

Faculty of Design

2017

The futures of Canadian governance: Foresight competencies for public administration in the digital era

Jones, Peter

Suggested citation:

Jones, Peter (2017) The futures of Canadian governance: Foresight competencies for public administration in the digital era. Canadian Public Administration, 60 (4). pp. 657-681. ISSN 0008-4840 (Unpublished) Available at <http://openresearch.ocadu.ca/id/eprint/2207/>

Open Research is a publicly accessible, curated repository for the preservation and dissemination of scholarly and creative output of the OCAD University community. Material in Open Research is open access and made available via the consent of the author and/or rights holder on a non-exclusive basis.

The OCAD University Library is committed to accessibility as outlined in the [Ontario Human Rights Code](#) and the [Accessibility for Ontarians with Disabilities Act \(AODA\)](#) and is working to improve accessibility of the Open Research Repository collection. If you require an accessible version of a repository item contact us at repository@ocadu.ca.

The Futures of Canadian Governance: Foresight Competencies for Digital Public Administration

Peter Jones, OCAD University

Introduction

Much of the current research and discussion reporting on digital governance attends to the technosphere, with studies informing of the challenges and developmental opportunities for civil service in digital management, information technology, technology trends, and social media. Accordingly, several articles within the special issue collection report on the adoption and realization of digital competencies within government to deliver and improve public services or engage citizens in the digital sphere (Lindquist, 2017, Brown & ..., 2017). Others develop accounts of digital policy design (Clarke and xxx, 2017), and dealing with regulation in the rapidly digital public sphere (Dutil, 2017). Important concerns of temporality, trend, and uncertainty are implicated across the entire project of anticipating and advising future directions of digital governance. These concerns for anticipating and predisposition are functions of strategic foresight, and demand the cultivation of rigorous futures thinking and modeling within current policy practices.

Strategic foresight develops a range of competencies instrumental in envisioning future strategies, informing planning alternatives and strategic options through application of expert, evidence, creative and collaborative methods. Foresight methods enable anticipatory reasoning and formal speculation about possible and probable future outcomes to facilitate current situational decision making. Strategic foresight methods in policy and governance contexts has enjoyed a long history, especially in Canadian public administration. However, as we consider the disruptive and abrupt changes to information and communication technology, consumer trends, new Internet media, and the impact of trends on governing, we find significant uncertainty in strategy and decision making. Governments are not organized across departments and functions to take advantage of broad-based foresight advising that might affect multiple policy functions.

Responding to the emerging challenges in digital era governance, we might address the value of foresight to three of the most relevant issues associated with digital era governance research:

- Developing an innovative and resilient public sector for the digital age;
- Anticipating the evolution of Westminster institutions for the digital age;
- Guiding long-range planning in the face of greater uncertainty, requiring collaboration across boundaries to improve digital era governance.

These issues require qualified observations about future social and technological trajectories affecting policy design, governance, service provision, and management decision making. Foresight artifacts and futures models are best realized as inputs to early policy formation, where possible second-order effects and future consequences of policy implementation can be anticipated before policy proposals become locked in and resistant to alteration.

The inclusion of rigorous strategic foresight into policy advising and services design ought to be welcomed by civil servants, but as with any process methodology, the proof of adoption lies in

the cultural fit and the quality of execution. In current practice, there are at least three communities of advising and several policy formation paradigms within policy advisory systems (Craft & Howlett, 2013), and not all may be apprised of foresight modalities. Foresight studies have typically been “imported” into advisories by external knowledge producers, unless commissioned within government offices by internal knowledge brokers (such as Canada’s Policy Horizons group). Across contemporary governments we have seen a growing preference for evidence-based, quantitative methodologies (e.g., data analytics, targeted surveys and demographic estimation), which might seem incompatible with futures studies. Yet the contributions of foresight, such as trend scanning, scenarios and future proposals, provide critical guidance for defining policy hypotheses, constructing policy business cases, and selecting key developing trends for deep study. These applications are far upstream from policy analysis and service delivery. Foresight provides complementary modes of advising and policy priority formation are critical and timely in research purporting to inform the future models for public administration and service provision in Canada.

Policymakers are challenged to produce relevant, accountable, and adaptive policy products, and have traditionally favoured quantitative forecasting, surveys and expert advising over foresight and ethnographic field studies in problem areas of interest. Forecasting (the attempt to identify highly probable outcomes from statistical trend analysis and modeling) and strategic foresight are significantly different research modes. Forecasting can be defined as “more or less linear systematic estimations, statements, extrapolations, projections, or predictions of highly probable future events” (Kuosa, 2014). They represent entirely different epistemologies, yet in policy advising both are helpful and even complementary. The practices must not only be integrated and synthesized methodologically within the policy organization, but the products of foresight must also be acknowledged and acted upon as legitimated knowledge in decision making.

The evidence-based paradigm values objectivist, quantified statistical arguments over qualitative narratives, which can be perceived as anecdotal or cherry-picked constructions. However there are well-established problems with reliance on statistical evidence for forecasting or trend anticipation (Taleb & Blythe, 2011). There may be a false sense of security or reliability in policy forecasting using statistical inferences based on population samples from the recent past. Advanced probability reasoning identifies lower-probability but possible “tail risk” events within long-standing situations that are unforeseeable with basic surveys and targeted sampling. The rapid disruption of established incumbents by innovative upstarts in consumer and international markets demonstrates the cost and impact of foresight failure. The lack of on-the-ground insight and cultural context in international and foreign political situations incurs similar “Black Swan” risks of unexpected occurrences. With today’s digital era trends, the rate of change outpaces the technologists and digital strategists. As governments are not recognized as equipped to lead the design and implementation of information technology, the perceived gap between current practice and digital era competency continues to expand. While digital era policy making may be starting to close this gap through better advising and knowledge mobilization, the missing capability may be the organizational capacity to project and reason in a variety of longer temporalities for anticipation in complex social and technology domains.

Contexts of Canadian Policy Foresight

Strategic foresight has its roots as a fairly esoteric, yet methodical practice led by futurists and business scenario planners, developed over years from a history of advising government, policy and corporate management. It has developed over the last decade through applied research and a flourishing of new methodologies across sectors. In particular, government foresight has been developed over roughly 50 years from a craft practice informing strategic advisors in national security to now assisting public servants in making sense of critical future challenges characterized by uncertainty and longer time horizons. In Canadian governments, strategic foresight has developed as a significant practice for informing public service leaders incorporating a wide range of methodologies (Martin, 2010, Miles, 2010). However, critiques are justified in suggesting that policymakers and public administration scholarship have not afforded effective and influential use of foresight for informed prospective reasoning about possible future outcomes (Roberge and Dinning, 2013).

Foresight, unlike forecasting, is distinguished by its projection into longer-term future time horizons that obviate the possibility of prediction. As a practice it engenders a change to organizational mindset as much as methods. In policy domains (Miles, 2010) the participation and views of multiple experts and stakeholder help build knowledge and consensus around foresight activities. Some of the most common techniques in public administration are trend analysis, scenario formation, and strategy analysis. Foresight involves trend scanning of information to identify social and systemic forces, technology trends, and the “signals” that indicate directions and the emergence of different future outcomes. Emerging practices in foresight include anticipatory design, collaborative foresight for long-term planning (Weigand, et al, 2014), future challenges formulation (Glenn & Gordon, 2001), and developing futures literacy as an organizational competency (Miller, 2007)

Strategic foresight enables better policy making by developing insights about possible future directions (typically in scenarios) and enabling collective understanding. It is a rapidly growing practice area, with governments and corporations worldwide investing in foresight capabilities, with distinctive differences found between nations, sectors, and industries. A small number of academic programs train foresight practitioners, including the seminal Hawaii Research Center for Futures Studies (HRCFS, at the University of Hawaii at Manoa) and the University of Houston’s M.S. in Foresight in the US. In Canada, OCAD University’s Strategic Foresight and Innovation program (an MDes design degree) has graduated learners from its interdisciplinary program since 2010; many of which have entered public service as foresight analysts in the energy, urban planning, and healthcare sectors. Foresight research is published in numerous journals, with notable well-ranked journals that inform public administration research including *Technological Forecasting and Social Change*, *Technology Analysis and Strategic Management*, and *Research Policy*. Specialized foresight journals include *Futures*, *Foresight*, *Journal of Futures Studies*, *Omega*, and *European Journal of Futures Research*. As typically incorporated in policy studies, foresight, trends, and futures studies are integrated within briefs and backgrounders supporting policy formulation. Many such studies are provided as widely-ranging advance materials, such as the HRCFS annual reports to the Hawaii State Legislature informing lawmakers of emerging trends and cutting-edge political ideas from foresight studies.

Most governments have developed foresight capabilities for informing critical future-sensitive functions, especially defense, energy, technology R&D, and economic development. Canada, perhaps uniquely, has actively developed its foresight capabilities in public policy advising continuously over decades. Thompson (1992) notes the importance of this area in the founding of the Canadian Association for Futures Studies first conference in 1976, on Canadian Public Policy and Futures Studies. Rosell and Canadian civil service leaders convened a series of roundtables and authored two books (Rosell, 1992, 1995) formulating early proposals on governance in the future information society. Since 1996 the Canadian government has sustained the interministerial foresight advisory group, Policy Research Initiative (PRI), transforming to Policy Horizons Canada. Policy Horizons is a dedicated policy foresight organization within the Government of Canada (now part of the Privy Council Office) that commissions and leads numerous studies for government agencies, policy problem areas, as well as exploratory futures projects to inform ministries and the public service.

The Social Sciences and Humanities Research Council (SSHRC, 2012) initiative *Imagining Canada's Future* exemplified a unique, significant social foresight exercise conducted across Canadian provinces with a wide range of experts and participants. The purpose of the initiative was to elicit multiple foresight responses from six regional panels, independent social futures studies conducted by different university-led teams in their regions. The results from the regional panels were reported and further developed into scenarios and critical challenges for the long-term, proposed as futures challenges to inspire and engage social sciences and humanities research in scholarly communities and Canadian society. After the foresight development phase (panels and findings) six future policy challenges (and four cross-cutting themes) were articulated. These range from new educational models for Canada, aboriginal ways of knowing, global peak population, and the future of knowledge practices. The program continues into a second five-year initiative following the completion of research and engagement responses, including study proposals and symposia, following the six future challenges.

Europe, Germany, and the UK have sponsored continuous agenda-level strategic foresight since the 1990's. The German Federal Ministry of Education and Research sponsored the Futur program in 1999 (Da Costa, et al, 2008), a series of foresight activities over a number of years, inviting citizen participants in multiple workshops over a series of engagements, focusing on Mobility and Communication and Health and Quality of Life. The UK's Nesta organization, which only five years ago launched the UK Alliance for Useful Evidence (Neville, 2011), now presents as an innovation centre, with little attention to evidence-based policy in its foregrounded materials. Nesta promotes the value of strategic foresight to policymakers, and numerous trends reports and forecasts are available online. The European Union Horizon 2020 program has sponsored numerous social research studies driven by foresight approaches. The CIVISTI (Citizens visions on Science, Technology and Innovation) project and method reported by Gudowsky and Peissl (2016) adopted a citizen engagement approach to developing demand-side "preferred futures" from citizens to guide social policy and technology assessment. Buttressing a foresight-oriented technology analysis approach, the CIVISTI participatory methodology was developed as a counter to the focus on Grand Challenges approaches to future studies for science and technology innovation (STI) studies (Boden, Johnston, and Scapolo, 2012).

The scale and reach of these social foresight research engagements in Canada and other nations for policy and governance advising suggests that these methods can have a vital and productive role. Many demonstrate a considered balance between evidence-based social science and the provocations of futures thinking methods. Demonstrating the impact of insights from foresight studies, even when successfully broadening the horizons of policy-makers remains a continuing challenge because, not only is it competing with other forms of evidence and influence on policy making, it is geared to raising awareness of possible futures and not directly tabling options.

Foresight Modes and Methods

Serious foresight initiatives always engage multi-method processes and generally extend any study across multiple domains of trend and inference, such as the canonical STEEP/V categories (social, technological, economic, environmental, political and value-based issues), (Durst, et al, 2015). Contemporary foresight studies typically develop prospectives (e.g. future outlooks) that draw on methods beyond typical scenarios and trend analysis. Because foresight studies necessarily rely on counterfactual proposals, or speculative projections about possible or preferred futures, Indeed, many foresight insights arise from imagining and reasoning about the future using and combining different forms of evidence. Foresight relies on interpretive and abductive reasoning from ambiguous and often provisional present data. Most foresight, including trends analysis, resists extrapolation from “hard evidence” such as quantitative survey studies. The assumptions of continuity from present observable trends stems from well-known cognitive biases, but foresight considers extrapolation extremely misleading. In order to thoughtfully consider the complexity of multiple future trends and social drivers, multiple foresight methods are selected for their relationship to each other and impact on policy-making.

Foresight and scenario development are typically sponsored by top leaders of organizations and, in government, these are usually deputy ministers. At their most effective, foresight methods cohere to present a compelling range of futures outcomes and options, infused by rhetoric and symbols appropriate to the enterprise. Executives (and ministers) are charged to become leaders by producing effective narratives, essentially futures storytelling, aligned with policy goals and strategies. In these various embodiments of future narratives, multiple pathways to future outcomes are often constructed to reveal a range of potentials and points of action. Future issues and possible conflicts and risks can then be identified and safely discussed as salient future concerns, even though there may be significant present-day implications.

Foresight Methodology

Strategic foresight methodology has traditionally been informed by technology futures and forecasting, as the major trends of the information age (starting 50 years ago) portended significant changes in policy and governance. Technological forecasting ranged from strong evidence-oriented methods such as surveys and trend mapping, to mixed qualitative approaches such as Delphi, horizon scanning, and expert panels, to more creative methods such as scenario design, near-future fiction, and wind tunneling. For much of its history, foresight practitioners tended to be technology futures experts and advised governments on near future trends for investment and strategic technology development.

Foresight practice has evolved to embrace a range of methods appropriate for informing governance, innovation and technology investment, and policy development. While there were always sociocultural futurists among practitioners in government, foresight led with a clear technology bias, as social norms could be tracked tangentially to technology adoption. Miles (2010) and others have developed and advocated foresight methods for anticipating impacts of technology on markets, organizations and government policy. Technology trends are perceived as reliable (in that technologies have visible developmental trajectories and well-known adoption patterns). Changes to collective social behaviors and norms, while also slow moving in development, can present rapid and unexpected, poorly-predicted shifts. The recent trend toward populist politics and the movement toward decolonization in public sector institutions, drawing from indigenous activism, were not apparent trends even two years ago.

A significant enabler is the development of futures literacy (Miller, 2007), as an organizational capability and orientation to foresight in practice. Methods employed to prepare scenarios or reports without the receptivity of futures-literate stakeholders result in the failure to absorb or socialize the meaning of foresight studies for strategic or policy decision making.

Different foresight methodologies employ many of the same methods but for different purposes and orientations toward the future. There are no academic or industry standards in foresight practice, which can lead to a lack of robust commitment to its products. Foresight as a futures literacy (Miller, 2007) is an approach that develops the organizational capacity to explore and extend knowledge from the present to understand and create scenarios for projecting “possible, probable, and desirable” futures. Ringland (2010) developed strategic foresight for surfacing assumptions and mental models, encouraging reflection, understanding complexity, and extending collective vision beyond the boundaries of organizational knowledge.

Along with trend analysis, scenario planning might be the best known of foresight methods, as it has enjoyed years of development in corporate contexts as a strategic planning process. Scenario planning (design or development) is one of the oldest futures thinking techniques, deriving from Herman Kahn’s employment of strategic Nash-equilibria game scenarios for plotting out the mutual assured destruction deterrence scheme of the Cold War (Sigal, 1979). Scenario modeling has since found extensive application in corporate planning, especially following groundbreaking applications such as the Shell strategic oil exploitation scenarios developed in the 1980s (Schoemaker & van der Heijden, 1995) and developed methodologically in the business literature. Scenario planning developed into a canonical method, drawing on environment scanning and assessment of critical uncertainties, mapped into 2x2 matrices for the typical quadratic framework enshrined as practice by the Global Business Network (Ringland and Schwartz, 1998).

A systematic review of scenario methods (Varum and Melo, 2010) shows over a hundred references to models for scenario planning for foresight across all sectors with nearly 30 different purposes for which scenarios have been employed. Among these we find Schnaars’ (1987) early attention to two broad approaches of scenarios. These were distinguished as those used to inform *optionality* and strategic decision making, and those used in *framing emerging ideologies* to consider a range of perspectives among actors in a policy area.

Mapping Foresight Methods to Applications

A variation of the Popper (2008) “diamond” framework is presented in Figure 1 showing a range of methods organized on spectra between the following dimensions: from evidence to creative speculation (e.g., design fiction); and from reliance on expertise to collaborative interaction. Methods are colour coded by research modality, designated as qualitative, quantitative, or semi-qualitative (a Popper distinction). The selection or mix of methods employed can be considered epistemological choices enabling consideration of the evidence-orientation of sponsors or foresight study users.



Figure 1. Foresight methods by modality (adapted from Popper, 2008)

Only three “pure” quantitative methods are indicated in the diamond framework and 18 are purely qualitative, which indicates a bias toward constructivist or interpretive modes. A plurality (16) are described as semi-qualitative and adaptable to data analysis and presentation in either more positivist (“evidence-based”) or interpretive modes of discourse. These variations are useful to consider when interpretivist foresight studies (as arguably most are) are conducted for evidence-based applications such as (typically used) in public administration. Quantitative methods, typically including surveys as part of foresight projects conducted for strong evidence organizations, are often selected within a mix of modes to strengthen the statistical evidence basis

for a foresight brief that might influence decision making. A balanced mix of both types of methods can support policymakers in identifying critical trends and categories for further in-depth research.

The foresight literature generally presents methodologies as collections of methods for specific clients and outcomes (technology foresight), that cohere together (e.g., scenario planning) or were developed from an authorial perspective (e.g. Godet's La Prospective (1982) or Miller's Futures Literacy, (2007)). The Popper diamond visually organizes a collection of methods and can serve as a comprehensive table of references, however it does not suggest guidance for method selection for types of foresight problem areas. When informing government and policy-making communities, foresight practitioners employ various mixes of methods. Emerging foresight methodologies are increasingly integrating with policy analysis, design thinking, social and long-term innovation, anticipatory systems science, and systemic design (Jones, 2014).

Four approaches are drawn from the range of applications applicable to policy and governance problem domains as reference for method selection in advising. These are identified in Figure 1 and defined below.

Foresight-led Policy Advising. Figure 1 shows typical methods including: Scenarios, Three Horizons, Backcasting, Roadmapping, Interviews, Expert panels, Dialogic Design and Delphi. Other methods appropriate in policy advising include those in the Evidence section: Surveys, Literature Review, Horizon scanning, Trends/signals, Critical technologies, Cross-impact analysis, and Benchmarking.

Foresight has evolved and adapted from its tradition of technology-centric futures studies to a strategic discipline accepted in an advisory capacity. Policy advising and strategic planning are the two major applications for taking action on foresight. Foresight-led policy studies have been commissioned to develop trends and foresight prospectuses for the most recent decade by EU and Canadian governmental organizations. (US-based studies are often produced by private companies for government and may be less publicly accessible). According to an international review by Dreyer and Stang (2013) EU projects have included the European Foresight Platform (2009-2012), FORLEARN (2005-2008), and iKnow (2008-2011), all of which are accessible online. Major Canadian programs have been noted previously (canada@150 and the Horizons Metascans) but many direct commissioned studies will remain inaccessible to the public.

Collaborative and Participatory Foresight. Figure 1 indicates Workshops, Dialogic Design, Scenarios, Polling and Surveys (participatory platforms) and mixed methods. Scenarios, and creative methods such as Brainstorming, Bodystorming, and Tangible futures are also prevalent. Within the structure of collaborative workshops, expert-led methods are often integrated, as in the appropriation of Three Horizons in the study reported in this article.

This approach engages stakeholders as well as subject experts in futures studies, for the purposes of increased diversity and broader knowledge, to identify trends or emerging challenges from a larger sample, and to enhance the mobilization of foresight findings among the policy or sponsor user community. Collaborative foresight typically refers to methods where specific stakeholders, often selected for expertise, are engaged for one or a series of facilitated, collaborative workshops for foresight-led planning and scenario creation (Weigand, et al, 2014). The Weigand case describes a dialogic design methodology employed with (US Air Force) government lab experts in developing alternative approach to long-horizon R&D strategic planning. As a collaborative foresight case, it also drew on expert knowledge and was compatible with policy formation. Other studies in the field and literature describe large-scale and long-term collaborations such as the Millennium Project and EU research studies.¹

Participatory or ‘open’ foresight (Miemis, et al, 2012) refers to more distributed or crowdsourced methods, where multiple participants, typically not experts, are invited to contribute to a large trends study, surveys, or open platforms for voluntary participation. Participatory and collaborative foresight approaches have gained considerable respect in policy studies and in the field. Foresight methods over the decade appear to be following the trend of design research toward co-creation modalities (Sanders and Stappers, 2008), characterized by a movement from expert-led evidence-grounded studies to justify large design proposals toward design concepts co-developed with users and producers.

Expert-led Technology Foresight. Selected expert-led methods in Figure 1 include Interviews, Expert panels, Delphi, Roadmapping, and Ethnography. Other expert methods include Horizon scanning, Trends/Signals, Critical technologies, and Three Horizons.

These studies represent the traditional mode of futures research, developing future dossiers based on trends analysis and often led by technology trend foresight. Expert methods are called for when science and technology evolution and implications are required as significant inputs to policy planning. Expert studies are favoured for advising such areas as energy policy planning and urban infrastructure investment, technology and innovation R&D investment priorities, long-term information technology planning and technology-driven domains such as healthcare, media, and finance. Future use cases of scenarios in these domains are often developed in mixed stakeholder engagements, but trends and scenario development are primarily expert-led, as the assessments of technology policy require technical judgment and scientific evidence. An exemplary expert-led study includes the Media Futures 2020 study (van Alstyne, et al, 2011), the public dossier report indicates 18 media (expert stakeholder) partners conducted for Ontario Media Development Corp. In essence a policy advisory document, the Media Futures 2020 project developed a set of scenarios (complemented by a number of contributing methods) supporting near-future development of the Ontario media industry. While the foresight methods were conducted in collaborative workshops, the methods were appropriately selected to elicit

¹ Examples include the massively participatory Millennium Project (Glenn and Gordon, 2001), sourcing problems and trends from over 250 original participants and analyzing these to result in a problematique of 15 consistent global issues. The Millennium Project succeeded by distributing its trend sourcing to multiple country “nodes” with dedicated researchers contributing intelligence on a continuing basis, reporting on an annual basis. Other notable initiatives include the European Union FORLEARN study (Da Costa, et al, 2008) and the canada@150 program (Government of Canada, 2010).

stakeholder expertise to develop a robust foresight product.

Social Foresight Research. Figure 1 shows that social foresight research draws on: interviews, expert panels, surveys, stakeholder analysis, Horizon scanning/Trends/Signals, Dialogic Design, and others.

What we now refer to as social futures research has a long history in policy studies, as policy studies have always entailed an anticipation of future collective behavior. Harold Lasswell's social planetarium (Laswell, 1959, 1970) presented early proposals in policy and political studies as a means for envisioning alternative future proposals, engaging citizens in rational discourses to arrive at possible scenarios and options. Christakis (1973) and Ozbekhan's (1969) normative planning methods adopted a social systems approach to preferred futures. Social foresight research is primarily oriented toward inquiry and understanding of social behaviours and trends in present society that might inform future social phenomena and contribute to policy and governance. Social foresight studies are typically incorporated within the disciplinary domain of interest, whether urban planning, human geography, foreign policy. The SSHRC Imagining Canada's Future initiative (SSHRC, 2012) would be considered a model process for a large cross-national foresight initiative in Canada, drawing on multiple sample and methods.

Foresight in Action: Canada and Beyond

Canadian government demonstrates a continuing development of capacity in strategic foresight and shows a history of major engagements and publications over decades. Exemplary cases can be selected from as far back as the 1960's, with key historical markers such as the establishment of the Ministry of State for Science and Technology in 1971, and interdepartmental Committee on Technological Forecasting set up in 1973 in the new ministry (Thompson, 1992). More recent cases reveal a formative era of modern foresight practices commonly in use today, such as multidisciplinary collaboration, trend analysis, and scenario planning. These range from the *Changing Maps* public service roundtables (Rosell, 1995) with significant expert involvement, to the recent Policy Horizons (2013) Metascans3 and Canada @150 (2010). Canada's federal government and public service leaders have effectively drawn on advanced contemporary futures methods across many sectors of public administration, for envisioning probable scenarios and defining policy options for their emergence. Policy Horizons is perhaps unique among governments as an internal strategic foresight advisory that facilitates foresight studies, futures research for policy issues, and commissions and investigates technology evolution and impact. While many studies are commissioned as internal advisories, Policy Horizons also serves a significant role in knowledge mobilization from its studies. The Metascans series of technology foresight impact reports are developed with support from private experts, and are publicly accessible and promoted.

Foresight in Canadian governance has been employed effectively, as an educating and or even visionary process to broaden horizons about emerging and critical trends. Foresight methods also serve as engagement and thinking practices that break through the normative consensus mental models common in public sector and promote divergent and imaginative projections of possible

futures. Extrapolation into future trajectories from evidence and consensus thinking accommodates the significant risk of ignoring or overlooking the potential of future disruptions to policy and service from emerging trends that evolve over time, or statistically improbable but devastating “tail risk” events, known as Black Swans (Taleb & Blythe, 2011). If foresight is ignored or underused in policy planning and research, governments may be missing opportunities for guiding policy and planning decisions informed by rigorous, and often provocative, futures prospectives.

In the Canadian government, the reported cases from 1996 through late 2000’s shows continuing exploration from trend analysis and technology scans, to comprehensive multidisciplinary horizon scans (e.g., Metascans), to more recently, innovative collaborative studies such as the Canada@150 study. The predominating tenor of Canadian foresight has focused on large-scale problem areas of interest to specific government or industry sectors, such as the Canadian media industry, internet technology, healthcare, technology sector development, or the energy sector.

The literature of foresight applications and practice cases show a significant progression of contemporary methodologies advising public policy and public service programs. While advising government, futures studies are typically invested in policy domains and major economic and social trends, and not about government or public administration as the subject of foresight. In the aforementioned study (Canadian Governance in the Digital Era) the future of government is situated as the future object.

Other governments, including the European Commission, UK, Australia, and Dubai have recently expanded their foresight capabilities by developing internal organizations or commissioning comprehensive studies (such as those from advisories such as the International Futures Forum and Institute for the Future). Da Costa *et al* (2008) reviews the extensive European foresight series known as FORLEARN directed to inform policymaking and convene a mutual learning network of policymakers, advisors, and science and technology (S&T) experts. It emphasized that the connection of foresight activities to actual policy change may be more tenuous than often idealized in foresight-led policy studies. The FORLEARN program (a major engagement series largely convened between the years 2005–2008) proposed six contributions to public policy functions that apply to the Canadian context and serve arguments for foresight in governance:

- Informing policy – Foresight provides emerging ideas and options for policymakers as an input to policy design and prioritization.
- Facilitating policy implementation – Implementation and the choice of policy instruments are guided by foresight through a shared model of future scenarios or trends, enabling awareness of critical uncertainties and future challenges,
- Enabling participation in policymaking – In Europe the goal was to involve and embed citizen participation in foresight and inform the resulting policy proposals, enabling transparency and legitimacy.
- Supporting policy definition - Foresight outcomes are translated from collective engagements into policy design options for definition and implementation.
- Reconfiguring the policy system – Futures thinking can change the policy process to ensure longer-term challenges are fully considered.
- Symbolic functions – Communicating to the public that new policies are developed from rigorous approaches to analysis of trends and evidence.

Each of these six functions of strategic foresight requires different method selection, well-planned engagements with experts or stakeholders, and design processes for produced artifacts and communications. The selection of specific foresight methods for a policy program remains an expert judgment, as there are no standards or guidelines accepted across foresight practices (or policy studies for that matter). While many advisors and practices are known for scenario planning, trend analysis, or narrative fiction, for examples, it would be a mistake to adopt one methodology for every futures analysis. As in design research (Jones, 2014) models that guide selection and adaptation of methods for thoughtful adaptation to a problem are more effective than prescriptive guidance of conventional methods.

In many large programs such as those cited (e.g., Millennium Project, FORLEARN, Metascans) we have seen foresight platform resources developed and maintained throughout at least the course of the project. A foundation foresight platform consists of an online website with stakeholder participant recruitment and registration, the presentation of foresight tools for elicitation of responses, and the dissemination of interim and final products.

Roles of Foresight for Governing in the Digital Era

Foresight studies addressing the future of government (and the functions of public service) have been under-explored in policy studies. Westminster and US governance in the near to mid-future timeframe represent significant challenges relevant to foresight. National governments and regional economies are facing current challenges to their long-standing models of governance. The 2016 US national election turned out 60% of the population (McDonald, 2016), the lowest since 1942. In the US concerns with media presentation, campaign financing and management, multi-party relevance and the dominance of special interests present us with an historical challenge to governance integrity. Some analyses and forecasts (Adams, 2006) have suggested declining participation stems from perceived lack of relevance to individualized values, as Western societies (the US in particular) are split more between consumerist and conservative than right versus left. The trends of digital culture have not translated to online engagement with government. The shift to individualized sources of online media may lead to disconnection with government and the relevance of broader political issues. The political cycles of governing may also not help citizens maintain engagement between administrations. These problems have transitioned to Canada, although not to the extent of a systemic crisis, but sufficiently to witness the same trends in lower election turnouts, dissociation from politics, and absorption in digital culture.

Even more dramatic social and economic shifts are on the near horizon as artificial intelligence, manufacturing automation, robotics, and algorithmic decision making become mainstream, and the horizon for their evolution becomes better understood. These developments offer governments immense opportunities to produce more efficient and effective services and policies, and might prove crucial in the state's response to mounting social and economic challenges, such as aging societies and climate change that are already highlighting the limits of governments' policy capacity. Yet, these emerging technologies along with disruptive industries (such as the so-called "sharing economy" of Uber and AirBnB) and disrupted traditional economies (such as automotive, journalism and television media) place new pressures on

governments to develop regulatory responses at a rapid pace and with an agility typically lacking in large hierarchical organizations.

The Digital Era Governance project seeks to make a connection between these longer-term governance trends and address the possible scenarios through evidence-informed social foresight. The proposed program of research and engagement seeks to monitor emerging practice of digital tools and approaches, and explore the implications for possible futures. The goal is to influence the work and models of future governance and public service organization, and their relationship to citizens, firms, and non-profit organizations.

Collaborative Foresight - Engaging Citizens and Stakeholders in Digital Governance

A foresight-led design study was conducted by the OCAD University Strategic Innovation Lab (sLab) for the Digital Era Governance partnership convened between 2014-2015. A synthesis map was produced in a series of stages over the engagement phases of the study, reflecting the contributions of invited citizens, conference delegates, and public engagement participants. The synthesis map (Figure 3) presents an integration of trend analysis and systemic analysis within an infographic-type map structured according to the Three Horizons foresight method. Analysis of long-term trends, social system drivers, signals of change, and system models were integrated into a large-scale map of the anticipated future tensions between government and prospective societal changes.

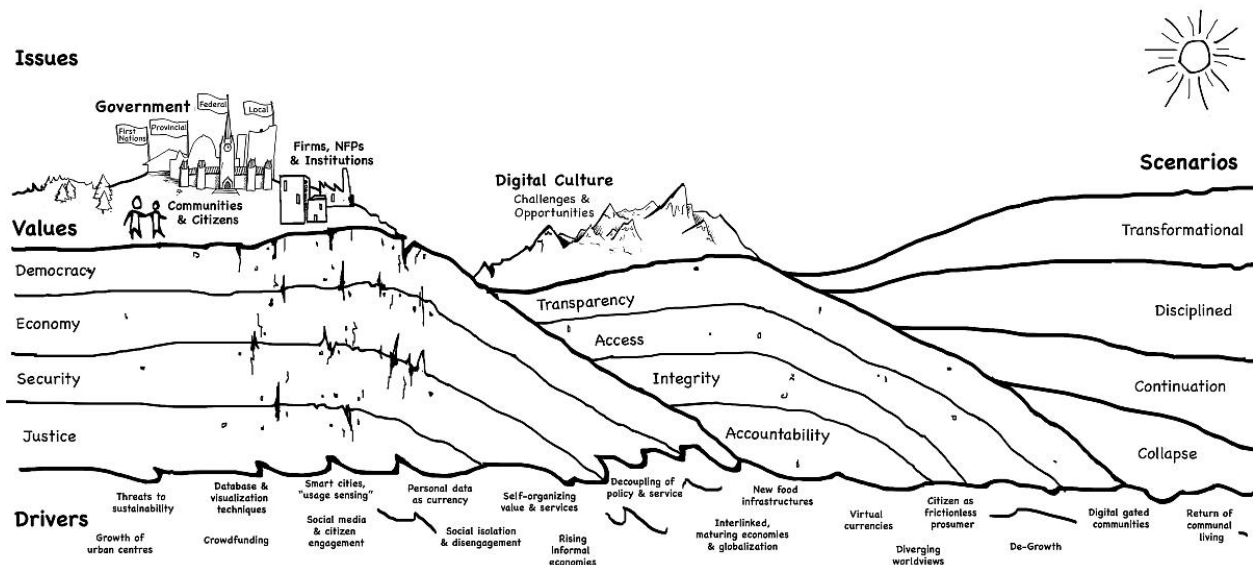
While other foresight methods were considered for the initial phase of study, the synthesis map was chosen and developed due to its viability as a participatory foresight approach across multiple stakeholder engagements. Synthesis mapping (Jones and Bowes, 2016) is based on Sevaldson's (2010) Gigamap technique, which recommends a creative studio process with stakeholders. The synthesis map method draws on research evidence (such as trend analysis) and direct expert knowledge, as appropriate for policy and evidence-based knowledge translation. Studio-based visual design was conducted in stages (without stakeholders) to construct the graphical dimensions of the map.

Deliberative, constructive foresight methods such as scenario planning often present a prematurely narrowed focus on critical uncertainties and future scenarios as determined by expert analysis. The synthesis map methodology was considered appropriate for meeting several goals of the research partnership: Capturing and representing perspectives from multiple stakeholders, identifying the most salient problems in future digital governance raised by experts and citizens, presenting a continuous snapshot of the evolution of learning among participants, and providing a durable visual thematic mapping of the systemic issues in the landscape of digital era governance.

The synthesis map approach employs five stages: 1) domain and literature research, 2) content development from multiple sources and research analysis, employing visual notetaking, 3) initial knowledge synthesis into preliminary maps, 4) engagement, critique and evolution of maps, 5) iterative final map design. Unlike infographics, synthesis maps do not simplify and reduce complexity to present a narrative. Unlike other foresight methods, the synthesis map presents a single visual integration of multiple sources into a metaphorical narrative. This method is

intended to illustrate and integrate processes within coherent system boundaries. The aim to visually represent elements and relationships within the complexity of a large-scale, evolving social system as understood by the participants in that system. Our use of an open visual framework, partially annotated as in Figure 2, enabled a mixed group stakeholders to more effectively speculate about future developments. The map's structure defined areas for contribution in relationship to time scales and to each other. By providing a scaffolding of concepts inviting participation, participants were able to identify new drivers and values associated with future issues.

The synthesis map was developed over four participatory workshops, starting with a hand-drawn visual framework used in the initial public consultation (November, 2014). Drawing on the contributions from an Open Space workshop and participants' direct interactions with the map, the research team continued to develop a structured framework adapting the Three Horizons (Curry and Hodgson, 2010) foresight method, annotated with contributions from the first stages of engagement. Figure 2 presents the framework developed after the first workshop, a line drawing representing the Three Horizons and the emerging issues drawn from research and participants identified as drivers (at the bottom of the map) and the conditional values at stake in the resolution between governance and the emerging digital culture, depicting fissures and stresses in the near term (Horizon 1) as digital culture impresses challenges and opens opportunities for innovation. A set of four staged scenarios in Horizon 3 was included to inspire narratives to inform these trajectories for these possible futures.



The fully formed map² in Figure 3 presents the synthesis of foresight contributions incorporated into the Three Horizons visual formalism. The map is titled with a foresight question driving the inquiry (How might Canadian governance be transformed in the digital era?) The question is both normative and descriptive, with responses interpreting values (that ought to be transformed) and trends (described as transformative). The essential model of the Three Horizons is retained,

² An earlier version of this synthesis map was published by Greg van Alstyne of the OCAD sLab in *Canadian Government Executive*, 21 (3) March 2015, pp. 13-15.

A bridge connects H1 to H2, indicating the necessity for a secular shift to accommodate the anticipated change in society, or Digital Culture. The bridges at H1-H2 and at H2-H3 signify that large-scale innovation is necessary to connect society to new emerging regime of governance values as the new social systems become apparent (within current trends) in that relative time period. The values in H2 include those commonly identified with digital culture, while those in H3 reveal values found as desirable in the long term, inclusion, collaboration, and sustainability. Self-organization suggests a radical reordering of governance relationships in the shift to a “transformational” scenario. The final synthesis map did not visually present futures anticipated with the four scenarios, but the optimistic representation indicates the third horizon as an era with “digitally engaged citizens and public service.”

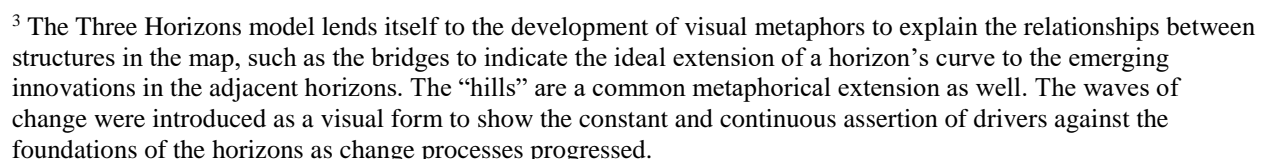


Figure 3. Digital Era Governance Synthesis Map⁴.

A unique aspect of this foresight process was the inclusion of three influence maps (see the top of the map). These were constructed by stakeholder participants in the second workshop in the series, proposed as representative system cycles for emerging digital governance problems that Horizon 2 policies must address. Subsets of participants (5-6 in each group) proposed the themes, generated the elements within the themes and linked them in provisional system maps according to influence logic. Each of the themes – Access Equity, Privacy, and Citizen Data Diffusion – were generated in response to a printed map based on the open framework in Figure 2. These were considered the most compelling concerns arising from the developing tensions between present era Canadian governance and the emerging digital culture. These concerns can be translated to public policy directives that might be addressed in response to the drivers and values identified in the earlier workshop engagements. As a digital governance problematique, the future problem space is represented by influence maps and their relations, as selected and co-created by workshop stakeholders. The inset system maps (causal loop form) are read from left to right, which reveal both temporal relationships as the issues propagate over time, and the relations of influence between these issues, stemming from the deep drivers (the left-most issues) to outcomes (right-most). *Online literacy* links to the *Privacy* influence map, and *Privacy* to *Data Diffusion*. The content of the influence maps can be summarized as follows:

- **Access Equity** – *Should full citizens not have full access?* Access can be considered a public good and will be demanded as more of a utility in the future. Access equity implies the inequitable internet access currently provided by private firms across Canada might be resolved by ensuring universal access is afforded for government services, whether by subsidies or common carrier provisions. Near-term issues include “Government moves to online services,” “Uncertain access (rurals),” and “Battle with Bell.” These influence the bolded issues, which represent foreseeable outcomes for policy intervention: “Government services mandate internet,” “Earnings divide,” and eventually “All service accessible online,” and “Online literacy.”
- **Privacy and Profit** – *New Social Contracts?* The second influence map anticipates the changing Canadian social contract due to changes in privacy and the regulatory policies. “Changing defaults” results from a renegotiation of privacy rights, as citizens start “watching the watchers.” *Surveillance for security* results in a government’s “Privacy erosion.” We also see unequal power relations between citizens who can afford to opt out. “Private to open” reveals a positive Horizon 2 turn where a strong consumer data protection regime can be envisioned to counterbalance the trend to open data sharing.
- **Citizen Data Diffusion** – *Future public domain for data?* The most future-oriented map describes citizen-owned data in H2 and H3 eras. As “Personal data becomes currency,” the need for regulation and control of citizen data sets will emerge in the H2 era of transparency and sharing. A future state of “Secular data transparency,” negotiates accessibility to “Government sources of personal data.” We also see the role for data

⁴ The synthesis map was designed and produced in 2015 by an OCAD University sLab research team consisting of Greg van Alstyne, Peter Jones, Kelly Kornett, Patricia Kambitsch, Peter Scott, and Goran Matic.

governance and novel regulation, with “Data sense-making in government” and functions such as “Ambient data collection” within this system.

This visual method based on inclusive, participatory elicitation was developed from a design action research methodology (Swann, 2002, Sein et al, 2011) and not typical foresight studies. The foresight products were not prepared by a research team working in isolation with access to experts and the literature. It enabled a transparent, traceable representation of contributions by multiple stakeholders over a series of engagements (annotated by participants in a series of interactive presentations and workshops). The combination of visual templating, partial horizon scanning and incomplete scenario definition has not been reported among the scenario methods in foresight literature. Instead the design research approach developed a consensus set of trends and future outcome issues for digital governance problems, defined largely by experts and citizens in series of stakeholder engagements.

The Three Horizons synthesis map represents only the first stage to develop the scope and key themes from eliciting digital governance trends, drivers, and systemic relationships and outcomes over a long time horizon. Continuing foresight-led participatory research is planned for further development within a research process for the digital era governance partnership. An online, accessible foresight platform provided over the period of the partnership project will provide a repository and communication system for capturing the results of trends analyses and signals identification, system maps and models, expert and content analyses, and elicited stakeholder contributions from workshops and engagements.

There are three major challenge areas planned for continuing study to benefit from foresight research:

- How are Canadian public services innovating?
- How are Westminster institutions evolving?
- What are the emerging models for collaboration & performance?

The design action research process follows a well-known AR cycle of Problem Framing, Intervention and Evaluation, Reflection and Learning, and we add Mobilization/Socialization as a cyclic process of interaction through the online platform. The primary purpose of the foresight platform is to systematically collect and coordinate diverse futures perspectives across a large research partnership, with numerous planned and emergent research objectives within the three main challenge areas. Foresight enables the partnership to undertake diverse lines of inquiry in research and discussion forums, and well as monitoring emerging data and trends, knowing that they can be integrated into more coherent narratives and perspectives.

We expect to develop foresight findings from pre-existing work in the corpus (published studies and partnership data) to develop initial foresight products, including the synthesis map and its relevant trends. The research process will develop further stakeholder knowledge from conferences and workshops, both presenting current findings and eliciting new contributions within workshop sessions. Foresight methods for each engagement will be selected for futures (signals and trends) data collection, evaluation of current models, and the potential for further scenario development. Stakeholder surveys, Horizon 2 and H3 scenarios, outcome mapping,

future and options analysis, and further systemic mapping research are considered leading methods to guide the socio-technological research in the project. Visualization techniques such as synthesis mapping will be employed to develop models of systems and causal relationships in future problem areas, as research enabling policy, leadership and institutional guidance. A central challenge in governance foresight will be to formulate scenarios, possible trajectories, preferred futures and strategic options which include governance, public administration, and leadership styles in concert with policy studies. Overall, the foresight research not only develops the challenges and opportunities for the future of Westminster government, it aims to contribute to digital governance and Canadian policymaking.

Foresight as Anticipatory Design

We are challenged with social research aiming to inform future policy and decisions – the extent to which we rely on research evidence, we risk the cognitive bias of anchoring (Tversky and Kahneman, 1973) in data and conclusions drawn from “the past” as the problem of concern continues to evolve into future uncertainty. Yet foresight methods cannot be effectively “dropped in” to policy development and initiative planning. As with the FORLEARN project and the Digital Era Governance synthesis map, the appropriate applications of strategic foresight are “designed in” to emerging and existing processes within public administration.

Design thinking and design disciplines (such as service design and user experience) have made substantial inroads in government and public service projects, often through the proliferation of government services and innovation labs. A survey of the proportion of design projects in public sector applications shows “design” yielding most of its added value downstream from policy development, in the formulation of service delivery and implementation of policy instruments such as procedures, online services, and better end user products to citizens. The definition of agendas and long-term planning for policy has not yielded significantly to design co-creation approaches.

If we examine the commonly accepted models of design thinking in policy studies the disconnection from foresight or formal anticipatory insight becomes apparent. Junginger (2013) presents policymaking as a design process, extending the policy-centric models of Peters (Linder and Peters, 1984) and Howlett (Howlett and Ramesh, 1995) from a multidisciplinary design perspective. Developing the stages of design thinking within policy development, the staged model of Howlett and Ramesh (1995) is extended and critiqued. Juninger shows that design practices (to date, primarily) have only occupied the policy implementation and evaluation stages, and have yet to enhance or contribute to the formative policymaking stages. The most significant obstacle to foresight design practice lies in the insular institutional culture of government policy organization. The envisioning of future digital era governance proposals might first resolve the problem of access and then continue to advocate the content value of strategic foresight as a complementary practice in evidence-based culture.

Strategic foresight obviously will remain ineffective if conducted downstream from formative policy design (agenda setting and concept development) as it will appear as ancillary advice and not influential input. The inclusion of foresight modes in policy design must take into account the staging of processes in the policy cycle. Foresight itself ought to become an integral practice contributing to the design of policy options over different timeframes of strategic selection of

options. However, the definition of policy agendas and long-term planning remains a largely expert-driven process. The fuzzy front-end stages of policy formulation are politically developed, and perhaps for this reason have not invited methodologies such as stakeholder co-creation or design thinking, as in the commercial sectors. Foresight may be uniquely adaptive to early policy formation, as the argument can be made that high quality observations about future trajectories relevant to a policy, even if based on uncertain present-day evidence, have a direct effect on the content and strategy of policy formulation. Especially in the realm of digital era governance, the access to rapidly evolving trends and foresight models describing the trajectory of digital culture, such as developed in the case project for example, should inform policymakers on a more frequent basis than current practice.

References

1. Adams, M. (2006). *American backlash: The untold story of social change in the United States*. Toronto: Penguin Canada.
2. Boden, M., Johnston, R. & Scapolo, F. (2012) The role of FTA in responding to grand challenges: A new approach for STI policy? *Science and Public Policy* 39, 135–139.
3. Borins, S., Kernaghan, K., Brown, D., & Bontis, N., Perri, & Thompson, F. (2007). *Digital State at the Leading Edge*. Toronto: University of Toronto Press.
4. Christakis, A.N. (1973). A new policy science paradigm. *Futures*, 5(6), 543-558.
5. Coates, J.F. (2010). The future of foresight - A US perspective. *Technological Forecasting & Social Change*, 77, 1428–1437.
6. Curry, A. & Hodgson, A. (2008). Seeing in multiple horizons: Connecting futures to strategy. *Journal of Futures Studies*, 13 (1), 1 - 20.
7. Da Costa, O., Warnke, P., Cagnin, C. & Scapolo, F. (2008). The impact of foresight on policy-making: insights from the FORLEARN mutual learning process. *Technology Analysis & Strategic Management*, 20 (3), 369-387.
8. Dreyer, I. & Stang, G. (2013). Foresight in governments – practices and trends around the world. In *Yearbook of European Security: YES 2013*. EU Institute for Security Studies.
9. Durst, C., Durst, M., Kolonko, T., Neef, A. & Greif, F. (2015). A holistic approach to strategic foresight: A foresight support system for the German Federal Armed Forces. *Technological Forecasting and Social Change*, 97, 91-104.
10. Glenn, J.C., & Gordon, T.J. (2001). The Millennium Project: Challenges we face at the millennium. *Technological Forecasting and Social Change*, 66(2), 129-312.

11. Godet, M. (1982). From forecasting to 'la prospective: A new way of looking at futures. *Journal of Forecasting*, 1(3), 293-301.
12. Government of Canada. (2010). *Canada@150 Final Report*. Ottawa: Public Works and Government Services Canada.
13. Gudowsky, N. & Peissl, W. (2016). Human centred science and technology—transdisciplinary foresight and co-creation as tools for active needs-based innovation governance. *European Journal of Futures Research*, 4(8). DOI 10.1007/s40309-016-0090-4.
14. Habegerr, B. (2010). Strategic foresight in public policy: Reviewing the experiences of the UK, Singapore, and the Netherlands. *Futures*. 42, 49-58.
15. Halligan, J. (1995). Policy advice and the public service. In B. Guy Peters and Donald J. Savoie (Eds.), *Governance in a changing environment*. Montreal: McGill-Queen's University Press, 138–72.
16. Howlett, M., Ramesh, M., & Perl, A. (1995). *Studying public policy: Policy cycles and policy subsystems* (Vol. 3). Toronto: Oxford University Press.
17. Jones, P. (2014). Design Methods for Systemic Design Research. In *Proceedings of RSD3, Third Symposium of Relating Systems Thinking to Design*. Oslo, Norway: Oslo School of Architecture and Design, October 15-17, 2014.
18. Jones, P. and Bowes, J. (2016). Synthesis maps: Systemic design pedagogy, narrative, and intervention. In *Proceedings of Relating Systems Thinking and Design (RSD5) 2016 Symposium*. Toronto, Canada, October 13-15, 2016.
19. Junginger, S. (2013). Design and innovation in the public sector: Matters of design in policy-making and policy implementation. *Annual Review of Policy Design*, 1(1), 1-11.
20. Konnola, T., et al. (2011). Foresight tackling societal challenges: impacts and implications on policy-making. *Futures*, 43, 252-264.
21. Kuosa, T. (2014). *Towards strategic intelligence: foresight, intelligence, and policy-making*. Helsinki: Dynamic Futures.
22. Lasswell, H. D. (1959). Strategies of inquiry: the rational use of observation. In D. Lerner (ed.), *The Human Meaning of the Social Sciences*. New York: Meridian Books, pp. 89-113.
23. Lasswell, H. D. (1970). The library as a social planetarium. *American Libraries*, 1 (2), 142-143.
24. Liebl, F. & Schwarz, J.O. (2010). Normality of the future: Trend diagnosis for strategic foresight. *Futures*, 42, 313-327.

25. Linder, S.H. & Peters, B. G. (1984). From social theory to policy design. *Journal of Public Policy*, 4(03), 237-259.
26. Linstone, H.A. (2011). Three eras of technology forecast. *Technovation*, 31, 69-76.
27. Martin, B.R. (2010). The origins of the concept of ‘foresight’ in science and technology: An insider's perspective. *Technological Forecasting and Social Change*, 77(9), 1438-1447.
28. McDonald, M.P. (2016). *United States Election Project*. Gainesville, FL: University of Florida. Retrieved online at: <http://www.electproject.org/2016g>
29. Miemis, V., Smart, J. & Brigis, A. (2012). Open foresight. *Journal of Future Studies*, 17 (1), 91–97.
30. Miles, I. (2010). The development of technology foresight: A review. *Technological Forecasting & Social Change*. 77, 1448–1456.
31. Miller, R. (2007). Futures literacy: A hybrid strategic scenario method. *Futures*, 39(4), 341-362.
32. Miller, R. (2015). “Learning, the Future, and Complexity: An essay on the emergence of future literacy”, *European Journal of Education*. 50 (4). November 2015.
33. Miller, R. & Neng, W.W. (2015). *Adaptive governance for a changing world*. Civil Service College, Singapore.
34. Neville, S. (2011). Call for more evidence-based Whitehall policy. *Financial Times*, 26 October. Retrieved 4 Nov, 2016 at: <https://www.ft.com/content/3a20fc04-fe37-11e0-a1eb-00144feabdc0>
35. Ozbekhan, H. (1969). *Toward a general theory of planning*. Philadelphia: Management and Behavioral Science Center, University of Pennsylvania.
36. Policy Horizons. (2013). *Metascan3: Emerging technologies*. Ottawa: Government of Canada. Retrieved from: <http://publications.gc.ca/pub?id=9.698911&sl=0>
37. Popper, R. (2008). How are foresight methods selected? *Foresight*, 10 (6), 62-89.
38. Ringland, G. (2010). The role of scenarios in strategic foresight, *Technological Forecasting & Social Change* 77 1493–1498.
39. Ringland, G. & Schwartz, P. P. (1998). *Scenario planning: Managing for the future*. New York: John Wiley & Sons.

40. Roberge, I., & Dinning, B. (2013). Foresight: Constructing futures in public administration. In C. Conteh and I. Roberge (eds.) *Canadian Public Administration in the 21st Century*. Boca Raton, FL: CRC Press.
41. Rosell, S. A. (1992). *Governing in an information society*. Montreal: Institute for Research in Public Policy.
42. Rosell, S. (1995). *Changing maps: Governing in a world of rapid change*. Montreal: McGill University, Queen's Press.
43. Sanders, E. B. N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *Co-design*, 4(1), 5-18.
44. Schultz, W.L. (2015). A brief history of futures. *World Futures Review*, 7(4), 324-331.
45. Schnaars, S. P. (1987). How to develop and use scenarios. *Long range planning*, 20(1), 105-114.
46. Schoemaker, P. J., & van der Heijden, C. A. (1992). Integrating scenarios into strategic planning at Royal Dutch/Shell. *Planning Review*, 20(3), 41-46.
47. Sein, M. K., Henfridsson, O., Purao, S., Rossi, M., & Lindgren, R. (2011). Action design research. *MIS Quarterly*, 35 (1), 37-56.
48. Sigal, L. V. (1979). Rethinking the unthinkable. *Foreign Policy*, (34) 35-51.
49. Social Sciences and Humanities Research Council. (2012). *Imagining Canada's Future*. Ottawa.
http://www.sshrc-crsh.gc.ca/society-societe/community-communite/Imagining_Canadas_Future-Imaginer_l_avenir_du_Canada-eng.aspx
50. Swann, C. (2002). Action research and the practice of design. *Design Issues*, 18(1), 49-61.
51. Taleb, N. N., & Blyth, M. (2011). The black swan of Cairo: How suppressing volatility makes the world less predictable and more dangerous. *Foreign Affairs*, 90(3), 33-39.
52. Thompson, F.G. (1992). *Looking back on the future*. Ottawa: Futurescan International.
53. Tversky, A. & Kahneman, D. (1973). *Judgment under uncertainty: Heuristics and biases*. Washington, DC: Office of Naval Research.
54. Van Alstyne, G., Richards, L., Logan, R. K., Stein, S., Lyman, P., Roberts, K., & Webb, K. (2011). *2020 Media Futures*. Toronto: Strategic Innovation Lab, OCAD University.

55. Varum, C. A., & Melo, C. (2010). Directions in scenario planning literature—A review of the past decades. *Futures*, 42(4), 355-369.
56. Weigand, K., Flanagan, T.R., Dye, K.M.C., & Jones, P.H. (2014). Collaborative foresight: Complementing long-horizon strategic planning., *Technology Forecasting & Social Change*. 85, 134–152