# REPORT TO THE CLERK OF THE PRIVY COUNCIL:
# A DATA STRATEGY ROADMAP
## FOR THE FEDERAL PUBLIC SERVICE

Government of Canada / Gouvernement du Canada

Canada

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# Executive Summary

The volume of data that governments, businesses and Canadians produce is growing exponentially, animated by digital technologies. Organizations are changing their business models, building new expertise and devising new ways of managing and unlocking the value of their data. Governments need to evolve rapidly to keep up.

Public service modernization efforts focus on a more transparent, collaborative, citizen-centered and digitally enabled public service. A forward-looking, open approach to data is an essential piece of public service renewal.

How the Government of Canada collects, manages and governs data—and how it accesses and shares data with other governments, sectors and Canadians—must change. The government has a responsibility to ensure its workforce has the skills and tools it needs to ethically leverage data to support the public good, while protecting the sensitive and personal data of Canadians.

Data have the power to enable the government to make better decisions, design better programs and deliver more effective services. But for this to occur—and for us to share data in a way that allows other governments, businesses, researchers and the not-for-profit sector to also extract value from data—we need to refresh our approach.

Today, individual departments and agencies generate and hold a vast, diverse and ever-expanding array of data, including program, geo-spatial, administrative, sensor and population data. These data are often collected in ways—based on informal principles and practices—that make it difficult to share with other departments or Canadians. Their use is inconsistent across the government and their value sub-optimized in the decision-making process and in day-to-day operations.

**Through the power of data, public servants can fundamentally transform governments by changing the way they operate, make decisions and deliver services.**

To enable social innovation and support economic activity, a modern digital and data-enabled government should develop and consistently follow world-leading standards governing transparency, archiving, management, usability, interoperability and privacy. This would enable governments and others to unlock the value of data and provide better services, support evidence-informed decisions, create internal efficiencies and better understand the real impact of programs so that funds can be directed towards those interventions that have the greatest impact. If we do so, Canada will become a destination of choice for researchers and entrepreneurs and Canadians will create new businesses, make scientific discoveries, improve services and find new solutions.

To this end, the Clerk asked us in January 2018 to develop a Data Strategy. The strategy is intended to position the public service to provide the best possible advice to Ministers and support the more strategic use of data while protecting citizens' privacy. While not all data have privacy implications, where they do, departments and agencies should incorporate privacy by design and engage early with the Office of the Privacy Commissioner (OPC). Following consultations with all federal departments and agencies, this report provides a roadmap for a more strategic use of data. The recommendations are structured around four themes: stronger governance, improved data literacy and skills, enabling infrastructure and legislation, and more focused treatment of data as a valuable asset. The goal is to set a foundation so that the Government of Canada creates more value for Canadians from the data we hold. This strategy will align our internal efforts to use data more strategically and complements other ongoing work, such as externally focused national consultations on digital and data transformation led by Innovation, Science and Economic Development Canada (ISED). Their consultations are helping us better understand how Canada can drive innovation, prepare Canadians and firms for the future of work, and ensure that Canadians have trust and confidence in how their data are used.

We are encouraged that so many departments and agencies are already developing data strategies and undertaking bold initiatives of their own. Organizational data strategies underpin the strategic use of data, support the transition to a digital government and ensure the public service is empowered and equipped to harness the power of data to make better decisions and create better outcomes for Canadians. This roadmap provides concrete next steps that can be taken over the short and medium terms. Recommendations are intended to continuously move the Government of Canada and our behaviours in the right direction on data issues.

**The most important things for us to do are:**

1. By September 2019, all departments, agencies or portfolios have a data strategy in place appropriate to their line of business.

2. Provide greater clarity on who is in charge of data within individual organizations and for the government as a whole.

3. Improve and develop overall standards and guidelines that govern how departments access, collect, use, safeguard and share data, and a clear process for developing and refining these over time.

4. Clarify the governance around data to ensure that the Government of Canada manages valuable data assets for the public good.

5. Improve recruitment and professional development practices to ensure that we have the skilled people we need to do data work in a digital environment.

6. Ensure we have the right information technology (IT) environment that allows skilled professionals to use the disruptive technologies that will support the ambitious agenda outlined in this report.

These recommendations acknowledge that while there is a need for common standards and principles to guide the government's efforts, there cannot be a "one-size-fits-all" approach to data. We have sketched out an architecture and principles, but recognize that different organizations will have different needs. To the extent that funding and authorities will be required to support the recommendations, they would be sought as appropriate at the initiative level. As well, this strategy is intended to be evergreen and will inevitably evolve with a changing context.

Canada can and should be a leading jurisdiction with respect to the ethical use of data. Canada should be viewed as an ideal jurisdiction in which to undertake work using data, for both the public and private sectors, offer an alternate paradigm to strict government control or a free market approach to data, and build on and improve upon the European Union General Data Protection Regulation (EU GDPR).

In conclusion, we would like to thank our respective teams and colleagues who undertook extraordinary work in a very short time, the networks across government that mobilized to help us understand how these issues play out in individual departments and agencies, and the Clerk for the opportunity to undertake this important work on behalf of Canadians.

*Anil Arora*
*Chief Statistician of Canada*

*Alex Benay*
*Chief Information Officer*
 *of Canada*

*Matthew Mendelsohn*
*Deputy Secretary to the*
*Cabinet, Results and Delivery*

# The Challenge

Managing, using and sharing data will be crucial in the coming years, but the government is not set up to treat data as a strategic asset for policy-making, program design or service delivery, or to create value for the public, private, not-for-profit, and research sectors.

By increasing their capacity to create, manage and use data, many government departments and agencies are making better decisions and, ultimately, better serving Canadians. However, this is happening in a fragmented fashion, along the traditional business lines of government. While decentralization can create and support innovation and experimentation, an integrated, whole-of-government approach can enable synergies through sharing and interoperability; encourage openness and ongoing learning; and ensure commitment to some common standards and best practices while driving progress and results.

Across the government, data are created, used and stored within individual areas and are often limited to use for a single purpose. Access, use and re-use between and within organizations are often difficult, in part because of a lack of awareness that data could be useful to others and a reticence to share information with others. Additionally, Canada's regulatory and legislative landscape is complex, with federal, provincial, territorial, and even organizational provisions affecting data and information sharing between departments and agencies, as well as between levels of government and with Indigenous Peoples.

## Real and perceived barriers to collaboration have obvious consequences for citizens and businesses.

While intragovernmental data sharing does occur, it is often via ad hoc technical solutions requiring formal letters of agreement signed at the deputy minister level, adding to administrative burden. The government has also pursued greater availability of data through investments in open data, but more can be done to increase the volume of data made available by default.

Compounding these challenges is the absence of a governance structure or senior-level decision-making table charged with providing strategic direction on data issues and driving cultural change.

**Departments and agencies struggle with the same issues**

| | |
|---|---|
| Absence of horizontal governance for strategic direction on data issues | Lack of data literacy and cultural reticence to break silos |
| Lack of adequate digital infrastructure and a complex rules framework | Challenge of acquiring, governing and managing large volumes of disparate data |

In this rapidly accelerating environment, data-driven innovation is an increasingly important source of economic growth, which is critical to the future competitiveness of Canada's businesses in traditional and emerging sectors. Advances in various digital technologies—notably machine learning, edge computing, and satellite imagery—have the potential to greatly accelerate analytical power. While access to more data, along with technological advances, presents great opportunities for the private sector, this also elicits concerns and potentially increases risks for citizens, notably from a privacy perspective.
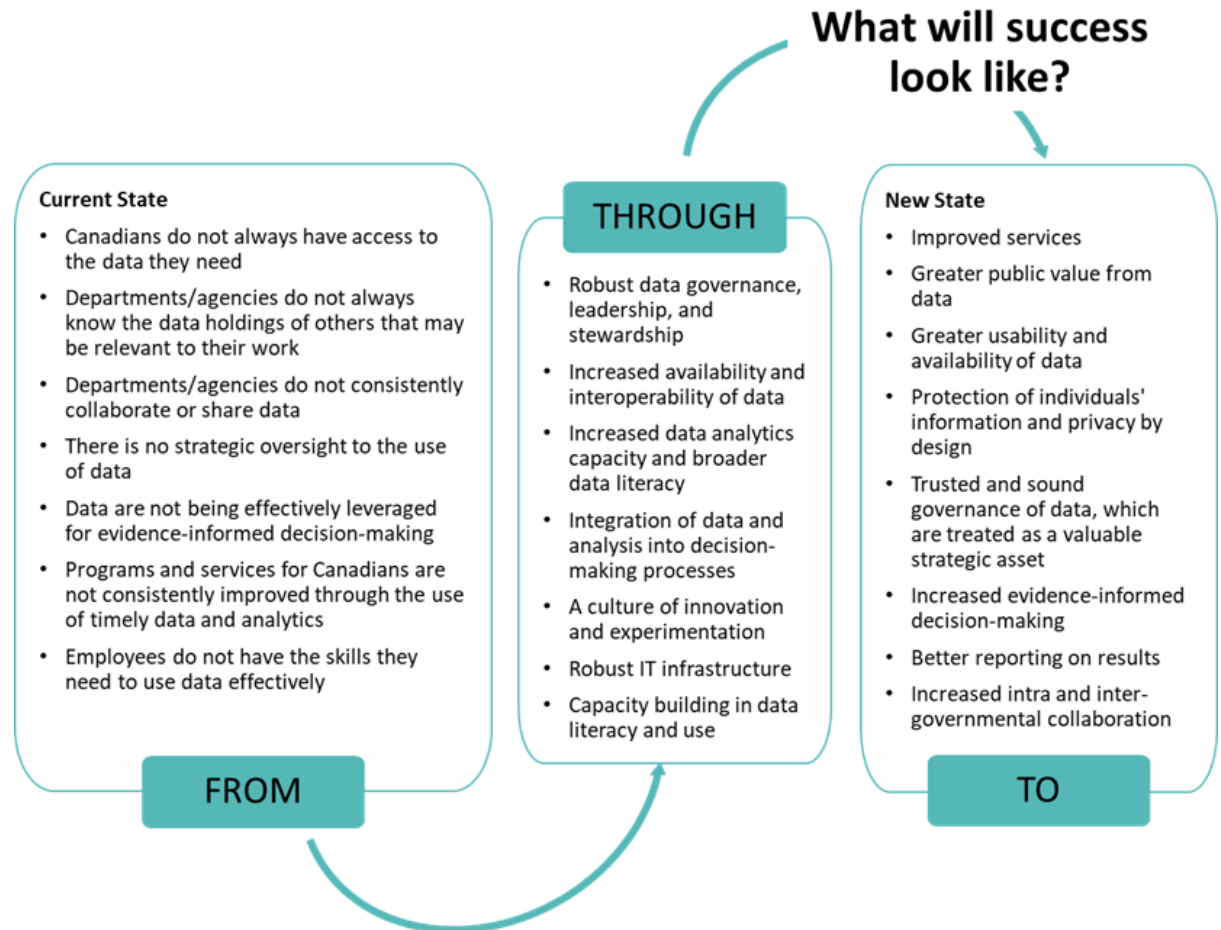
It is clear that the government is at an important inflection point and should embrace significant new opportunities by better leveraging data.

# The Opportunity

This is an opportunity for Canada to position itself as a leading jurisdiction in the data sphere by setting forward-thinking, globally recognized standards that spur innovation and economic growth, and create positive social impact. It is an opportunity for the Government of Canada to address a number of important issues facing governments around the world, including:

- Leveraging data as a strategic asset for the benefit of Canadians

- Maintaining legitimacy and credibility in an increasingly complex society

- Directing resources appropriately and harnessing opportunities to improve impact

- Helping workers adapt and be competitive in a changing labour market

- Protecting citizens from the misuse of their data and adverse impacts of technology

- Maintaining sound resource management.

Along a parallel track, the government is conducting consultations on digital and data transformation to better understand the economic opportunities afforded by a data-driven society and how to balance these with privacy. The outcomes of these consultations will be instrumental in making progress on this Data Strategy.

## What will success look like?

**Current State**
- Canadians do not always have access to the data they need
- Departments/agencies do not always know the data holdings of others that may be relevant to their work
- Departments/agencies do not consistently collaborate or share data
- There is no strategic oversight to the use of data
- Data are not being effectively leveraged for evidence-informed decision-making
- Programs and services for Canadians are not consistently improved through the use of timely data and analytics
- Employees do not have the skills they need to use data effectively

**FROM**

**THROUGH**
- Robust data governance, leadership, and stewardship
- Increased availability and interoperability of data
- Increased data analytics capacity and broader data literacy
- Integration of data and analysis into decision-making processes
- A culture of innovation and experimentation
- Robust IT infrastructure
- Capacity building in data literacy and use

**New State**
- Improved services
- Greater public value from data
- Greater usability and availability of data
- Protection of individuals' information and privacy by design
- Trusted and sound governance of data, which are treated as a valuable strategic asset
- Increased evidence-informed decision-making
- Better reporting on results
- Increased intra and inter-governmental collaboration

**TO**

# The Scope

This Data Strategy focuses on how the Government of Canada can improve how it creates, protects, uses, manages and shares data to improve the lives of Canadians and support businesses, researchers and the not-for-profit sector, and how it makes decisions on policy and programs. It builds on current federal data initiatives to ensure complementarity, coherence and transparency, so that emerging opportunities are understood and quickly acted upon.

**Building on Excellence:**

Many government departments and agencies are increasingly harnessing the power of data to make better decisions and ultimately better serve Canadians. Their expertise and the paths they have forged provide a strong foundation for progress for the government as a whole. From harnessing the use of artificial intelligence (AI) for the reduction of manual processes to using maps and data visualizations to support decisions, there are many examples of excellence across the government, gathered through environmental scans and consultations (see Annex on p. 53), some of which are highlighted throughout this strategy.

## Adapting the government to the digital era

We have embarked on a journey to a digital government, as signalled by the recently expanded role for the President of the Treasury Board as Canada's first Minister for Digital Government. The role of the Chief Information Officer of Canada has been elevated to a deputy minister position, and strong relationships and networks are being built with digital leaders domestically and internationally. There are a number of intersecting data-related initiatives underway, including:

- The launch of the Canadian Digital Service, and development of a digital policy to support the transition to a digital government, consolidating and evolving the existing Treasury Board Policies on Service, IT and Information Management (IM)

- Engaging Canadians on digital and data transformation in support of the Innovation and Skills Plan to turn Canada into a global innovation leader, by focusing on skills, innovation, privacy and trust

- Statistics Canada's (StatCan) modernization initiative, designed to increase access to data to foster innovation and inclusion, by leveraging their expertise

- Other government initiatives, including development of the 4th National Action Plan on Open Government, which includes commitments to improve transparency, accountability and public engagement

- The creation of the Results and Delivery Unit (RDU) at the Privy Council Office (PCO) to support the government in strengthening a culture and approach that is evidence-based and is focused on measurable results and the launch of the Impact Canada initiative by the Impact and Innovation Unit (IIU) to help departments accelerate the adoption of outcomes-based and data- driven approaches to deliver meaningful results to Canadians

- Initiatives by other partners, including provinces, territories, municipalities and Indigenous Peoples

- The development or implementation of specific department and agency data strategies

- Assessing and modernizing legislative and policy frameworks to allow for responsible and innovative uses of personal information while ensuring continued protections and privacy by design.

**As digital technologies proliferate and fundamentally transform economies and societies, the generation of data is increasing exponentially, helping drive innovation and shape decisions. These data must be used and managed as a strategic asset in an ethical and secure manner that respects privacy and generates trust.**

# Where does public sector data come from?

Around the world, 2.5 quintillion bytes (2.5 x $10^{18}$ bytes) of data are created every day, with 90 per cent of the data in the world generated in the last two years alone (IBM, 2016). The Government of Canada generates and holds a vast amount and diverse array of data, including spatial data, operational data, transactional service data, and data collected from or about citizens and businesses. These data can be categorized into four over-arching categories based on the purpose they serve, and improvements to the government's use of data will result in efficiencies across each of these areas. For certain categories, including statistical and research purposes, progress may be made more quickly, while others may take more time and require discussions with Canadians to ensure proper social license.

# DATA STRATEGY FRAMEWORK FOR THE FEDERAL PUBLIC SERVICE

A whole-of-government approach to creating, protecting, using, managing and sharing data as a strategic asset, enabling informed decisions that lead to better outcomes and services for Canadians

**GUIDING PRINCIPLES**

- Client-centered
- Purposeful
- Trusted
- Enabling
- Agile
- Open
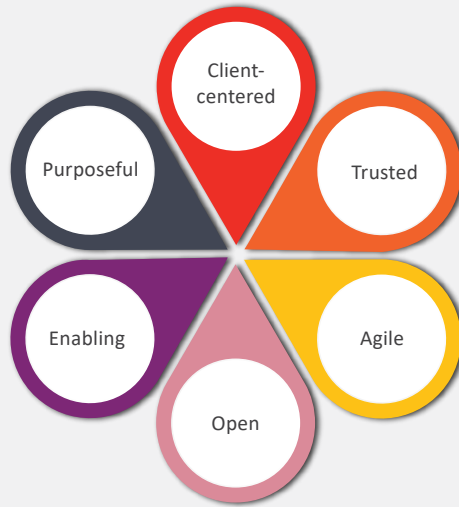
**DESIRED OUTCOMES FOR CITIZENS, BUSINESSES AND GOVERNMENTS**

Improved services

Greater public value from data

Greater usability and availability of data

Protection of individuals' information and privacy by design

Trusted and sound governance of data, which are treated as a valuable and strategic asset

Increased evidence-informed decision-making

Better reporting on results

Increased intra and inter-governmental collaboration

## PROPOSED PILLARS

### People and culture
The government has the talent and capacity it needs to manage, interpret, use and understand data. Includes, for example:

- Culture
- Skills
- Recruitment and retention
- Development and training

### Environment and digital infrastructure
Processes and infrastructure are aligned to turn good data and analysis into action. Includes, for example:

- Enabling infrastructure and tools
- Security, confidentiality and integrity
- Privacy
- Legislation and supporting policies

### Data as an asset
The government has the data it needs, which are fit for use, discoverable, and available. Includes, for example:

- Planning and stewardship
- Use
- Quality
- Storage
- Sharing and access

## FOUNDATION

### Governance
Governance exists at the right levels to ensure that data are managed holistically as a strategic asset. Includes accountability, roles and responsibilities.

### Communication
Transparency to Canadians on the government's management and use of data, as well as effective intra and inter-governmental communication.

# Transformation Roadmap

The recommendations provided in this Data Strategy seek to ignite change, demonstrate value, resolve barriers, and help the government make better use of data to improve the lives of Canadians while continuing to safeguard their privacy in a modern data-driven environment. They are presented along a transformation roadmap consisting of two timeframes, designed to generate momentum through ambitious early actions, build horizontality through collaboration, and develop strength over time. As execution and delivery will be key, this report provides some concrete timelines and overall direction, while also providing flexibility for deputy ministers to tailor implementation to the needs of their organizations, which will be crucial to success.

The recommendations are at varying stages of development, with some still being conceptualized and requiring further work and analysis by departments and agencies. As the Data Strategy is designed to be evergreen, the list is not exhaustive and will naturally evolve over time, with further work and strengthened data governance. Implementing several of the recommendations would require incremental resources. Costing estimates have not been undertaken as part of this report and there is no source of funds. Funding and authorities will be pursued, as appropriate, at the project level.

**Laying the foundation and building momentum**

Short-term
(up to September 2019)

**Expanding and scaling across the government**

Medium-term and transition advice
(October 2019+)

Build confidence, create momentum and demonstrate the value of changing the way the government uses and manages data

Strengthen leadership to drive progress, set up systems and capability to support horizontal collaboration and greater use of data

Expand successful practices across the government, adapt to build capability and support progress

Implement systemic changes necessary for holistic adoption and transformation

# Recommendations at a glance

| | GOVERNANCE | PEOPLE AND CULTURE | ENVIRONMENT AND DIGITAL INFRASTRUCTURE | DATA AS AN ASSET |
|---|---|---|---|---|
| **Short-term (to Sept 2019)**<br><br>Laying the foundation and building momentum | (1) Establish a senior level decision-making body for horizontal data issues by modifying the mandate and membership of the Deputy Minister Committee on Enterprise Priorities and Planning (DM CEPP)<br><br>(2) Strengthen and clarify roles and responsibilities around enterprise data leadership, including by establishing a Government of Canada Chief Data Steward<br><br>(3) Develop and implement new frameworks and standards with respect to the ethical and secure use of data<br><br>(4) Require all departments, agencies or portfolios to develop data strategies that are relevant, scaled and customized to their needs and aligned with the Data Strategy<br><br>(5) Require all departments and agencies to ensure proper accountabilities, roles and responsibilities with respect to data<br><br>(6) Convene a central agency-led working group to evaluate and make recommendations to the way data are considered in the decision-making process | (9) Assess the current state of data literacy as well as skills and competencies required<br><br>(11) Pilot and launch a digital academy to develop digital and data skills of existing employees<br><br>(12) Ensure the government is competitive in its hiring practices | (15) Accelerate work to assess the legislative and policy framework and practices to support greater strategic use of data while ensuring the protection of personal information<br><br>(16) Leverage work underway to support and build the digital identity ecosystem | (19) Foster innovation within the public service and leverage the outcomes of existing pilot projects<br><br>(20) Leverage and expand secure, user-friendly environments to facilitate access to government-held data for decision-makers and Canadians |
| **Medium-term and transition advice (Oct 2019+)**<br><br>Expanding and scaling across the government | (7) Provide regular updates on data to the Clerks and Cabinet Secretaries table, and encourage departments and agencies to pursue collaboration on specific issues or needs with other levels of government and Indigenous Peoples<br><br>(8) Recognizing that Indigenous Peoples have an inherent right to self-determination, co-develop with Indigenous partners distinctions-based strategies to advance Indigenous data governance and institutional capacity. The Government of Canada should also work with Indigenous partners, who are the custodians of their data, to co-develop indicators and data collection strategies | (10) Renew HR strategies with targeted training and development, including engagement with colleges, universities, and unions | (13) Work with departments and agencies to establish a common set of data needs and establish a process for easy adoption of data tools<br><br>(14) Assess required digital/data infrastructure needs | (17) Establish a centralized view of government-held data, develop a government data quality framework, and develop guidance for the long-term management of digital government assets<br><br>(18) Enhance the rigor of analysis of program administrative data and increase the generation of new data to assess outcomes and strengthen performance measurement, program evaluation and policy development<br><br>(21) Develop an approach to increase access to public and private sector data to drive insights for enhanced global competitiveness and social impact |

# Laying the foundation and building momentum:

## Driving early action



**Why is this important?**

- Raise awareness
- Commitment to transparency and protection of individual data
- Engage key influencers, expert users, academics and data providers
- Data leads to better decision-making and policy development
- Provide horizontal direction on strategic and technical data issues
- Model and support cultural change
- Manage coherence and flexibility
- Maximize public value from data through standardization and prioritization
- Foster data-driven culture that is open and shares by default
- All public servants are data agents
- Hire, retain, cultivate, and empower the right talent and capacity
- Increase data literacy of employees
- Fully harness technological opportunities
- Protect data and privacy of information
- Appropriate tools, infrastructure and processes are available
- IT architecture supports and facilitates data management and analytics
- Encourage horizontality and coherence
- Value driven by combining government-held data with data from other sources
- Data are well managed, secure, and fit for use
- Data use is appropriate, citizen- and business-centric, and ethical
- Greater use and availability of data
- Government has the data it needs

**Departments, agencies or portfolios**

**Communications**
- Open and transparent communication with Canadians
- Encourage data sharing, access and collaboration

**Governance**
- Develop data strategies
- Ensure accountabilities for data roles and responsibilities

**Whole-of-government**
- Modify DM CEPP
- Clarify roles and responsibilities including for a Chief Data Steward
- Data in decision-making
- Ethics and security Frameworks

**People and culture**
- Assess state of data literacy
- Launch digital academy
- Identify talent supply sources
- Pilot demand map for hiring targets
- Data scientist recruitment pilot

**Environment and digital infrastructure**
- Accelerate work to assess legislative and policy frameworks
- Develop federal roadmap for digital IDs
- Assess required infrastructure needs

**Data as an asset**
- Review and analysis of data pilots
- Develop prototype of virtual data lab
- Update policy requirements towards a new digital policy

# GOVERNANCE

# OBJECTIVE

🌐

**Governance**
exists at the right levels to ensure that data are managed holistically as a strategic asset

_____

## Why is this important?

- To provide coherent direction on strategic and technical data issues

- To model and support cultural change

- To ensure balance between coherence and flexibility

- To provide standardization and prioritization to extract maximum public value from data

**Laying the foundation and building momentum**

Short-term
(up to September 2019)

**Expanding and scaling across the government**

Medium-term and transition advice
(October 2019+)

(1) Establish a senior level decision-making body for horizontal data issues by modifying the mandate and membership of DM CEPP

(2) Strengthen and clarify roles and responsibilities around enterprise data leadership, including by establishing a Government of Canada Chief Data Steward

(3) Develop and implement new frameworks and standards with respect to the ethical and secure use of data

(4) Require all departments, agencies or portfolios to develop data strategies that are relevant, scaled and customized to their needs and aligned with the Data Strategy

(5) Require all departments and agencies to ensure proper accountabilities, roles and responsibilities with respect to data

(6) Convene a central agency-led working group to evaluate and make recommendations to the way data are considered in the decision-making process

(7) Provide regular updates on data to the Clerks and Cabinet Secretaries table, and encourage departments and agencies to pursue collaboration on specific issues or needs with other levels of government and Indigenous Peoples

(8) Recognizing that Indigenous Peo-ples have an inherent right to self-determination, co-develop with Indigenous partners distinctions-based strategies to advance Indigenous data governance and institutional capacity. The Government of Canada should also work with Indigenous partners, who are the custodians of their data, to co-develop indicators and data collection strategies

# Greater oversight to better leverage data

**Recommendation 1:**

Establish a senior level decision-making body for horizontal data issues by modifying the mandate and membership of DM CEPP

**Recommendation 2:**

Strengthen and clarify roles and responsibilities around enterprise data leadership, including by establishing a Government of Canada Chief Data Steward

**Recommendation 3:**

Develop and implement new frameworks with respect to the ethical and secure use of data

*Goal: strengthen data leadership, drive change and support the strategic use of data*

## A deputy minister-level committee for data issues

The government has established a number of new government-wide senior official committees in recent years to support its efforts to adapt to digital and data developments. While these committees have tackled many important issues, there is a need for increased coordination of effort toward greater cohesion and coherence so that key organizations are represented and take part in the decision-making process. Analysis and consultations have demonstrated the need for a single senior-level body to provide horizontal oversight of the strategic and technical uses of data and to make decisions on data management issues spanning the whole of government. It is recommended that the mandate and membership of the Deputy Minister Committee on Enterprise Priorities and Planning (DM CEPP) be broadened beyond IT direction and prioritization to address the need for horizontal oversight of both the strategic and technical uses of data. A shift in mandate and membership would allow the committee to also:

- provide strategic direction
- drive cultural change
- encourage greater data and analytics use
- align and prioritize data-related investments or gaps
- drive progress on data strategies
- ensure open by default and sharing by default
- compel data decisions to be holistic.

Consideration should be given to elevating the committee from a sub-committee of the Public Service Management Advisory Committee to a full co-chaired DM committee with decision-making authorities. Given the horizontal nature of the government's system, and to support cultural change, the committee should work closely with the Deputy Minister Task Force on Public Sector Innovation and should report on a regular basis to the Coordinating Committee of Deputy Ministers. The existing governance that supports DM CEPP (i.e., the Assistant Deputy Minister [ADM] Committee on Enterprise Priorities and Planning and the Enterprise Architecture Review Board) should be reviewed so that the DM committee is also supported by an ADM-level body focused on the strategic elements of data.

### International best practices

The United Kingdom's Data Advisory Board, led by the Chief Executive of the Civil Service and Cabinet Office Permanent Secretary, aligns efforts to make the best use of data across government, such as initiatives to keep sensitive data secure, ensure common security standards, and make it easier for citizens to view and correct data about themselves, and refines ethical principles for data science techniques.

# Roles and responsibilities around data

The government also needs to strengthen and clarify roles and responsibilities around enterprise data leadership, especially given the recent elevation of the Chief Information Officer (CIO) of Canada to a deputy minister position and the recommendations in this report. Therefore, further work and consultations will need to be undertaken to explore the best fit for enterprise responsibilities for data, especially with respect to the different categories of data held by the government (p. 9).

# Champion enterprise data stewardship

Formalizing the role of a Government of Canada Chief Data Steward (GC CDS) would support and empower government organizations and others in building their data management and stewardship capacity, optimize the strategic use of and access to data, and support data-driven innovation.

The GC CDS would work closely with the CIO of Canada, and with other horizontal governance mechanisms, including the modified DM CEPP, to help ensure the effective use and management of data and information across the government. Ongoing collaboration would also be expected with those responsible for strategic data functions in departments and agencies to discuss progress on the government's data agenda. The GC CDS and the CIO should work to strengthen jurisdictional collaboration and interoperability, enabling public, private, not-for-profit, and research sectors to create economic activity and social innovation.

GC CDS, StatCan and the Treasury Board Secretariat (TBS) would co-lead work on the development of frameworks, principles, protocols and guidance with respect to the ethical and secure use of data. This would support social license and ensure the government's use and analysis of data continues to be appropriate, citizen- and business-centric, and ethical.

**Enterprise-level and organizational data stewardship can:**

- Support high quality and optimized use of data
- Facilitate data discoverability and accessibility
- Help build and promote innovation, expertise, skills and data literacy
- Help set common data definitions, standards and policies to support interoperability
- Reduce the time spent finding data, verifying results or identifying inconsistencies
- Help eliminate duplication in the purchase and acquisition of data
- Support effective data governance and strategies
- Ensure collaboration with department/agency data stewards/custodians, other levels of government, Indigenous Peoples, etc.

## Next steps

- Consult on committee changes and draft updated mandate, authorities, membership, governance and support (fall 2018)

- Potential committee modifications implemented (winter 2019)

- PCO, TBS and StatCan to work together to clarify roles and responsibilities around enterprise data leadership, including vis-a-vis roles of CIO and GC CDS with respect to data, for discussion at DM CEPP

- Ultimate scope and authorities of GC CDS to be determined as appropriate

- GC CDS, StatCan and TBS to co-lead work on the development of frameworks, principles, protocols and guidance with respect to the ethical and secure use of data

# Build data and analytics capability and culture

| Recommendation 4: | Recommendation 5: | Recommendation 6: |
|---|---|---|
| Require all departments, agencies or portfolios to develop data strategies that are relevant, scaled and customized to their needs and aligned with the Data Strategy | Require all departments and agencies to ensure proper accountabilities, roles and responsibilities with respect to data | Convene a central agency-led working group to evaluate and make recommendations on the way data are considered in the decision-making process |

*Goal: ensure data are at the heart of decision-making and are strategically managed and leveraged to improve programs and services*

The growth in volume and strategic importance of data assets requires the development of organizational data strategies as well as the assignment of specific responsibility for data. This will help align strategy, processes and structures around data, support the transition to a digital government and help ensure the public service is agile, properly equipped and inclusive. To ensure essential elements are in place and support an integrated perspective on data, strategies will be built around a foundation of governance and the three pillars in alignment with this Data Strategy.

In recent years, the roles of Chief Financial Officers (CFOs) and CIOs have become more professionalized as our working environments have evolved. Moving forward, government organizations will be significantly more data-enabled and **data management will become just as important as human resources or financial management.** Many would argue that this should already be the case, and that we are lagging behind.

The Clerk's tasking requested consideration of the need for Chief Data Officers (CDOs) across the government and for the government as a whole. While their prevalence as an executive leader for data is growing in the private sector and some departments and agencies have recently named CDOs, such a position may not suit the diverse range of mandates and structures across the government. As well, recent changes to the IM/IT policies have empowered organizational CIOs with more responsibilities around data. However, all organizations must clearly identify who is responsible for fulfilling data functions and it would be expected that most will choose to have a CDO to achieve the appropriate balance between data management (CIO) and privacy, governance and analytics (CDO). The assignment of func-tions to positions should be articulated in organizational data strategies.

Work will also explore how to consider data earlier in the decision-making process through the provision of guidance for Budget asks, Memoranda to Cabinet (MC) and Treasury Board submissions (TB Subs). This would include assessing the needs of others when planning new data activities. An assessment will be conducted of the necessity of data management plans aligned to the FAIR principles (findable, accessible, interoperable, reusable). This will support proper data stewardship and increase access to data that could be repurposed by others. This work will also consider implementing attestations, similar to what is required for the CFOs in decision-making processes, by the entire C-suite of officers, including CFOs, CIOs, CDOs and Chief Results and Delivery Officers (CRDOs).

## Next steps

- TBS, StatCan and the Canada School of Public Service (CSPS) to develop guidance/training on data strategies for all organizations by April 2019

- Renewed DM CEPP to provide recommendations on reporting/updating of data strategies by April 2019

- All departments, agencies or portfolios to develop data strategies by September 2019

- Central agency-led working group to make any recommendations for changes to decision-making processes by September 2019

# Accelerate collaboration

*Goal: drive intragovernmental and intergovernmental collaboration and alignment of efforts on data*

Local, regional, national and global issues are all increasingly complex. A great deal of success has been achieved in collaborating with the provinces and territories through long-standing initiatives, such as the National Justice Statistic Initiative, a cross-jurisdictional forum and partnership. And we continue to adapt to emerging needs, such as through collaboration on the collection and sharing of quarterly data on opioid-related deaths. But, more can be done. We need to continue to work together to replicate our successes across other domains and with all our partners to create more value for Canadians.

All Canadians will ultimately benefit from greater collaboration between levels of government, with Indigenous Peoples, with the private sector, and with non-profit organizations. The Government of Canada needs to take a leadership role in the area of data, including through investments, standards and focus, to create platforms and opportunities that will enable all sectors to create value from data.

Existing infrastructure, including the Clerks and Cabinet Secretaries table and current departmental and agency federal, provincial and territorial (FPT) tables will be leveraged to provide regular updates and drive progress on specific data issues or needs with provinces, territories, and municipalities. An approach to co-develop data strategies with Indigenous Peoples is discussed on page 22.

## Next steps

- TBS, PCO and StatCan to host a joint FPT table at least once per year starting in 2019
- Clerk to issue a statement encouraging the pursuit of collaboration with other levels of government and Indigenous Peoples
- Where possible, expand collaboration on federal data tools, such as the Federal Geospatial Platform (FGP), to provinces and territories

### Calgary's use of data to help curb opioid overdoses

The City of Calgary has integrated data from novel sources, including the Closed Circuit Television system for Calgary Transit, into their overall data on opioid-related incidents. According to the City, "Overdose reporting correlates with high social disorder locations, primarily along the C-Train lines. When incidents occur on Calgary Transit property, approximately one third of cases are reported using the HELP phone system and approximately 50 per cent are reported by Transit operators or through CCTV monitoring at the Transit Operations Center. In response to this escalating issue, Transit and Alpha House are piloting an approach that pairs a Downtown Outreach Addictions Partnership (DOAP) team outreach worker with a Transit peace officer. This team will operate on the C-Train system and proactively monitor locations with high social disorder and reported overdoses. This pilot is funded through Council's one-time Community Services Prevention Investment Fund."

Source: The Opioid Crisis and Response: update to Council and Senior Administration

## Inter-jurisdictional collaboration on innovation

In 2017, the Federal, Provincial and Territorial Clerks and Cabinet Secretaries committed to inter-jurisdictional collaboration through the FPT Declaration on Public Sector Innovation, by:

- Seeking out and applying new insights, ideas, tools and technologies to complex problems by working within and across governments to continuously improve policies, programs and services

- Experimenting and measuring results by identifying what works and what doesn't, so that we can invest where we can have the greatest impact

- Sharing knowledge and data with citizens in an open and transparent way, while learning from them and incorporating their expertise and input into our work

- Putting citizens first by collaborating with all sectors of society, including Indigenous Peoples, the non-profit and private sectors, and civil society, to co-design and implement better policies, programs and services

- Exploring opportunities to work together on prizes, challenges and other outcomes-based funding mechanisms

- Continuing the dialogue on innovation and experimentation across Canada by sharing experiences and knowledge, making linkages and establishing partnerships.

## Data investments in the health sector

Health Canada provides leadership in the area of data standardization and collaborative partnerships through its funding of the Canadian Institute for Health Information (CIHI). Established in 1994, CIHI is an independent organization governed by a Board of Directors with Pan-Canadian representation. It collects, synthesizes, analyzes and disseminates comparable health information from partners from provincial and territorial governments, hospitals, regional health authorities and medical practitioners.

CIHI's standardized approach for the collection and reporting of health care data—while ensuring its confidentiality and integrity—has supported policy-makers, managers and decision-makers in tracking health system improvements and shaping policies and programs.

# Spotlight on data-sharing initiatives across the government

### Reducing client and government burden by providing access to information

Canada Border Services Agency (CBSA) and Immigration, Refugees and Citizenship Canada (IRCC) have long worked in collaboration, administering Canada's immigration laws, including in the realm of sharing data. When IRCC began requiring clients to provide information that demonstrated compliance with residency-in-Canada requirements, the operational impact on CBSA was enormous, as thousands of clients began requesting records of their travelling history across the border. Internally, there were risks of not meeting legislated timelines, and clients were frustrated with the delays in processing citizenship applications.

A streamlined data exchange solved the problem. The two departments collaborated on providing direct and controlled access to the CBSA information required. This allowed IRCC officials to access, upon receipt of consent from their clients, the required information. By working collaboratively and sharing relevant data in a controlled environment, the organizations reduced the burden on operational resources and clients, and developed a faster, more efficient process.

### Improving services for Canadians by joining datasets

Two of the government's largest service providers, Employment and Social Development Canada (ESDC) and the Canada Revenue Agency (CRA), together manage over 100 million interactions with Canadians every year. The two departments joined forces to improve the delivery of services to Canadians by creating connected datasets which inform decisions and spur innovation. For example, to assess and understand the vulnerability of populations to the government's move towards greater online service delivery, they created a visual representation (using the e-Vulnerability Index and aggregated tax filer data), which can also be used as a model by other jurisdictions. To facilitate data sharing between the CRA and ESDC, and to encourage new partners to structure their data in a similar fashion, the joint datasets were also made available on the Open Data portal.

Another joint project, the Direct Deposit and Address Information Sharing Initiative (DAISI), is geared to enabling a "Tell Us Once" experience by sharing basic client information across organizations to streamline the process for Canadians to update their information—reducing time and confusion, and providing consistency. With consent, Canadians' banking information will be updated for all CRA benefits and credit programs, such as the GST/HST credit, the Canada Child Benefit, the working income tax benefit, and their income tax refund. This information is shared with ESDC to update Canada Pension Plan information. In November 2017, the first iteration of DAISI went live, and as of June 30, 2018, more than 188,000 transactions have been sent to ESDC from the CRA through the initiative. With an enabling and strong joint governance structure in place, the team successfully worked through some key challenges, including how to handle differing data structures between the organizations and aligning with legislation and policy around the privacy and protection of client information.

# Supporting Indigenous data strategies

**Recommendation 8:** Recognizing that Indigenous Peoples have an inherent right to self-determination, co-develop with Indigenous partners distinctions-based strategies to advance Indigenous data governance and institutional capacity. The Government of Canada should also work with Indigenous partners, who are the custodians of their data, to co-develop indicators and data collection strategies.

*Goal: determine data strategies jointly with Indigenous partners, respecting the historical relationship and Canada's commitment to honour First Nations, Inuit, and Métis rights*

The Government of Canada is undergoing historic transformations towards reconciliation with Indigenous Peoples. It is working in partnership with First Nations, Inuit and Métis to renew relationships, recognize and respect rights, advance self-determination, rectify socioeconomic inequalities, and remove barriers so that they can control and plan the delivery of the services that affect them. These transformations will need to harness meaningful and reliable data to strengthen Indigenous Peoples' abilities to pursue their own goals and improve the quality of life in their communities by establishing baselines and data strategies to ensure that results can be measured over time. While much progress has been made toward the development of new partnerships and approaches, there is still much work to do. In particular, there are several key driving forces that need to be considered toward a government-wide Indigenous data strategy:

- First, partnering with First Nations, Inuit and Métis to co-develop data strategies that will contribute to self-determination and assist them in the design, planning and management of their services.

- Second, taking steps to enable devolution and greater Indigenous control over services. This includes exploring with Indigenous partners opportunities to build data collection, data storage solutions and analytic capacities outside of the Government of Canada.

- Third, progressively reducing dependency on reporting requirements by establishing Indigenous-led institutions, developing data sharing agreements with Indigenous partners and leveraging existing data sources, such as administrative datasets and targeted surveys, in a manner that supports the advancement of Indigenous data governance and their custodianship over data.

- Finally, co-developing data strategies that are distinctions-based and flexible to allow for aggregate data at the community, regional, and national levels, while at the same time, ensuring protection of sensitive and personal data, preventing potential misuse. This is also about integrating Indigenous ways of knowing into indicator development so that narratives are meaningful, reflecting distinct Indigenous cultures, values, and priorities.

Looking ahead, Canada will build on existing achievements, continue to strengthen working relationships with Indigenous partners based on an approach of mutual respect and enhanced collaboration, and introduce new processes as required. This is an opportunity to advance a collaborative approach for data collection, sharing, and stewardship between Indigenous partners and Canada. It would also advance Indigenous leadership and governments' capacity to govern their own data.

# PEOPLE AND CULTURE

# OBJECTIVE

**People and Culture:**
the government has the talent and capacity needed to manage, interpret, use and understand data

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## Why is this important?

- To enable a data-driven culture that is open and shares by default

- To recognize all public servants as data agents

- To hire, retain, cultivate, and empower the right talent and capacity

- To grow data literacy in existing and new employees

**Laying the foundation and building momentum**

Short-term
(up to September 2019)

**Expanding and scaling across the government**

Medium-term and transition advice
(October 2019+)

(9) Assess the current state of data literacy as well as skills and competencies required

(11) Pilot and launch a digital academy to develop digital and data skills of existing employees

(12) Ensure the government is competitive in its hiring practices

(10) Renew HR strategies with targeted training and development, including engagement with colleges, universities, and unions

# Support ongoing learning and development

**Recommendation 9:**

Assess the current state of data literacy as well as skills and competencies required

**Recommendation 10:**

Renew HR strategies with targeted training and development, including engagement with colleges, universities, and unions

**Recommendation 11:**

Pilot and launch a digital academy to develop digital and data skills of existing employees

*Goal: develop and retain talent by providing more professional development opportunities, increase data literacy and support mobility*

The varying levels of digital and data literacy across the government, along with a constantly evolving context, requires a multi-pronged, nimble and agile approach to the upskilling of employees. First, the government must establish a baseline measurement of the current state of literacy, and assess the skills and competencies required to build a skilled data scientist/specialist workforce (e.g., programming, machine learning, AI, geographic information system, visualization, privacy training, etc.). Second, renewed HR strategies must leverage best practices, accelerate capacity building and increase overall levels of digital and data literacy within communities (e.g., policy, administrative, IM and IT) and across levels, targeting employees from orientation through literacy and career development. It will be especially important to develop the data and digital literacy of government leadership, which will be critical to widespread cultural change.

Renewed strategies should include the development of training and curricula, communities of practice, a developmental program and options for increased retention and mobility. It will also be important to continue to engage in constructive dialogue with colleges and universities as well as with unions to grow the workforce of tomorrow, such that curricula, training and development are more data-focused. This should include engagement with credible industry and global experts to stay abreast of the latest tools and technologies. StatCan should be leveraged as a host organization to help build a network of data scientists and provide work experiences to support development and mobility.

## Innovative HR initiatives underway

CSPS is developing a blueprint for a **Digital Academy** that can be recreated in regions across Canada with strong emphasis on partnering with provincial and municipal governments, learning institutes (universities and colleges) and the private sector. It is also collaborating with the Policy Community Partnership Office to identify competencies related to digital/data literacy among the IT and policy communities.

Global Affairs Canada has developed a **Data Analytics Training pilot program** as part of its overall data strategy to increase data capacity among employees to make greater use of data in evidence-informed policy-making.

StatCan is working closely with 12 educational institutions with data scientist/specialist programs to seek out data scientists as part of their departmental HR strategy. The agency also offers Research Data Centres as a place to engage and collaborate with the data science community for experimentation and innovation.

# Next steps

- CSPS, TBS (Office of the Chief Human Resources Officer [OCHRO]), Public Service Commission (PSC), StatCan and others to:

  - develop a whole-of-government renewed HR strategy (including recruitment, talent management, training, performance management and classification) to support data analytics and digital community-building efforts, supported by organizational HR plans

  - identify needs, required skills and competencies, in collaboration with departments and agencies, related to digital/data literacy by April 2019

  - complete the training of the inaugural cohort of the Digital Academy, including participants in a dedicated data stream

  - establish an inventory of current training resources, recommend measures to facilitate access by December 2018

  - informed by dialogue with the universities and colleges, update courses of the CSPS core curriculum to better incorporate training needs for data

  - leverage and build on existing and developing partnerships to engage with colleges and universities on data literacy

  - create a community of practice for data specialists

  - work with the GC CDS, TBS, and DM CEPP to drive progress

- TBS and deputy ministers to actively engage with unions on the changing nature of work and on the workplace of the future

- CSPS to investigate the possibility of a data-science free-agent program

- Deputy ministers to ensure that employees have access to and are informed of training to increase their digital literacy, and to nominate learners for the digital academy

## Increasing agility and mobility

To tackle our toughest challenges, teams need to be multi-disciplinary and cut across organizations. Experiments to increase agility and mobility are being conducted across the government, including through the following initiatives:

**Fellowship program:** recruits subject matter experts to apply new innovative approaches to priority projects across the government. Fellows are matched with a department or agency to deliver results and improve outcomes in one of four areas of expertise: innovative finance, behavioural insights, impact measurement and data science.

**Talent Cloud:** an experiment to reimagine staffing for the digital age, including a new online platform for talent to apply for project-based work in the public service. The model includes work on: reducing time-to-staff; bias reduction and Indigenous inclusion; digital and tech talent; and improving fit-to-team.

**Free Agent program:** Canada's Free Agent program is designed to test Deloitte's "GovCloud" model. This cloud-based free agency model allows employees to choose their work and undertake project-based opportunities across the public service.

## Leveraging a multidisciplinary team to build GC Infobase

At GC InfoBase, Canadians find answers to their questions about their government, such as how much is being spent, how many people are employed and what results are being achieved. Their questions are answered via interactive data-visualizations that transform complex data into simple visual stories. The tool contains many years' worth of government data, bringing together information previously scattered across over 500 government reports, such as the Public Accounts, Main Estimates and Departmental Plans. The team attributes its success to flexibility, an obsession with data quality, and the platform's status as the authoritative source for program-level resources and results data. Future plans include incorporating Budget data and raising the profile of the database to encourage greater use. Lessons that can be shared with the whole of government include:

**The right skills:** The skillset to develop and build such a product is not normally found in one team; usually these skills are located in different functional silos (e.g., policy, communications and IT). Success was achieved by building a cross-disciplinary team in one location.

**Enabling technology:** In order to move quickly, InfoBase was built with architecture that has impeded the ability to add large amounts of new data.

**The importance of communication:** Raising awareness and visibility is an ongoing challenge for the team, although the use of social media, presentations and word of mouth has helped.

# Encourage job-seekers to choose the Government of Canada

*Goal: find and hire people with the right skills*

The time has come to move away from passive staffing approaches and toward active engagement and a reduction in the time it takes to hire staff. Amid the current strong demand for data scientists/specialists, we need to be able to hire quickly to be competitive in the marketplace. We also need to provide new hires with enabling environments consisting of the technology and equipment they need to do innovative work. Some organizations are already exploring new ways to attract this talent, and their successes should be leveraged toward a specific hiring model for data scientists/specialists.

The government should acquire talent through nimble, innovative hiring practices, and consider its value proposition, brand, and how it markets itself to potential candidates. It must also consider influencing the supply chain earlier via academia and the use of campus recruitment, a recruitment and development program, as well as the use of flexible resourcing options.

## Next steps

- StatCan to pilot a "demand map" in select departments to scope hiring targets for winter 2018-2019 and medium-term needs

- StatCan and ESDC to build upon their June 2018 Labour Market hack-a-thon to identify talent supply sources

- All government organizations to leverage and build upon existing and developing partnerships with academic institutions for hiring, and explore novel recruitment models, including through partnerships with the private sector

### A successful targeted hiring approach

The Chief Data Officer at ESDC recently conducted a successful hiring campaign for next generation data experts to conduct data science and research, and support evidence-based policy. Within four months from posters to offers, a pool of over 70 candidates was established, from which 37 offers across the department have been made to date.

Key to its success were dedicating time and resources to internal, collaborative management of the process to ensure speed and quality in evaluation and sending offers out to top candidates before competing offers could be produced. Actions to gain visibility and garner interest included visiting career fairs and university campuses, contacting professors in top programs to speak in classes, meeting graduate students to encourage applications and producing a YouTube video featuring innovative work by Chief Data Office data scientists. The team is now preparing material to share its process such that its successes and lessons can be leveraged in other recruitment efforts, and developing retention plans for the new hires.

- StatCan and PCO to launch a data science stream to PCO's fellowship program

- Pilot new assessment methods for potential hiring, including a data scientist recruitment pilot to be conducted by CSPS, TBS (OCHRO), PSC and StatCan

- Scale up successful pilots as part of a longer-term government-wide talent acquisition strategy for entry-, mid-, and senior-level positions

# ENVIRONMENT AND DIGITAL INFRASTRUCTURE

# OBJECTIVE

## ⚙☀

**Environment and digital infrastructure:**
Processes and infrastructure are aligned to turn data and analysis into action

---

## Why is this important?

- To encourage horizontality and coherence

- To provide supporting architecture to facilitate data management and analytics

- To ensure appropriate tools, infrastructure and processes are available

- To protect data and privacy of information

- To keep pace with and fully harness technological opportunities

**Laying the foundation and building momentum**
Short-term
(up to September 2019)

**Expanding and scaling across the government**
Medium-term and transition advice
(October 2019+)

(15) Accelerate work to assess the legislative and policy framework and practices to support greater strategic use of data while ensuring the protection of personal information

(16) Leverage work underway to support and build the digital identity ecosystem

(13) Work with departments and agencies to establish a common set of data needs and establish a process for easy adoption of data tools

(14) Assess required digital/data infrastructure needs
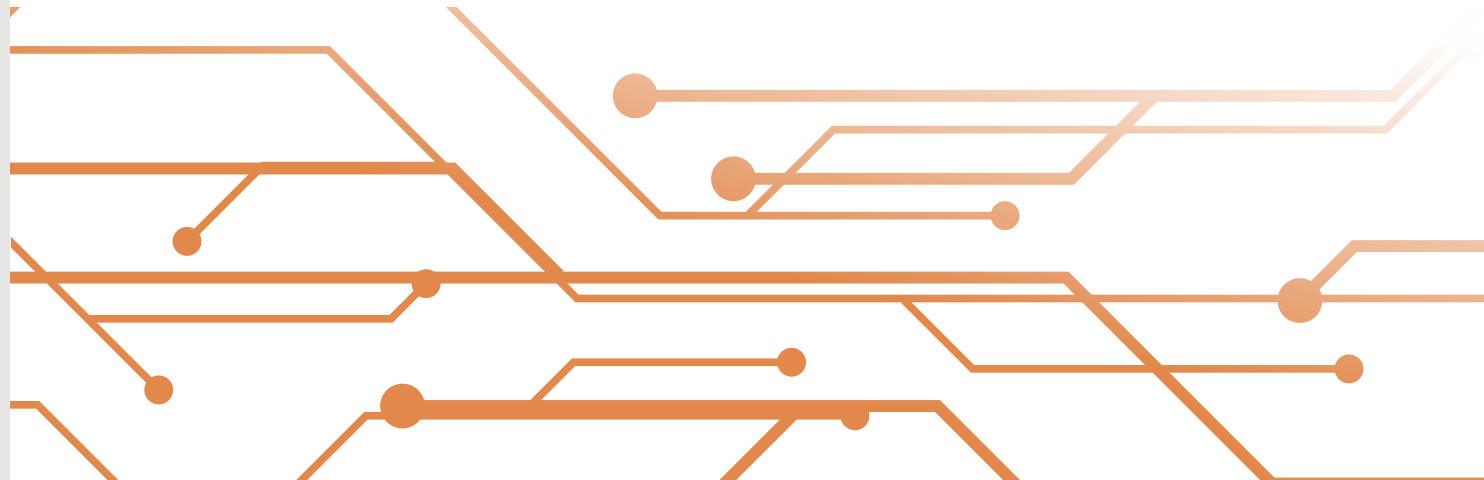
# Strengthen a **modern and enabling infrastructure**

Work with departments and agencies to establish a common set of data needs and establish a process for easy adoption of data tools

Assess required digital/data infrastructure needs

*Goal: ensure the government is prepared to meet its digital/data infrastructure needs and streamline access to required data tools*

The need for tools to collect, store, analyze, manage, share, and visualize data is increasing in all departments. Enabling open standards, open source, interoperability, and the sharing of expertise requires access to a common set of data tools commensurate with common data needs. At the same time, departments need a flexible framework to explore new tools and more advanced options, that are both interoperable and secure.

The Government of Canada's IT infrastructure must be able to support the ambitious agenda of its data system. There is a growing need for higher computing capacity and for the modernization of older data infrastructures. For example, collaborative efforts are underway through initiatives, such as the **Canadian Geospatial Data Infrastructure**. This initiative provides national geospatial standards and infrastructure critical to address environmental assessments, emergency response and space program continuity.

It is important that the government take a proactive approach in addressing its future data requirements. Currently, many departments and agencies are anxious for the delivery of secure cloud infrastructure and/or procurement options. It is expected that Public Protected B cloud services will be ready for departmental access by spring 2019.

## Next steps

- TBS to work with departments and agencies to identify common business requirements, develop a catalogue of recommended and pre-approved tools, and establish updated guidelines and processes for their implementation

- TBS and Shared Services Canada (SSC) to assess required infrastructure needs over the short and medium terms (i.e., trajectories based on historical data usage, data pressures on the network and bandwidth consumption, forward-looking opportunities) and provide an interim report to DM CEPP by the end of summer 2019

- TBS and SSC to provide a final report to DM CEPP by fall 2020, factoring in all organizational data strategies

### A cloud-first strategy

The government has adopted a cloud-first strategy, which presents a fundamental shift in the delivery of information technology services. As a cost-effective alternative to data centres, cloud services offer the flexibility to maintain information technology service as demand for online services increases and technologies evolve. StatCan has adopted this cloud-first approach, and plans to migrate almost all of its solutions to the public cloud by 2022. A continuous rollout of technical capabilities and solutions is being carried out over the next five years. For example, virtual data lab capabilities will become available to external partners over the next 12 to 18 months.

# Processing large amounts of data at the Meteorological Service of Canada

The Meteorological Service of Canada (MSC) at Environment and Climate Change Canada (ECCC) is the primary supplier of meteorological and hydrological information in Canada. Its core business is to provide vital weather and environmental information and warnings 24 hours a day, 7 days a week to help **protect the safety and security of Canadians and their livelihood.**

The MSC is a world leader in processing large amounts of data to run forecasting systems and generate new, integrated and transferable data ranging from global to community-level. These data are made available through open data platforms, including: MSC's DataMart (http://dd.weather.gc.ca), ECCC flagship websites Weather.gc.ca and WaterOffice.ec.gc.ca, geospatial web services (MSC GeoMet), and web-based tools that support application development.

Every day:

- Over 100M worldwide observations are received and processed by MSC (i.e., data from wind profilers, aircraft, surface buoys, GPS, satellites, and other types of measurement technology)

- 16M worldwide observations feed into MSC's weather forecasts

- Petabytes of data made accessible by MSC are downloaded

- 25 terabytes of new integrated atmospheric and environmental data and model outputs are generated.

These data are a highly sought commodity:

- 664M access requests were served through MSC geospatial web services in 2017

# Align foundational support

> **Recommendation 15:**
>
> Accelerate work to assess the legislative and policy framework and practices to support greater strategic use of data while ensuring the protection of personal information

*Goal: protect Canadians' rights and privacy and support the greater use of data in the digital environment*

To continue to safeguard data and privacy and support trust in the government as a data steward, while enabling the opportunities offered by a greater use of data, a number of reviews are being conducted. These include a review of the *Privacy Act*, the *Personal Information Protection and Electronic Documents Act* (PIPEDA), the *Statistics Act*, and a legislative review to support integrated federal service delivery. Principles to support an ethical framework for control of personal information will also be explored in the context of a modern, digital society.

**Privacy Act**
A modernized *Privacy Act* will support trust in the government as a steward of Canadians' personal information. A review of the Act will focus on relevant contemporary data protection principles, including elements of transparency, accountability, and data security, to allow for responsible and innovative uses of personal information.

**Personal Information Protection and Electronic Documents Act (PIPEDA)**
A modernized PIPEDA will put in place safeguards for Canadians' privacy in the collection, use or disclosure of personal information in the course of a commercial activity. This work will also consider the interoperability of data protection regimes both domestically and internationally, including Canada's status vis à vis the EU GDPR and other mechanisms, such as the Asia-Pacific Economic Cooperation Cross Border Privacy Rules.

**Statistics Act**
A modernized *Statistics Act* will increase access to data for researchers and other departments and agencies of government, remove legislative barriers, enhance data sharing and interoperability, and lead to more detailed and timely statistical products and insights while ensuring confidentiality, privacy and increased responsible access.

**Services Review**
Options will be assessed to improve the government's ability to share information or otherwise undertake activities that would facilitate easier, more convenient service delivery to Canadians through a "tell us once" approach, while safeguarding privacy.

## Next steps

- Develop proposals to modernize the *Statistics Act* in fall 2018
- Continue the review of the *Privacy Act*
- Continue the review of the PIPEDA
- Incorporate feedback from National Digital and Data Consultations
- Joint transition advice around the legislative framework environment —spring 2019

- Continue to mandate that departments and agencies integrate privacy protection in the design of programs and initiatives, and to consult the OPC as appropriate

  *Services review:*
- Assess requirements for more efficient information-sharing—fall/winter 2018
- Streamline information-sharing agreement process—spring 2019
- Develop options for legislative change—summer 2018 to summer 2019

## Keeping data secure

The Government of Canada has recently released a new National Cyber Security Strategy, outlining the key elements of the global cyber security environment and articulating some of the ways that the government will respond to an array of new challenges and opportunities in cyberspace. The Strategy is the roadmap for Canada's path forward on cyber security. It is designed to meet the objectives and priorities of Canadians and is rooted in a sustained commitment to:

- Protect the safety and security of Canadians and our critical infrastructure

- Promote and protect rights and freedoms online

- Encourage cyber security for business, economic growth, and prosperity

- Collaborate and support coordination across jurisdictions and sectors to strengthen Canada's cyber resilience

- Proactively adapt to changes in the cyber security landscape and the emergence of new technology

The government has also recently created a Canadian Centre for Cyber Security, which consolidates federal cyber expertise from several departments into the Communications Security Establishment (CSE), with a federal and national focus on:

- Informing Canada and Canadians about cyber security matters, as a single, clear, trusted source of information on cyber security for Canadians and businesses

- Protecting Canadians' cyber security interests through targeted advice, specific guidance, direct hands-on assistance, and strong collaborative partnerships

- Developing and sharing specialized cyber defence technologies and tools, resulting in better cyber security for all Canadians

- Defending cyber systems, including government systems, by deploying sophisticated cyber defence solutions

- Acting as the operational leader and government spokesperson during cyber security events

The government is also making strides to help Canadians protect their personal information. Public Safety Canada publishes a Get Cyber Safe Blog and the Office of the Privacy Commissioner publishes Ten tips for protecting personal information as well as other information for businesses and individuals on privacy issues. The Treasury Board of Canada Secretariat offers a number of policy instruments, guidance and tools to support federal institutions in protecting the personal information of Canadians through the Treasury Board Policies on Privacy Protection and Government Security.

# Work with our partners to create change

*Goal: support inter-jurisdictional data sharing through a pan-Canadian approach to digital identity*

The Government of Canada is working to develop a pan-Canadian approach to digital identity. This will allow individuals to safely and securely access its services, using the method of their choice, regardless of channel. Since 2012, a cyber-authentication solution has provided end-users with choice in the credentials they use for a secure, single sign-in to available Government of Canada online services. Clients could sign in to over 100 services offered by 29 departments and agencies, including ESDC's "My Service Canada Account" and CRA's "My Account" and "My Business Account." This solution significantly reduced costs by replacing a proprietary system with a standards-based solution and provided organizations with the flexibility to determine authentication solutions according to their unique security needs. TBS is leading the procurement of a replacement solution for this mandatory service, called Sign In Canada, which will evolve the existing service to support the service strategy and federating identity across the government. The platform will be "identity-ready," with the ability to accept trusted digital identities that conform to the Pan-Canadian Trust Framework, as and when they are available, positioning the government to take advantage of future developments and service evolution.

## MyAlberta Digital ID Pilot

The Government of Canada is working on a pilot to allow Albertans with a verified MyAlberta Digital ID to have real-time access to their My Service Canada Account, allowing clients to apply for benefits and services quickly and safely without having to provide numerous passwords and logins. This pilot aims to prove the concept of accepting a trusted digital identity from a non-federal entity such that the concept can be expanded for use with other jurisdictions. It would validate the principles of the Pan-Canadian Trust Framework, a set of agreed-on rules and criteria that enable governments to trust identity proofing and authentication processes originating from their own and external jurisdictions. This is an important step toward the ultimate goal of a pan-Canadian approach to digital identity, which will enable individuals to use their digital identity and supports data sharing with other jurisdictions.

## Next steps

- Convene a digital ID cluster to drive and coordinate progress on the development of a federal roadmap for digital identity by fall 2018

- Engage provincial and territorial partners for proofs-of-concept to work towards accepting their trusted digital identities into federal programs using the Pan-Canadian Trust Framework assessment process by winter 2019

# Design-driven interactive visualizations enhance access to information

The National Energy Board's (NEB) [Exploring Canada's Energy Future](#) tool allows users to explore energy production and consumption forecast trends by region and sector of the economy. This was an early success, which provided the foundation for a three-year initiative to make data more accessible, discoverable and understandable. The Board collaborated with the [Interactions Lab at the University of Calgary](#), a computer coding startup, and a data innovation specialist to assemble expertise in data structuring, information visualization and coding. To support and develop internal skillsets in these areas over time, all contracts include a training component. It was also specified that any visualization created would be open in both source-code and data to support the larger government and public efforts in this area. The NEB has also been shifting its focus to ensur-ing that this work and all the learnings are integrated into its everyday business. Visualizations published now include:

- a tool that enables the public to explore [incidents](#) that have occurred at NEB-regulated pipelines and facilities. It provides context and allows users to drill down to understand the details of specific incidents, and helps identify trends, such as the type of incidents more likely to occur during construction.

- an interactive tool, combining data from the NEB and StatCan, to explore [Canada's energy imports and exports](#) with more than 30 years of data for electricity, crude oil, natural gas, and natural gas liquids, as well as export data for refined petroleum products.

- additional visualizations of [Canada's energy future](#) reports as well as other im-provements made based on feedback received. Some of these views have uncovered new insights into the forecasted changes of energy use in small regions, which added the ability to make meaningful comparisons with larger regions.
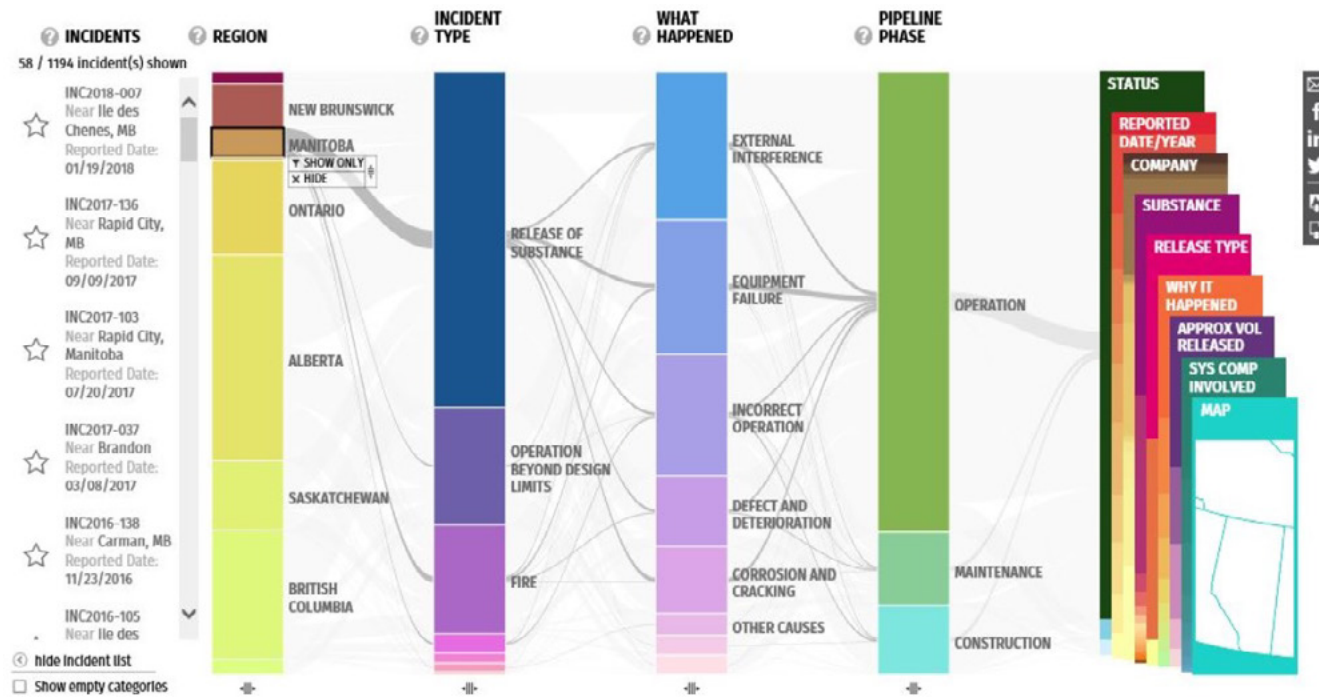


Source: [National Energy Board - Incidents at NEB Regulated Pipelines and Facilities](#)

# DATA
# AS AN ASSET

# OBJECTIVE

The government has the **DATA** it needs, which are fit for use, discoverable, and available. Their use is appropriate, ethical, and generates social and economic value.

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## Why is this important?

- To ensure the government has the data it needs

- To support and inspire greater use and availability of data

- To ensure data use is appropriate, citizen- and business-centric, and ethical

- To ensure data are well managed, secure, and fit for use

- To ensure that government-held data can be combined with data from other sources so Canadians can unlock their value

**Laying the foundation and building momentum**

Short-term
(up to September 2019)

**Expanding and scaling across the government**

Medium-term and transition advice
(October 2019+)

(19)  Foster innovation within the public service and leverage the outcomes of existing pilot projects

(20) Leverage and expand secure, user-friendly environments to facilitate access to government-held data for decision-makers and Canadians

(17) Establish a centralized view of government held data, develop a government data quality framework, and develop guidance for the long-term management of digital government assets

(18)  Enhance the rigor of analysis of program administrative data and increase the generation of new data to assess outcomes and strengthen performance measurement, program evaluation and policy development

(21) Develop an approach to increase access to public and private sector data to drive insights for enhanced global competitiveness and social impact

# Better understand the information we hold

**Recommendation 17:**

Establish a centralized view of government-held data, develop a government data quality framework, and develop guidance for the long-term management of digital government assets

*Goal: know what data we hold and ensure their quality and maintenance*

## Know what data the government holds

To increase the use of and access to data and reduce duplication, we must first have a complete view of the data we hold, along with an understanding of their quality, location, and format. This exercise will create an interface or tool to view all government data assets and will support interoperability so that organizations can share, combine and make optimal use of data. The work involves attaining a common vision for governance and stewardship and the development of a data reference model, privacy protection, security protocols and a maintenance plan. This will leverage existing work, including StatCan's *Inventory of Administrative Data Providers from the Public Sector*. Experience gained will inform metadata standards and inform a data reference model for a whole-of-government approach.

## Next steps

• StatCan to conduct a proof-of-concept of the inventory in fall 2018

• StatCan and TBS to conduct consultations to include data from other data-intensive departments and agencies in 2019

• TBS will establish an enterprise data reference model, as well as establish government-wide data standards, including for metadata, reference data and master data. The development work will be co-led with StatCan and carried out in collaboration with other departments and agencies, beginning in 2019

• TBS to work towards a tool to provide an authoritative, evergreen and accessible view of government data holdings, beginning in 2019

## Ensure the quality and maintenance of data

To maximize the value and strategic use of data, dimensions of quality, such as accuracy, timeliness, relevance, accessibility, interpretability and coherence according to intended use, must be applied. StatCan (for whom data quality management and quality control are core business activities) and TBS (who supports the development of administrative policies for the government), in coordination with other organizations, will develop, implement, and support data quality management strategies, policies, and practices for a comprehensive data quality framework. The proposed framework will be adaptable across government while establishing common enterprise-wide standards to ensure interoperability.

## Next steps

• Set up interdepartmental working group by October 2018

• Analyze current data quality policies/practices by January 2019

• Draft proposed quality approach/framework by May 2019

• Complete training strategies by June 2019

## Maintain digital information

Digital assets have a longer life cycle than their supporting technologies and are especially vulnerable to corruption and loss. A GC Digital Preservation Working Group established by Library and Archives Canada shares common challenges and works toward facilitating long-term retention of digital assets. The work of this committee will be leveraged and expanded to develop guidance, including best practices and standards.

# Next steps

- Working group to complete work plan and share interim guidance from international best practices by June 2019

- Develop strategies and guidelines for data management through effective use of tiered storage, cloud-based approaches by June 2020

## Data visualization as a tool for new insights

### Supporting government decisions and accelerating change

Providing non-partisan and expert advice is fundamental to the role of public servants, and the best advice is anchored in evidence, brought to life through rigorous data analysis. The Results and Delivery Unit (RDU) at PCO supports the government in strengthening a culture and approach driven by evidence. Routine Stock Take meetings with the Prime Minister and Ministers bring focus to results, identify implementation obstacles and address challenges. The creation of a "Digital Dashboard" by the RDU allows for a richness of data to be communicated at these meetings in a dynamic way that moves away from static presentations. Built in the cloud using Tableau Server on top of a database layer that uses open-sourced software, the data visualizations provide more interactivity and collaboration to support these conversations. The team is also a functional accelerator, bringing together talent and plugging into other areas of government to help those groups build their own skill sets.

Key benefits include facilitating targeted policy interventions at the community level, relying on one automatically updated cloud-based platform such that one can be confident one is always working with the latest data, and collaborating in real time with organizations across government on one common set of briefing materials.

### Harnessing data visualization for internal decision-making

Data visualization has introduced new ways of doing business to Canadian Heritage and provides a leap forward in the department's ability to make decisions informed by evidence, ultimately supporting the goal of improving outcomes for Canadians. In late 2015, Canadian Heritage began making a number of strategic investments in data visualization technology to help empower the data analysis capabilities of employees. These investments have resulted in the creation of an Enterprise Data Management Platform, which incorporates data from a variety of internal and external sources into interactive dashboards. The platform currently features more than 15 multi-dashboards, each designed for a specific purpose. For example, administrative data from Grants and Contributions are combined with population data from StatCan and displayed in an interactive map. By making selections in drop-down menus, a user can map how certain types of funding agreements or funded events are distributed across the country.

Employees are now able to quickly perform sophisticated data analyses, and the number of trained employees has grown considerably. The tools are facilitating data-driven decision-making across all business lines in the department—from policy and research, to program operations, to management committees.

# Strengthen analysis and experimentation

> **Recommendation 18:**
>
> Enhance the rigor of analysis of program administrative data and increase the generation of new data to assess outcomes and strengthen performance measurement, program evaluation and policy development

*Goal: leverage the powerful synergies from the creation and integration of data for development and evaluation*

The horizontal review of business innovation programs demonstrated the powerful synergies possible when data are brought together to help answer key policy questions. Rapid results were achieved by leveraging existing data holdings, infrastructure and analytical capacity across departments. To build on the success of this initiative, TBS and StatCan are continuing to develop common approaches to collect and analyze administrative data (including Grants and Contributions data), focusing first on business innovation programs. Going forward, this work will include reviewing capacity to carry out horizontal analysis to support and strengthen performance measurement and policy development in priority areas relating to Indigenous Peoples, Growing the Middle Class, and Diversity and Inclusion.

The 2016 Direction on experimentation reinforced the government's commitment to experiment with new approaches to produce evidence. An ADM-led interdepartmental Committee on Experimentation was created to help implement rigorous experimentation approaches into the core business of departments and agencies. The Committee is also linked to the Deputy Minister Task Force on Public Sector Innovation, which plays an action-oriented role in experimenting with emerging technologies and approaches. A government-wide initiative to strengthen experimentation capacity would establish a focal point for rigorous data analysis and generation for the Government of Canada, working with relevant departments to ensure the government has the conditions, capacity, and experimental design capabilities to turn data into better information on which its interventions work most effectively. Consideration will be given to whether to update the direction by dedicating a fixed percentage of resources used for generating, analyzing, collecting or commissioning data to rigorous experimentation (exploring, testing, and comparing effects and impacts of programs, policies, interventions or approaches). Final recommendations will be brought forward after interdepartmental consultations.

## Next steps

- TBS, in collaboration with StatCan and other partner organizations, to ensure ongoing collection and sharing of administrative data by June 2019, and facilitate linking and releasing the data by December 2019

- Building on international best practices, develop options for the creation of civil society-led work centres that can provide rigorous evidence on the effectiveness of programs

- PCO, TBS, StatCan and others to evaluate capacity to carry out horizontal analysis to support the government's key priorities by June 2019

- Consult across government about the proposal to dedicate a fixed percentage of resources to experimentation

- Consider formalizing the ADM interdepartmental Committee on Experimentation

- Consider the creation of an innovation/experimentation fund to encourage departments and agencies to undertake and implement new approaches to data. To optimize outcomes, consider leveraging programs such as the Free Agent Program and the Fellowship Program (p. 26) to acquire the data skills and expertise required.

## Enabling a richer understanding of the effectiveness of government programs

The horizontal review of business innovation programs was recently conducted to evaluate innovation support programs from across the government, many of which fall within the ISED portfolio.

Administrative program data from TBS were combined with economic microdata from StatCan, together providing 10 years of data for analysis. While program-specific reviews can evaluate how well programs achieve their specific goals, this approach allowed the examination of characteristics that were more successful in achieving outcomes.

The project team produced rapid results by leveraging existing data holdings and data infrastructure. TBS's strong leadership and support in acquiring administrative data from across departments combined with the authorities of the *Statistics Act* were key in compiling the final dataset. Co-location of TBS and StatCan staff was also a success factor—with combined teams jointly working on validation of results. Another success factor was continual engagement with departments and agencies as well as the research community.

As a result, TBS and StatCan developed a rich dataset that can benefit researchers and policy analysts within government and academia, and gained experience with an approach and methodology that can be applied to other domains.

Continued collaboration could yield an even richer understanding of the effectiveness of various government programs.

## Transparency on government progress and data

A number of data and results portals have been developed across the government, all of which further the culture of results reporting and data sharing. Examples of such portals include:

The **Mandate Letter Tracker**—where Canadians can see the details and review the progress of the government commitments tracked by the Government of Canada.

The **Innovation and Skills Plan Results Portal**—an interactive reporting tool, including data, graphs and insights into the details of the Plan along with key indicators being tracked.

The **Government of Canada Sustainable Development Goals (SDG) Data Hub**—a dashboard for regular monitoring of Canadian progress against the global SDG indicators.

**Exploring Canada's Energy Future**—where users can explore energy production and consumption forecast trends by region and sector of the economy through design-driven interactive visualizations (p. 36).

The **Transportation Data and Information Hub**—where users can explore multi-modal transportation data and performance measures, including traffic and performance indicators at the national level, interactive maps, analytical reports and tools (p. 44).

The **Canada and the World Statistics Hub**—provides information related to Canada's economic and financial activity with the world in a single interactive analytical tool.

The **Investing in Canada Plan Project Map**—presents a broad cross-section of projects that have been approved under the $180+ billion *Investing in Canada* plan.

# Be bold—innovate and take risks

**Recommendation 19:** Foster innovation within the public service and leverage the outcomes of existing pilot projects

*Goal: leverage the results of pilots to inform future directions*

Enabling the more strategic use of data requires their greater and more widespread use, including through analytics and innovation to transform data into new knowledge and insights. A number of initiatives are planned or underway to increase access to data and derive new insights to benefit Canadians, including:

- A crowd-sourcing initiative to generate expected delivery and/or results trajectories for the government's top priorities (Indigenous Peoples, Growing the Middle Class, and Diversity and Inclusion) and gather early intelligence about how actual progress is tracking towards expected delivery so as to inform course corrections.

- A virtual consultation with the academic community to identify policy questions that could be answered with greater access to data.

- A series of scalable pilots to examine the potential for AI to reduce the burden of administratively intense tasks, streamline processes, garner efficiencies and improve effectiveness.

- A pilot project aimed at recommending a technology solution for data sharing. The results will be widely applicable to help address barriers to sharing data within the government as well as with other jurisdictions. This body of work will contribute to the development of guidance aimed at increasing interoperability, such as ensuring that infrastructure and application systems are efficient and designed to facilitate sharing based on open standards.

Despite the natural reflex of wanting to undertake additional pilots, it is recommended that organizations focus primarily on implementing and scaling existing pilots, and that a comprehensive review and analysis of these pilots be undertaken, with the results shared across government.

## Next steps

- TBS and StatCan to conduct a comprehensive review and analysis of data-driven pilots, assess for scalability and impact, and report on lessons learned to DM CEPP by January 2019

### Automating manual processes with machine learning

ESDC's Data Science team uses cutting-edge methods, such as machine learning to extract value from unstructured data. The team is conducting a number of pilots that test AI and other advanced analytic methods for various business problems, enabling proactive decisions, automating repeated processes and leveraging unstructured data. Examples include:

**Collective Agreement Search Application for the Labour Program**

- Allows requests on collective agreements to be queried from over 50,000 documents
- The machine has been trained to parse input questions, retrieve relevant passages, and display suggestions to the user

**T4 tracking for Canada Pension Plan and Old Age Security**

- Eliminates manual processing of returned T4s, focusing efforts on remaining cases
- The machine scans and detects information in call centre notes to identify clients with already reissued T4s due to address changes, etc

**Automatic topic extraction for the Poverty Reduction Strategy**

- Provides fast, unbiased and reproducible insights to analysts for explanation of results
- The machine takes text from survey answers to detect and extract patterns, and identifies common themes

## Making data accessible at the Canadian Centre on Transportation Data

By placing emphasis on making data more accessible, the new Canadian Centre on Transportation Data is improving the quality of information that can be derived from transportation data. Managed by Transport Canada and StatCan, the Centre allows for enhanced collaboration with other federal departments, provincial and territorial governments, the transportation industry, academics and international stakeholders. It aims to facilitate discussions and foster collaboration to identify synergies and efficiencies that will support better decision-making at all levels.

One of the Centre's key initiatives is the Transportation Data and Information Hub, featuring high-quality, timely and accessible multi-modal transportation data and performance measures. Launched in April 2018, the first phase of the Hub provides public access to over 600 datasets, as well as traffic and performance indicators at the national level, interactive maps, analytical reports and tools. The second phase of the Hub will include enhanced analytics, interactivity and visualization, as well as more detailed projections on future transportation demand to inform investment decisions.

The team made important strides in consolidating a large number of datasets for inclusion in the Hub, and in enhancing partnerships with key stakeholders to facilitate data sharing and exchange of information, as well as joint projects and decision-making. They noted the importance of wide collaboration across the government to empower multidisciplinary teams, create partnerships inside and outside the organization, co-innovate and work in the open.

## Alternative methods to measure cannabis and opioids

With declining response rates for traditional collection methods and increasing demands for data of all kinds, alternative measurement methods are increasingly being harnessed, such as for the measurement of the cannabis market and consumption.

To provide Canadians, governments and businesses with a clear picture of the economic and social consequences of legalization, StatCan is estimating the production, sale and use of cannabis pre- and post-legalization. As a result of the difficulty in obtaining such information pre-legalization, non-traditional methods were used, including analyzing wastewater to measure drug consumption levels and crowdsourcing to measure purchase information.

Wastewater analysis has been used to measure drugs in various countries for more than 10 years. The results are fed into a model—using wastewater flow, pharmacokinetics and population estimates—to arrive at an overall estimate of drug consumption per person. This methodology is being used for the measurement of both cannabis use and opioid consumption.

Crowdsourcing allows Canadians to anonymously provide information about purchasing cannabis (including price, quality, location, reason for use, and consumption habits) to produce a monthly price for illegal cannabis in Canada. The user's reported price is also immediately displayed in a visualization with average prices across the country, to allow respondents to make comparisons.

# Make government data more open and transparent

*Goal: drive new insights through greater access to data*

While the government houses and provides access to data through many avenues, including the Open Government Portal, Research Data Centres, and the Federal Geospatial Platform (FGP), these can be improved and better leveraged.

### Increasing access to data through Open Government

While work is underway to improve the Open Government Portal, there are further opportunities to integrate new elements, including open source infrastructure for data management, data visualization, piloting automated translation, improving measures to protect confidentiality and privacy, advanced searching, improved data quality, and making working documents open by default to citizens.

### Grow Open by Default

While we have made some progress on Open Data, the environment is changing and citizen expectations are evolving rapidly. The government needs to accelerate the pace of change to keep up with the private sector, civil society, and other governments. To accelerate the adoption of Open by Default, the government could integrate the principle into the government's information management practices. This would include concurrent assessment and implementation of the concept of privacy by design.

### Increasing access to data through a Virtual Data Lab

The Virtual Data Lab pilot builds on the foundation established by the Research Data Centres and the Canadian Centre for Data Development and Economic Research, and is being carried out in partnership with SSC and others, including Canada Mortgage and Housing Corporation, Finance Canada and the Bank of Canada. Data access will be increased via expansion beyond physical space limitations, facilitating greater access to more Canadian data for research and analysis. This reduces duplicative collection, facilitates new insights, and increases the public good that can be enabled with existing data. The medium-term goal is to build the Lab on scalable cloud infrastructure, with data discovery tools, automated confidentiality vetting, and a full range of data files appropriately treated to ensure confidentiality and privacy.

### Increasing access to data through the Federal Geospatial Platform

Geospatial data (such as maps and satellite imagery) increasingly support federal decision-making and operations, such as tracking forest fires and extreme weather events, managing Canada's natural resources more sustainably, or ensuring Canadian sovereignty by defining our borders and monitoring marine traffic. It also drives innovation by providing precise positioning and navigation, and by timing data for location-based technologies, such as drones and autonomous vehicles. While the FGP is a vehicle for sharing among federal partners (and with Canadians through Open Maps), the government has yet to harness the full power of geospatial information. There remains a need to raise the relevance and profile of geospatial tools, to meet the needs of an increasingly "location-based" economy. Ongoing work will look at options for a more dynamic, user-friendly FGP interface, with improved organization of data and tools, and advanced capabilities to suit the wide range of users' interests.

## Next steps

- Implement the 4th National Action Plan on Open Government, which includes commitments to introduce a dataset quality rating system, a pilot for user-submitted datasets and visualizations, and quarterly reporting on departmental data release by September 2020

- StatCan to develop a prototype of the Virtual Data Lab for broader testing by winter 2019

- NRCan to work with federal partners to broaden the use of the FGP as an enterprise-wide tool

- StatCan and NRCan to conduct a series of projects integrating geospatial and statistical information, to demonstrate how bringing these data together can support deeper analysis for decision-making

- Explore scope to update mandatory policy direction on open government to embed openness throughout the data lifecycle, aligning with the government's Digital Policy by spring 2019

## The Federal Geospatial Platform

The Federal Geospatial Platform (FGP) is a unique horizontal initiative that aggregates access to the country's geospatial data into a free online site. Through the FGP, the government and Canadians (through the TBS Open Portal) can access critical geospatial data and perform analysis to better inform environmental policy-making and national emergency management decisions. Established in 2013, the platform allows federal public servants and Canadians to discover geospatial information and create maps to support their interests. Hundreds of layers of geospatial data (built on base foundational layers) support online visualization, integration and socio-economic and environmental analysis. The platform has provided authoritative data and visualizations on issues, such as tanker safety, emergency response for flood mapping, monitoring of wildfires, and Indigenous and Northern communities. As of July 2018, 750+ datasets have been made available to the public via Open Maps, and about half of all federal departments/agencies access platform data monthly.

The FGP is a good example of the benefits of a government-wide approach to data and information, and provides some lessons and practices that can be leveraged by others. For example, one of its key challenges was ensuring that data contributions followed specific standards, which required relationship building, trust, voluntary cooperation and changes in business practices by many organizations. All provinces and territories have expressed interest in integrating their open geospatial data with the Platform, which will provide Canadians with an even wider range of government information to support their interests. The FGP aims to put the power of location-based data in the hands of Canadians and enable decision-makers to easily leverage location-based data.
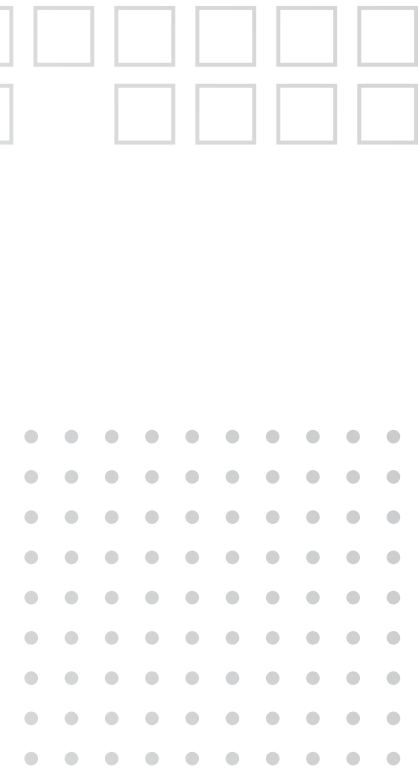
## Open government is about more than just datasets

**The Open Government Portal:** provides single-window access to government datasets and digital records to improve research, foster proactive information disclosure, and support innovation through new business models and product development.

The **Directive on Open Government** made Open by Default, the practice of releasing government data and information, wherever possible, mandatory government policy.

**Open data and information:** since 2011, tens of thousands of datasets have been made available through open.canada.ca. Projects such as Open Data 150—an infographic developed by the GovLab and Open Data Exchange that highlights 150 Canadian companies leveraging open data—demonstrate the immediate, tangible impact of this data release.

Canada's National Action Plans to the Open Government Partnership advance open government across federal departments and agencies. For example, the 2016-18 Action Plan **increased fiscal transparency** by making budget data open, and standardized reporting on Grants and Contributions, making it easier to understand government spending through third-party organizations.

**Public and stakeholder engagement:** public engagement is being supported by improvements to how Canadians find and participate in consultations, training and resources, and new options for procuring consultation services.

**Intergovernmental coordination:** collaboration with international and inter-jurisdictional partners on data standards, and within Canada, on high-value datasets to prioritize for release. The results are being seen through initiatives like the federated open data pilot, where users can search for provincial data from open.canada.ca.

## Inspiring greater data access and use for research and analysis

At Immigration, Refugees and Citizenship Canada, making immigrant-outcomes data accessible opens up research and analytical possibilities on topics and themes that are of strategic value. The department makes data accessible by:

- Providing access to researchers through the Canadian Research Data Centres
- Continually increasing the nature and volume of data available in the Open Data Portal
- Developing information-sharing arrangements with provinces and territories to provide shared access to data
- Collaborating directly with researchers and academics on immigration-specific projects and analyses
- Collaboration with other departments and other levels of government to connect and enrich data, making them more beneficial to more potential users.

**Examples:**

- Merging immigration and tax data via the Longitudinal Immigration Database; to measure immigrant economic outcomes, fiscal impact and benefits of immigration, interprovincial mobility and retention
- Incorporating immigration categories into the 2016 Census
- Supporting and funding immigrant over-sampling in the General Social Survey
- Working with StatCan to augment the number of immigrant dimensions in the Canadian Community Health Survey
- Creating linkages with provincial data, particularly in the area of health data
- Administering outcomes surveys to clients in order to obtain timely program and policy results and client experiences.

# Support innovation in the economy

*Goal: support private sector growth and competitiveness*

Data-driven innovation is an increasingly important source of economic growth and is critical to the competitiveness of Canadian businesses. Canada's private sector can better leverage both public and private sector data, which can be used to derive important insights to drive competitiveness and innovation. Governments can use private sector data to improve understanding of program impacts on elements, such as business growth, research and development, or skills. ISED is currently conducting consultations on digital and data transformation to better understand the economic opportunities afforded by a data-driven society and how to balance these with privacy. This Data Strategy should enable, support, and accelerate the work ISED is undertaking.

The significant pooled data source of anonymized private-sector resource data, coupled with publicly derived and publicly funded data, can be leveraged by private sector organizations and businesses to improve decision-making, accelerate innovation, and create new markets and services. Given the government's focus and collaboration with the private sector on the six economic strategy tables (digital, energy, environment, health, agriculture, and advanced manufacturing) and major investments in five superclusters, leveraging innovation ecosystems and Canada's comparative advantages, the government has a historic opportunity to accelerate innovation and prosperity by unleashing its own data.

The Government of Canada currently provides funding for research projects that generate significant amounts of data. All data derived from publicly funded research and investment must be open source, and industry must be incentivized to donate private data for the public good. For example, Government of Canada support for research through contributions and granting councils generates significant amounts of data every year. The associated agreements could include a clause requiring that data derived from public funding also be included in data pools. For example, a research grant from the Social Sciences and Humanities Research Council for a study on enhancing healthy and productive work for young men and women with disabilities could generate significant data containing, for example, demographics, salaries, types of work, and workplace accommodations. These data could be repurposed in a multitude of ways by other institutions and private firms, resulting in new economic activity or insights. The federal government must promote public–private collaboration to pool data assets to grow Canada's data-driven economy. Canadian government data are a public resource and should benefit Canadians. Consideration should be given to creating data trusts or pools that can be easily accessed by Canadians.

## Next steps

- ISED to work with respective departments, the private sector and other organizations to increase the availability of data to empower private sector innovation and growth in support of the six strategy tables and five superclusters

- Pursue options to create a Canadian open data trust or pool

- StatCan to provide support for linked data pools, which could potentially be accessed using existing Research Data Centre infrastructure

## Helping businesses grow

While there are hundreds of programs and services designed to help businesses innovate, create jobs and grow Canada's economy, if businesses cannot find them, they cannot take advantage of them. Innovation Canada is an AI-enhanced digital platform from ISED that matches businesses with the best fitting programs and services from across federal, provincial and territorial governments—all in about two minutes. The initiative:

- Makes government programs more accessible and inclusive for Canadians
- Helps inform decision-making, based on a better understanding of those looking for government programs and services
- Saves businesses time and money

The site's algorithm looks at program eligibility criteria, compares and matches them to what a business is looking to achieve. Then, AI is used to help narrow down the thousands of options often produced. As more Canadian businesses use the site, more data are available that show patterns over time, which helps to train the AI for more precise matching. Future aspirations for the platform include expanding its reach, content, and functionality. Having access to more open data, not only from program owners, but also from information the Government of Canada already holds, would help accelerate attainment of these objectives.

# NEXT STEPS

# Driving progress

The recommended short-term steps for the government to lay the foundation and build momentum are illustrated on page 13 of this report and summarized below.

## Whole-of-government implementation

### Governance

- Clerk to write to current DM CEPP co-chairs requesting changes to mandate, membership, and authorities by winter 2019. Once established, DM CEPP would then take the lead with a clear, consistent, and coordinated approach to ensure the implementation of this work

- Renewed DM CEPP to provide recommendations on reporting/updating of data strategies by April 2019

- PCO, StatCan and TBS to define roles/responsibilities for enterprise data leadership, including for a Government of Canada Chief Data Steward, to ensure that the government manages data for the public good

- GC CDS, StatCan and TBS to co-lead work to develop new ethics and security frameworks

- Central agencies to lead work to optimize the way data are considered in decision-making (Budget 2-pagers, MCs, TB Subs) by September 2019

## Department, agency, or portfolio implementation

### Governance

- Clerk to write to deputy ministers articulating the requirement for data strategies and organizational responsibility for data

### People and culture

- CSPS, TBS (OCHRO), PSC, StatCan and others to assess state of data literacy and requirements by April 2019

- CSPS to pilot and launch a digital academy by January 2019

- StatCan to pilot a "demand map" for hiring targets for winter 2018-2019

- StatCan and ESDC to build upon Labour Market hack-a-thon to identify talent supply sources

- CSPS, TBS (OCHRO), PSC and StatCan to conduct a data scientist recruitment pilot

### Environment and digital infrastructure

- Accelerate work to assess legislative and policy frameworks

- TBS to coordinate development of a federal roadmap for digital IDs by fall 2018

- TBS and SSC to assess required infrastructure needs and provide an interim report to DM CEPP by summer 2019

### Data as an asset

- TBS and StatCan to conduct a comprehensive review, analysis and results of data-driven pilots; and provide to DM CEPP by January 2019

- StatCan to develop prototype of Virtual Data Lab by winter 2019

- TBS to update policy requirements and direction, and begin work on the development of standards and guidance, in respect of information/data management, including Open Government, as part of the development of a new digital policy by spring 2019

# ANNEXES

# Project team

This work has been carried out as a joint venture between PCO, TBS and StatCan. The team is headed by the Deputy Secretary to the Cabinet for Results and Delivery, the Chief Information Officer of Canada, and the Chief Statistician of Canada and includes:

**Statistics Canada**
**Office of the Chief Statistician**

Anil Arora
Sylvie Michaud
Stéphane Dufour
Deryck Trehearne
Elena Prokopenko
Joanne Ellis
Robert Andrew Smith
Clarissa Lo-Nugent

**Treasury Board Secretariat**
**Office of the Chief Information Officer**

Alex Benay
Francis Bilodeau
Sonya Read
Marc Khouri
Ashley Casovan
Dawn Hall
Jessica Romkey
Andrea St-Laurent
Jérôme Foldes-Busque
Monica Barker

**Privy Council Office**
**Results and Delivery Unit**

Matthew Mendelsohn
Alain Beaudoin
Craig Kuntz
Christel Le Petit
Tina Patel
Margaret Morris

The team was fortunate to work with an engaged population government-wide, who provided input to, commented on, and helped shape this Data Strategy Roadmap. Some of the groups engaged included:

- An ADM table of key players identified in the data strategy arena

- The Director General (DG) data leads community

- The Enterprise Architecture Review Board

- DG-level coordinating committee meetings, each tailored to specific pillars or themes

- The Deputy Minister Task Force on Public Sector Innovation

- The Coordinating Committee of Deputy Ministers

# Environmental scans

Other jurisdictions, including other countries around the world, as well as other departments, agencies and organizations, have developed and implemented or are developing data strategies. Research and consultations were therefore carried out to leverage the wealth and breadth of existing experience to inform the Data Strategy.

Two types of environmental scans were carried out to achieve a better understanding of the data landscape in terms of what has been done or what is underway within the government and in other jurisdictions. The first type of scan was a jurisdictional scan of data strategies, IM/IT plans, and digital government strategies from multiple organizations, including other countries, provinces, municipalities, and academic institutions. The second was a scan of data-centric initiatives within the government.

Consultations were also conducted with departments, agencies and other stakeholder communities to leverage existing expertise from the development of their own data strategies. The consultations were also intended to detect any missing components, and to determine how a Data Strategy could assist them, including through the identification of actions that could drive progress.

## Jurisdictional scan

The jurisdictional scan covered data strategies, IM/IT plans, and digital government strategies from multiple organizations, including those in other countries, provinces, municipalities, and academic institutions. Identified commonalities included:

- Data strategies were often at early stages, and often being implemented as sub-strategies to other strategies already in place, such as digital transformation strategies or an open government agenda. In fact, enterprise-wide data strategies were not common; data strategies were often targeted at specific domains (such as health or statistics or open data).

- Data strategies required support from a high level within the organization. Data governance included clearly defined roles and responsibilities for decision-making, such as identification of data leaders or champions and oversight committees, and was often supported by policy instruments.

- Data protection and privacy are frequently enacted through legislation or regulations. Of note is the European Union General Data Protection Regulation, which harmonized data protection across the European Union member states into a single law when it came into force in May 2018.

- The implementation outcomes from these digital, IM/IT plans and data strategies were not evident.

## Data-centric initiatives within the Government of Canada

The scan of the data landscape across the Government of Canada started with a review of existing documents available administratively. The partially populated scan was then shared with data-centric groups across government, including the DG data leads group and the Enterprise Architecture Review Board, for completion and validation. Findings and commonalities include:

- Departments are taking a variety of approaches to data governance. Most departments/agencies have some form of corporate, internal governance for data, and most have data strategies in place, in development or as a need.

- Some departments have or are considering the role of Chief Data Officer. The level and location within the organization of either a person such as a Chief Data Officer or Chief Information Officer or a committee championing data differ, often based on organizational needs and preferences.

- Departments are collaborating on initiatives: most commonly with other government departments, but also with municipalities, provinces, territories, Indigenous communities and academia. Several departments are working with Statistics Canada on data-enabled initiatives (e.g., Status of Women, Natural Resources Canada, Agriculture and Agri-food Canada, Infrastructure Canada).

- Most departments indicated goals or initiatives relating to workforce development, open data, and culture transformation.

- Other themes were consideration of privacy, ethics and security; IT modernization, analytics needs; data inventories (existing or needed, within department, or enterprise-wide, relating to department's business lines), harnessing new data sources and novel methods (Big Data, AI, geomatics), and experimentation.

- Departments are and will be leveraging existing processes, frameworks, platforms, approvals, and communities to improve communication, and increase data and availability of modern tools.

## Consultations

Consultations were conducted in two phases. To create early understanding, the first phase targeted key players identified in the data strategy arena. The most commonly cited barriers to advancing the more effective use of data included cultural barriers to data sharing, privacy considerations, legal considerations, a lack of a whole-of-government approach to the management, sharing and use of data, and a lack of enabling technology for data exchange.

The second phase openly invited the participation of all departments and agencies on those topics that interested them. They formed the coordinating committees, which worked collaboratively and openly throughout the summer, in-cluding engaging on GCcollab with others across the government. Initiatives were discussed and recommendations agreed upon that would feed into the Data Strategy.

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**The Opioid Crisis and Response: Update to Council and Senior Administration, City of Calgary, June 21, 2018**