bodies (NDPBs) such as Natural England and the Environment Agency were producing major pieces of futures work, and the police were developing an operational futures tool for forensic teams.

The MoD, the natural locus for intelligence work and early warning systems, now takes a more holistic approach to the future. Since the 1990s, its lens has broadened to include social and environmental drivers of change, partly, perhaps, as a result of the collapse of the Berlin Wall and the changing socio-political and geopolitical landscape. Its Global Strategic Trends (GST) report, published every four years since 2002, "takes a comprehensive view of the future" and the strategic context for decision-making, covering issues such as climate change, globalisation and global inequality. More recently it has had an explicit remit to use its work to influence and inform partners and allies, which has in turn influenced its priorities and the way it develops the GST.

It would be a mistake to think of the development of foresight in UK government as generally 'linear'. Its history is much more fluid than that. The PMSU was disbanded in 2010, much like its predecessor, the CPRS, had been in 1983, and there is currently no equivalent unit for the development of cross-government, long-term strategy in Whitehall.

A 2012 Public Administration Select Committee (PASC) report concluded: "We do not consider that the process of strategic thinking in Government currently reflects a virtuous circle of emergent strategy. We have little confidence that Government policies are informed by a clear, coherent strategic approach, itself informed by a coherent assessment of the public's aspirations and their perceptions of the national interest … Policy decisions are made for short-term reasons, little reflecting the longer-term interests of the nation." Our work in this project and elsewhere echoes these findings.

The 2013 Day Review of cross-government horizon scanning was commissioned by the Cabinet Secretary to consider how departments use horizon scanning and to make recommendations on how best to enable effective, shared strategic analysis across government on the future challenges facing the UK. The review made recommendations on having a senior champion, a commissioning process and structures to support horizon scanning.

A subsequent 2015 PASC report found that while some progress had been made, both horizon scanning and financial planning were "disjointed" and that there was "no comprehensive understanding across government as a whole of

the future risks and challenges facing the UK" The report noted that a report eight years prior had similarly "urged the Government to take a more coherent approach to strategic thinking".

Since 2012, the senior champion role has sat with the Cabinet Secretary under various iterations of a Cabinet Secretary Advisory Group (CSAG). CSAG, originally led by Sir Jeremy Heywood, had a remit to incorporate horizon scanning into government work and commission further horizon scanning for policy implications. As of autumn 2020, discussions on forward looking issues amongst permanent secretaries were taking place as monthly Strategy Seminars, under the leadership of the Cabinet Office Chief Operating Officer, Alex Chisholm.

In 2014, the Cabinet Office's Horizon Scanning Secretariat, which provided support to CSAG, and GO-Science's Horizon Scanning Centre merged to form the Horizon Scanning Programme team. The Cabinet Office role sat within the Economic and Domestic Secretariat (EDS) Projects team. GO-Science futures and foresight project work continued in parallel. Responsibility for Strategy Seminars now sits with the Civil Service Group in Cabinet Office. An expanded GO-Science team covers emerging technologies, futures resources, advice, capability building, foresight projects and convenes the cross-government Heads of Horizon Scanning Group, a peer group support network for futures practitioners.

As the timeline in annex 3 shows, the story is one of stopping and starting, of steps taken backwards as well as forwards — of progress but not consistent progress.

What the findings might mean for the UK

We have outlined the features that make up successful and sustainable foresight ecosystems, as well as the need for these to be shaped in the way that is right for the relevant national context. And we have shown how foresight systems in other countries activate these features. Having set out a high-level overview of the state for strategic foresight at the national government level in the UK and particularly in England, we hope that those who are interested in a sustainable foresight ecosystem find options and possibilities for where next in the UK.

Developing and sustaining a foresight ecosystem is not easy; it takes years of work and comfort with a cyclical approach, often feeling like one is going back around the same ground although usually in a different way and with a different context. But the benefits are massive; it is critical that policy-makers in all areas are able to grapple with uncertainty, complexity and the unpredictable possibility of the future or many futures. That in doing so policies become more agile, more effective and more resilient to shocks. And that choices are made to shape the preferred future out of the many that may emerge.

We hope this report provides guidance and possibility for those who are advocating for governing in complexity to continue to grow and thrive.

Annexes

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Annex 1: Case studies

Contents

1. How to read the case studies

The case studies are set out in three sections:

Section 1. What was this case study selected?

This section describes why the case study was included in the programme of work. Four characteristics were evaluated as part of the selection process:

Comparability: how similar to the UK is the socio-cultural and government context of this country (1 – not similar at all; 5 – very similar)

Activity: how involved and busy is the foresight ecosystem in that country

Impact: the extent to which the foresight ecosystem is seen to be influencing policy, including its capacity to survive different administrations and governments

Innovation: the level of new and cutting-edge foresight work underway in that system

These assessments are of course subjective, based on SOIF's own experience and expertise, and discussed and agreed with the GO Science foresight team.

Section 2. Case studies

Each of the eight case studies showing why the case was selected, key themes, a summary of the different aspects of the case study mapped to the capability features, and a timeline showing some of the key milestones in the development of each countries foresight ecosystem.

Section 3: Summary of the information

Summary tables showing:

A. Key themes. The most compelling and relevant insights emerging from the given case study based on priorities for the UK system.

B. Key components summarised by the four capability features for a sustainable ecosystem

C. Key components summarised by country and capability feature

The components are not listed in any particular priority order.

2. Why was this case study selected?

The table below shows the selection assessments for each of the case studies.

This initial selection was based on existing awareness and knowledge of the countries and does not reflect an absolute judgement of the country's foresight ecosystem or capability.

Country	Description	Comparability	Activity	Impact	Innovation
Canada	Canada was chosen because it has a similar government structure to the UK at the national level, if less so at the regional tier. It also has one of the most resilient foresight structures, particularly the Policy Horizons Canada (Policy Horizons) unit.	Medium/high 4	High 5	High 5	Medium/high 4
Finland	Finland has strong institutions for foresight across the system including in the legislature, the executive and funded non-departmental public bodies. It is an example of a well-structured and well-connected ecosystem for long-term thinking.	Medium/high 4	High 5	High 5	High 5
Malaysia	Malaysia is an example of using foresight to create a national vision and to create cohesion across sectors. The focus has historically been on emerging technology, although this has broadened to include other aspects of change including the economy and society.	Medium 3	Medium 3	Medium 3	Medium/low 3
Netherlands	Although smaller than the UK, there are structural similarities with the government of the Netherlands. Decision-making in the Dutch system is grounded in consensus building (known as the polder-model) which includes a strong orientation toward consensus and consultation.	Medium 3	Medium/high 4	Medium/high 4	Medium/high 4
New Zealand	New Zealand was chosen as a place where investment in foresight has been driven across specific departments and topics and where a sense of stewardship is one of the drivers of foresight activity.	Medium/high 4	High 5	Medium/high 4	High 5
Singapore	Singapore is regularly referenced as the most developed foresight ecosystem in the world. Established by a highly effective champion, there are clear structures and processes for foresight with impact.	Medium/low 2	High 5	High 5	High 5
United Arab Emirates	The United Arab Emirates (UAE) was chosen to provide insight from a system with significant investment in foresight and futures within a governing context that is different than the UK.	Low 1	High 5	Medium 3	High 5
United States	The USA has a large central government infrastructure. Each state also carries significant policy authority for domestic areas in their localities. There is a long history of foresight practice at national and local level, with pockets of sustained activity in some areas.	Medium 3	Medium 3	Medium/high 4	High 5

3. Case studies

1. Canada
2. Finland
3. Malaysia
4. The Netherlands
5. New Zealand
6. Singapore
7. United States
8. United Arab Emirates

Canada

Why was this case study selected?

Canada was chosen because it has a similar government structure to the UK at the national level, if less so at the regional tier. It also has one of the most resilient foresight structures, particularly the Policy Horizons Canada (Policy Horizons) unit.

4 Comparability to UK system Medium/high.	**5 Activity across the ecosystem** High.	**5 Impact at system levels** High.	**4 Level of innovation** Medium/high.

Key themes

- A strong central foresight resource, Policy Horizons has lasted through multiple administrations. Responds to demand from various federal departments and agencies, while developing its own foresight work in emerging areas. A Deputy Minister Steering Committee provides oversight and guidance.
- Success of Policy Horizons partly depends on engagement of senior officials with its foresight work, incorporation of its foresight findings and methods to departmental processes, Deputy Minister Steering Committee support, as well as the role of the Privy Council Office to bridge into mainstream policy-making.
- Line ministries have varying foresight capabilities which they use to pursue and deliver activities relevant to their own. There is mixed levels of engagement and coordination between ministries, agencies and Policy Horizons.

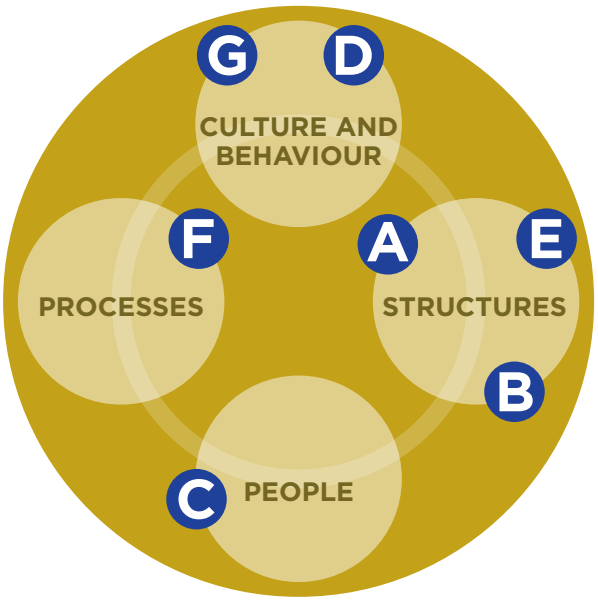
Capability features for a sustainable foresight ecosystem

A. Policy Horizons has lasted through multiple administrations. It has three roles: analysing the emerging policy landscape, engaging in conversations with public servants to inform policy and decision-making, and building foresight literacy and capacity across the federal public service. Most recent work has included foresight on COVID-19, bio-digital convergence, the Next Digital Economy and social futures, which are newer areas of focus for the team and for policy-makers.

B. The Privy Council Office sits on the Steering Committee of Policy Horizons and plays a crucial role in linking foresight work into mainstream policy processes. The relationship with and buy-in from the Privy Council Office is seen as crucial to creating impact.

C. Strong leadership at many levels has allowed Policy Horizons' foresight practice to evolve and mature over time.

D. There is growing awareness and efforts across the foresight ecosystem to broaden the voices and views incorporated into foresight work. For example, Policy Horizons created a Federal Foresight Network across the public service and there is an explicit aim to include participation of Indigenous peoples.



E. Ministries with foresight capabilities include Canada Revenue Agency, Health Canada, Global Affairs Canada and the Department of National Defence.

F. Policy Horizons measures its influence through feedback from the Steering Committee members and users in line ministries on how they value the foresight work. It also looks at the level of demand and the types of asks that come from departments and agencies within the public service, including senior leaders within those organisations.

G. There is a recognised need within the community to improve communication around the concept of foresight and its role in policy. Foresight is often seen as remote to decision-making but is gaining credibility, including in the light of COVID-19. There is strong demand for strengthening foresight capacity across the Government of Canada.

Timeline	Key milestones
1945	Ministry of State and Technology is set up, including some attention to what the future might bring.
1967	Montreal hosted the World Expo with a focus on "The World of Tomorrow".
1973	Interdepartmental Committee on Technological Forecasting established within the Ministry of Science and Technology. Advanced Concepts Centre, Environment Canada established, focusing on studies of the future of energy and renewable energy.
1976	Canadian Association for Futures Studies conference established and held national conferences over 10 years, with extensive government participation and financial support.
1976-1989	System operates with no major change.
1989	Development of the Inter-departmental Committee for Futures and Forecasting (ICFF), bringing together leaders representing 40 federal departments and agencies to consider future trends and their implications for policy.
1990	Department of National Defence (DND) collaborated to produce a foresight report on the future of Air Force.
1991	National Research Council (NRC) establishes a Futures and Synergy Network to support its science and technology foresight activities.
1994	Department of Foreign Affairs and International Trade (DFAIT, now Global Affairs Canada) begins a competitive intelligence training programme that includes foresight. In 1999, a small foresight and research group was set up in the Policy Planning group. There was a break in the foresight function of this group, which was revived in 2015.
1996-2010	The Policy Research Secretariat (PRS) was created in the Privy Council Office of the federal public service. In 2000, the PRS became known as Policy Research Initiative (PRI), which launched a number of horizontal policy research studies with a foresight component, often with engagement with senior management within the public service.
1996-2016	Environmental Scanning Practice Group brought together 20 departments to share scans and experience with scanning six times a year.
2006	Health Canada's foresight unit established – this is then closed in 2009.
2008-2009	At the request of the Clerk of the Privy Council, PRI launched Canada@150, a project to train 150 new public servants in scanning and foresight and brought extensive engagement with the deputy minister community.
2010	PRI shifted from a traditional think tank to a foresight centre, Policy Horizons Canada.
2011-2021	Policy Horizons produces a number of foresight studies, trains hundreds of public servants, builds a foresight network across government and collaborates with many departments to enhance the use of foresight in their work.
2017-2018	At the request of the Privy Council Office, Policy Horizons launched the Canada Beyond 150 project in 2017 to train 80 early-career public servants in foresight, as a follow-up to the Canada@150 project and in anticipation of Canada's 150th anniversary.
2010-2021	Growing interest and capacity in foresight and increased investment in Policy Horizons, Ministry level foresight capabilities and mechanisms for foresight collaboration.

Finland

Why was this case study selected?

Finland has strong institutions for foresight across the system including in the legislature, the executive and funded non-departmental public bodies. It is an example of a well-structured and well-connected ecosystem for long-term thinking.

4 Comparability to UK system Medium/high.	**5 Activity across the ecosystem** High.	**5 Impact at system levels** High.	**5 Level of innovation** High.

Key themes

- Finland entered into a deep economic downturn in the early 1990s, seen as a catalyst for foresight. Today, there is a strong focus on sustainability and an awareness of the need to be prepared for risks, crises and vulnerabilities while focusing on driving the economy forward.
- Foresight in Finland closely links parliament and the executive branch and the innovation infrastructure in society. The executive branch is closely linked with universities, keeping abreast of innovation.
- Requirement for Government Report on the Future sets long-term strategic agenda. Translated into the executive with parliamentary oversight.

Capability features for a sustainable foresight ecosystem

A. Government Report on the Future produced by government including engagement with the public, third sector, private sector and universities.

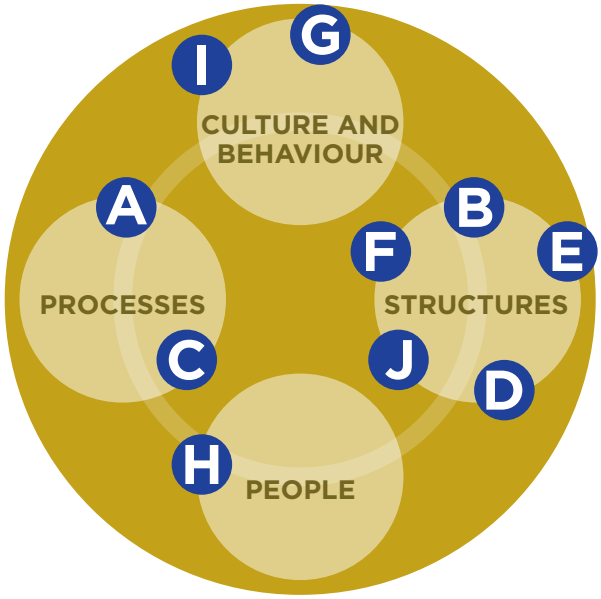
B. Parliamentary Committee for the future has approval role for the Report on the Future and uses it to signal strategic priorities for the next Government term. The Committee also produces its own futures reports on key issues.

C. Ministries required to proaduce their own futures reviews to inform government programming.

D. Financially and politically independent think-tank, Sitra, reports to Parliament, with a remit to fund research and innovation, to do its own work and to provide insight to government and other actors on the long-term.

E. Government Foresight Group promotes foresight at a national and network-wide level to link foresight and decision-making processes.

F. National Foresight network coordinated by Prime Minister's Office and Sitra, connects Government Foresight Group with foresight hubs across private sector, academia, regional councils and the wider research and innovation system. Including hosting foresight Fridays, national seminars and thematic events.



G. Government participates in international foresight activity, including the Network of Institutions for Future Generations

H. Finland Futures Research Centre in the University of Turku dedicated to futures studies in academia. There are also many actors seeking to popularise futures thinking and change making, for example the Future Makers project by Sitra.

I. There are mixed views on the level of conflict or competition within the system as a result of capacities and networks having some overlapping roles.

J. Foresight initiatives also exist at regional level (municipalities, regional councils, etc.).

Timeline	Key milestones
1917	Finland declares independence.
1967	Sitra established by Parliament in commemoration of the nation's fiftieth year of independence. Sitra set up as a gift to the Finnish people people with a mission to to build the successful Finland of tomorrow.
1967-1990s	System operates with no major change.
1990s	Economic crisis prompts many Finnish ministries, private organisations, councils and research organisations to adopt foresight methods and activities.
1992	The Futures Research Centre, a department in the Tuku School of Economics founded by collaboration of three universities.
1993	The Committee for the Future was established in Parliament as a temporary unit. The first report on the Future was produced in 1993.
2001	The Committee for the Future established as a permanent body. Subsequent reports have been produced for every parliamentary term (in 1996, 2001, 2004, 2008, 2013, 2017)
2013	First Report on the Future produced by Government and Parliament; submitted to the Committee for the Future to set strategic policy goals for Finland.
2016	Hosts the Network of Institutions for Future Generations annual conference.
2018	Second Report on the Future produced by Government and Parliament; submitted to the Committee for the Future to set strategic policy goals for Finland.

Malaysia

Why was this case study selected?

Malaysia is an example of using foresight to create a national vision and to create cohesion across sectors. The focus has historically been on emerging technology, although this has broadened to include other aspects of change including the economy and society.

3 **Comparability to UK system** Medium.	3 **Activity across the ecosystem** Medium	3 **Impact at system levels** Medium.	3 **Level of innovation** Medium.

Key themes

- Commitment to long-term development of a harmonious, prosperous and sustainable nation is enshrined in the Rukun Negara (national principles) proclaimed in 1970. Focus on just, liberal, progressive and inclusive society that makes use of science and modern technology.
- Powerful, visible and long-standing champions leading foresight efforts have helped sustain activity and ecosystem over time.
- Strong focus around visioning, especially linked to Science, Technology and Innovation but limited success institutionalising across the ecosystem. This is being addressed through the National Policy on STI (2021-2030) and the 10-10 My STIE Framwork, with a focus on institutional frameworks and strengthening science, technology and innovation.

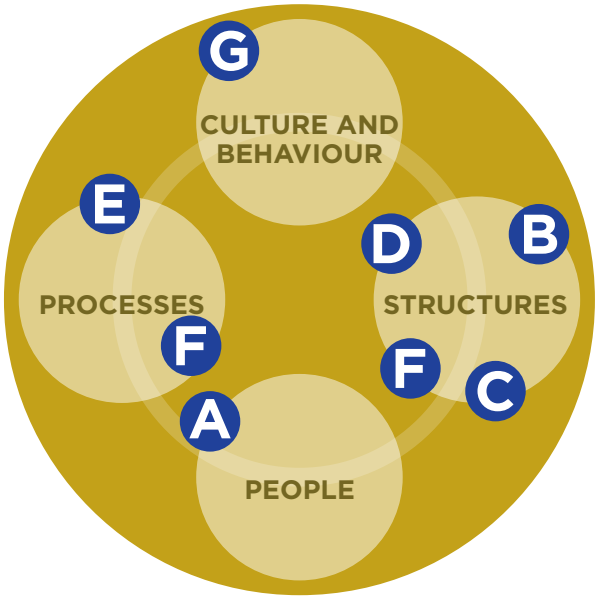
Capability features for a sustainable foresight ecosystem

A. Malaysia's Tan Sri Dr. Omar Abdul Rahman, former Science Advisor to the Prime Minister, has been a long-standing proponent of foresight, driving strategic level investment and attention to foresight, building capacity and appetite for the work.

B. Malaysia has invested in a number of foresight institutions, but interviewees felt more could be done, including developing a dedicated foresight unit within government with a clear call for institutionalisation.

C. Malaysian Industry-Government Group for High Technology (MIGHT) leads on foresight work, with a focus on new and emerging technology. Originally under the Prime Minister Department but now moved to the Ministry of Science, Technology and Innovation. MIGHT's governance, board, networks and work offer an example of public and private partnerships in foresight for technology use and business development with considerable consultation. Governed by government and industry co-chair who consult on agenda with PM twice a year.

D. MIGHT includes the Malaysia Foresight Institute, or myForesight which provides training and runs consultations and projects, networking and horizon scanning.



E. Foresight work in Malaysia is often focused on vision setting. Early visions were aspirational, but not linked to action. More recent visions have had a stronger focus on prioritisation and action. These include the Academy of Sciences Malaysia's Envisioning Malaysia 2050: A Foresight Narrative, and Malaysia 2050 - Emerging Science, Engineering & Technology (ESET) report.

F. Malaysia is focused on building capacity among young people. This explicit commitment to joint and future ownership means there is collective, long-term buy in to the plan. Malaysia also hosts one of the first UNESCO chairs of foresight at the Universiti Sains Islam Malaysia supporting futures literacy.

Timeline	Key milestones
1984	Tan Sri Dr. Omar Abdul Rahman was appointed as Science Advisor to the Prime Minister in 1984 and subsequently launches a foresight programme that focuses on values, beliefs and social cohesion.
1991	Vision 2020 is introduced by Prime Minister Mahathir Mohamad who served as the fourth and seventh Prime Minister of Malaysia. Developed during the Sixth Malaysia Plan the vision sets out a nation that is self-sufficient and industrialised by the year 2020. The vision covers all parts of life, from economic prosperity, social well-being, education, political stability and psychological balance.
1992	The Ministry of Science, Technology and Innovation (MOSTI), uses the Industrial Technology Development: A National Plan of Action to create the Malaysia Science and Technology Information Centre (MASTIC).
1993	Malaysian Industry-Government Group for High Technology (MIGHT) is established as an independent, non-profit technology think tank that comes under the Prime Minister's Office. Tan Sri Dr. Omar Abdul Rahman appointed Founding Chairman of MIGHT.
1995	Academy of Sciences of Malaysia (ASM) is founded. Commonwealth Partnership for Technology Management established, building on collective work started by Chief Scientific Advisers coming together in the 1980s to consider the use of science and technology for the development of the emerging economies.
1996	National Technology Action Plan (NTAP), was launched using to guide technology planning and Research & Development (R&D) looking at 10-year future scenarios.
2009	National Technology Foresight 2020 was conducted to identify National research priority arrears was conducted by the Ministry of Science Technology & Innovation (MOSTI)
2010	Under MIGHT, the Global Science and Innovation Advisory Council is established to optimise foresight capabilities across the nation through engaging with a network of international experts, academics, public sector practitioners and business people. The Academy of Sciences Malaysia embarked on foresight studies and initiatives under the Mega Science studies involving 15 different sectors since 2010.
2012	MIGHT is expanded to create the Malaysia Foresight Institute (also known as myForesight).
2015	Professor Sohail Inayatullah becomes the first UNESCO Chair in Futures Studies at Universiti Sains Islam Malaysia promoting futures literacy in Malaysia.
2016	A Foresight and Strategic Data Division was established in the Ministry of Science, Technology and Innovation in October 2016.

Timeline	Key milestones
2017	Transformasi Nasional 2050 (2050 National Transformation or TN50) is launched by the Prime Minister as a two year national development initative. The programme was formulated by gathering people's aspirations and ideas particularly young adults and youth through a bottom-up approach while quantifying the economic, social, cultural and environmental targets and milestones. The TN50 programme was led by the Ministry of Youth and Sports and received strong participation and support from the younger generation and youth in the country. Envisioning Malaysia 2050: A Foresight Narrative was a study published by ASM in 2017. It integrates the perspectives of science, technology and innovation, economics and finance, society and culture as well as geopolitics.
2018	The Science Advisor's Office dissolved in 2018. MIGHT moves to the Ministry of Science, Technology and Innovation. National Transformation 2050 dissolved under the new *Pakatan Harapan* government. Envisioning Malaysia 2050: A Foresight Narrative by ASM continued to receive support andit formed the foundation for the development of the National Policy on Science, Technology and Innovation (2021-2030) and the National 10-10 Malaysia Science, Technology, Innovation and Economy (10-10 MySTIE) Framework to transform Malaysia into a High Tech Nation by 2030.
2020	National Policy on Science, Technology and Innovation (DSTIN) 2021-2030 and 10-10 Malaysian Science, Technology, Innovation and Economy (MySTIE) Framework launched. MySTIE developed utilising foresight approaches to to identify global science and technology drivers that will increase return on value (ROV) of socioeconomic drivers of the country. The framework uses a 'Whole-of-Government and Society' approach to ensure that science, technology, innovation and economic development policies and plans enhance economic growth, improve the livelihood as well as quality of life of the citizens and global competitiveness of Malaysia as outlined in the national Shared Prosperity Vision 2030.

The Netherlands

Why was this case study selected?

Although smaller than the UK, there are structural similarities with the government of the Netherlands. Decision-making in the Dutch system is grounded in consensus building (known as the polder-model) which includes a strong orientation toward consensus and consultation.

3 **Comparability to UK system** Medium.	4 **Activity across the ecosystem** Medium/high.	4 **Impact at system levels** Medium/high.	4 **Level of innovation** Medium/high.

Key themes

- Strong and long-standing pieces of foresight infrastructure that have matured over time. The structures themselves are strong enough to last even without a specific champion.
- Strong focus on consensus across government lends itself to integrating multiple voices in any process, including foresight.
- Legislature plays a growing role in setting requirements and expectations for long-term thinking.

Capability features for a sustainable foresight ecosystem

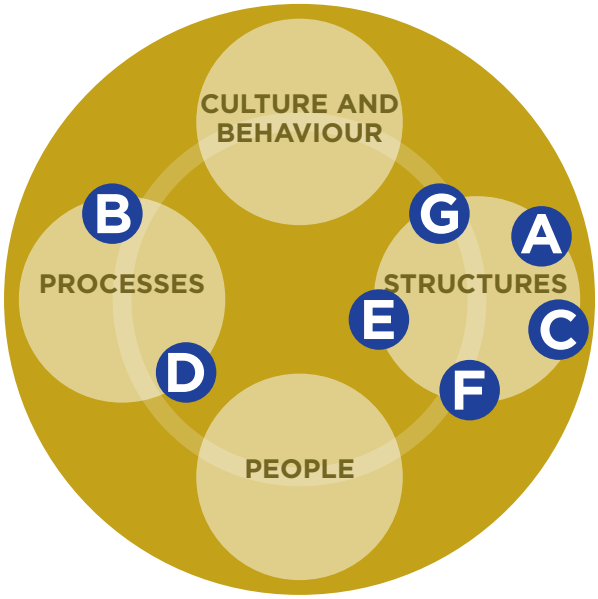
A. Foresight is largely ministerial or sectoral with significant de-centralisation. Cross-ministerial coordination is facilitated through the Council of Ministers.

B. There is evidence of the use innovative approaches to foresight in some Departmental teams. For example, the Ministry of Foreign Affairs has tried using 'Foresight Tournaments' to support policy development.

C. The Central Planning Bureau (CPB) for Economic Policy Analysis is an independent body within the Ministry of Economic Affairs and Climate, which maintains its own research agenda. It works with political parties (cabinet and opposition), government ministers, parliamentary members and factions and the Dutch Cabinet to provide reports about the past, present and future.

D. Group Decision Rooms allow planning councils, government departments, social organisations, scientific institutions and private companies (e.g., Unilever) to come together and consider mid to long-term policies.

E. The Netherlands Organisation for Applied Scientific Research (TNO) is an independent research organisation that supports government ministries to foster innovation in thematic areas such as healthy living or the circular economy. It supports industry and academic engagement.



F. The Netherlands Institute of International Relations Clingendael, the Hague Centre for Strategic Studies (HCSS) and the Rathenau Institute are third sector bodies that explore emerging and upcoming issues often related to security and international relations, as well as science and technology.

G. The Netherlands Scientific Council for Government Policy (WRR) is an independent advisory body, established under an Act of government. It provides advice on long-term strategic and cross-sectoral issues that have political or societal relevance. Reports can be commissioned or self-generated. They are delivered by Council members and reports are made public.

Timeline	Key milestones
1945	The Central Planning Bureau (CPB) is founded. It is funded by the government of the Netherlands, functions independently and focuses on economic analysis that is aligned with scientific rigour for policy development and public consumption. An independent finance committee is set up with a mandate around “stewardship for future generations’.
1972	The Netherlands Scientific Council for Government Policy (WRR) was established in as a temporary advisory council.
1974	WRR’s role with future research came into focus. It was determined that futures-oriented reports produced were to include policy recommendations to be useful to Cabinet.
1974-1977	The report "Maken wij er werk van? ('Are we working to make it work?') was published and demonstrated the linkages between WRR and policy.
1978	The WRR is established permanently by the Act Establishing a Scientific Council on Government Policy.
1978-2015	Systems operate with no major change.
2015	The Oslo Principles on Global Climate Change Obligations were adopted by legal experts around the world and the Supreme Court of the Netherlands rules that the Dutch government must cut its emissions by at least 25% by 2020. Subsequent rulings In 2018 by the Hague Court of Appeal and upheld by The Dutch Supreme Court in 2019 as part of the Urgenda Climate Case brought about due to government inaction.
2018	The Dutch Public Health Foresight Study is undertaken, providing the basis for the National Health Policy Memorandum. The Trend Scenario is the baseline for the National Prevention Agreement.
2020	The Judicial branch of the Council of State rules in favour of young climate activists who sue the state for failing to take their needs into account when considering opening up oil fields; plaintiffs win.

New Zealand

Why was this case study selected?

New Zealand was chosen as a place where investment in foresight has been driven across specific departments and topics and where a sense of stewardship is one of the drivers of foresight activity.

4 Comparability to UK system Medium/high.	**5 Activity across the ecosystem** High.	**4 Impact at system levels** Medium/high.	**5 Level of innovation** High.

Key themes

- Work to secure long-term thinking often done by setting up bodies that advise or inform government.
- Individual ministries, particularly defence, have their own in-house foresight capability that plays an ongoing role in policy development and decision-making.
- Relatively little investment in formal foresight capability and a sense that short-term continues to dominate, particularly in the parliament and the mainstream policy spaces.

Capability features for a sustainable foresight ecosystem

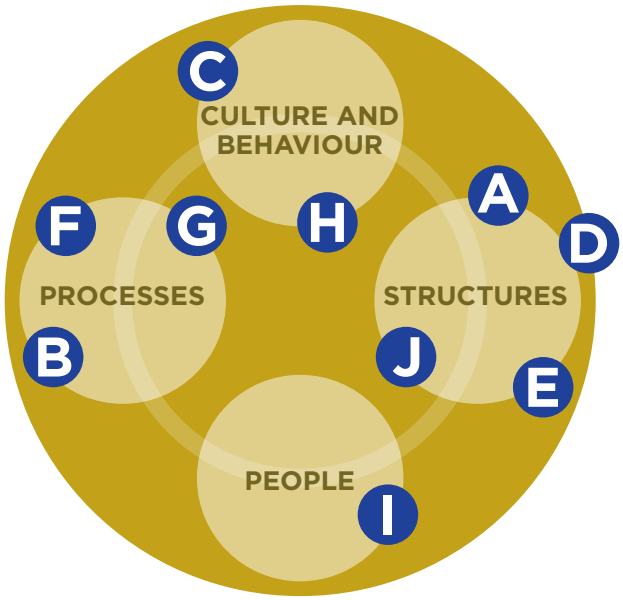
A. The Public Service Act 2020 requires long-term insight briefings be produced by the chief executive of each government department every three years. The briefing, which is unclassified, is to address medium- and long-term trends, risks and opportunities.

B. The 2019 Wellbeing budget, followed by the 2020 budget, sets out investment in activities for the long-term.

C. New Zealand endeavours to draw on methods from Maori to bring together multiple views and manage complexity. Maori culture has a concept of stewardship - kaitiakitanga -which means collective guardianship, for the sky, the sea and the land

D. Foresight capability exists in a number of public service departments including the Ministry of Foreign Affairs and Trade and the Ministry of Defence. The Ministry of Defence is staffed mainly by civilians and co-leads long-term defence thinking with the non-public service New Zealand Defence Force.

E. The National Library and Archives New Zealand, semi-autonomous business units of the Department of Internal Affairs, a central public service agency, have capacity as do health systems in places such as Canterbury.



F. The strategy unit of the Inland Revenue Department, the public service department responsible for tax revenue and advising tax policy, uses foresight methods in their work. A recent restructure has downgraded the size and prominence of the unit.

G. Some parliamentary mechanisms exist though the Parliamentary Commissioner for the Environment has scrutiny and review capacity to support for long-term management of resources including preventative measures.

H. There is a history of foresight being used in crisis response and risk management, with a centrally coordinated response, but strong integration into communities and private sector.

I. Semi-formal networks bring together public servants interested in foresight but are typically unfunded. Academics, non-profit organizations and some private providers play a role in supply and knowledge transfer. The National Assessments Bureau conducts strategic assessment and sits in the Department of the Prime Minister and Cabinet.

J. The Ministry of Transport uses foresight methods as inputs to the long-term transport plans they are legislatively required to produce. The Treasury have quite a long-standing (but small) team of economic forecasters responsible for providing the long-term fiscal forecasts required by the Public Finance Act.

Timeline	Key milestones
1936	Institute of Public Administration (IPANZ) established and produces forecasting and planning documents for New Zealand.
1960	The Industrial Development Conference held with the aim to develop a shared vision for economic diversification.
1977-1982	New Zealand Planning Act 1977 establishes the Commission for the Future and the New Zealand Planning Council. The Commision for the Future was disbaned in 1982.
1986	Environment Act of 1986 establishes the Parliamentary Commissioner for the Environment.
2001	New Zealand Post invites the public to submit their visions for the future of the nation as part of introducing the Kiwibank.
2002	State Services Commission began conducting futures research and developed the Futures Programme. As interest in futures projects increased, the Commission developed the Future Practitioners Forum, a network to support public servants in foresight. The Local Government Act 2002 mandated that local authorities create long-term plans for a minimum of 10 years.
2004	The Public Finance Act is modified to include every four years the Treasury is to report on the country's fiscal position, projecting out a minimum of 40 years.
2006-2007	The Maori Future Makers programme is established in the Ministry of Maori Development.
2013	The State Sector Act 1988 is amended to include 'stewardship', defined as 'active planning and management of medium and long-term interest, along with associated advice'.
2016	The Future of Work Commission report is published by the New Zealand Labour Party.
2020	The State Sector Act 1988 repealed and replaced with Public Service Act. Changes include a shift responsibility from individual agencies to the collective and a more unified approaches to public service. The Act also requires long-term insights briefings be produced by the chief executive of a department every three years. The briefing, unclassified, is to address medium and long-term trends, risks and opportunities related to New Zealand. Long and medium term are undefined in the legislation. The Department of Prime Minister and Cabinet (DPMC) is developing a horizon-scanning approach to improve long-term thinking on matters relating to national security strategy and to strengthen the National Risk Framework. The aim is to aid cross-government priority setting and influence strategy formation so that it is more resilient, far-sighted and adaptable. DPMC has been looking to approaches taken by other nations in this area and is using the Three Horizons model as the base approach. DPMC is working across government on horizon scanning with engagement likely over 2021. DPMC and Ministry of Business, Innovation and Employment are interested in scanning and impacts, risks and opportunities of emerging technologies. Initial conversations are starting to take place now and are anticipated to lead to a cross-government, strategic approach.

Singapore

Why was this case study selected?

Singapore is regularly referenced as the most developed foresight ecosystem in the world. Established by a highly effective champion, there are clear structures and processes for foresight with impact.

2 Comparability to UK system Medium/high.	**5 Activity across the ecosystem** High.	**5 Impact at system levels** Medium/high.	**5 Level of innovation** High.

Key themes

- Foresight has played a role from independence, helping to frame a national vision that is live to the geo-political location and the resources available. Focus is on highly skilled people as a primary resource.
- Strong and long-standing pieces of foresight infrastructure that have matured over time. Established and led by a highly effective champion.
- Investment in building a foresight-aware and literate civil service.

Capability features for a sustainable foresight ecosystem

A. The Centre for Strategic Futures (CSF) is a longstanding unit delivering and coordinating foresight work across government and with partners.

B. "Scenario Planning Plus" (SP+) tool developed by CSF is used by government bodies to engage in scenario planning and to examine likely and less likely signals and trends in preparation for the future.

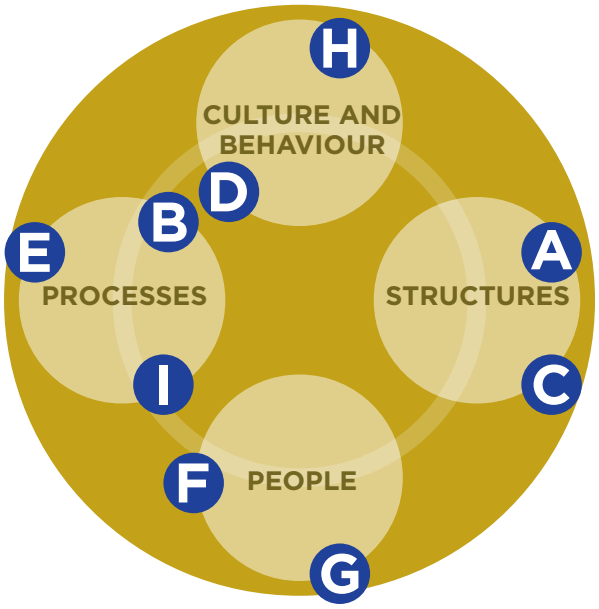
C. The Strategic Futures Network (SFN) brings together senior policy-makers to introduce new vocabulary and build awareness of emerging ministries.

D. CSF focuses on ensuring its work has policy impact, to maintain relevance and support. To that end, it will work on projects with varying timeframes from relatively near-term to long-term.

E. Strong knowledge-transfer including learning from their foresight journey in regular in-depth reports about what has worked and what could be better.

F. Foresight infrastructure and resource established by a vocal, effective and very senior champion who integrated foresight into all of the roles he played and plays across Singapore government.

G. Invests in, develops and rewards foresight skills including through training in the civil service college. Foresight skills seen as enablers of promotion and long-term success in the civil service.



H. Has invested in using and improving methods for engaging a broad audience, including the wider civil services and the public.

I. The CSF, together with the National Security Coordination Secretariat, hosts the biennial Foresight Week to support network building and identification of emerging issues. The most recent, in 2019, comprised the International Risk Assessment and Horizon Scanning Symposium (IRAHSS) with the theme "The Futures Reimagined" and the Foresight Conference with the theme "Society 4.0".

Timeline	Key milestones
1980s	The Ministry of Defence uses scenario planning in its work.
1991	Risk Detection and Scenario Planning Office established in the Ministry of Defence.
1995	Risk Detection and Scenario Planning Office as moved to the Prime Minister's Office's Public Service Division (PSD). Scenario Planning Office set up in the Prime Minister's Office.
2003	The Scenario Planning Office became the Strategic Policy Office (SPO), furthering the links between foresight and strategy. The International Risk Assessment and Horizon Scanning Symposium is established as a biennial event for leaders across the world to consider shared future risks.
2004	The RAHS programme was set up in the National Security Coordination Secretariat (NSCS). The overarching foresight infrastructure of the government, the RAHS programme comprised the RAHS Experimentation Centre and the Horizon Scanning Centre (HSC).
2009	Scenario Planning Plus (SP+) toolkit developed at the Horizon Scanning Centre in 2009 to complement and enhance the use of foresight in government.
2010	The Centre for Strategic Futures (CSF) set up as a think tank for foresight within the public sector. The Strategic Foresight Unit (SFU) was established under the Ministry of Finance and had responsibility for ensuring that government future work is built into budgeting. Within SPO, the Strategic Foresight Network (SFN) was established, led by the head of the civil service of Singapore.
2012-2013	Singapore hosts Our Singapore Conversation (OSC) where citizens were convened to discuss the future.
2015	The Future of Us Exhibition encourages visitors to learn about the possibilities for future of Singapore and share their thoughts on the future. CSF became part of the Prime Minister's Office's strategy group. Singapore hosted and part funded UNDP's Global Centre for Public Service Excellence (runs for 4 years). One of its four priorities at the time was expertise in building foresight capability. The GCPSE has since been reconstituted with a new agenda.
2019	Biennial Foresight Week hosted by CSF and the NSCS, comprising the International Risk Assessment and Horizon Scanning Symposium (IRAHSS) with the theme "The Futures Reimagined" and the Foresight Conference with the theme "Society 4.0".

United Arab Emirates

Why was this case study selected?

The United Arab Emirates (UAE) was chosen to provide insight from a system with significant investment in foresight and futures within a governing context that is different than the UK.

1 Comparability to UK system Low.	**5 Activity across the ecosystem** High.	**3 Impact at system levels** Medium.	**5 Level of innovation** High.

Key themes

- Strong drive for security following independence, including through economic diversification and social security.
- Foresight mixed between executive (Ministry of Cabinet Affairs) and bodies funded by government, such as the government-backed Dubai Future Foundation.
- Long-term visions set out developmental pathway, with strong emphasis on how emerging technology can transform society.

Capability features for a sustainable foresight ecosystem

A. Ministry of Cabinet Affairs (MOCA) is a central function that provides support to Cabinet and all ministerial councils. Responsible for building futures work into all government strategy and vision, with recommendations to the Prime Minister and Cabinet of the UAE.

B. Dubai Future Foundation (DFF) is a government-backed foundation inaugurated in 2016 by a Dubai government public statement to work on projects that promote long-term thinking and support long-term goals in Dubai. DFF has strong links to government, but is able to be more agile. It has a research, agenda setting, capability and partnership building agenda, but limited capacity to enforce implementation.

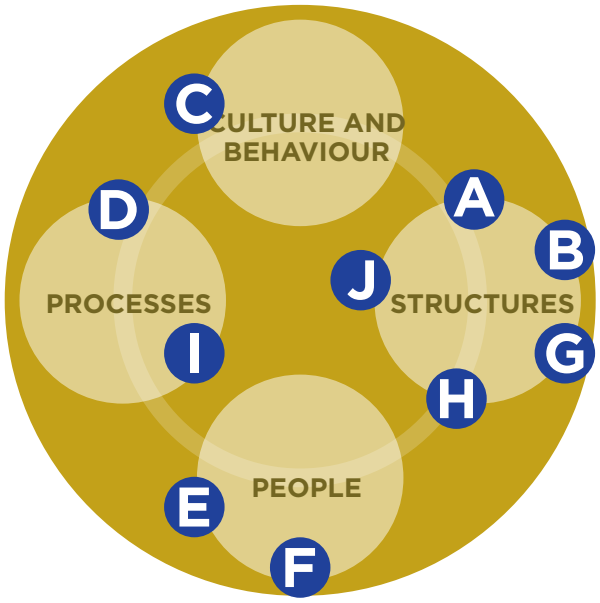
C. Strong reliance on relational politics. Understanding culture and power dynamics and cultivating relationships and allies.

D. Long-term Vision for UAE 2021 and UAE Centennial Plan 2071 create shared ambition and cohesion.

E. Dual investment in bringing in expertise to deliver and support knowledge transfer.

F. Dubai Future Academy provides government and private sector training.

G. The Museum of the Future launching in 2021 will be a AI-generated building providing public-facing immersive foresight work to educate public,



Ministers and civil servants. This builds on previous immersive experiences that were a central feature of the World Government Summit.

H. UAE hosts the World Government Summit and has a partnership with the World Economic Forum to host the Centre for the Fourth Industrial Revolution in the UAE. Strengthens networks, allows for experimentation and testing of emerging technology and identification of international best practice to apply to the UAE context.

I. Use of mixed, multiple and innovative methods to enrich processes and to create buy-in to insights and work.

J. National Advanced Sciences Agenda 2031 focuses on the long-term. Ministry of State for Advanced Sciences also focuses on the long-term of science.

Timeline	Key milestones
1971	The United Arab Emirates was founded as a constitutional federation of six emirates in 1971, following a declaration of independence from the UK. A seventh emirate joined the federation a year later.
1990	The Future Foresight and Decision Support Centre is established to support the Dubai Police General Command.
2007	Launch of first Government Strategy putting forth a strategic framework for government and public administration beginning of a series of government reforms, including restructuring ministries and departments, aligned around a Vision for UAE in 2021.
2010	UAE Vision 2021 launched.
2016	The Dubai Future Foundation (DFF) is established by the government in order to institutionalise futures work and deliver initiatives around knowledge sharing, imagination, capacity building and future design. Creation of the UAE Future Foresight Platform (focused on resources for foresight, capacity-building and knowledge sharing), the Future Foresight Strategy and annual networked meetings for Shaping the Future of the UAE. UAE government partners with the World Economic Forum (WEF) to host the Annual Meeting for Shaping the Future is an annual conference in January about Future of Governance.
2017	The Future Foresight Strategy sets out the aim to build national capacity with foresight; design future models for education, health, development and environment; build partnerships internationally; and institutionalise foresight as a feature of strategic government planning. Appointment of Minister of State for Artificial Intelligence and Minister of Cabinet Affairs. The Future Foresight Platform (FFP) was launched to be a virtual platform to share foresight knowledge and capacity-building materials.
2018	National Advanced Sciences Agenda 2031 and the 2021 Advanced Science Strategy. The 2031 Agenda sets out eight scientific priorities up to 2031 with 30 specific scientific targets for 2021. Ministry of Advanced Sciences established to deliver the plan.
2020	The UAE Centennial Plan 2071 is designed to map the government's work to "fortify the country's reputation" and invest in future generations. Annual meetings will be held to help unify efforts across federal and local levels and aid sector participation towards 2071. The Dubai Future Foundation and the World Economic Forum open the Centre for the Fourth Industrial Revolution UAE (C4IR UAE). The centre is a public-private collaboration for parties to share technological developments related to the fourth industrial revolution. Expo 2020 planned with a strong futures component – now postponed to 2021.

United States*

Why was this case study selected?

The USA has a large central government infrastructure. Each state also carries significant policy authority for domestic areas in their localities. There is a long history of foresight practice at national and local level, with pockets of sustained activity in some areas.

3 Comparability to UK system
Medium.

3 Activity across the ecosystem
Medium.

4 Impact at system levels
Medium/high.

5 Level of innovation
High.

Key themes

- Foresight in the US began primarily in the military after WWII, with organisations like RAND developing scenarios and other techniques to support national ambitions.
- Since 1997, the National Intelligence Council has published an unclassified strategic assessment of how key trends and uncertainties might shape the world over the next 20 years. This is a bedrock document for American foresight work and used by systems across the world.
- Some parts of government have strong and long-lasting foresight capabilities with decentralised capacity across federal government.

*The USA is the largest and most complex system in our review; this overview reflects what we were able to gather in the resources of this project, with a dominant focus on the federal community.

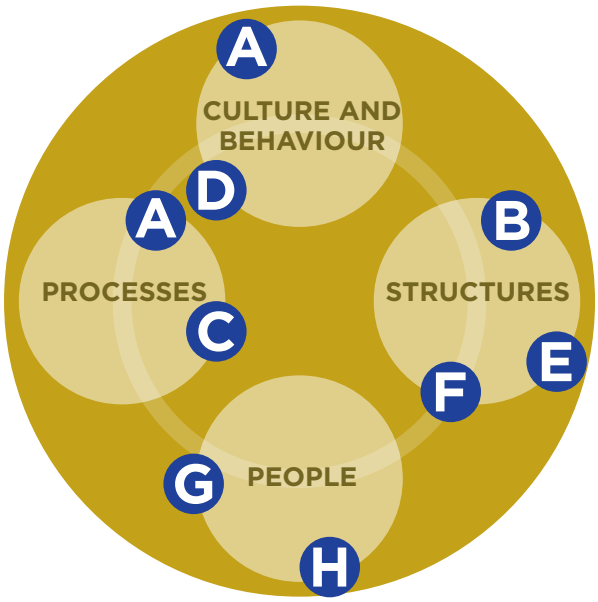
Capability features for a sustainable foresight ecosystem

A. Global Trends published every 4 years by the National Intelligence Council. Designed to provide context for the incoming presidential administration (even if second term). Strong role for outreach and engagement internationally with experts, universities, think tanks, science labs, businesses and government institutions.

B. Decentralised foresight capacity exists across federal government, including Central Intelligence Agency (CIA), U.S. Air Force, U.S. Coast Guard, U.S. Forest Service, Office of Public Management, National Aeronautics and Space Administration (NASA).

C. As part of a four-year planning cycle, Veteran Affairs and the U.S Coast Guard (USCG) conduct an intensive scanning exercise that is then continued in smaller efforts through the cycle. The activity feeds into recommendations that are formulated as a foresight report for the new cycle's Commandant. This then feeds into a strategic plan issued by the new office holder.

D. Strong networks of practitioners exist both nationally and internationally including the US Federal Foresight Community of Interest (FFCOI) and the Public Sector Foresight Network (international).



E. Government Accountability Office has a remit to provide analysis of how federal agencies manage and adopt technologies. They have been using foresight to inform their assessment of emerging technology; and are advancing how supreme audit institutions use foresight and scenario planning.

F. Other areas where foresight is effectively being practiced but not institutionalised into a policy-making framework for foresight activity at the national level include the President's Council of Advisors on Science and Technology and the President's Council on Jobs and Competitiveness. These are operators who sit outside policy arenas but have the mandate to study implications of future policy-making through a group of experts.

G. Interviewees noted the importance with the US system of having close advisors who can provide a critical perspective, with trust, but outside of the political or strategic agenda. The importance of visual communication has also been highlighted with intelligence and other agencies.

H. Many departments have developed in-house programmes, including through partnerships with futures studies programmes such as those at the University of Hawaii and University of Houston.

Timeline	Key milestones
1945	The U.S. Government works with Federally Funded Research and Development Centers (FFRDCs) and other think tanks to inform public sector decision-making. For example, Project RAND, an organization formed immediately after World War II to connect military planning with research and development decisions, separates from the Douglas Aircraft Company of Santa Monica, CA, in May 1948 to become an independent, nonprofit organization dedicated to furthering and promoting scientific, educational and charitable purposes for the public welfare and security of the United States.
1970	Futurist Alvin Toffler releases Future Shock, which introduced the concept of "anticipatory democracy", where citizens and government are future-conscious in decisions.
1971	The Hawaii State Legislature created the Hawaii Research Center for Futures Studies at the university of Hawaii.
1972	US Congress establishes an Office of Technology Assessment (OTA) to support policy-makers with information on technology and science topics. Dismantled in 1995.
1974	House of Representatives in Congress rules that nearly all standing committees of the House must undertake forecasting efforts on "matters within the jurisdiction of that committee." This rule still exists but has very rarely ever been exercised.
1982	The Program of the Future established at the University of Houston in Texas.
1990s	The first Global Trends report published by the National Intelligence Council, in partnership with global experts to anticipate upcoming changes and their impact on policy-making.
2000	First National Intelligence Committee Global Trends report published as unclassified.
2008	The Project for National Security Reform (PNSR), a nonprofit and nonpartisan organization focused on national security, released the 'Forging a New Shield' report which names the importance of foresight.
2010	CIA's Emerging Trends Program begins, with the aim to pinpoint trends relevant to intelligence. Products are shared across different agencies of the intelligence community The US Federal Emergency Management Agency (FEMA) launched its Strategic Foresight Initiative (SFI).
2013	The Department of Veteran Affairs established the Federal Foresight Community of Interest (FFCOI) to foster exchange of foresight practices and methods between think tanks, federal workers, strategists and industry.

Timeline	Key milestones
2018	Government Accountability Office (GAO) develops a Center for Strategic Foresight which reports to Congress and serves as a cross-cutting organization, housing eight non-resident foresight fellows with international expertise across the public sector, private sector, the third sector and academia.
2019	An inaugural conference held to explore US national security based on the themes of "deep space" and "deep fakes" or disinformation and fake news on social media.

3. Summary of the information

A. Key themes

The table below summaries the key themes for each of the case studies.

Country	Description
Canada	• A strong central foresight resource, Policy Horizons has lasted through multiple administrations. Responds to demand from various federal departments and agencies, while developing its own foresight work in emerging areas. A Deputy Minister Steering Committee provides oversight and guidance. • Success of Policy Horizons partly depends on engagement of senior officials with its foresight work, incorporation of its foresight findings and methods to departmental processes, Deputy Minister Steering Committee support, as well as the role of the Privy Council Office to bridge into mainstream policy-making. • Line ministries have varying foresight capabilities which they use to pursue and deliver activities relevant to their own. There is mixed levels of engagement and coordination between ministries, agencies and Policy Horizons.
Finland	• Finland entered into a deep economic downturn in the early 1990s, seen as a catalyst for foresight. Today, there is a strong focus on sustainability and an awareness of the need to be prepared for risks, crises and vulnerabilities while focusing on driving the economy forward. • Foresight in Finland closely links parliament and the executive branch and the innovation infrastructure in society. The executive branch is closely linked with universities, keeping abreast of innovation. • Requirement for Government Report on the Future sets long-term strategic agenda. Translated into the executive with parliamentary oversight.
Malaysia	• Commitment to long-term development of a harmonious, prosperous and sustainable nation is enshrined in the Rukun Negara (national principles) proclaimed in 1970. Focus on just, liberal, progressive and inclusive society that makes use of science and modern technology. • Powerful, visible and long-standing champions leading foresight efforts have helped sustain activity and ecosystem over time. • Strong focus around visioning, especially linked to Science, Technology and Innovation but limited success institutionalising across the ecosystem. This is being addressed through the National Policy on STI (2021-2030) and the 10-10 My STIE Framwork, with a focus on institutional frameworks and strengthening science, technology and innovation.
Netherlands	• Strong and long-standing pieces of foresight infrastructure that have matured over time. The structures themselves are strong enough to last even without a specific champion. • Strong focus on consensus across government lends itself to integrating multiple voices in any process, including foresight. • Legislature plays a growing role in setting requirements and expectations for longterm thinking.
New Zealand	• Work to secure long-term thinking is often done by setting up arm's length bodies that advise or inform government. • Individual ministries, particularly defence, have their own in-house foresight capability that plays an ongoing role in policy development and decision-making. • Relatively little investment in formal foresight capability, and a sense that short-term continues to dominate, particularly in the parliament and the mainstream policy spaces.

Country	Description
Singapore	• Foresight has played a role since independence, helping to frame a national vision that is alert to the geo-political location and the resources available. Focus is on highly skilled people as a primary resource. • Strong and long-standing pieces of foresight infrastructure that have matured over time. Established and led by a highly effective champion. • Investment in building a foresight-aware and literate civil service.
United Arab Emirates	• Strong drive for security following independence, including through economic diversification and social security. • Foresight mixed between executive (Ministry of Cabinet Affairs) and bodies funded by government, such as the government-backed Dubai Future Foundation • Long-term visions set out developmental pathway, with strong emphasis on how emerging technology can transform society.
United States	• Foresight in the US began primarily in the military after WWII, with organisations like RAND developing scenarios and other techniques to support national ambitions. • Since 1997, the National Intelligence Council has published an unclassified strategic assessment of how key trends and uncertainties might shape the world over the next 20 years. This is a bedrock document for American foresight work and used by systems across the world. • Some parts of government have strong and long-lasting foresight capabilities with decentralised capacity across federal government.

B. Aspects mapped by capability feature

Below are all of the key aspects of case studies mapped by capabilty feature. In some cases these cut across more than one feature.

Culture and behaviour

Country	Feature
Canada	• There is growing awareness and efforts across the foresight ecosystem to broaden the voices and views incorporated into foresight work. For example, Policy Horizons created a Federal Foresight Network across the public service and there is an explicit aim to include participation of Indigenous peoples. • There is a recognised need within the community to improve communication around the concept of foresight and its role in policy. Foresight is often seen as remote to decision-making but is gaining credibility, including in the light of COVID-19. And there is a strong demand for strengthening foresight capacity across the Government of Canada.
Finland	• Government participates in international foresight activity, including the Network of Institutions for Future Generations. • There are mixed views on the level of conflict or competition within the system as a result of capacities and networks having some overlapping roles.
Malaysia	• Malaysia is focused on building capacity among young people. This explicit commitment to joint and future ownership means there is collective, long-term buy in to the plan. Malaysia also hosts one of the first UNESCO chairs of foresight at the Universiti Sains Islam Malaysia supporting futures literacy.
Netherlands	
New Zealand	• New Zealand endeavours to draw on methods from Maori to bring together multiple views and manage complexity. Maori culture has a concept of stewardship - kaitiakitanga -which means collective guardianship, for the sky, the sea and the land. • There is a history of foresight being used in crisis response and risk management, with a centrally coordinated response, but strong integration into communities and private sector.
Singapore	• The Centre for Strategic Futures (CSF) focuses on ensuring its work has policy impact, to maintain relevance and support. To that end, it will work on projects with varying timeframes from relatively near-term to long-term. • Has invested in using and improving methods for engaging a broad audience, including the wider civil services and the public.
United Arab Emirates	• Strong reliance on relational politics. Understanding culture and power dynamics and cultivating relationships and allies.
United States of America	• Global Trends published every 4 years by the National Intelligence Council. Designed to provide context for the incoming presidential administration (even if second term). Strong role for outreach and engagement internationally with experts, universities, think tanks, science labs, businesses and government institutions. • Strong networks of practitioners exist both nationally and internationally including the US Federal Foresight Community of Interest (FFCOI) and the Public Sector Foresight Network (international).

Processes

Country	Feature
Canada	• Policy Horizons measures its influence through feedback from the Steering Committee members and users in line ministries on how they value the foresight work. It also looks at the level of demand and the types of asks that come from departments and agencies within the public service, including senior leaders within those organisations.
Finland	• Government Report on the Future produced by government including engagement with the public, third sector, private sector and universities. • Ministries required to produce their own futures reviews to inform government programming.
Malaysia	• Malaysian Industry-Government Group for High Technology (MIGHT) includes the Malaysia Foresight Institute, or myForesight which provides training and runs consultations and projects, networking and horizon scanning. • Foresight work in Malaysia is often focused on vision setting. Early visions were aspirational, but not linked to action. More recent visions have had a stronger focus on prioritisation and action. These include the Academy of Sciences Malaysia's Envisioning Malaysia 2050: A Foresight Narrative, and Malaysia 2050 - Emerging Science, Engineering & Technology (ESET) report.
Netherlands	• There is evidence of the use innovative approaches to foresight in some Departmental teams. For example, the Ministry of Foreign Affairs has tried using 'Foresight Tournaments' to support policy development. • Group Decision Rooms allow planning councils, government departments, social organisations, scientific institutions and private companies (e.g. Unilever) to come together and consider mid- to long-term policies.
New Zealand	• The 2019 Wellbeing budget, followed by the 2020 budget, sets out investment in activities for the long-term. • Some parliamentary mechanisms exist though the Parliamentary Commissioner for the Environment has scrutiny and review capacity to support for long-term management of resources including preventative measures. • The strategy unit of the Inland Revenue Department, the public service department responsible for tax revenue and advising tax policy, uses foresight methods in their work. A recent restructure has downgraded the size and prominence of the unit.
Singapore	• "Scenario Planning Plus" (SP+) tool developed by CSF is used by government bodies to engage in scenario planning and to examine likely and less likely signals and trends in preparation for the future. • Strong knowledge-transfer including learning from their foresight journey in regular in-depth reports about what has worked and what could be better. • CSF, together with the National Security Coordination Secretariat, hosts the biennial Foresight Week to support network building and identification of emerging issues. The most recent, in 2019, comprised the International Risk Assessment and Horizon Scanning Symposium (IRAHSS) with the theme "The Futures Reimagined" and the • Foresight Conference with the theme "Society 4.0".
United Arab Emirates	• Long-term Vision for UAE 2021 and UAE Centennial Plan 2071 create shared ambition and cohesion. • Use of mixed, multiple and innovative methods to enrich processes and to create buy-in to insights and work.
United States of America	• Global Trends published every 4 years by the National Intelligence Council. Designed to provide context for the incoming presidential administration (even if second term). Strong role for outreach and engagement internationally with experts, universities, think tanks, science labs, businesses and government institutions.

Structures

Country	Feature
Canada	• Policy Horizons has lasted through multiple administrations. It has three roles: analysing the emerging policy landscape, engaging in conversations with public servants to inform policy and decision-making, and building foresight literacy and capacity across the federal public service. Most recent work has included foresight on COVID-19, biodigital convergence, the Next Digital Economy and social futures, which are newer areas of focus for the team and for policy-makers. • The Privy Council Office sits on the Steering Committee of Policy Horizons and plays a crucial role in linking foresight work into mainstream policy processes. The relationship with and buy-in from the Privy Council Office is seen as crucial to creating impact. • Ministries with foresight capabilities include Canada Revenue Agency, Health Canada, the Public Health Agency of Canada, Global Affairs Canada and the Department of National Defence.
Finland	• Parliamentary Committee for the future has approval role for the Report on the Future and uses it to signal strategic priorities for the next Government term. The Committee also produces its own futures reports on key issues. • Financially and politically independent think-tank, Sitra, reports to Parliament, with a remit to fund research and innovation, to do its own work and to provide insight to government and other actors on the long-term. • Government Foresight Group promotes foresight at a national and network-wide level to link foresight and decision-making processes, • National Foresight network coordinated by Prime Minister's Office and Sitra, connects Government Foresight Group with foresight hubs across private sector, academia, regional councils and the wider research and innovation system. Including hosting foresight Fridays, national seminars and thematic events. • Foresight initiatives also exist at regional level (municipalities, regional councils, etc.)
Malaysia	• Malaysia has invested in a number of foresight institutions, but interviewees felt more could be done, including developing a dedicated foresight unit within government with a clear call for institutionalisation. • MIGHT leads on foresight work, with a focus on new and emerging technology. Originally under the Prime Minister Department but now moved to the Ministry of Science, Technology and Innovation • MIGHT's governance, board, networks and work offer an example of public and private partnerships in foresight for technology use and business development with considerable consultation. Governed by government and industry co-chair who consult on agenda with PM twice a year.
Netherlands	• Foresight is largely ministerial or sectoral with significant de-centralisation. Cross-ministerial coordination is facilitated through the Council of Ministers. • The Central Planning Bureau (CPB) for Economic Policy Analysis is an independent body within the Ministry of Economic Affairs and Climate, which maintains its own research agenda. It works with political parties (cabinet and opposition), government ministers, parliamentary members and factions, and the Dutch Cabinet to provide reports about the past, present and future. • The Netherlands Organisation for Applied Scientific Research (TNO) is an independent research organisation that supports government ministries to foster innovation in thematic areas such as healthy living or the circular economy. It supports industry and academic engagement. • The Netherlands Institute of International Relations Clingendael, the Hague Centre for Strategic Studies (HCSS) and the Rathenau Institute are third sector bodies that explore emerging and upcoming issues often related to security and international relations, as well as science and technology. • The Netherlands Scientific Council for Government Policy (WRR) is an independent advisory body, established under an Act of government. It provides advice on long-term strategic and cross-sectoral issues that have political or societal relevance. Reports can be commissioned or self-generated. They are delivered by Council members and reports are made public.

Country	Feature
New Zealand	• The Public Service Act 2020 requires long-term insight briefings be produced by the chief executive of each government department every three years. The briefing, which is unclassified, is to address medium- and long-term trends, risks and opportunities. • Foresight capability exists in a number of public service departments including the Ministry of Foreign Affairs and Trade and the Ministry of Defence. The Ministry of Defence is staffed mainly by civilians and co-leads long-term defence thinking with the non-public service New Zealand Defence Force. • The National Library and Archives New Zealand, semi-autonomous business units of the Department of Internal Affairs, a central public service agency, have capacity as do health systems in places such as Canterbury.
Singapore	• The CSF is a longstanding unit delivering and coordinating foresight work across government and with partners. • The Strategic Futures Network (SFN) brings together senior policy-makers to introduce new vocabulary and build awareness of emerging ministries.
United Arab Emirates	• Ministry of Cabinet Affairs (MOCA) is a central function that provides support to Cabinet and all ministerial councils. Responsible for building futures work into all government strategy and vision, with recommendations to the Prime Minister and Cabinet of the UAE. • Dubai Future Foundation (DFF) is a government-backed foundation inaugurated in 2016 by a Dubai government public statement to work on projects that promote long-term thinking and support long-term goals in Dubai. DFF has strong links to government, but is able to be more agile. It has a research, agenda setting, capability and partnership building agenda, but limited capacity to enforce implementation. • The Museum of the Future launching in 2021 will be a AI-generated building providing public-facing immersive foresight work to educate public, Ministers and civil servants. This builds on previous immersive experiences that were a central feature of the World Government Summit. • UAE hosts the World Government Summit and has a partnership with the World Economic Forum to host the Centre for the Fourth Industrial Revolution in the UAE. Strengthens networks, allows for experimentation and testing of emerging technology and identification of international best practice to apply to the UAE context. • National Advanced Sciences Agenda 2031 focuses on the long-term. Ministry of State for Advanced Sciences also focuses on the long-term of science.
United States of America	• Decentralised foresight capacity exists across federal government, including Central Intelligence Agency (CIA), U.S. Air Force, U.S. Coast Guard, U.S. Forest Service, Office of Public Management, National Aeronautics and Space Administration (NASA). • As part of a four-year planning cycle, Veteran Affairs and the U.S Coast Guard (USCG) conduct an intensive scanning exercise that is then continued in smaller efforts through the cycle. The activity feeds into recommendations that are formulated as a foresight report for the new cycle's Commandant. This then feeds into a strategic plan issued by the new office holder. • Government Accountability Office has a remit to provide analysis of how federal agencies manage and adopt technologies. They have been using foresight to inform their assessment of emerging technology; and are advancing how supreme audit institutions use foresight and scenario planning.

People

Country	Feature
Canada	• Strong leadership in Policy Horizons has allowed the practice to evolve and mature over time.
Finland	• Finland Futures Research Centre in the University of Turku dedicated to futures studies in academia. There are also many actors seeking to popularise futures thinking and change making, for example the Future Makers project by Sitra.
Malaysia	• Malaysia's Tan Sri Dr. Omar Abdul Rahman, former Science Advisor to the Prime Minister, has been a long-standing proponent of foresight, driving strategic level investment and attention to foresight, building capacity and appetite for the work.
Netherlands	
New Zealand	• Semi-formal networks bring together public servants interested in foresight but are typically unfunded. Academia and non-profit organisations play a role in supply and knowledge transfer.
Singapore	• Foresight infrastructure and resource established by a vocal, effective and very senior champion who integrated foresight into all of the roles he played and plays across Singapore government. • Invests in, develops and rewards foresight skills including through training in the civil service college. Foresight skills seen as enablers of promotion and long-term success in the civil service.
United Arab Emirates	• Dual investment in bringing in expertise to deliver and support knowledge transfer. • Dubai Future Academy provides government and private sector training.
United States of America	• Interviewees noted the importance with the US system of having close advisors who can provide a critical perspective, with trust, but outside of the political or strategic agenda. The importance of visual communication has also been highlighted with intelligence and other agencies. • Many departments have developed in-house programmes, including through partnerships with futures studies programmes such as those at the University of Hawaii and University of Houston.

C. Capability features mapped by country

Below are all of the examples of features from the case studies mapped by country. In some cases these cut across more than one feature.

Country	Culture and behaviour	Processes	Structures	People
Canada	There is growing awareness and efforts across the foresight ecosystem to broaden the voices and views incorporated into foresight work. For example, Policy Horizons created a Federal Foresight Network across the public service and there is an explicit aim to include participation of Indigenous peoples. There is a recognised need within the community to improve communication around the concept of foresight and its role in policy. Foresight is often seen as remote to decision-making but is gaining credibility, including in the light of COVID-19. And there is a strong demand for strengthening foresight capacity across the Government of Canada.	Policy Horizons measures its influence through feedback from the Steering Committee members and users in line ministries on how they value the foresight work. It also looks at the level of demand and the types of asks that come from departments and agencies within the public service, including senior leaders within those organisations.	Policy Horizons has lasted through multiple administrations. It has three roles: analysing the emerging policy landscape, engaging in conversations with public servants to inform policy and decision-making, and building foresight literacy and capacity across the federal public service. Most recent work has included foresight on COVID-19, biodigital convergence, the Next Digital Economy and social futures, which are newer areas of focus for the team and for policy-makers. The Privy Council Office sits on the Steering Committee of Policy Horizons and plays a crucial role in linking foresight work into mainstream policy processes. The relationship with and buy-in from the Privy Council Office is seen as crucial to creating impact. Ministries with foresight capabilities include Canada Revenue Agency, Health Canada, the Public Health Agency of Canada, Global Affairs Canada and the Department of National Defence.	Strong leadership in Policy Horizons has allowed the practice to evolve and mature over time.

Country	Culture and behaviour	Processes	Structures	People
Finland	Government participates in international foresight activity, including the Network of Institutions for Future Generations. There are mixed views on the level of conflict or competition within the system as a result of capacities and networks having some overlapping roles.	Government Report on the Future produced by government including engagement with the public, third sector, private sector and universities. Ministries required to produce their own futures reviews to inform government programming.	Parliamentary Committee for the future has approval role for the Report on the Future and uses it to signal strategic priorities for the next Government term. The Committee also produces its own futures reports on key issues. Financially and politically independent think-tank, Sitra, reports to Parliament, with a remit to fund research and innovation, to do its own work and to provide insight to government and other actors on the long-term. Government Foresight Group promotes foresight at a national and network-wide level to link foresight and decision-making processes National Foresight network coordinated by Prime Minister's Office and Sitra, connects Government Foresight Group with foresight hubs across private sector, academia, regional councils and the wider research and innovation system. Including hosting foresight Fridays, national seminars and thematic events. Foresight initiatives also exist at regional level (municipalities, regional councils, etc.)	Finland Futures Research Centre in the University of Turku dedicated to futures studies in academia. There are also many actors seeking to popularise futures thinking and change making, for example the Future Makers project by Sitra.

Country	Culture and behaviour	Processes	Structures	People
Malaysia	Malaysia is focused on building capacity among young people. This explicit commitment to joint and future ownership means there is collective, long-term buy in to the plan. Malaysia also hosts one of the first UNESCO chairs of foresight at the Universiti Sains Islam Malaysia supporting futures literacy.	Malaysian Industry-Government Group for High Technology (MIGHT) includes the Malaysia Foresight Institute, or myForesight which provides training and runs consultations and projects, networking and horizon scanning. Foresight work in Malaysia is often focused on vision setting. Early visions were aspirational, but not linked to action. More recent visions have had a stronger focus on prioritisation and action. These include the Academy of Sciences Malaysia's Envisioning Malaysia 2050: A Foresight Narrative, and Malaysia 2050 - Emerging Science, Engineering & Technology (ESET) report.	Malaysia has invested in a number of foresight institutions, but interviewees felt more could be done, including developing a dedicated foresight unit within government with a clear call for institutionalisation. MIGHT leads on foresight work, with a focus on new and emerging technology. Originally under the Prime Minister Department but now moved to the Ministry of Science, Technology and Innovation MIGHT's governance, board, networks and work offer an example of public and private partnerships in foresight for technology use and business development with considerable consultation. Governed by government and industry co-chair who consult on agenda with PM twice a year.	Malaysia's Tan Sri Dr. Omar Abdul Rahman, former Science Advisor to the Prime Minister, has been a long-standing proponent of foresight, driving strategic level investment and attention to foresight, building capacity and appetite for the work.

Country	Culture and behaviour	Processes	Structures	People
Netherlands		There is evidence of the use innovative approaches to foresight in some Departmental teams. For example, the Ministry of Foreign Affairs has tried using 'Foresight Tournaments' to support policy development. Group Decision Rooms allow planning councils, government departments, social organisations, scientific institutions and private companies (e.g. Unilever) to come together and consider mid- to long-term policies.	Foresight is largely ministerial or sectoral with significant de-centralisation. Cross-ministerial coordination is facilitated through the Council of Ministers. The Central Planning Bureau (CPB) for Economic Policy Analysis is an independent body within the Ministry of Economic Affairs and Climate, which maintains its own research agenda. It works with political parties (cabinet and opposition), government ministers, parliamentary members and factions, and the Dutch Cabinet to provide reports about the past, present and future. The Netherlands Organisation for Applied Scientific Research (TNO) is an independent research organisation that supports government ministries to foster innovation in thematic areas such as healthy living or the circular economy. It supports industry and academic engagement. The Netherlands Institute of International Relations Clingendael, the Hague Centre for Strategic Studies (HCSS) and the Rathenau Institute are third sector bodies that explore emerging and upcoming issues often related to security and international relations, as well as science and technology. The Netherlands Scientific Council for Government Policy (WRR) is an independent advisory body, established under an Act of government. It provides advice on long-term strategic and cross-sectoral issues that have political or societal relevance. Reports can be commissioned or self-generated. They are delivered by Council members and reports are made public.	

Country	Culture and behaviour	Processes	Structures	People
New Zealand	New Zealand endeavours to draw on methods from Maori to bring together multiple views and manage complexity. Maori culture has a concept of stewardship - kaitiakitanga -which means collective guardianship, for the sky, the sea and the land. There is a history of foresight being used in crisis response and risk management, with a centrally coordinated response, but strong integration into communities and private sector.	The 2019 Wellbeing budget, followed by the 2020 budget, sets out investment in activities for the long-term. Some parliamentary mechanisms exist though the Parliamentary Commissioner for the Environment has scrutiny and review capacity to support for long-term management of resources including preventative measures. The strategy unit of the Inland Revenue Department, the public service department responsible for tax revenue and advising tax policy, uses foresight methods in their work. A recent restructure has downgraded the size and prominence of the unit.	The Public Service Act 2020 requires long-term insight briefings be produced by the chief executive of each government department every three years. The briefing, which is unclassified, is to address medium- and long-term trends, risks and opportunities. Foresight capability exists in a number of public service departments including the Ministry of Foreign Affairs and Trade and the Ministry of Defence. The Ministry of Defence is staffed mainly by civilians and co-leads long-term defence thinking with the non-public service New Zealand Defence Force. The National Library and Archives New Zealand, semi-autonomous business units of the Department of Internal Affairs, a central public service agency, have capacity as do health systems in places such as Canterbury.	Semi-formal networks bring together public servants interested in foresight but are typically unfunded. Academia and non-profit organisations play a role in supply and knowledge transfer.

Country	Culture and behaviour	Processes	Structures	People
Singapore	The Centre for Strategic Futures (CSF) focuses on ensuring its work has policy impact, to maintain relevance and support. To that end, it will work on projects with varying timeframes from relatively near-term to long-term. Has invested in using and improving methods for engaging a broad audience, including the wider civil services and the public.	"Scenario Planning Plus" (SP+) tool developed by CSF is used by government bodies to engage in scenario planning and to examine likely and less likely signals and trends in preparation for the future. Strong knowledge-transfer including learning from their foresight journey in regular in-depth reports about what has worked and what could be better. CSF, together with the National Security Coordination Secretariat, hosts the biennial Foresight Week to support network building and identification of emerging issues. The most recent, in 2019, comprised the International Risk Assessment and Horizon Scanning Symposium (IRAHSS) with the theme "The Futures Reimagined" and the Foresight Conference with the theme "Society 4.0".	The CSF is a longstanding unit delivering and coordinating foresight work across government and with partners. The Strategic Futures Network (SFN) brings together senior policy-makers to introduce new vocabulary and build awareness of emerging ministries.	Foresight infrastructure and resource established by a vocal, effective and very senior champion who integrated foresight into all of the roles he played and plays across Singapore government. Invests in, develops and rewards foresight skills including through training in the civil service college. Foresight skills seen as enablers of promotion and long-term success in the civil service.

Country	Culture and behaviour	Processes	Structures	People
United Arab Emirates	Strong reliance on relational politics. Understanding culture and power dynamics and cultivating relationships and allies.	Long-term Vision for UAE 2021 and UAE Centennial Plan 2071 create shared ambition and cohesion. Use of mixed, multiple and innovative methods to enrich processes and to create buy-in to insights and work.	Ministry of Cabinet Affairs (MOCA) is a central function that provides support to Cabinet and all ministerial councils. Responsible for building futures work into all government strategy and vision, with recommendations to the Prime Minister and Cabinet of the UAE. Dubai Future Foundation (DFF) is a government-backed foundation inaugurated in 2016 by a Dubai government public statement to work on projects that promote long-term thinking and support long-term goals in Dubai. DFF has strong links to government, but is able to be more agile. It has a research, agenda setting, capability and partnership building agenda, but limited capacity to enforce implementation. The Museum of the Future launching in 2021 will be a AI-generated building providing public-facing immersive foresight work to educate public, Ministers and civil servants. This builds on previous immersive experiences that were a central feature of the World Government Summit. UAE hosts the World Government Summit and has a partnership with the World Economic Forum to host the Centre for the Fourth Industrial Revolution in the UAE. Strengthens networks, allows for experimentation and testing of emerging technology and identification of international best practice to apply to the UAE context. National Advanced Sciences Agenda 2031 focuses on the long-term. Ministry of State for Advanced Sciences also focuses on the long-term of science.	Dual investment in bringing in expertise to deliver and support knowledge transfer. Dubai Future Academy provides government and private sector training.

Country	Culture and behaviour	Processes	Structures	People
United States	Global Trends published every 4 years by the National Intelligence Council. Designed to provide context for the incoming presidential administration (even if second term). Strong role for outreach and engagement internationally with experts, universities, think tanks, science labs, businesses and government institutions. Strong networks of practitioners exist both nationally and internationally including the US Federal Foresight Community of Interest (FFCOI) and the Public Sector Foresight Network (international).	Global Trends published every 4 years by the National Intelligence Council. Designed to provide context for the incoming presidential administration (even if second term). Strong role for outreach and engagement internationally with experts, universities, think tanks, science labs, businesses and government institutions.	Decentralised foresight capacity exists across federal government, including Central Intelligence Agency (CIA), U.S. Air Force, U.S. Coast Guard, U.S. Forest Service, Office of Public Management, National Aeronautics and Space Administration (NASA). As part of a four-year planning cycle, Veteran Affairs and the U.S Coast Guard (USCG) conduct an intensive scanning exercise that is then continued in smaller efforts through the cycle. The activity feeds into recommendations that are formulated as a foresight report for the new cycle's Commandant. This then feeds into a strategic plan issued by the new office holder. Government Accountability Office has a remit to provide analysis of how federal agencies manage and adopt technologies. They have been using foresight to inform their assessment of emerging technology; and are advancing how supreme audit institutions use foresight and scenario planning. Other areas where foresight is effectively being practiced but not institutionalised into a policy-making framework for foresight activity at the national level include the President's Council of Advisors on Science and Technology and the President's Council on Jobs and Competitiveness. These are operators who sit outside policy arenas but have the mandate to study implications of future policy-making through a group of experts.	Interviewees noted the importance with the US system of having close advisors who can provide a critical perspective, with trust, but outside of the political or strategic agenda. The importance of visual communication has also been highlighted with intelligence and other agencies. Many departments have developed in-house programmes, including through partnerships with futures studies programmes such as those at the University of Hawaii and University of Houston.

Annex 2: Acknowledgements

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Annex 3: UK Timeline

Timeline: Key developments in the past 120 years

1904: The Committee of Imperial Defence (CID), set up in 1902, becomes a permanent adviser to the Prime Minister. The forerunner of the Secret Service and the national security council, it 'scans the horizon' for undesirable developments in world affairs

1910: The Secret Service Bureau, 'son' of CID, splits into MI6 and MI5

1920: The Supply and Transport Committee, a regular provider of foresight and contingency planning, becomes a permanent body. Its purpose is to keep services moving in the event of strikes, which are increasing in frequency

1923: The Chiefs of Staff Committee is set up with its own horizon-scanning team, the Joint Planning Committee. The prime mover is Winston Churchill, who had floated the idea for the committee as Secretary for War and Air, in 1919

1936: The Joint Intelligence Committee (JIC) is created. Part of the Chiefs of Staff Committee, it co-ordinates inter-services intelligence

1942: The Beveridge Report sets out a vision for post-war transformation, tackling what its author calls the "five giants on the road to reconstruction" — want, disease, ignorance, squalor and idleness

1948: The RAND Corporation, a global policy think tank, is set up in America by Douglas Aircraft Company to provide research and analysis to the US Armed Forces

1958: The Assessments Staff is created. Working for the JIC, it drafts assessments of situations and issues of concern, "providing warnings of threats to British interests and identifying and monitoring countries at risk of instability".[7] The JIC agrees most assessments before they're circulated to ministers and senior officials

1959: Harold Macmillan commissions Future Policy Study, a secret horizon scan looking at where Britain would be by 1970 on current policies

1960: Macmillan pulls Future Policy Study from full Cabinet discussion because it gloomily foresees a Britain: dwarfed by superpowers; falling behind the six EEC countries; struggling to meet welfare and defence costs. (The only thing it doesn't get right is Northern Ireland, failing to predict a resurgence of The Troubles.)

1962: The UK Policy Planning Staff (UKPPS) is set up at the Foreign and Commonwealth Office. It follows the PPS model established by George Kennan and George Marshall at the US State Department in 1947

[7] Joint Intelligcence Organisation, Gov.UK

1963: Dr Beeching publishes his controversial report[8] on the future of the railways. His proposals for the rationalisation of trunk routes are based on forecasts for traffic patterns in 1974 and 1984 [9]

1964: The post of Government Chief Scientific Adviser is created. It is independent of Government

1966: The Science Policy Research Unit (SPRU) is founded at the University of Sussex by Christopher Freeman, a pioneer of innovation studies. Its aim is to take a sociologically informed approach to the study of scientific and industrial research

1967: Harold Wilson sets up the Programmes Analysis Unit. Working for the Ministry of Technology and based at the Atomic Energy Agency (AEA) in Harwell, it produces disinterested evidence on the benefits of investment in various new technologies, often using AEA computers for forecasting and modelling purposes

1970: The Reorganisation of Central Government White Paper laments the government's lack of a "clear strategic purpose" and its inability to consider "the totality of current policies" and to evaluate as objectively as possible alternative options and priorities under the "pressures of the day to day problems"

1971: Edward Heath sets up the Central Policy Review Staff (CPRS) as a strategic think-tank within government to take a long-term view. Led by Lord Rothschild, former head of research at Shell, it sets up an Early Warning System (EWS) and tries to encourage Whitehall departments to share their anxieties about the future

c1973: The government gives SPRU an £11,000-pound contract to review and evaluate current future studies, including the Club of Rome study, Limits to Growth, published in 1972; Heath creates the Cabinet research group, the World Future Trends Committee (WFTC)

1974: Launch of the Number 10 Policy Unit by Harold Wilson. Wilson wants an "authoritative alternative source of policy ideas, especially economic, to fight the Treasury" [10]

1974: The Department of the Environment, created by Heath when he came to power, sets up a Systems Analysis Research Unit (SARU) to monitor global models of the future and test their feasibility

1975: William Plowden, founder member of the CPRS, publishes 'A Joint Framework for Social Policy Studies'. It's greeted enthusiastically by the DHSS, less so by the Treasury[11]

1976: The Cabinet Office publishes 'Future World Trends: A Discussion Paper on World Trends and Their Implications'. Based on modelling work by SARU, it concludes that the World3 computer model used by Limits to Growth was too crude, claiming that there "are no hard and fast physical limits to resources; the limits are economic and technological and can vary widely"

1979: The National Intelligence Council (NIC) is set up in America as the center for mid-term and long-term strategic thinking in United States Intelligence

[8] 'The Reshaping of Britain's Railways'. The report, which led to the removal of just over 4,000 route miles, was commissioned by the Transport Secretary Ernest Marples, who had co-founded the road-construction company Marples Ridgway

[9] Richard Beeching, BBC Hindsight interview, 1981

[10] Bernard Donoghue, first head of the Policy Unit, March 2018

[11] Plowden's obit in The Daily Telegraph

1979: Michael Heseltine, newly appointed Secretary of State for the Environment, introduces an internal audit system, MINIS (management information system for ministers), including expenditure, staff costs and forward plans

1983: Margaret Thatcher disbands the CPRS

1988: Donald McLaren of the UKPPS publishes a report on east-west relations that foresees the collapse of the Berlin Wall

1989: The Parliamentary Office for Science and Technology (POST) is officially created, with charitable funding

1991: Michael Heseltine, Secretary of State for the Environment, announces the City Challenge programme: local authorities are invited to compete for £40m. To 'win', they must submit five-year strategies to transform an inner-city area

1992: POST is adopted as a parliamentary body, subject to five-year reviews

1993: In response to the White Paper 'Realising our potential: a strategy for science, engineering and technology' the government announces a national Foresight programme, managed by the Office of Science and Technology (OST or GO-Science)

1995: The OST is transferred to the DTI, under Deputy Prime Minister and President of the Board of Trade, Michael Heseltine

1998: The Strategic Defence Review (SDR) makes clear the need for the MoD to set out a future strategic context, following the example of the NIC in America

1998: The Performance and Innovation Unit (PIU) is established to work on cross-cutting issues such as e-commerce, the ageing population and the future of rural economies. Teams are to be given "the time and space to develop forward-looking policies rather than reacting to short-term pressures"

1998/1999: In response to the 1998 Strategic Defence Review, a think-tank, The Development, Concepts and Doctrine Centre (DCDC) is created as part of the MoD. It is located outside Whitehall, at Shrivenham near Swindon

1999: The Blair administration sets out its approach to policy-making and public services in the Modernising Government White Paper and the Professional Policy Making for the Twenty-first Century report. These papers conclude that, although long-term thinking is taking place within government, the difficulties identified by the 1970 White Paper, The Reorganisation of Central Government, remain: a bias towards strategies that produce short-term results; lack of 'joined up' thinking

1999: The Centre for Management and Policy Studies (CMPS) is set up. A Cabinet Office body, it has two functions: to provide a thinking hub for Whitehall; to oversee civil service learning and development through the Civil Service College (CSC)

2000: The Local Government Act includes a statutory requirement for local authorities to develop a 20-year Community Strategy to promote and improve the economic, social and environmental well-being of their areas

2001: John Birt, former director-general of the BBC, is appointed (unpaid) strategy adviser to Tony Blair, overseeing the development of long-term strategy on drugs, health, crime reduction, education and transport

The creation of the Prime Minister's Forward Strategy Unit (PMFSU), a complementary body to the PIU, follows

2001: The Defence Science and Technology Laboratory (DSTL) is created at the MoD to "maximise the impact of science and technology for the defence and security of the UK".[12] It scans the horizon for technological threats and opportunities

2001: POST becomes a permanent parliamentary institution

2001: The Local Government White Paper 'Strong Local Leadership' calls for local councils to develop strategies for sustainable development that take account of the needs of future generations

2001: The MoD's think-tank the DCDC publishes its first edition of Global Strategic Trends. It follows the example of the NIC's Global Trends report, which "assesses critical drivers and scenarios for global trends with an approximate time horizon of fifteen years" [13]

2002: The PIU and the PMFSU merge with parts of the Centre for Management and Policy Studies to create the Prime Minister's Strategy Unit (PMSU)

2002: Chief Scientific Adviser David King and Foresight UK Director Claire Craig establish a programme of in-depth scenarios- and futures-led projects; the Foresight lens is broadened to include social sciences

2002: The DCDC publishes its second edition of Global Strategic Trends. The purpose of the report, which is now to be published every four years, is to "identify the key drivers of changes that will shape and reshape our world" for both Defence and its "cross-governmental partners" [14]

2003: The Treasury publishes the Lambert Review, which makes a number of recommendations to improve the transfer of knowledge between university research departments and businesses; the DTI publishes David Sainsbury's report, 'Competing in the global economy: the innovation challenge'

2004: The Technology Strategy Board is created as an advisory body

2004: Foresight publishes Future Flooding, a report looking at the risks to the UK from flooding and coastal erosion over the next 100 years

2005: The Horizon Scanning Centre (HSC) is created (within Foresight) to feed futures work into departments across Whitehall and grow capacity for strategic futures across government

2005: DEFRA sets up an in-house horizon scanning and futures unit to support long-term planning and futures work across the DEFRA family

2005: The Advanced Research and Assessment Group (ARAG) is founded inside the Defence Academy

[12] Defence Science and Technology, Gov.UK

[13] Quote from National Intelligence Council Wikipedia. For more on the prgramme see Office of the Director of National Intelligence

[14] Ministry of Defence (2018) Global Strategic Trends. The Future Starts Today. Sixth Edition

of the United Kingdom. It is 'tasked' with long-term planning and threat assessment and brings together experts from the military, academia and other fields, working across government departments

2005: The Scottish Parliament establishes the Scotland's Futures Forum think-tank to look beyond the five-year electoral cycle and enable MSPs and others to consider the effects of "decisions taken today on Scotland's long-term future" [15]

2005: In the run-up to the General Election, Andrew Turnbull, Cabinet Secretary, commissions the Government Office for Science to use scenario planning to envisage the future of the world we're living in

2005: The Centre for Management and Policy Studies is shut down and replaced by the National School for Government (formerly the Civil Service College)

2006: The JIC prepares an assessment on the future of the nuclear deterrent — looking 50 years ahead

2006: The Stern Review on The Economics of Climate Change, commissioned by the UK government, comes out. Looking ahead to 2030 and 2060, it concludes the benefits of action on climate change outweigh the costs

2006: Foresight publishes Infectious diseases: preparing for the future, a report on the detection and identification of infectious diseases over the next 10 to 25 years

2006: The Technology Strategy Board becomes a non-departmental public body

2007: The Public Administration Select Committee (PASC), in a report entitled 'Governing the Future', otherwise known as the Wright Review, suggests Parliament strengthens its capacity to think ahead and work with outside experts and the wider public

2007: David Miliband takes over as Foreign Secretary and charges the FCO Policy Planners Unit (founded in the mid 1960s) with the task of using "a 'formal strategy project' approach to analysing foreign policy issues", modelled on that of the PMSU; a revamped strategy centred on eight Departmental Strategic Objectives and related sub-strategies follows and is filtered down to every FCO outpost/embassy [16]

2007: Foresight publishes Tackling obesities: future choices. The report "takes a strategic 40-year forward look at how the UK can respond sustainably to rising levels of obesity".[17] (It's to be reviewed ten years later.)

2008: The Cabinet Office publishes its first National Risk Register — but fails to make any reference to the financial crisis, despite ARAG warnings of the impending threat to the economy

2008: The Horizon Scanning Unit (HSU), the National Security Secretariat (NSSec) and a Horizon Scanning Forum (HSF) are set up. The HSU, later known as the Strategic Horizons Unit (SHU) is located within the Joint Intelligence Organisation of the Cabinet Office, to "co-ordinate horizon scanning activity and improve its overall effectiveness across government" [18]

[15] Scotland's Futures Forum website

[16] The National School of Government case study

[17] Tackling obesities: future choices, Gov.UK

[18] House of Commons Science and Technology Committee report, 2014

2009: The public agency Natural England publishes 'England's Natural Environment in 2060 — issues, implications and scenarios', a major piece of futures work

2009: The PMSU publishes 'Applying Complex Thinking to Public Services'

2010: David Cameron disbands the PMSU and transfers its functions to other units. He also closes the National School of Government, which provided training for civil servants in (among other things) strategic thinking, and replaces it with Civil Service Learning, which relies heavily on private contractors

2010: The SHU is transferred from the Cabinet Office to the NSSec Strategy and Projects team. The horizon scanning capability of the CO is reduced to a staff of one

2010: ARAG is closed in a cost-cutting move by the Defence Academy

2010: The Austrian entrepreneur Dr Hermann Hauser publishes a report[19] recommending the creation of a network of science and technology centres. The government subsequently allocates £200m to create the first seven Catapult Centres for innovation. They include centres for cell and gene therapy, digital technology, future cities and medicines discovery

2010: The HSC's FAN club (Future Analysts Network), a group of futures thinkers from across the public, private, academic and third sectors, is disbanded

2011: The public-private NPO Future Cities Catapult is created to build better cities for the urban "dwellers of tomorrow" [20]

2011: A White Paper on the Natural Environment is published. It includes a key piece of horizon scanning-based evidence, the National Ecosystem Assessment

2012: The PASC highlights concerns about the erosion of strategic thinking across the Civil Service.[21] It recommends the government publishes an annual statement of National Strategy (over and above the National Security Strategy) to "ensure that short-term decisions are made in the context of the long-term national strategic framework". This follows its 2010 inquiry, 'Who does UK National Strategy?' and a subsequent report of 2011

2012: Michael Heseltine sets out an industrial strategy for England in his 'No Stone Unturned: in pursuit of growth' report

2013: The Jon Day review[22] of cross-government horizon scanning is published as part of the government's Civil Service Reform Plan. It recommends the Cabinet Secretary formally owns and champions cross-cutting horizon scanning and sets out a new structure to improve co-ordination and reduce duplication

2013: Following the Day Review, A new hub of cross-departmental horizon scanning is formed at the Cabinet Office to increase understanding of "the world around us, and how that world is changing" and

[19] Hermann Hauser (2010) The Current and Future Role of Technology and Innovation Centres in the UK. Report for the Department for Business, Innovation and Skills.

[20] Future Cities Catapult website

[21] House of Commons. Public Administration Select Committee (2012) Strategic thinking in Government: without National Strategy, can viable Government strategy emerge?. See also House of Commons. Public Administration Select Committee (2015) Leadership for the long term: Whitehall's capacity to address future challenges'.

to identify "potential threats, risks, emerging issues and opportunities". The Cabinet Secretary Advisory Group (CSAG) is created. Formed of permanent secretaries and chaired by the Cabinet Secretary, it is set up to "give direction and leadership" to horizon scanning work[23]

2013: Foresight publishes Future of cities, a report looking at the opportunities and challenges facing UK cities over the next 50 years

2014: Hermann Hauser reviews progress of the Catapult science and technology centres

2014: The Science and Technology Select Committee identifies "substantial weaknesses" in the new horizon scanning programme, saying it is "little more than an echo chamber for government views" and criticising the government for not making better use of the cross-department horizon scanning centre (HSC) in the Foresight Unit. It also recommends the relocation of GO-Science from the Department for Business, Innovation & Skills (BIS) to the Cabinet Office[24]

2014: The Cabinet Office's Horizon Scanning Secretariat, which provided support to CSAG, and GO-Science's Horizon Scanning Centre merged to form the Horizon Scanning Programme team. The Cabinet Office role sat within the Economic and Domestic Secretariat (EDS) Projects team.

2015: The We Welsh Assembly passes the Well-being of Future Generations (Wales) Act, establishing a set of long term well-being goals for Wales, a duty on public organisations to think long term, a duty on Government to publish a report on the future every 5 years; and the establishment of an independent Future Generations Commissioner for Wales.

2015: George Osborne launches the National Infrastructure Commission, a standing body that will think "passionately and independently" about Britain's long-term infrastructure needs. It is to produce a report at the beginning of each Parliament with recommendations for spending

2016: The Chilcot report on the Iraq war is published. It describes post-conflict preparation as "wholly inadequate" and says: "the Government's preparations failed to take account of the magnitude of the task of stabilising, administering and reconstructing Iraq, and of the responsibilities which were likely to fall to the UK". Among its recommendations: increased use of scenario planning in policy-making

2016: First Future Generations Commissioner for Wales appointed

2017: Welsh Government's first statutory Future Trends Report published

2018: The sixth edition of Global Strategic Trends (GST6) is published

2019: The independent think-tank the Institute for Government expresses concern about the government's preparations for a no-deal Brexit, judging planning to be inadequate in nine key policy areas, including health, energy and the environment, and agriculture, fisheries and food. The Department for Exiting the European Union counters it has been planning for "all scenarios" for two years.

[22] Cabinet Office (2013), Review of gross-government horizon scanning'

[23] Horizon Scanning Programme: a new approach for policy making Gov.uk

[24] At the time of writing, GO-Science is located at the Department foar Business, Energy and Industrial Strategy

Annex 4: Long list of potential case studies

A long list of 17 cases was explored with GOS. The long list is shown here grouped according to five categories:

1. Large systems with similar structures to the UK
2. European neighbours with particular strengths
3. Systems with interesting stories of building institutional capability and infrastructure
4. Non-Western international examples
5. Examples of recent innovations.

Assessments were made before case study interviews were conducted and should not be treated as absolute.

1. Large systems with similar structures to the UK.

Country	Comparability	Activity	Impact	Innovation
Canada	4 Medium/high	5 High	5 High	4 Medium/high
South Korea	3 Medium	5 High	5 High	5 High
France	4 Medium/high	4 Medium/high	4 Medium/high	3 Medium
United States	3 Medium	3 Medium	4 Medium/high	5 High
Germany	3 Medium	4 Medium/high	4 Medium/high	3 Medium

2. European neighbours with particular strengths.

Country	Comparability	Activity	Impact	Innovation
Finland	4 Medium/high	5 High	5 High	5 High
Netherlands	3 Medium	4 Medium/high	4 Medium/high	4 Medium/high
France	4 Medium/high	4 Medium/high	4 Medium/high	3 Medium
European Union	3 Medium	5 High	3 Medium	5 High
Germany	3 Medium	4 Medium/high	4 Medium/high	3 Medium

3. Systems with interesting stories of building institutional capability and infrastructure.

Country	Comparability	Activity	Impact	Innovation
Finland	4 Medium/High	5 High	5 High	5 High
Canada	4 Medium/high	5 High	5 High	4 Medium/high
New Zealand	3 Medium	4 Medium/high	4 Medium/high	4 Medium/high
Singapore	2 Medium/Low	5 High	5 High	5 High
France	4 Medium/high	4 Medium/high	4 Medium/high	3 Medium
United States	3 Medium	3 Medium	4 Medium/high	5 High
European Union	3 Medium	5 High	3 Medium	5 High

4. Non-Western international examples.

Country	Comparability	Activity	Impact	Innovation
South Korea	3 Medium	5 High	5 High	5 High
Singapore	2 Medium/Low	5 High	5 High	5 High
United Arab Emirates	1 Low	5 High	3 Medium	5 High
Taiwan	3 Medium	3 Medium	3 Medium	3 Medium
South Africa	3 Medium	2 Medium/Low	1 Low	3 Medium

5. Examples of recent innovations.

Country	Comparability	Activity	Impact	Innovation
New Zealand	4 Medium/high	5 High	4 Medium/high	5 High
Wales	3 Medium	5 High	5 High	5 High
United Arab Emirates	1 Low	5 High	3 Medium	5 High
Taiwan	3 Medium	3 Medium	3 Medium	3 Medium

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