

02.14.2019

Data & Analytics Master Plan

Compendium of Deliverables



1 Executive Summary 3	2 Current State Assessment 20	3 Vision, Goals, Objectives and Recommendations 50	4 Implementation Plan 126	5 Risk Analysis 168
6 Change Management 182	7 Jurisdictional Scan 188	A-C Appendices: Additional Details 199		

Executive Summary

Objectives

- 1** *Outline the need for the Master Plan*
- 2** *Review our approach and deliverables*
- 3** *Share our insights and recommendations*
- 4** *Discuss the roadmap and benefits*
- 5** *Highlight the implementation supports required*

The 'power of data' is recognized at the highest levels in Canada...

Report to the Clerk of the Privy Council

January 2019

A Data Strategy Roadmap for the Federal Public Service

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

...yet many public sector organizations are falling short.

Ontario Premier's Office

SEPTEMBER 25, 2018

Line-by-line Review of Ontario Government Expenditures

...nowhere in the data at all, is there a sufficient basis of evidence to assess the productivity of expenditures.

Even when the **data exist**, the **decentralized nature of governance** makes it very difficult to get **timely and relevant information** to support on-going fiscal management. What **information** is received (in many cases, in duplicative formats) is **not integrated** in a centralized database to allow for **comparative analysis**. **No private sector business would operate under such conditions, and neither should the Ontario government.**

The Globe & Mail

JANUARY 26, 2019

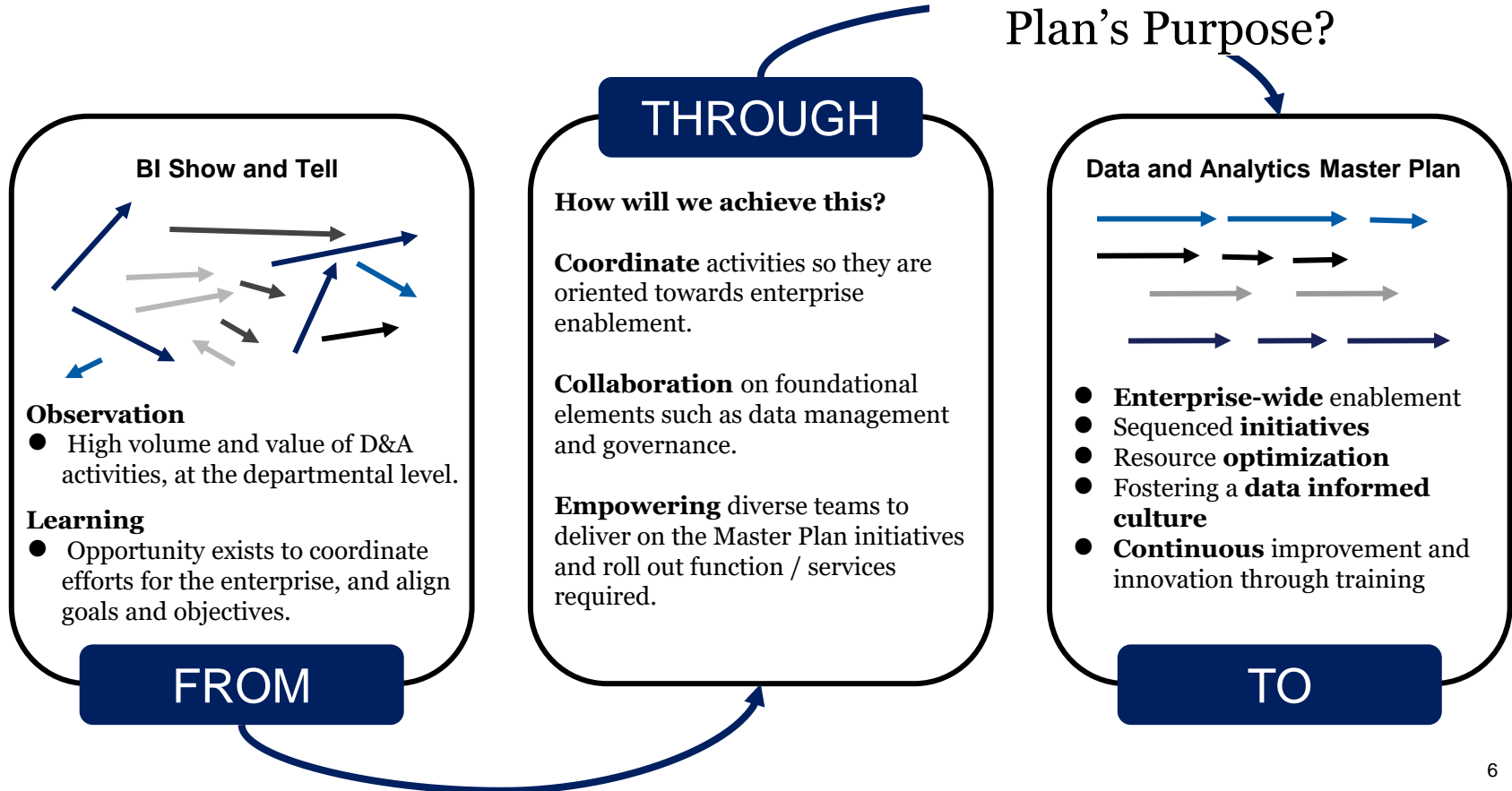
Canada's Data Crisis

“Good policy is impossible without good data,” said Finance Minister Bill Morneau in a 2016 speech. But this government's trademark **policies often don't have good data behind them.**

“There could come a day when the population says, ‘You had access to all of these data stores and you could have reasonably used it to prevent something nasty from happening. Why didn't you?’ ”

The Need for a Unified Approach

What is the Master Plan's Purpose?



Approach to Building the Roadmap

The following process was utilized to develop the roadmap:

1 Analyze Aspirations and Current Gaps

Deliverables:

- Current State Assessment
- Vision, Mission, Goals, Objectives, and Principles

2 Develop Recommendations

Deliverables:

- Recommendations

3 Identify Projects and Business Outcomes

Deliverables:

- Roadmap

100+
staff contacted

30+
sessions

80+
projects analyzed

23
sets of recommendations

13
programs

40
projects

5
personas



Gap Analysis For Function Maturity And Function Delivery Structure



Root Cause in Maturity Gap	Recommendations
<p>Roles and responsibilities associated to data management are inconsistently defined</p> <p>Some data set "owners" have been identified</p> <p>Roles and responsibilities for various data sets have not been sufficiently established, defined or communicated</p> <p>The development of an consistently articulated data management responsibilities</p>	<p>2.1 Develop a data governance framework with clearly defined functions, roles and responsibilities for data management practices</p> <ul style="list-style-type: none"> Identify high priority data management functions required Establish clear roles and responsibilities for data governance Document the roles and responsibilities Apply governance privacy and security to a just in time manner where high value risk data sets are first to be reviewed Review Assess the progress of operationalizing data governance across various levels within the various of entities
<p>Staff are not aware of data governance components (including existing policies, standards and procedures) that may exist</p> <ul style="list-style-type: none"> Staff are not aware data management exist in data quality There have to seek policies, standards and procedures out to improve data Some policies, standards and procedures are yet to be defined 	<p>2.2 Create and incorporate policies, standards and procedures into existing workflows</p> <ul style="list-style-type: none"> Define a risk based approach for the prioritization of policies Identify policies to be developed, published and / or reviewed to be applied Align the management structure and workflow to the value of data governance framework Develop policies to ensure a central responsibility of policies, standards and procedures Operationalize policies through workflows and business plans

Recommendation Outline



Personas For Projects

The following process was utilized to develop the roadmap:

4 Analyze Factors and Prioritize

Deliverables:

- Risk Analysis

10+

factors analyzed



Variety Of Factors Assessed

5 Sequencing, RACI generation and Skill-sets Required

Deliverables:

- Implementation Plan

Responsible
Accountable
Consulted
Informed

Raci Chart For Projects

6 Develop Coordinated Master Plan Roadmap

Deliverables:

- Change Management Plan
- Executive Summary

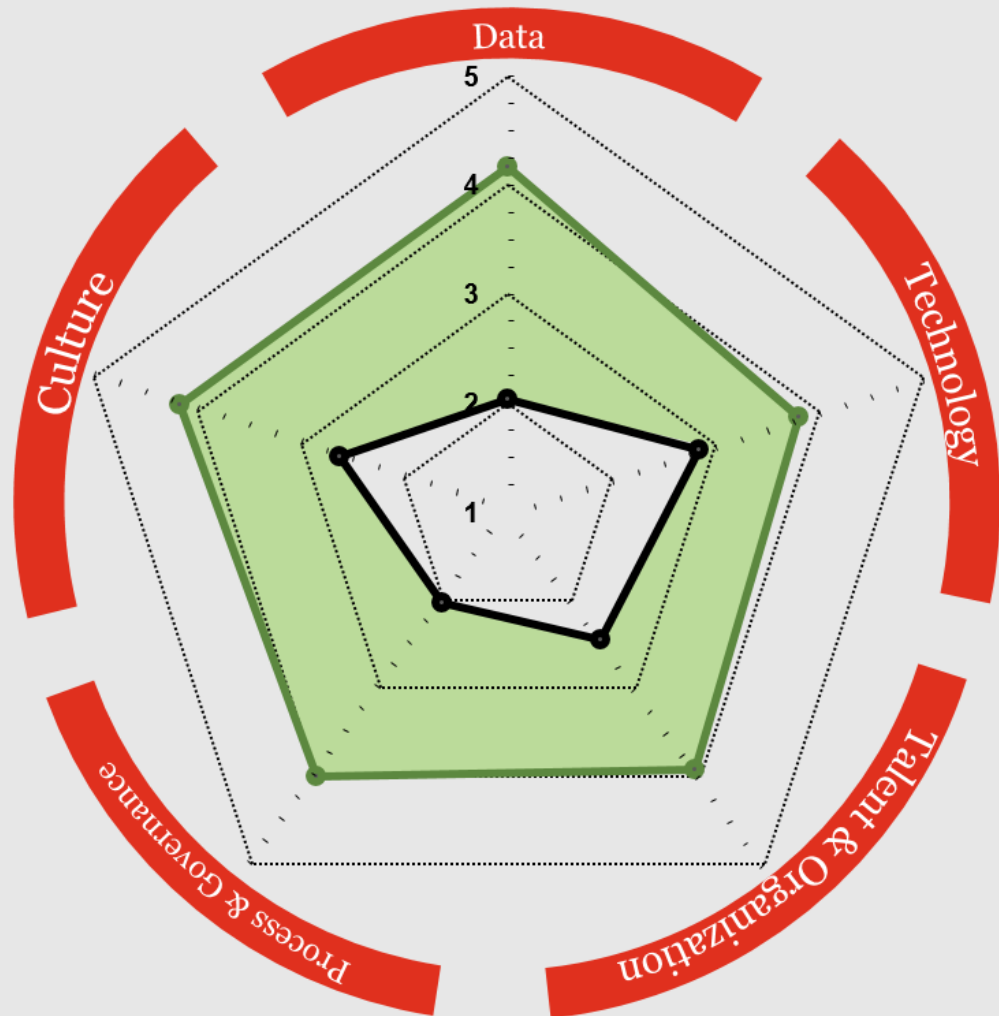


York Region Data And Analytics Master Plan Document

The Data and Analytics Maturity Gap

The Master Plan outlines the journey from the assessed current state to the desired future state. The most beneficial enhancements focus on:

- Enterprise data **governance**
- Data-informed **leadership**
- Data **literacy**
- A cultural **transformation** in how we work together with data



Together, putting data to work.

We will be successful, over the next 4 years, as we:



1 Data Informed Culture

Foster an organizational culture that supports data informed activities and outcomes.



2 Establish Governance

Establish and adopt horizontal and vertical governance, with clear accountability.



3 Enhance Capabilities and Literacy

Provision access to training and adoption tactics to promote and enhance data literacy.



4 Appropriate Access to Trusted and Timely Data

Provide appropriate access to the right data at the right time to support decision-making.



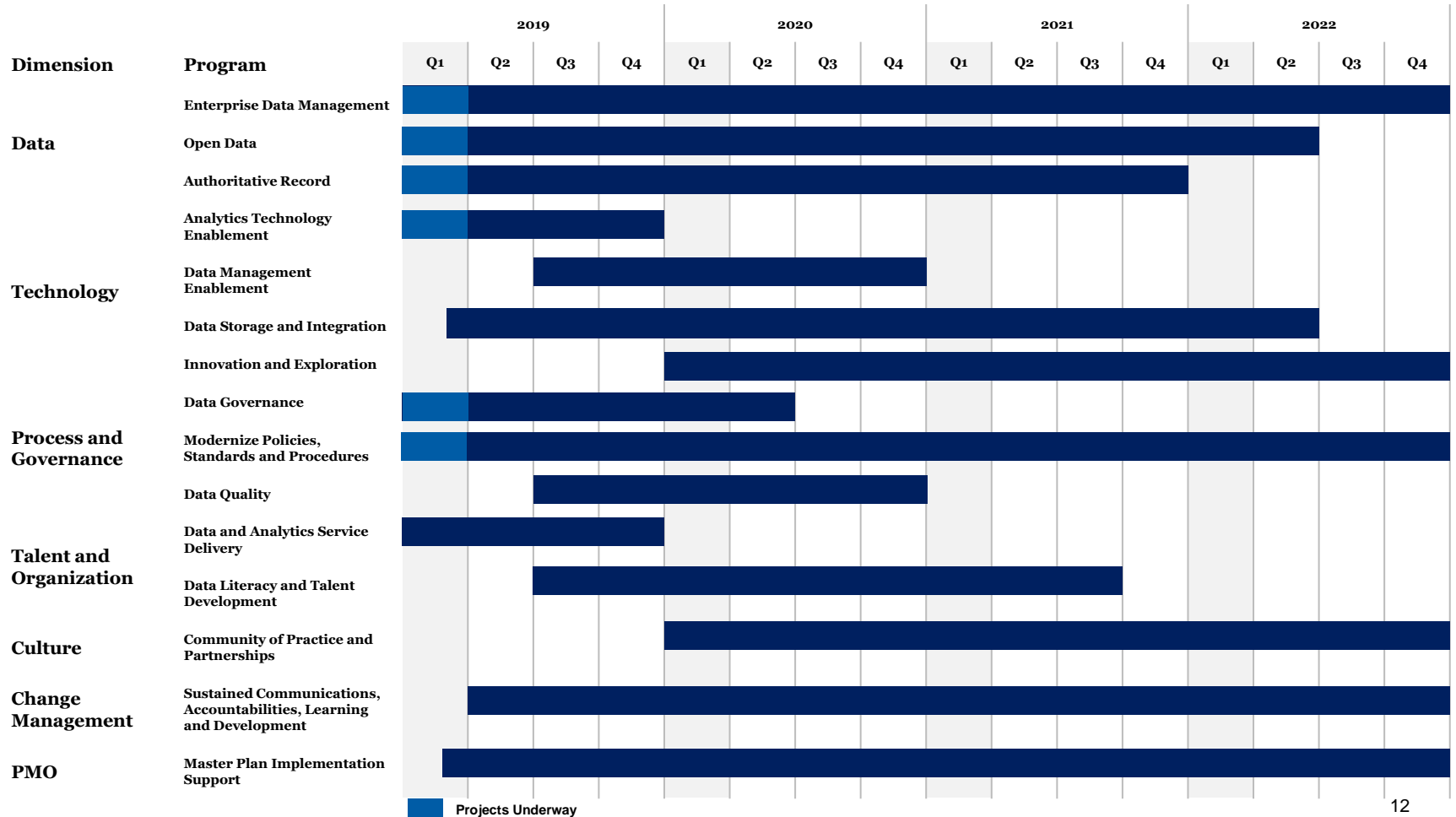
5 Tools for Self-Service Data and Analytics

Equip staff with access to tools for self-service enablement.

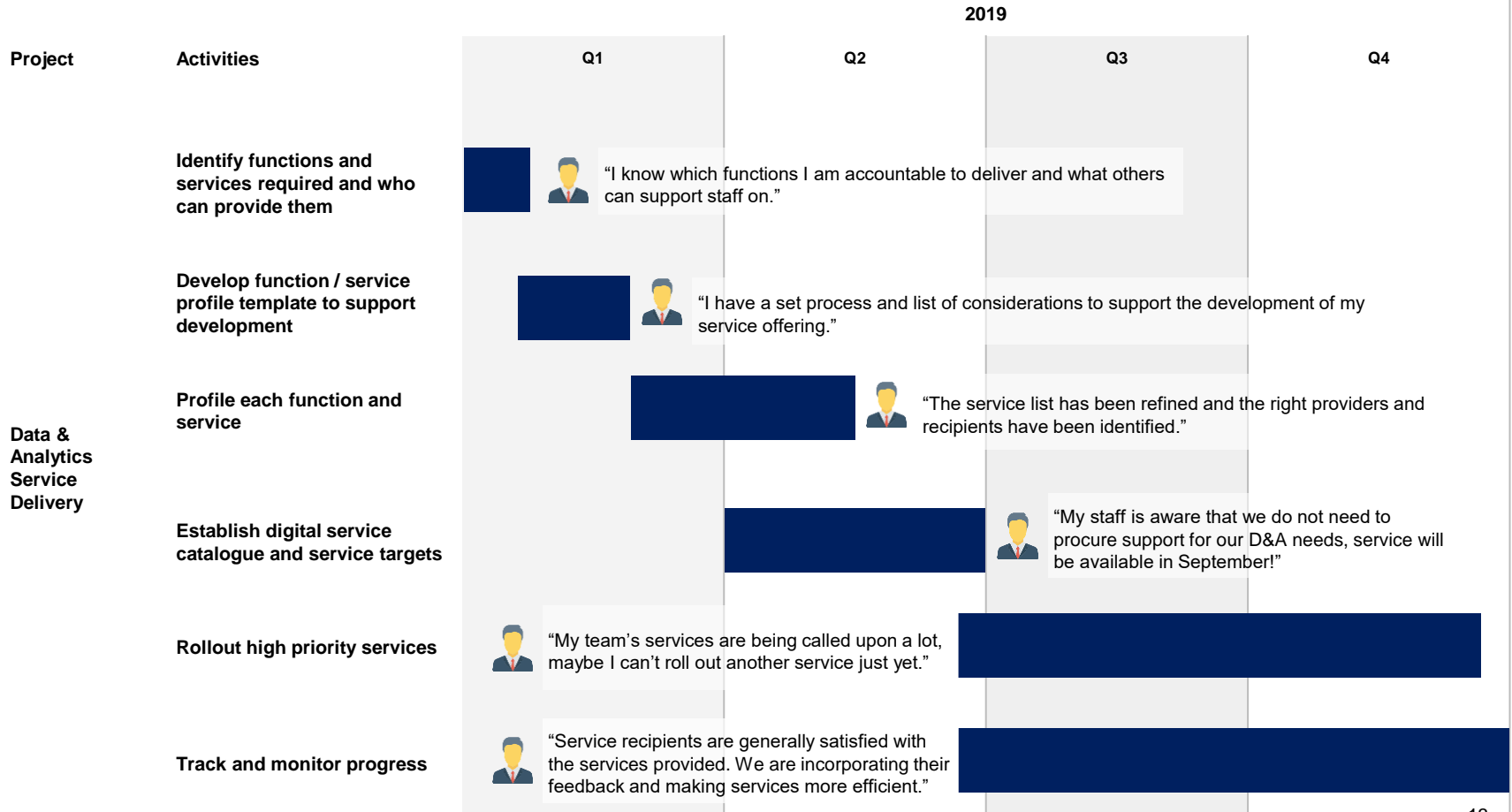
Specific and Pragmatic Recommendations

Dimension	High Impact Recommendations
Data	Develop and adopt an enterprise-wide data management framework.
	Establish the authoritative record for business critical data sets.
Technology	Prioritize technology procurement based on business project needs .
	Ensure enterprise-wide data management tools exist.
Process and Governance	Develop a data governance framework with clearly defined functions, roles and responsibilities.
	Utilize a fit-for-purpose approach to data quality management.
Talent and Organization	Identify, develop and deliver data and analytics services required by the Region.
	Recognize human resources that can offer value to the enterprise .
Culture	Develop a set of shared goals / objectives .
	Leverage the Community Practice model to share data and analytics expertise.

York Region Data and Analytics Roadmap



Example of Year 1 Outcomes for D&A Service Transformation



What needs will the Data and Analytics Master Plan address?



Community Member	Commissioner	Manager	Frontline Staff	External Partner
Needs: Access to regional data to inform personal and business decisions	Needs: Reliable, consistent and timely answers	Needs: Generating reports that tell a consistent and clear story for SMT	Needs: Self-service access to data to discover operational efficiencies	Needs: Seeing the whole picture through integrated and shared data

“I plan to open a new restaurant in the Region. What location is best suited for my business?”

“I have data at my fingertips to answer Council or Citizen questions, and meet my legislative needs.”

“I can report to my Commissioner what land assets and liabilities we have.”

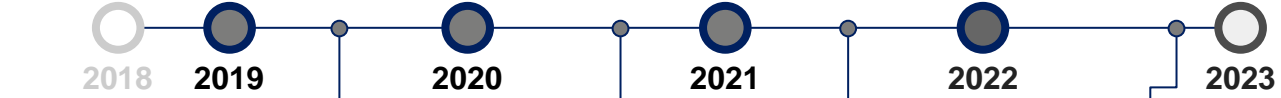
“I can prioritize my workload based on real-time data, providing better customer service.”

“I can now prioritize my development inspections.”

Impact of Projects to Personas: Manager



Steven is a manager within Transportation Services. Innovation is a priority for him. He has a good handle on operations running smoothly but he wants to find innovative ways to improve the customer experience without increasing expenditures. His team generate reports for him but the story or “so what” of the story is not clear. He needs to ensure that his team are generating reports that tell a consistent, clear story so that an opportunity to explore an innovative idea is clear. Steven plans to showcase some of these opportunities to his Director before further exploration.



Project

Data Management Strategy

Data quality gaps in the data are identified in a proactive manner. With the right frameworks and procedures, his team has what they need to identify a single source of truth for business critical data sets. They are able to fill in the data gaps and relay the full story.



Project

Emerging Technology Strategy - Internet of Things

With pilot projects demonstrating the value of connected devices, Steven has a sense of how he can store, access and use sensor and Internet of Things data to support decision-making. Steven intends to use his learnings to inform a policy on autonomous vehicles.



Project

Strategy and Long-Term Transportation Planning

Steven can use data from across various departments to inform his strategy and long-term plan from transportation. Data is accessible and fit for consumption.



Project

Self-Serve Data Delivery

Steven has access to data through the open data portal. He has access to the necessary attributes related to that data and can answer ad-hoc questions from SMT. He is confident in the answer he provides and knows that the answers will be consistent every time.



Foundational Enablement

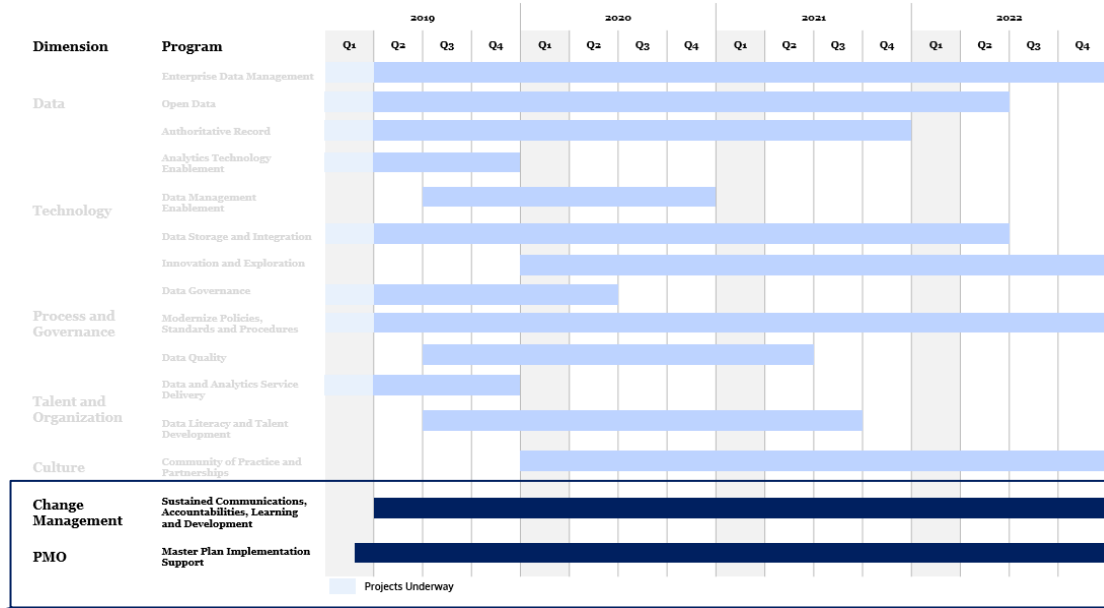


Building on the foundation



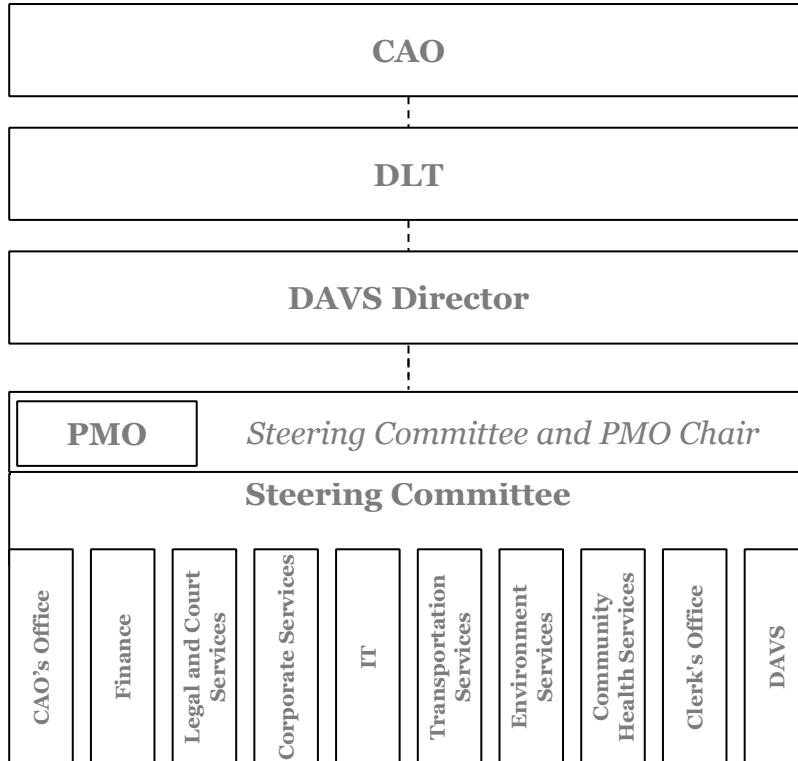
Business Project

Supporting the Journey: Change Management and PMO Focus



Two critical elements that enable transformation and require DLT support - Change Management activities and a PMO.

PMO / Reporting Structure to Support Roadmap Implementation



As needs evolve, consider a dedicated PMO to support similar initiatives for Technology, Information and other large corporate initiatives

PMO Responsibilities include:

- Coordinating projects to ensure they incorporate the **enterprise disposition and requirements**
- Tracking the **realization of benefits** intended through planned projects
- Oversight of **13 programs and 40 projects** over 4 years
- Coordinating and managing the **service catalogue transformation**, profiling, roll out and communication
- Executing **change management** and **communication** activities (3 programs) to promote a data-informed culture
- **Sustainment** planning for foundational projects
- Developing a mechanism and communication channel to **share progress** on execution of the Master Plan

Our approach to change management focuses on the people, both those driving the change as well as those who will be impacted. In order to realize the full benefits of this transformation, the underlying cultural change must be supported through sustained communication, clear accountabilities, as well as learning and development opportunities.



Sustained Communications

DLT Check-ins

Digital Program Plan

Marketing and Communications

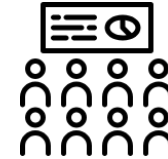


Accountabilities

Performance Appraisals

Publish Function Owners

Assign Staff Members



Learning and Development

Support Learning and Adoption

Learning Goals

Measure Data Literacy

01. Approve

Does DLT approve the Master Plan and support the implementation of it?

02. Accountable

Will staff performance appraisals incorporate activities to deliver on the Master Plan?



03. Structure

Does the DLT endorse the organizational structure proposed to deliver the Master Plan?

04. Alignment

Will the DLT prioritize and help solicit support for the execution of the Master Plan from SMT?

Section 2: Current State Assessment

Approach

Current State Assessment

Future State

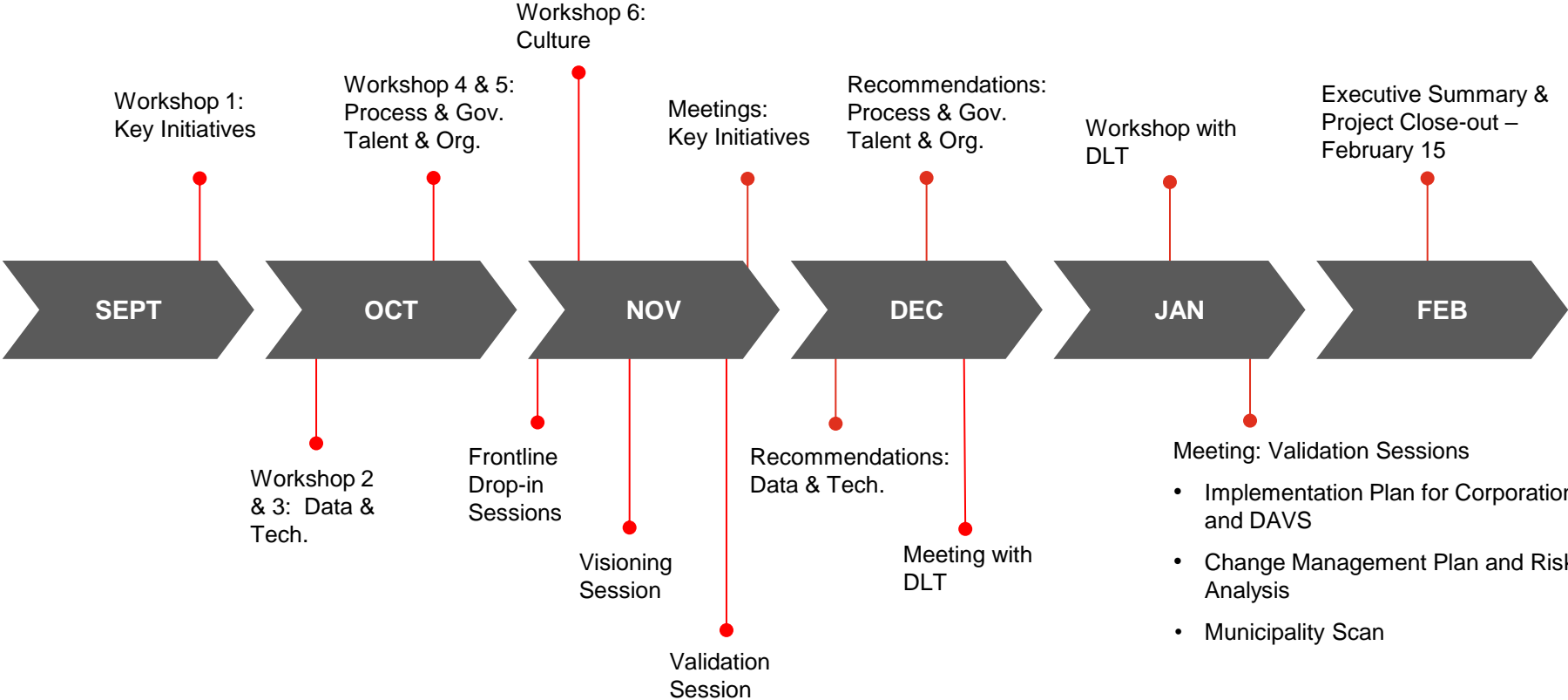
Function Delivery

Approach

SECTION 2.1



Engagement Schedule



Workshop 1:
Key Initiatives

Workshop 4 & 5:
Process & Gov.
Talent & Org.

Workshop 6:
Culture

Meetings:
Key Initiatives

Recommendations:
Process & Gov.
Talent & Org.

Workshop with
DLT

Executive Summary &
Project Close-out –
February 15

SEPT

OCT

NOV

DEC

JAN

FEB

Workshop 2
& 3: Data &
Tech.

Frontline
Drop-in
Sessions

Visioning
Session

Validation
Session

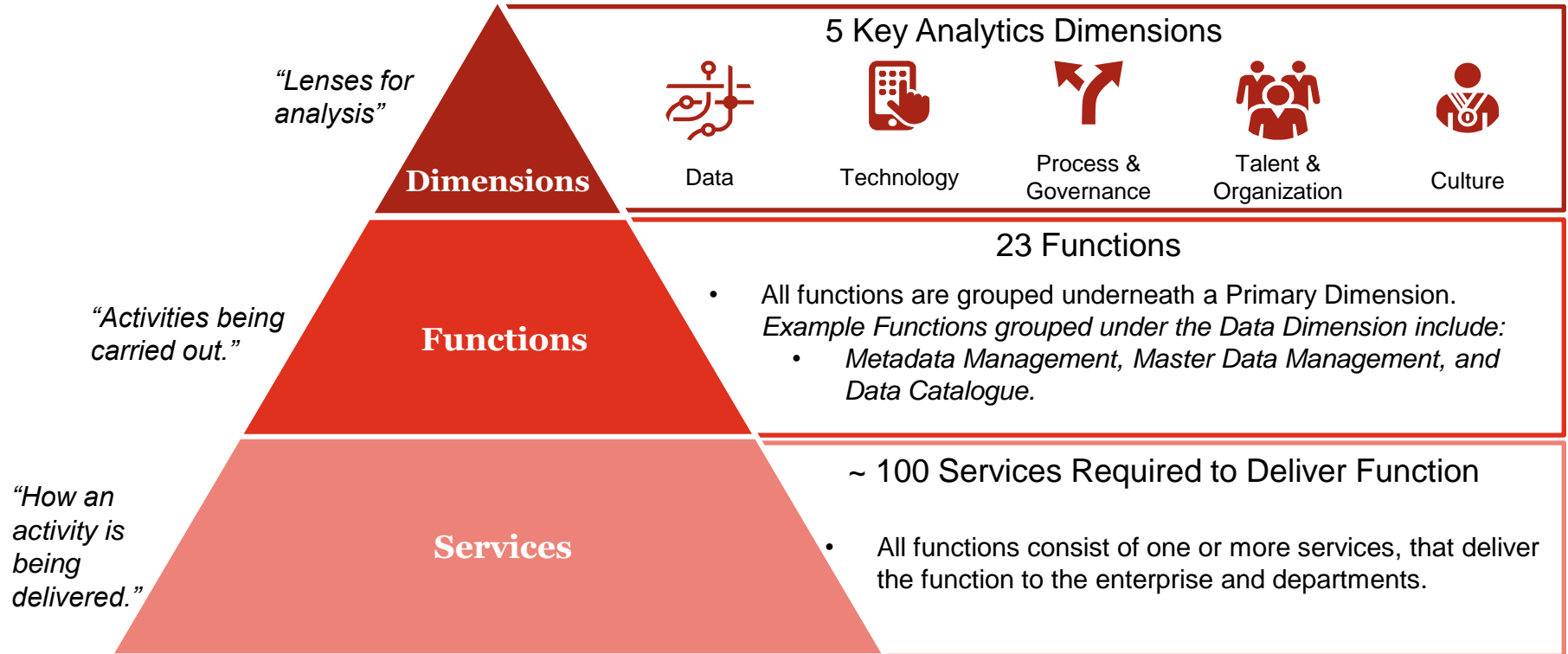
Recommendations:
Data & Tech.

Meeting with
DLT

Meeting: Validation Sessions

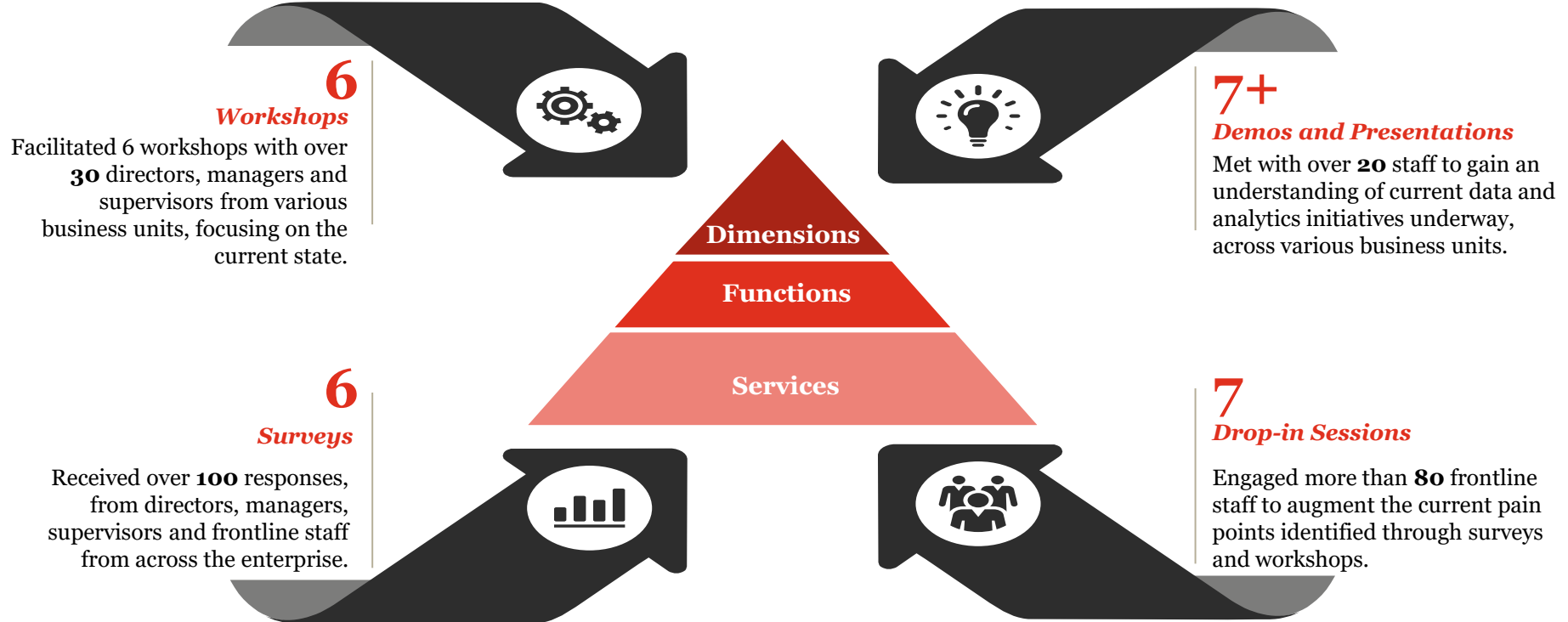
- Implementation Plan for Corporation and DAVS
- Change Management Plan and Risk Analysis
- Municipality Scan

Dimension, Function and Service Mapping



Input into Current and Future State

The following inputs were used to assess the current state and identify the future state, at the function level.



Current State Assessment

SECTION 2.2

THIS CURRENT STATE ASSESSMENT WAS DEVELOPED WITH OUR UNDERSTANDING AND INPUT FROM THE REGION AS OF NOVEMBER 23RD, 2018.



Maturity Scale



1 - Non - Existent

- The functionality does not exist within the organization.

2 - Reactive

- Basic functionality does exist within isolated pockets of the organization.

3 - Proactive

- Most of the functionalities exist with consistency.

4 - Committed

- Most of the functionalities do exist within the organization and are well connected, accepted and adopted.

5 - Leader

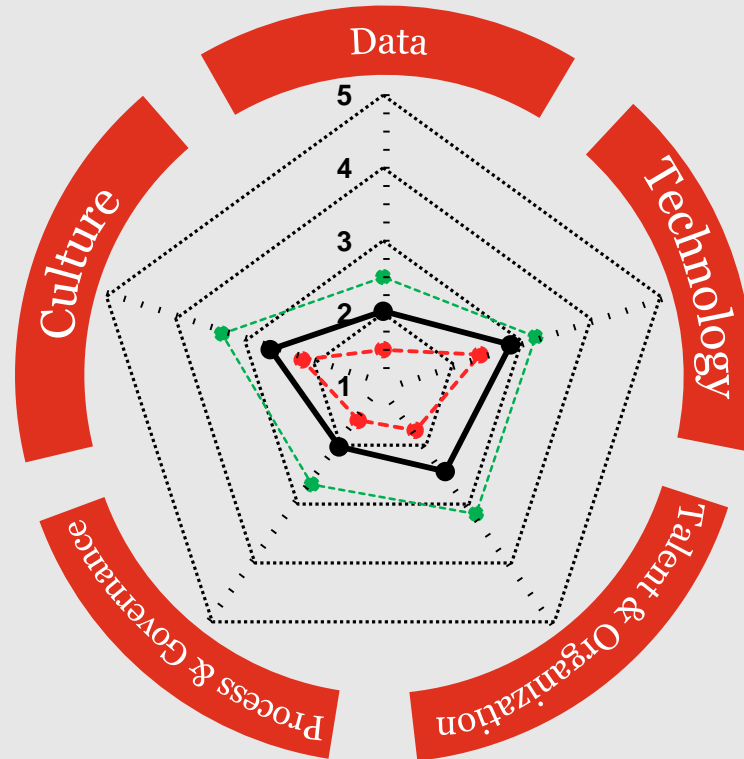
- Most or all of the functionalities do exist within the organization and have been adopted and scaled across.

Enterprise Current State Summary

Through our current state assessment we identified strengths in available technology and localized areas of data and analytics talent, however enterprise data and analytics maturity was often impeded by gaps in process and governance, as well as data functions.

The greatest localized range existed within the talent and organization as well as process and governance dimensions. This was often due to a variance in local departmental / branch leadership and practices.

Current State Enterprise Average Local Maximum* Local Minimum*



Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

*Local maximum and minimum values are calculated using the average score for all the departmental maximum and minimum, for each dimension.

How to Read this Section of the Report

Assessment dimension.

Current areas of strength.

Average level of maturity of the functions within assessment dimension.

Data

30% of survey respondents did not feel confident in their data due to similar versions of the same information existing.

Frontline staff felt identifying a single / authorized source of truth needs to be a priority.

Regional staff felt that a data catalogue with a dictionary providing business context would be required to support the appropriate use of data.

Evidence points from:
• Survey Responses
• Drop – in sessions
• Workshops
• Demos and presentations

Areas of Strength

- Staff generally feel that the data that does exist provides sufficient level of detail to conduct analyses.
- Inconsistent data due to multiple versions is mostly resolved by knowing who to contact for support.

Opportunities for Improvement

- Staff will leverage data assets more frequently and effectively with metadata fields clearly defined for datasets or databases.
- Augmenting a data catalogue with business context dramatically increases the value of a data catalogue to a user.

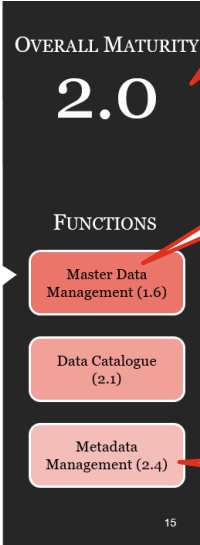
Legend

Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Confidential information for the sole benefit and use of PwC's client.

Opportunities for future improvement.

Colour gradient legend of the maturity scale in slide 11.



Function maturity aligned with legend colouring.

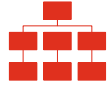
Function maturity score.

Data Function Definitions



Metadata / Dictionary

Identifying characteristics of the data, managing the content being captured, assisting in the retrieval of information, and tracking the use and modifications of data.



Master Data Management

Providing processes to collect, aggregate, match, consolidate, and distribute data across the organization, ensuring consistent definitions and format of enterprise data assets.



Data Catalogue

Identifying organizational data-sets or databases as well as their appropriate metadata. This may include business context to the data-set or database.

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Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader



OVERALL MATURITY

2.0

FUNCTIONS

Master Data Management (1.6)

Data Catalogue (2.1)

Metadata Management (2.4)

Technology Function Definitions



Extract Transform Load and Preparation

Extracting, transforming and loading data into a format ready for analysis..



Report Generation

Managing the creation, visualization and distribution of standard reports and self-service portal(s) for users to gain access to information.



Data Integration

The collection of data from various sources into one uniform record. Integration methods may include physical and virtual integration.



Solution Architecture

Leveraging a set of technologies to connect disparate applications and data sources to answer a business question.



Geo-spatial Information Systems

Ensuring a reliable and effective Geo-spatial Information Systems technology infrastructure exists to support the organizational needs.

Technology

Existing data reporting tools support the organization sufficiently.

Current data management tools do not support departments / branches appropriately.

“Tools are available, enterprise-wide, access to the technology is the issue.”

“Various departments / business groups are using different tools - Power BI, Tableau, Apex.”

Areas of Strength

- Robust tools to support data reporting and visualization are licensed within the organization.
- Geo-spatial Information Systems and associated capabilities continue to be a strength for the Region.

Opportunities for Improvement

- Staff should be made aware of their access to data reporting and visualization tools that exist.
- Toolsets for Data Management and Data Governance should be explored.
- Integrate data from disparate transactional source systems to enhance analytic capabilities.
- Using a standard set of tools can assist with collaboration, reduce work duplication and simplify solution architecture.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader



OVERALL MATURITY

2.8

FUNCTIONS

Data Integration
(2.3)

Solution
Architecture (2.4)

Extract, Transform,
Load and Prepare
(2.7)

Report Generation
(2.8)

Geo-spatial
Information
Systems (4)

Process and Governance Function Definitions



Data Asset Supervision

Providing supervision and overall strategic direction on how data assets are managed and utilized across the enterprise.



Access, Security and Privacy

Assessing, monitoring and assisting with the protection of data assets when being used for analytics purposes.



Data Governance

Planning, supervision, and control over data management and use.



Policy Standard and Procedure Development

Assessing current needs and practices in order to develop safeguards and guidance on how data assets are to be managed and used. This may include specific guidance through the development of standards and procedures.



Data Quality

Identifying, measuring and resolving quality issues related to data completeness, integrity, reliability and overall utility for a specific purpose.



Project Prioritization

Ensuring projects / initiatives are strategically aligned and prove to have return on impact for staff and the greater community.

Process and Governance

Verifying data quality currently takes up the majority of time within data and analytics activities.

A standard process to accessing data does not exist.

“The business owner is clearly defined for most data assets, but the stewardship of the assets is not always managed effectively.”

Areas of Strength

- Projects are prioritized based on value, learning goals, and strategic alignment.
- Components of governance exist but there is limited awareness of them.

Opportunities for Improvement

- Some policies, standards and procedures exist but staff is unaware of them and how to use them. User-experience and design-thinking can be used to incorporate better use.
- To assist with data quality remediation, a set of metrics, policies and procedures need to be defined to improve data custodianship.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader



OVERALL MATURITY

2.0

FUNCTIONS

Policy, Standard and Procedure Development (1.8)

Access, Security and Privacy (1.9)

Data Quality (1.9)

Data Governance (2)

Asset Supervision (2.1)

Project Prioritization (2.5)

Talent and Organization Function Definitions



Decision Support

Supporting decision making opportunities across the organization with robust and consistent interpretation of analyses.



Advanced Analytics

Utilizing statistical modeling and algorithm generation in combination with programming capabilities to conduct diagnostic, predictive, and prescriptive analytics. This may include machine learning components.



Technology Management

Organizing and managing software designs, technology support and procurement, as well as application inventory, including the provisioning to the access of technology.



Data and Analytics Training

Supporting and managing staff training related to data and analytics.



Story Telling

Integrating a narrative with data and visuals to explain what is happening in the data and why a particular insight is important.



Consultation Services

Providing advice, information, or an opinion on a specified subject.

Talent and Organization

OVERALL MATURITY

2.5

FUNCTIONS

Advanced Analytics
(2)

Data & Analytics
Training (2.2)

Story Telling (2.4)

Decision Support
(2.5)

Technology
Management (2.7)

Consultation
Services (2.9)

Areas of Strength

- Training for data and analytics is available to Regional staff. Staff feel satisfied that the training is supported.
- Many departments / branches are working in more of a consultative manner where they seek advice from one another, based on past experiences and working relationships.

Opportunities for Improvement

- The role of data communicator / story-teller are extremely valuable to support interpretation and identifying the 'so what' to the insight. This role is essential to support the Region becoming more data-informed.
- Existing staff can be trained to perform data and analytics activities with their roles, responsibilities and involvement in projects clearly defined.
- Service offerings need to consider existing skill-sets across the Region. There is also a need to clarify roles and responsibilities in delivery, to reduce work-duplication.

Legend

1 - Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader



“We have a shortage of data related talents. We need to invest more in these talents.”

“Tools are discussed when a “fun” new concept comes up ... or in the context of “what others do” instead of within the context of the Region's needs, priorities and focus.”

“DAVS training is available to all regional staff which is great. However sometimes in the classes there is such a variety of skill sets that it makes it difficult to gain value.”

Culture Function Definitions



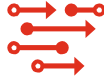
Data Partnership

Establishing data-oriented partnerships with external organizations such as municipalities, universities, research institutes, and private sector organizations, as well as internal departments, branches and divisions.



Leadership and Decision-Making

Oversight, strategic direction, and support / sponsorship in transforming the use and capabilities of data and analytics functions.



Data and Analytics Coordination

Support planning and coordination of data and analytics initiatives within and across multiple departments and / or branches.

Culture

“Other "priorities" and political "noise" will get in the way. The departments are way too competitive here at York Region to collaborate on moving this forward past this stage within the next 4 years. The "discipline to execute" progressive changes are always a struggle here at the Region.”

“Sometimes we make a decision and find data after to support, but I'm sure that's always a bad thing.”

[Transmission from leadership to the frontline is an issue], “there is a higher level value of change management activities and innovation but that doesn't always translate to an organization that adjusts well to change.”

Areas of Strength

- The Region has worked well with local municipalities and other regional municipalities, fostering a culture of mutually beneficial partnerships.
- Ownership of data assets exist, a critical initial step in becoming a data-informed organization.

Opportunities for Improvement

- A key success factor lies within the commitment to collaborate across departments and branches.
- Data needs to be used to inform decision-making at all levels.
- Responsibilities associated with data ownership and stewardship need to be articulated.
- A balance between value and risk should be incorporated into corporate decisions to advance a data-driven culture.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader



OVERALL MATURITY

2.6

FUNCTIONS

Data and Analytics
Coordination (2.3)

Leadership and
Decision-Making
(2.7)

Data Partnership
(2.9)

Most Mature Functions at Current State

Functions	Non Existent	Reactive	Proactive	Committed	Leader
Geo-spatial Information Systems				4	
Data Partnerships			2.9		
Consultation Services			2.9		
Report Generation			2.8		
<ul style="list-style-type: none">• Extract, Transform, Load & Prepare• Technology Management• Leaderships & Decision-making			2.7		

Least Mature Functions at Current State

Functions	Non Existent	Reactive	Proactive	Committed	Leader
Master Data Management		1.6			
Policies, Standards and Procedures		1.8			
Access, Security and Privacy		1.9			
Data Quality		1.9			
<ul style="list-style-type: none">• Advanced Analytics• Data Governance		2.0			

Future State

SECTION 2.3

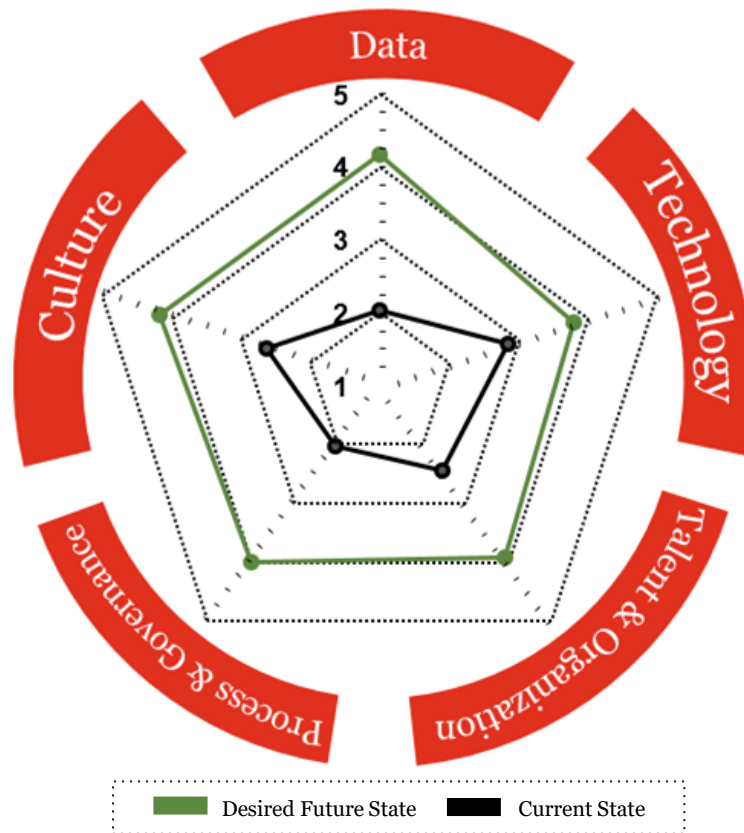


Current State to Future State Mapping

Summary

The smallest range between current and future state exists within the technology dimension. Much of this transition can occur through acquiring the appropriate tools and sharing them across the Region.

The greatest desired maturity for future state exists for data as well as process and governance. These two dimensions relate to one another as the establishment of governance can operationalize data functions.



Legend

1 - Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Goals for the Future State



Appropriate Access to Trusted and Timely Data



Enhance Capabilities and Literacy



Establish Governance

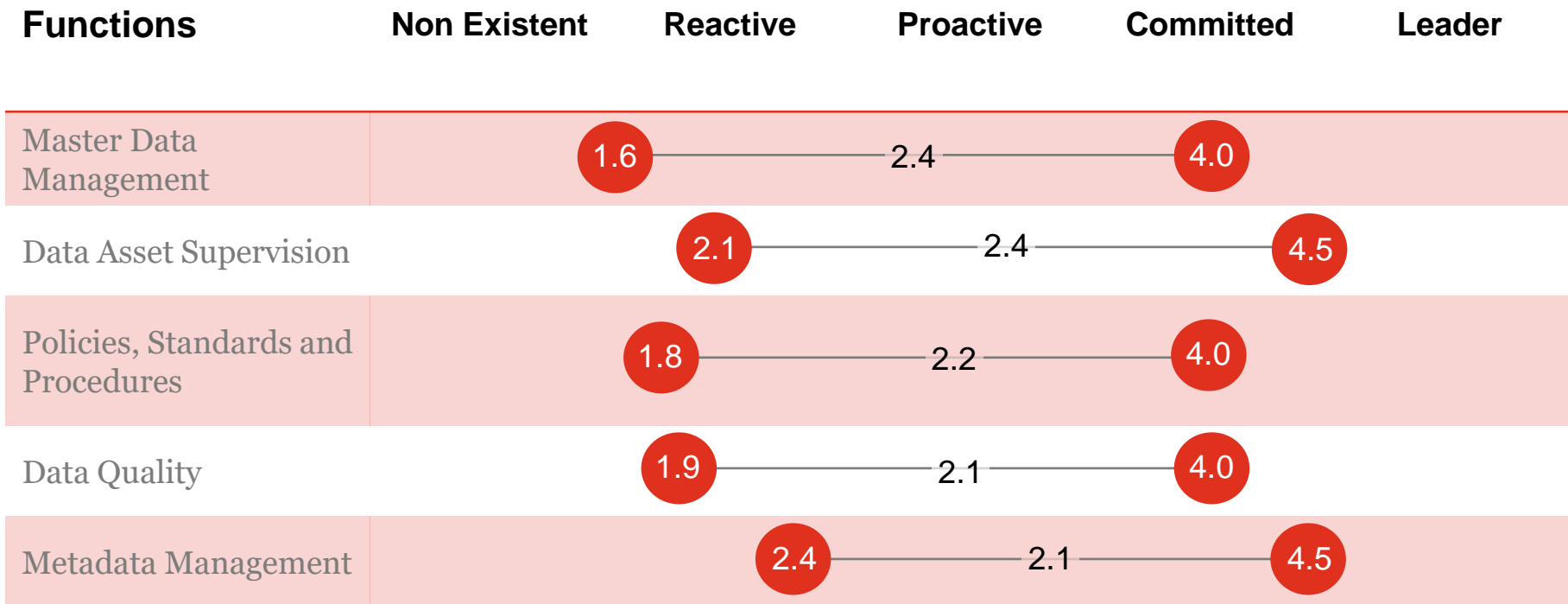


Data Informed Culture

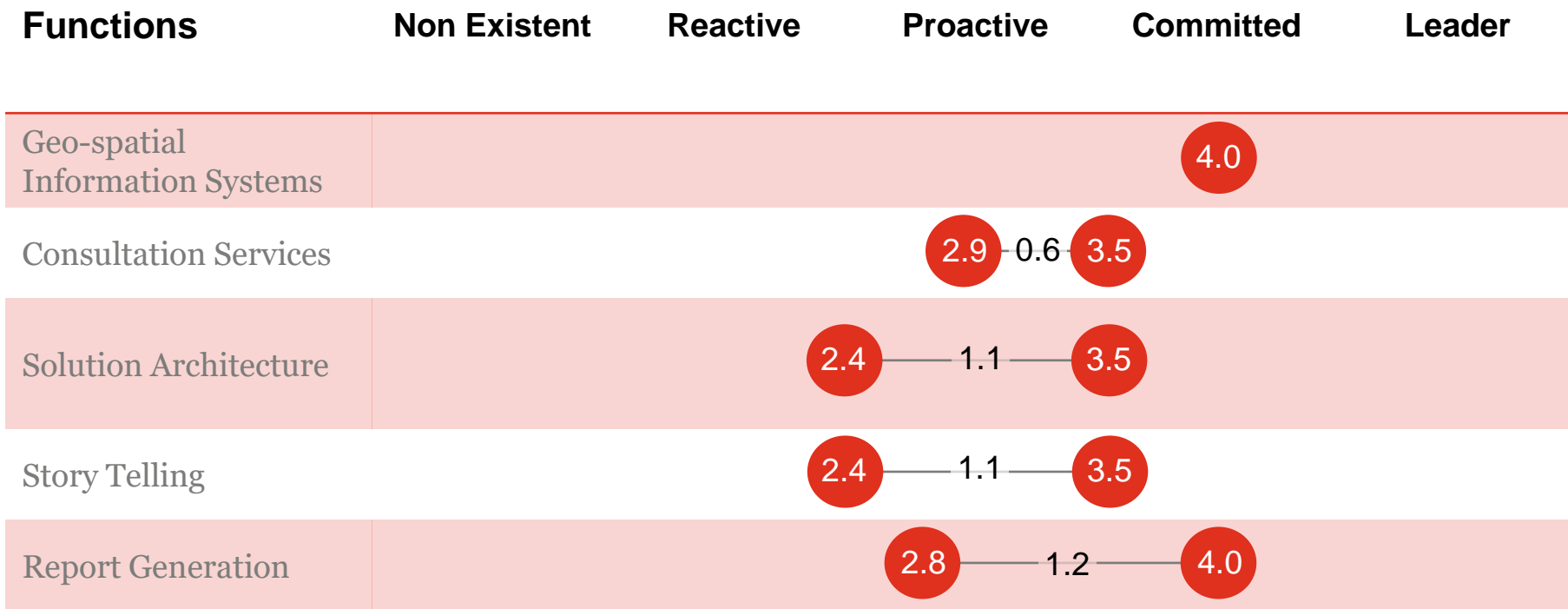


Tools for Self-Service Data and Analytics

Largest Gap in Maturity



Shortest Gap in Maturity

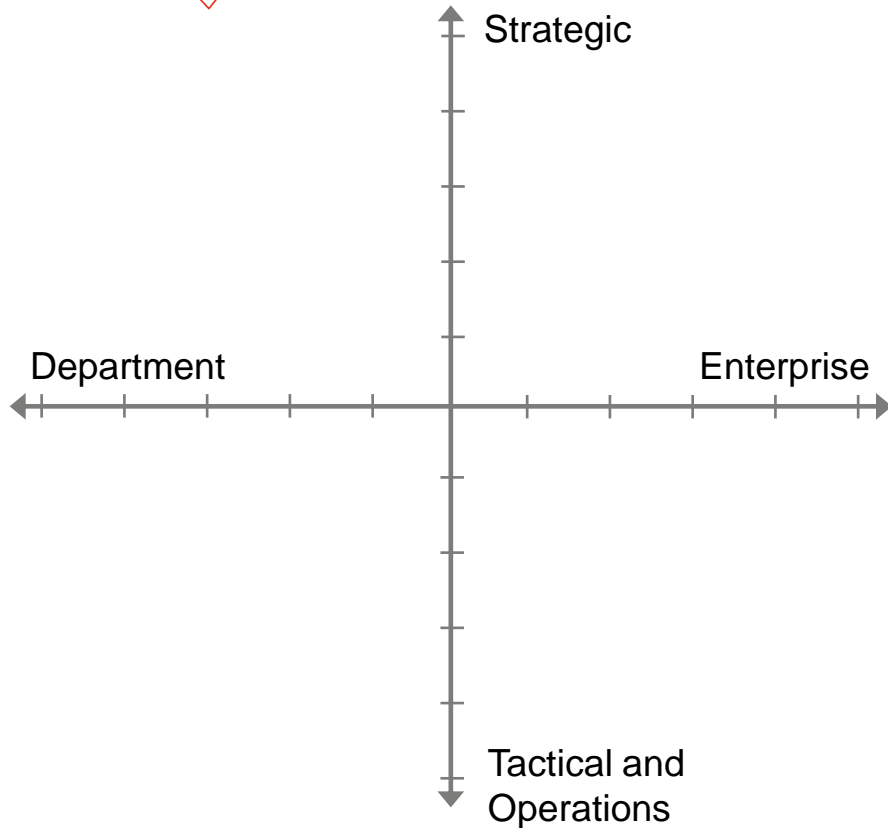


Function Delivery Assessment

SECTION 2.4



Approach to Assessing and Co-designing Function Delivery



X – Axis

- *Department*: Localized to the individual business unit
- *Enterprise*: Standardized across the organization

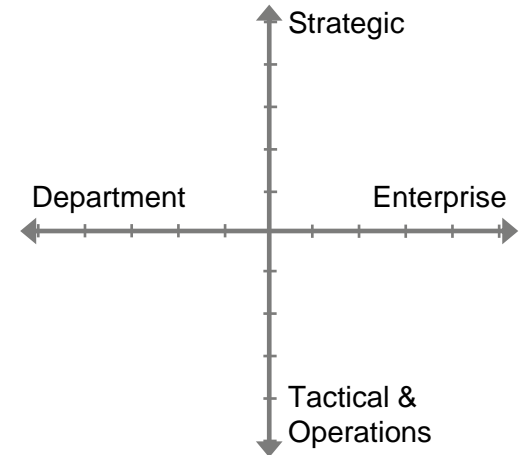
Y – Axis

- *Strategy*
- *Tactical and Operations*

List of Functions Assessed

Functions

1. Master Data Management
2. Metadata Management
3. Extract Transform Load and Preparation
4. Report Generation
5. Decision Support
6. Advanced Analytics
7. Data Partnership
8. Technology Management
9. Data Integration
10. Data and Analytics Training
11. Solution Architecture
12. Data Asset Supervision
13. Access Security and Privacy
14. Data Governance
15. Story Telling
16. Leadership and Decision-Making
17. Policy Standard and Procedure Development
18. Data Quality
19. Geo-spatial Information Systems
20. Consultation Services
21. Data Catalogue
22. Data and Analytics Coordination
23. Project Prioritization



Function Delivery

Functions with the Largest Delivery Gaps

1. Project Prioritization
2. Data and Analytics Coordination
3. Data Governance
4. Leadership and Decision-Making
5. Data Integration

Legend

Size of Bubble represents Function Maturity

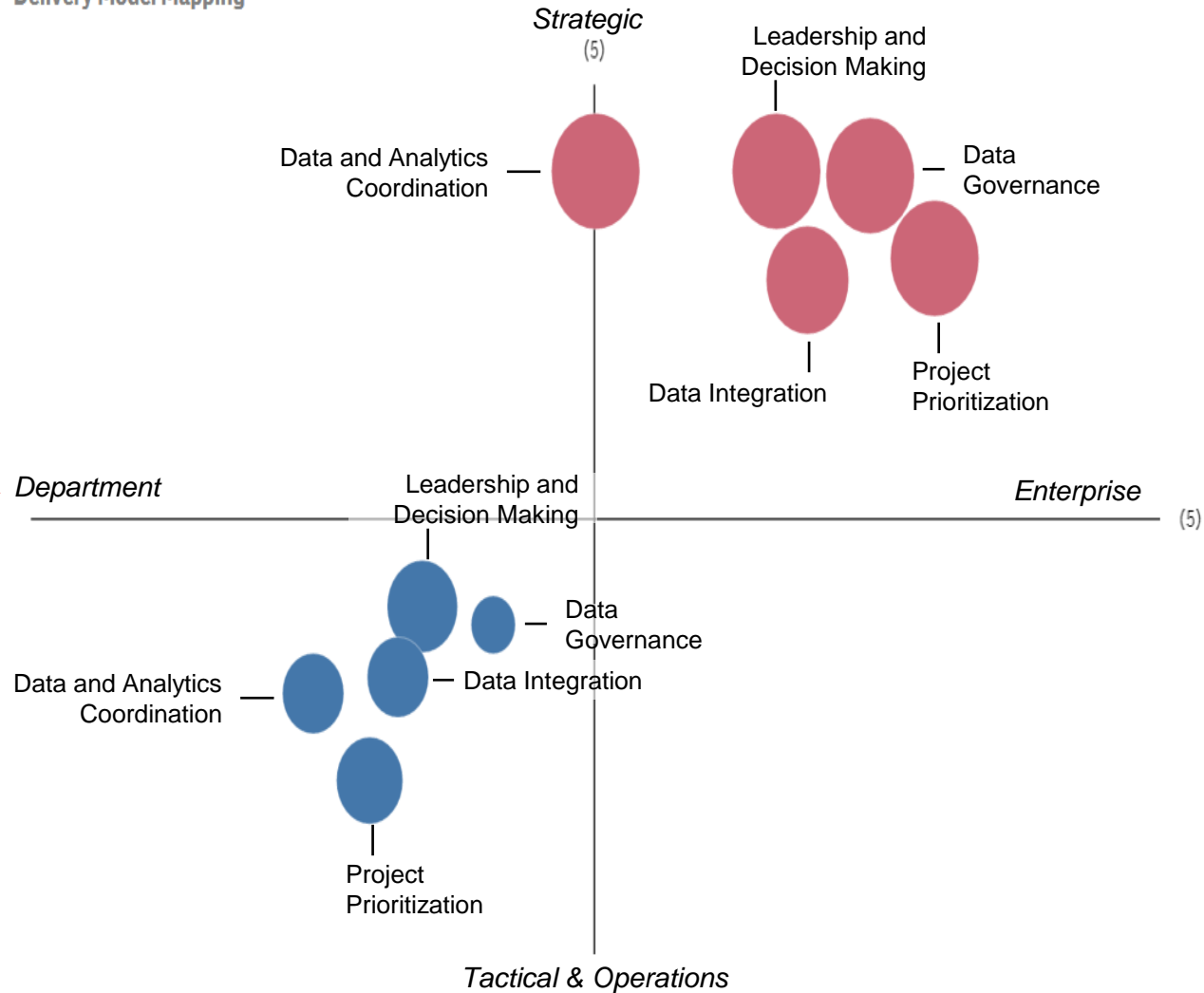


Current State



Future State

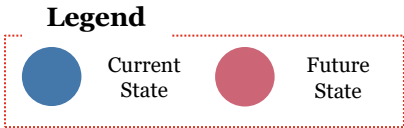
Delivery Model Mapping



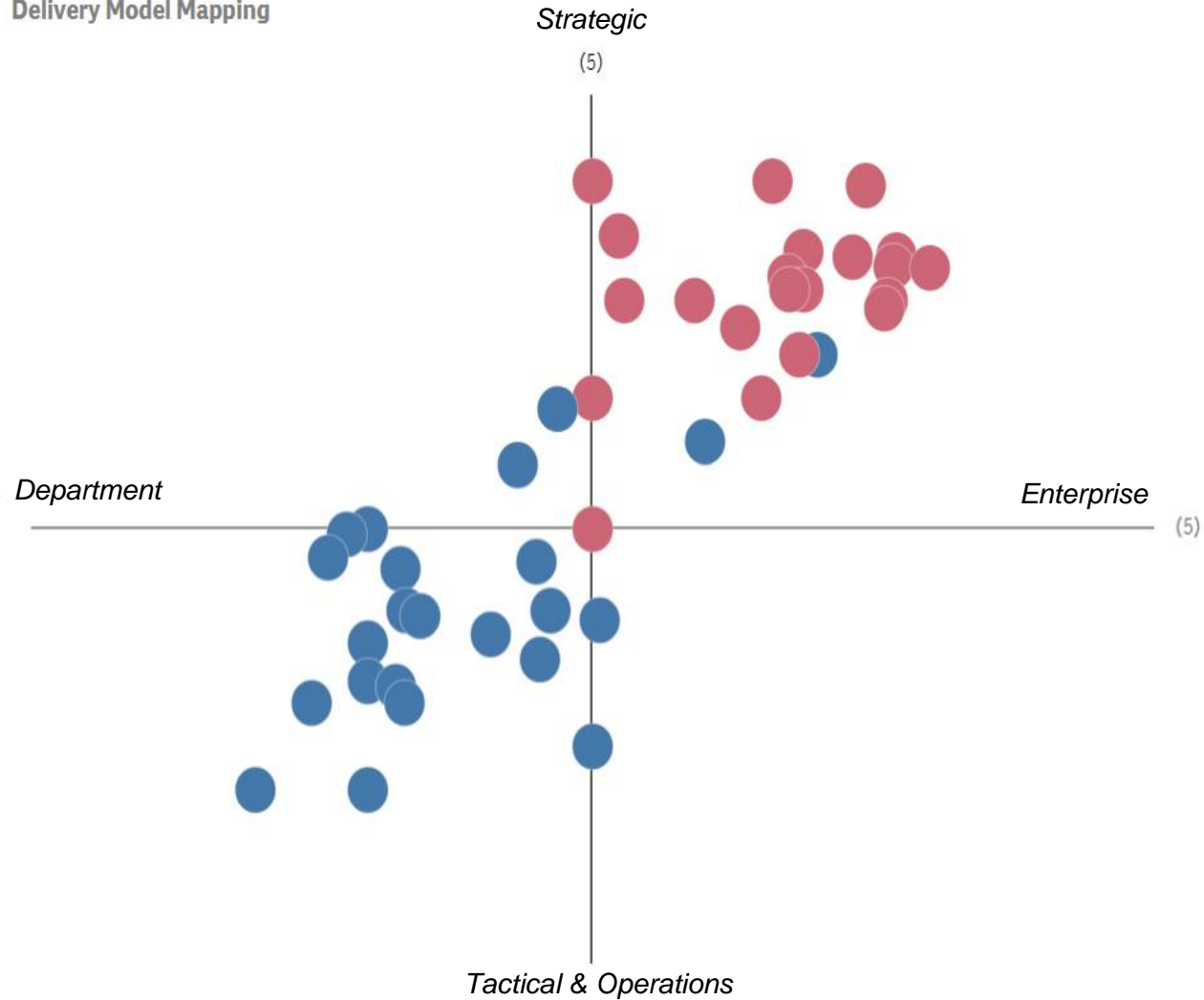
Functional Delivery

Overview of Function Delivery at Current and Future State

- A mapping for each function can be found in Appendix A2.



Delivery Model Mapping



Section 3: Vision, Goals, Objectives, Guiding Principles and Recommendations

Vision, Goals, Objectives
and Guiding Principles

Data: Observations and
Recommendations

Technology:
Observations and
Recommendations

Process and Governance:
Observations and
Recommendations

Talent and Organization:
Observations and
Recommendations

Culture: Observations
and Recommendations

Vision, Goals, Objectives and Guiding Principles

SECTION 3.1



*Together, putting data to
work.*

Together, putting data to work.

We will be successful, over the next 4 years, as we create:



1 Data Informed Culture

Foster an organizational culture that supports data informed activities and outcomes.



2 Establish Governance

Establish and adopt horizontal and vertical governance, with clear accountability.



3 Enhance Capabilities and Literacy

Provision access to training and adoption tactics to promote and enhance data literacy.



4 Appropriate Access to Trusted and Timely Data

Provide appropriate access to the right data at the right time to support decision-making.



5 Tools for Self-Service Data and Analytics

Equip staff with access to tools for self-service enablement.

Emerging Goals and Objectives – Alignment with DLT Objectives



1 Data Informed Culture

Foster an organizational culture that supports data informed activities and outcomes.

3.0 Aligned priority setting
5.0 Deliver Priority Projects



2 Establish Governance

Establish and adopt horizontal and vertical governance, with clear accountability.

4.0 Solidify intra-organizational governance
6.0 Communicate Information



3 Enhance Capabilities and Literacy

Provision access to training and adoption tactics to promote and enhance data literacy.

1.0 Clarify accountabilities & authorities
2.0 Advance organization-wide planning
6.0 Communicate Information



4 Appropriate Access to Trusted and Timely Data

Provide appropriate access to the right data at the right time to support decision-making.

4.0 Solidify intra-organizational governance
6.0 Communicate information

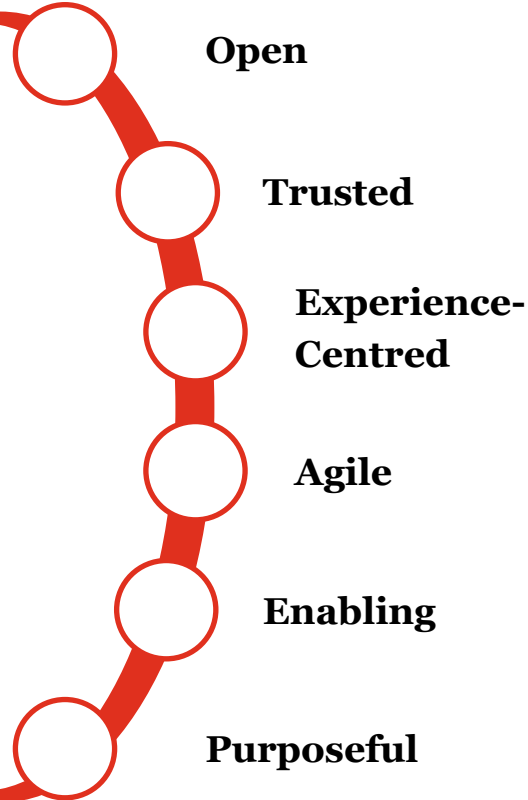


5 Tools for Self-Service Data and Analytics

Equip staff with access to tools for self-service enablement.

4.0 Solidify intra-organizational governance
6.0 Communicate information

Guiding Principles



Data should be open and available, by default.

Data must be trusted to ensure it is treated as a strategic enterprise asset.

Digital assets must be designed with the end user in mind, where their needs and expectations are incorporated.

Upskilling staff and community members digitally requires a nimble and agile approach.

Staff and community members must be enabled through appropriate tools and technologies, in addition to access to data.

Identify the “why” before the “what” and the “how” are defined.

Observations and Recommendations: Data

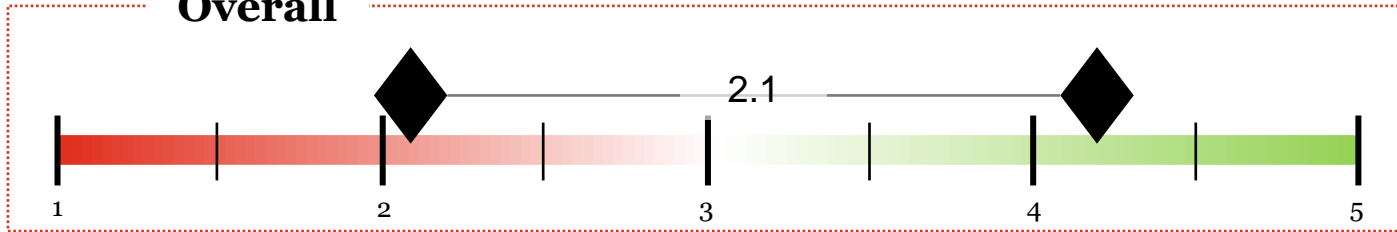
SECTION 3.2

- Review where the Region is today and where it wants to be in 4 years
- Share observations focused on the root cause of pain points identified
- Share recommendations to close the gap in maturity
- Identify recommendations that have the highest impact in closing the gap
- Demonstrate what “good” looks like for the highest impact recommendation(s)
- Describe a practical approach for the Region to achieve the desired state



Data – Current and Future State

Overall



Master data Management- Providing processes to collect, aggregate, match, consolidate, and distribute data across the organization, ensuring consistent definitions and format of enterprise data assets.



Metadata Management - Identifying characteristics of the data, managing the content being captured, assisting in the retrieval of information, and tracking the use and modifications of data.



Data Catalogue - Identifying organizational data-sets or databases as well as their appropriate metadata. This may include business context to the data-set or database.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

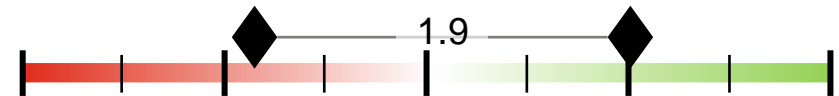
Master data Management



Metadata Management



Data Catalogue



Root Cause in Maturity Gap

There is a need for an authoritative record

- Staff report difficulty identifying a **single source of truth**.
- For some data sets, **confidence in quality is low**.
- **Duplicate data** sources exist.
- Similar reports can draw on **different data**.



Metadata capture, in some cases, is incomplete

- Metadata is **inconsistently collected** by departments.
- **Organizational needs** are not always met by the metadata collected through transactional systems and the current data catalogue (e.g. business context).
- **Valuable metadata elements** which support important processes are not captured (i.e. retention rules and PII).



A data catalogue is not widely adopted.

- Staff are challenged by **not knowing** what data exists.
- Data **storage** practices are inconsistent.
- Knowing who to **contact** may not be clear.



Recommendations

1.1 Establish an authoritative record

- **Collaboratively** design and implement a methodology to identify the authoritative source for data.
- Focus on **shared, priority** data sets.

1.2 Develop mandatory metadata fields

- Define **business context** with **relevant examples** of use.
- Apply field requirements to **priority data sets**.
- Define fields collecting **legislatively required** data.

1.3 Create a Data Asset Inventory

- Identify key **characteristics** (i.e. title, description, category, format, stewards, custodians, and coordinators).
- **Start** data element classification with **priority** data sets.
- Create a data classification standard to identify **degree of sensitivity and protection**.
- Leverage the **same approach** for the catalogue and open data.

Root Cause in Maturity Gap

Data set use is limited due to data quality issues

- Insight confidence is impacted by **confidence** in data quality.
- Contributors are not aware of their **downstream impacts** on data quality.
- Users may be **unaware** of data quality levels and the data quality required (fit for purpose).
- Remediation efforts are difficult to **target**.



Data access controls are not consistently applied

- Staff in **similar roles** do not have access to the same data.
- Access issues are often resolved by **knowing who to contact**.
- An agreed upon **confidentiality framework** does not exist.



Some data management efforts are being undertaken in silos

- Awareness of the **responsibilities** associated with metadata management is limited.
- There is **limited accountability** for maintenance.
- Efforts on data management are not **unified**.



Recommendations

1.4 Define workflows for data quality maintenance

- Create process maps to **delineate data quality remediation activities and responsibilities**.
- **Assessments and validation** checks must be established for **key characteristics**.
- **Automate** the validation streamline assessment.

1.5 Access control objectives and mechanisms must be applied consistently

- Establish and deploy an agreed upon **confidentiality framework** (including defined levels, descriptions, and examples).
- Based on data classification, provision **role-based access** consistently.

1.6 An enterprise-wide data management framework must be adopted

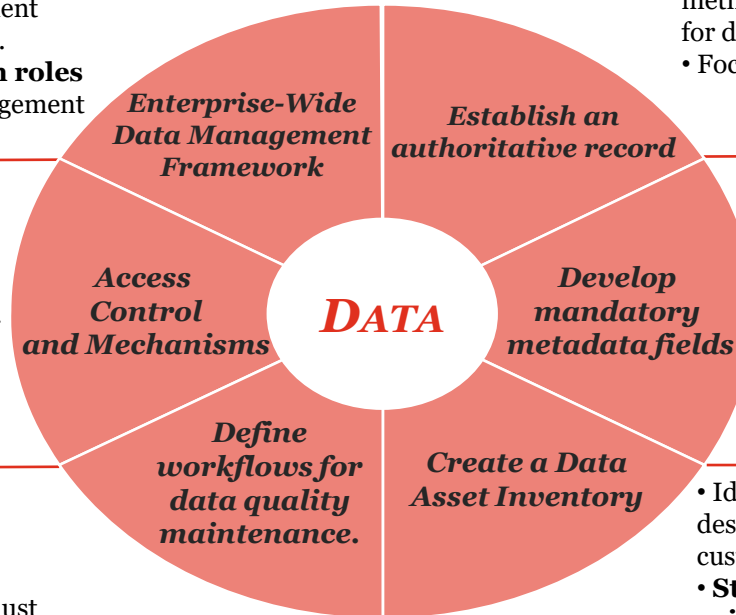
- Prioritization efforts should focus on **business critical data sets**.
- **Collaboratively** design a data management framework, addressing data lifecycle issues.
- Define a governance framework and **align roles and responsibilities** with the data management framework.

Data - Summary of Recommendations

- Prioritization efforts should focus on **business critical data sets**.
- **Collaboratively** design a data management framework, addressing data lifecycle issues.
- Define a governance framework and **align roles and responsibilities** with the data management framework.

- Establish and deploy an agreed upon **confidentiality framework** (including defined levels, descriptions, and examples).
- Based on data classification, provision **role-based access** consistently.

- Create process maps to **delineate remediation activities and responsibilities**.
- **Assessments and validation** checks must be established for **key characteristics**.
- **Automate** the validation streamline assessment.



- **Collaboratively** design and implement a methodology to identify the authoritative source for data.
- Focus on **shared, priority** data sets.

- Define **business context** with **relevant examples** of use.
- Apply field requirements to **priority data sets**.
- Define fields collecting **legislatively required** data.

- Identify key **characteristics** (i.e. title, description, category, format, stewards, custodians, and coordinators).
- **Start** data element classification with **priority** data sets.
- Create a data classification standard to identify **degree of sensitivity and protection**.
- Leverage the **same approach** for the catalogue and open data.

2.1

Master Data
Management

Data Catalogue

Metadata
Management

Recommendation 1.6 – An enterprise-wide data management framework must be adopted

To effectively manage data at the Region, a Data Management Framework must be established and rolled out with input and participation from all departments' Data Management resources as well as subject matter experts on Open Data.

Benefits



Standardization

Multiple reports can draw from the same information, improving trust and confidence.



Compliance

The Region is able to identify compliance risk and issues as well as continuously measure, monitor and control.



Fit for Purpose

Efforts to classify data are efficient and prioritized based on a desired purpose.



Classification

Workflow can be defined and applied at the group level rather than individually.

What does good look like?

San Francisco's Data Management Journey

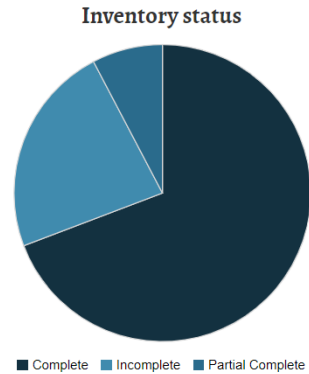
52 Departments
36 Inventories Complete
27 Plans Complete

[Read the Publishing Plans](#)
[View Progress by Department](#)

What was the business problem?
Leadership and employees continuously use data to improve city services and operations. To increase the quality of life and work for residents, employer, employees, and visitors through data requires it to be well understood, documented, and of high quality.

Updates to data and metadata are published.

Publication plans are shared for each department.



Updated **November 16, 2018**

Data Last Updated: November 16, 2018 Metadata Last Updated: November 16, 2018

Date Created: April 19, 2016

Views: **8,907** Downloads: **11.2K**

Data Provided by: *(none)* Dataset Owner: OpenData

[Contact Dataset Owner](#)

Department Metrics

Publishing Department	Airport (SFO)
-----------------------	---------------

Detailed Descriptive

Geographic unit	City
-----------------	------

Publishing Details

Publishing frequency	Quarterly
Data change frequency	Daily

Attachments





- [DataSF Data Dictionary for Air Traffic Passenger Statistics.pdf](#)
- [DataSF Data Dictionary for Air Traffic Passenger Statistics.pdf](#)

Submission guidelines require owners and maintainers defined.

A definition of fields, using a classification framework is published.

Components of a Data Management Framework

A Data Management Framework is designed to balance value and risk, while addressing key issues such as usability, timely and appropriate access as well as security / privacy. Key steps in managing / classifying data include:

- Step 1  The **Data Asset Inventory** will standardize identification of all data sets at the Region, with sufficient detail to describe business value and key considerations.
- Step 2  A **Classification Scheme** will help categorize data into levels ranging in privacy / security needs. Data can then be grouped into specific levels for each of the following dimensions: confidentiality, quality, change frequency, and retention.
- Step 3  A high-level **Data Impact Assessment** evaluates the value and risk associated with each data type identified in the Data Asset Inventory.
- Step 4  **Document Workflow with Control Objectives and Controls Mechanisms** for each classification level assists in identifying a standard set of controls that need to be applied to corresponding data asset(s).

To enable the Region to use and manage data practically, facts about the data asset need to be articulated. This helps inform stakeholders on what data exists, what details it may capture and who to contact to access it.

An **example** of fields / characteristics that should be captured for each data asset includes:

Title: *A concise and descriptive title, without any acronyms or jargon.*

e.g. Client Vaccination Records

Description: *What was the original purpose of this data? Why is this data collected and what is it used for?*

e.g. Contains the vaccination records of clients captured from March 1 2007 onwards. Utilized to notify the local public health unit of out of date immunization records. For more information visit: http://yorkregion.ca/EXAMPLE_CHS/POLICYXYZ

Category: Select one of the following: *Management and Ethics, City Infrastructure, Parks, Culture and Recreation, Economy, Census, Geography and mapping, Community Services, Transportation, Energy and Environment, Health Services*

e.g. Health Services

Format: *Define the format that the data is stored in.*

e.g. JSON

Critical Roles for Data Set: *Depending on the governance structure, identify key roles to provision access and maintain the data set. Examples could include: Owner, Steward and Custodian / Subject Matter Experts.*

e.g. Owner: Director Health Services, Doe Sally Steward: Manager Immunology, Smith John Custodian / SME: Senior Analyst Epidemiology, Couvert Sebastian

Classification Scheme

The next step is to classify the data asset. Below, is an **example** based on industry standards and PwC's experience as well as our knowledge on the Region's needs.

Confidentiality



- Restricted
- Protected
- Sensitive
- Internally Available
- Public

Quality Impact



- Percentage score based on factors or formula that includes:
 - Completeness
 - Duplicates
 - Integrity of formats
 - Consistency in data profile
 - Frequency of usage
 - Frequency of change
 - Number of dependent systems or applications

Change Frequency



- Real-time
- Hourly
- Daily
- Weekly
- Bi - weekly
- Monthly
- Quarterly
- Annually
- Ad hoc

Retention



- Permanent
- Retain for at least *7 years* dispose within *10 years* *
- Retain for at least *18 years* *
- Dispose of within *90 days* *
- Do Not Retain
- Unknown

Common Unit



- Geography
- Phone number
- Client Name
- SIN
- Time
- Date

Data Impact Assessment - Value

Once a comprehensive data asset is inventoried with classified data, an impact assessment should be undertaken determining the value and risk associated with the data asset. Data classes can be created through the Region's experience of classifying data. With data classes defined, a standard approach to controlling the access and use can be operationalized.

Value: the potential for a data asset to help deliver strategic outcomes, support operational needs, address key public interest, and answer other priority questions. See **example** below.

Value

Business Needs

- Not required for operations
- Same as above but, retention required for compliance
- Required but alternative data set can be used for operations
- Required but alternative data set can be used for operations with high operational impact
- Critical for operations and compliance; lack of data will cause disruptions

System of Record

- Not a system of record
- Unsure if data set is a system of record
- System of record

Interfaces

- No applications interfaces with this data set
- Internal applications interface with this data set
- External applications interface with this data set

Data Impact Assessment - Risk

Once a comprehensive data asset is inventoried with classified data, an impact assessment should be undertaken determining the value and risk associated with the data asset. Data classes can be created through the Region's experience of classifying data. With data classes defined, a standard approach to controlling the access and use can be operationalized.

Risk: the potential for the data asset to pose negative impacts (legally, reputational, etc.) to the business if the asset is not managed or secured appropriately. See **example** below.

Risk

Presence of PII

- No PII present
- PII de-identified / masked
- Presence of PII unknown
- PII is present

Retention and Disposition

- Not Applicable
- Defined and followed
- Defined but inconsistently applied
- Defined but likely in violation
- No clear definition of retention schedule

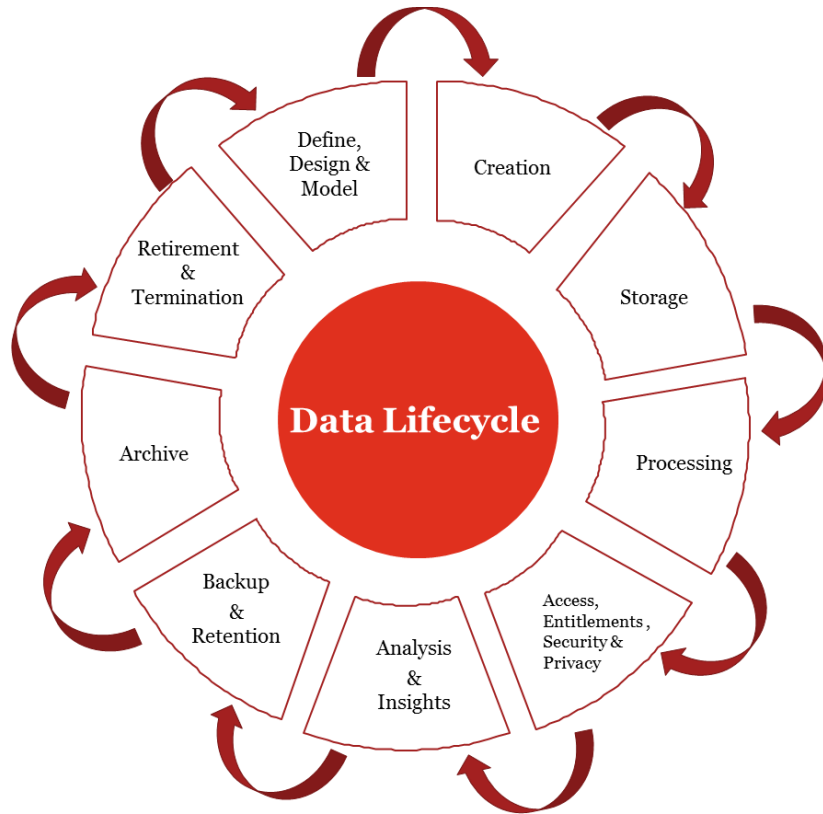
Security Controls

- Integrated RBAC (Role Based Access Controls)
- Limited access, not open by default
- Security is in place, but based on user access
- Access is granted based on relationship

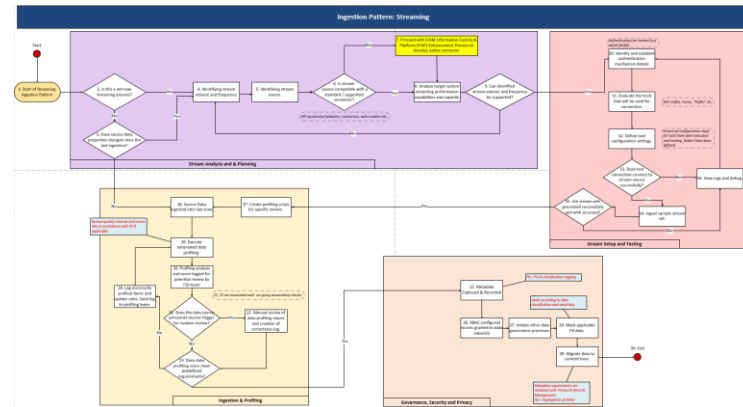
Compliance

- Compliant
- Unknown
- Non-compliant

Document Workflow with Control Objectives and Controls Mechanisms



Based on steps 1-3, data will be classified into like groupings. For each grouping, workflows for the entire data lifecycle need to be defined. These groupings will include a set of the control objectives, checks and gates assigned through business rules to different roles within the governance structure. This will delineate the responsibilities for the roles within the governance structure through the entire data lifecycle.



Ultimately this will allow the Region to implement the required controls and activities to effectively manage, preserve, and protect its data assets.

The Application of a Data Management Framework

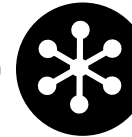
Using machine learning to extract classification information from data set and publish metadata standards seamlessly.

2021



Automate workflows to gain access and preview data, based on defined user roles and classification.

2020



Augmenting an existing form.

2019



Sample York Data Catalogue Form

Title:	
Description:	
Category:	
Format:	
Change Frequency:	
Is retention of schedule defined?	
What is retention schedule?	
Retention Schedule: Manual or Automated?	
Is PII present?	
What is Confidentiality Rating?	
System of Record?	
Common Unit	
Interfaces	
Business Operations Criticality	
Security Controls:	

2.1

Master Data
Management

Data Catalogue

Metadata
Management

Recommendation 1.2 – Establish an authoritative record

Facilitate a series of interactive workshops to discuss critical data elements that are used by more than one business unit within a department or used by multiple departments / branches to identify a “single source of truth.”

Benefits



Consistent

Using the right data to generate reports, conduct analyses and build confidence in insights.



Trust

Using trustworthy data improves confidence and uptake in using data to make informed decisions.



User Engagement and Collaboration

Incorporating other perspectives and collectively agreeing on an authoritative record to be used going forward.

What does good look like?

Li Ka Shing's Master data Management Methodology

St. Michael's
Inspired Care.
Inspiring Science.

LKS-CHART

What was the business problem?

Healthcare centres collect massive volumes of data, typically stored in various systems, differing by department, making it inefficient and inconsistent for healthcare teams to use data to make informed decisions to improve patient care.

A community-hospital typically uses over 200 transactional applications, each holding some data related to the patient but, never the full story.

An approach to identifying the single source of truth:

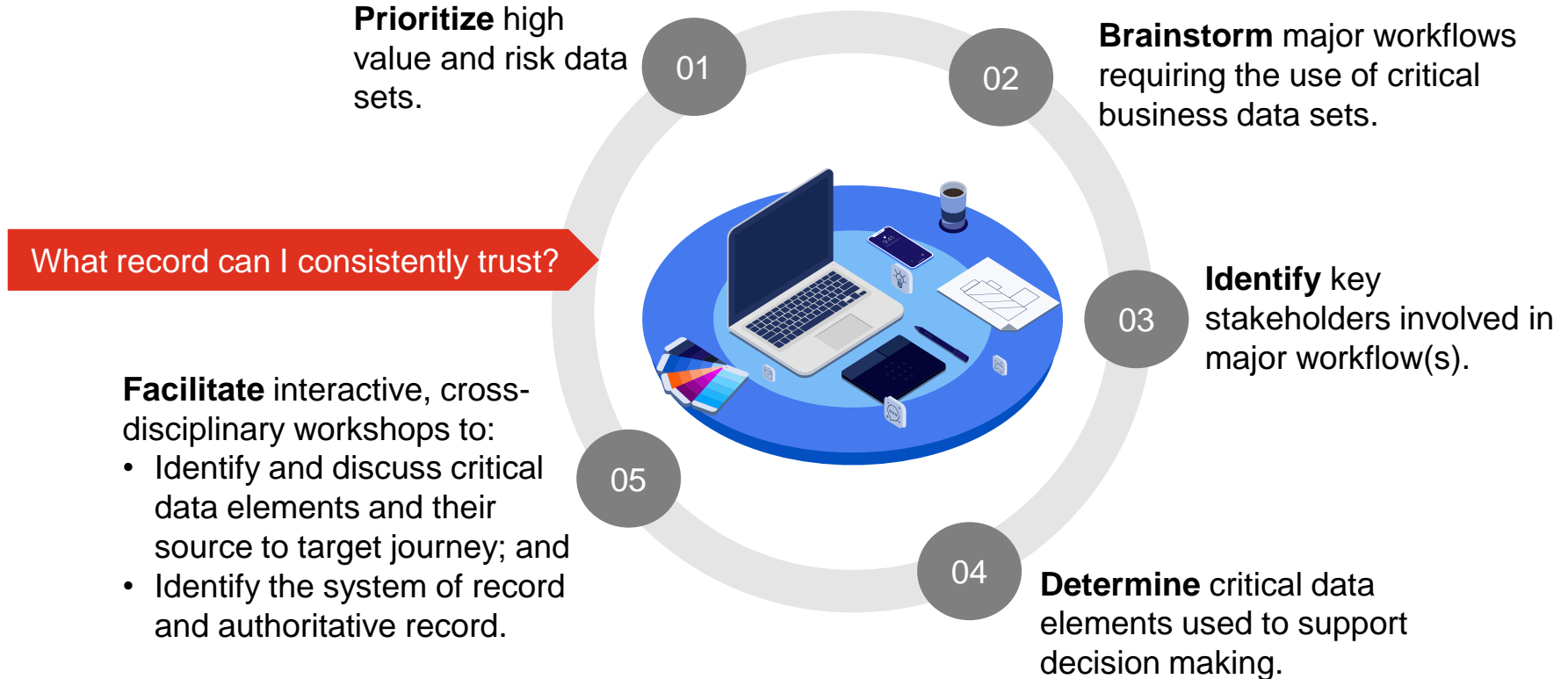
- Combine disparate data such as inpatient, primary health records, demographics, laboratory, medical imaging, pharmacy, case costing, etc. to **identify critical health data used to inform the “circle of care.”**
- Identify the source to target journey for critical data elements and **discuss the varying source to target journeys** for the same / similar data elements.
- Align on **consistent authoritative sources** and standardize the use of the data element for care delivery and research purposes.



An Early Warning System for General Internal Medicine

Using near-real-time hospital data to help clinicians identify high-risk patients so they can improve patient care and reduce the chances of mortality.

Key Steps to Identifying a Single Source of Truth



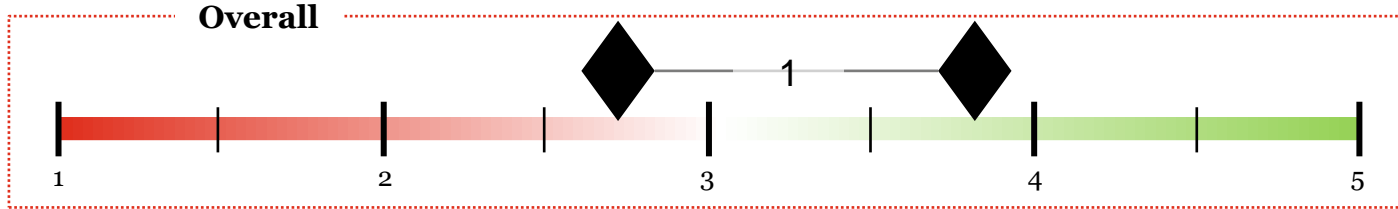
Observations and Recommendations: Technology

SECTION 3.3

- Review where the Region is today and where it wants to be in 4 years
- Display a logical architecture with current applications mapped
- Share observations focused on the root cause of pain points identified
- Share recommendations to close the gap in maturity
- Identify recommendations that have the highest impact in closing the gap



Technology – Current and Future State



Extract, Transform, Load and Preparation - Extracting, transforming and loading data into a format ready for analysis.



Report Generation - Managing the creation, visualization and distribution of standard reports and self-service portal(s) for users to gain access to information.



Data Integration - The collection of data from various sources into one uniform record. Integration methods may include physical and virtual integration.



Solution Architecture - Leveraging a set of technologies to connect disparate applications and data sources to answer a business question.



Geo-spatial Information Systems - Ensuring a reliable and effective Geo-spatial Information Systems technology infrastructure exists to support the organizational needs.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

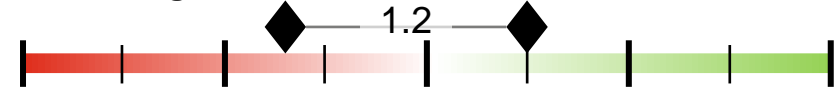
Extract, Transform, Load and Preparation



Report Generation



Data Integration



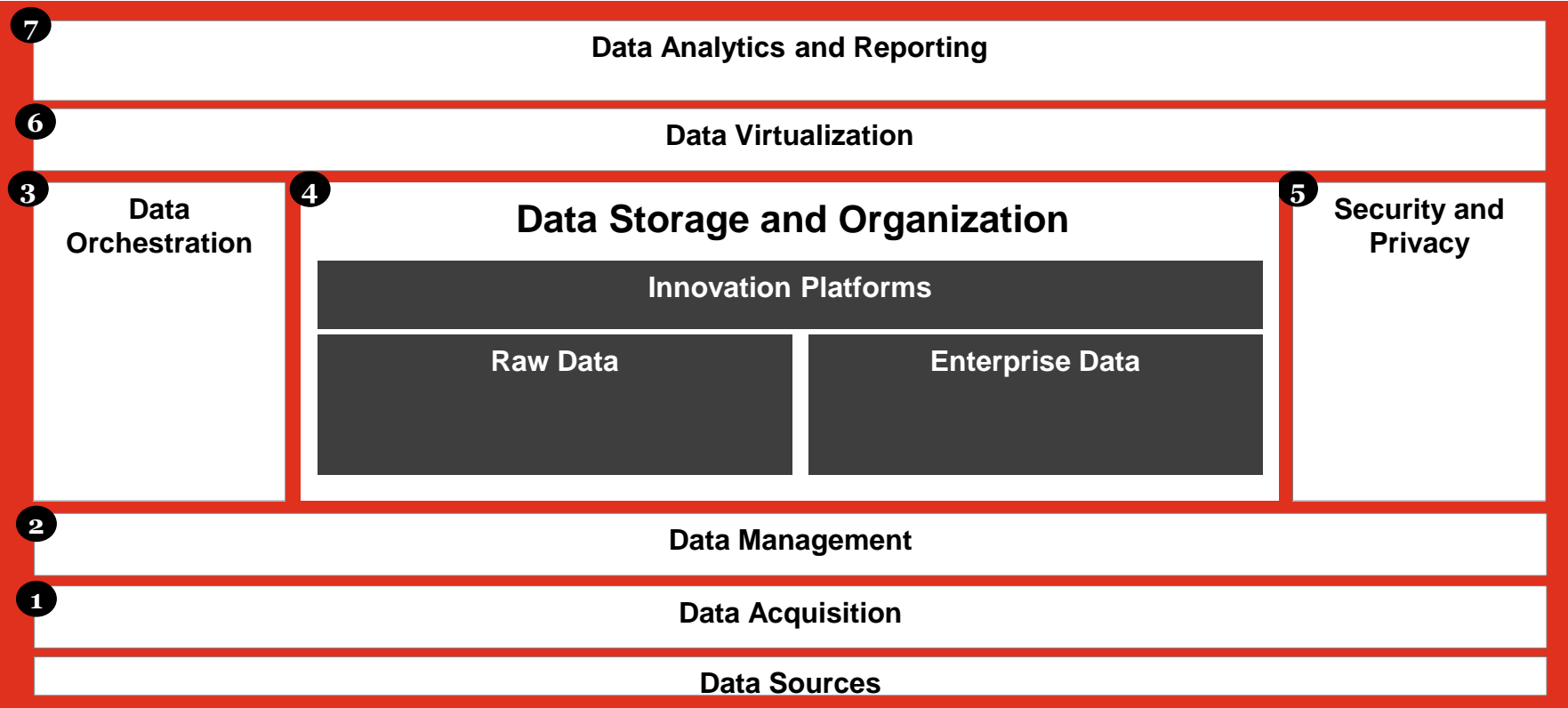
Solution Architecture



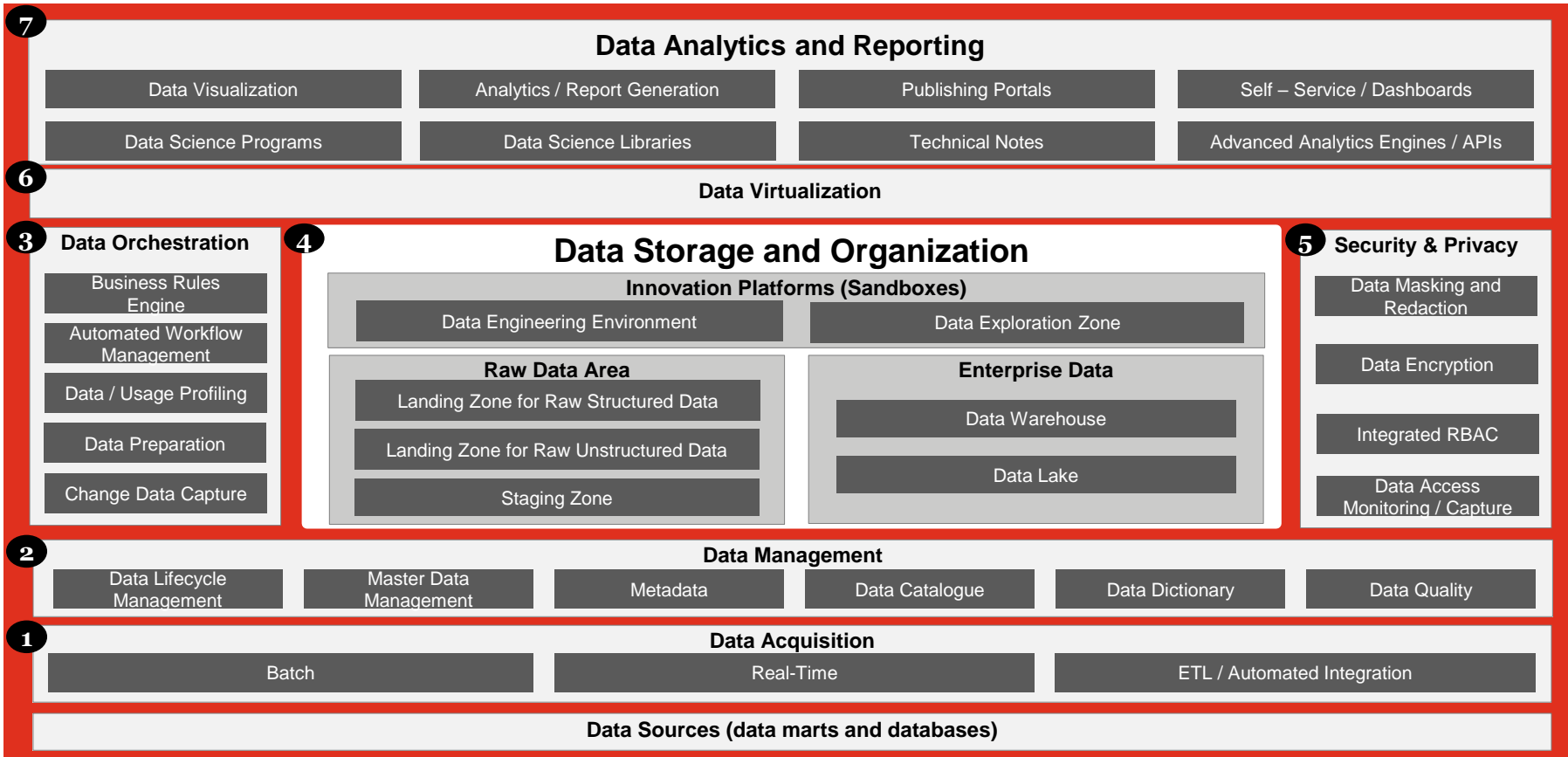
Geo – spatial Information Systems



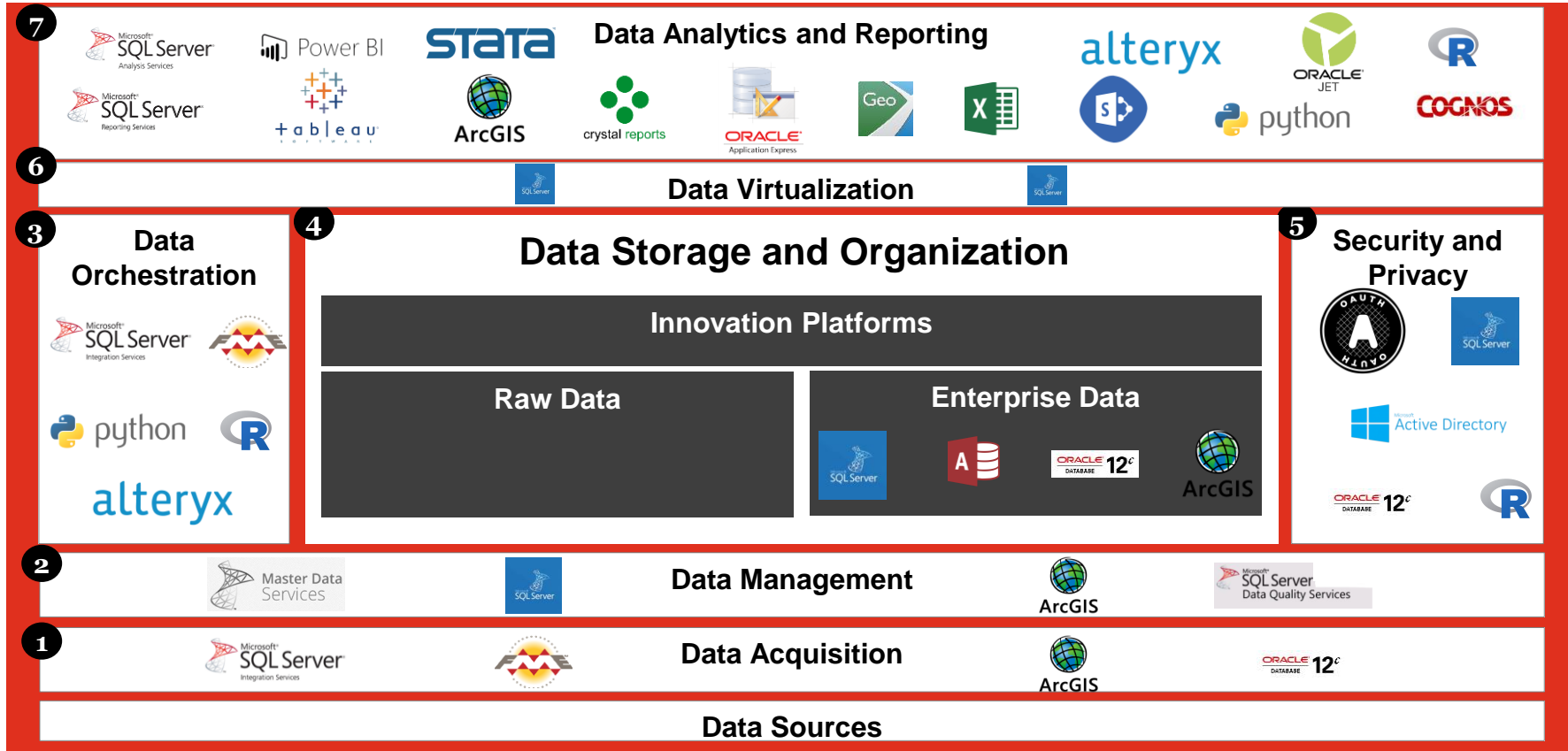
Data and Analytics - Logical Architecture



Data and Analytics - Logical Service Mapping



Data and Analytics - Logical Application Mapping



*Other data and analytics tools may exist but this list is comprised of technology and tools identified through survey responses, workshops and ad-hoc meetings.

Root Cause in Maturity Gap

Tools exist, use and access to the tools is not clear or consistent.

- Staff report **not having** many of the tools.
- **Multiple tools** exist to support the **same / similar function**.
- A **guideline** for which tool(s) to use does not exist.

Connected devices continue to be a growing source of critical data sets.

- Current systems have a **limited ability** to process and store **large volumes** of data.
- Current systems may **fail processing high velocity** data.
- **Use cases** for real time processing of data are currently **limited** at the Region.

Integrating data is a major hurdle for analytics

- Many **source systems do not interact** with one another.
- **Merging data** from disparate sources is **manual** and **resource intensive**.
- **Data** remains in **siloes**, sometimes within departments / branches.

Recommendations

2.1 Conduct an evaluation of tools available and how they meet your current and future needs

- Analyze technical and functional requirements to **create a data architecture**.
- Use the logical data architecture to **define** a set of **enterprise standard** tools.
- **Communicate** the functions available within enterprise standard tools.
- **Offer training** and avenues to adopt enterprise standard tools.

2.2 Technology procurement should be prioritized based on use case needs

- Systems for handling a large variety, velocity and volume of data (Hadoop systems) should be considered as a **managed service**.
- Implementation, administration and maintenance activities would be highly efficient, with **reduced risk**.
- Staff efforts can be focused on **driving value** as opposed to operating cutting-edge technologies.

2.3 Ensure a set of default integration and transformation tools are defined

- Conduct a **needs assessment** for an **enterprise service bus**.
- **Convert manual processes** into workflows that are automated.

Root Cause in Maturity Gap

Data management practices are highly manual and are difficult to apply consistently

- Processes to ensure and enforce framework **adoption** are **manual**.
- Capturing, storing and profiling **metadata** is **not enabled** through a tool.
- The periodic **maintenance** of data is highly **manual**.
- **Propagating authoritative** data is a manual process.



Not all departmental data repositories are created in a standardized manner.

- The data **architecture** for department specific repositories **vary**.
- **Duplicate** data sets exist.
- **Integration** of data sets and databases is often **manual**.



Recommendations

2.4 Identify enterprise-wide data management tool(s)

- Collaboratively define **enterprise-wide data management requirements** (including functional and non-functional).
- Evaluate tool(s) by providing vendors with **Regional workflows** and requesting live demos.

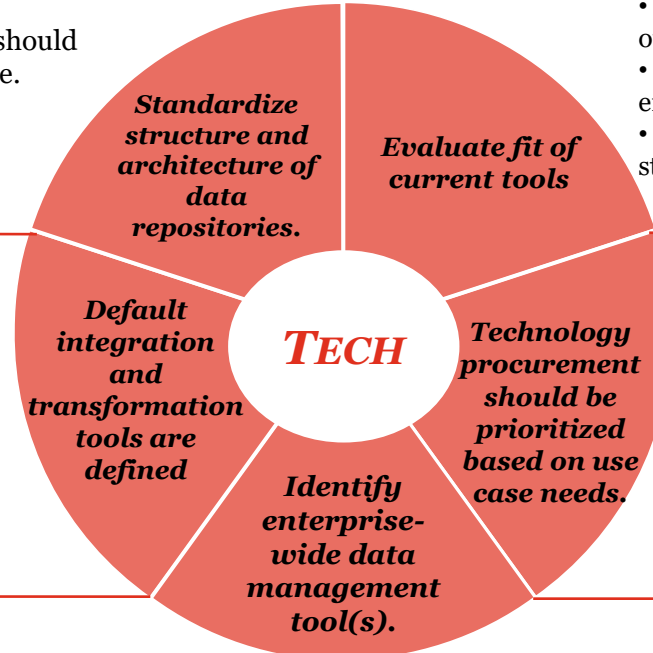
2.5 Standardize structure and architecture of departmental data repositories

- Adopt a **standard approach** to constructing data warehouses.
- Ensure **data sets** from various departments can be easily **aggregated** for analyses.
- Collaboratively **define** which data sets should exist within an enterprise data warehouse.
- Standardize documentation for **data lineage** to create data models.
- Focus data warehousing activities on **limiting manual integration**.

Technology Summary of Recommendations

- Adopt a **standard approach** to constructing data warehouses.
- Ensure **data sets** from various departments can be easily **aggregated** for analyses.
- Collaboratively **define** which data sets should exist within an enterprise data warehouse.
- Standardize documentation for **data lineage** to create data models.
- Focus data warehousing activities on **limiting manual integration.**

- Analyze technical and functional requirements to **create a data architecture.**
- Use the logical data architecture to **define** a set of **enterprise standard** tools.
- **Communicate** the functions available within enterprise standard tools.
- **Offer training** and avenues to adopt enterprise standard tools



- Conduct a **needs assessment** for an **enterprise service bus.**
- **Convert manual processes** into workflows that are automated.

- Systems for handling a large variety, velocity and volume of data (Hadoop systems) should be considered as a **managed service.**
- Implementation, administration and maintenance activities would be highly efficient, with **reduced risk.**
- Staff efforts can be focused on **driving value** as opposed to operating cutting-edge technologies.

- Collaboratively define **enterprise-wide data management requirements** (including functional and non-functional).
- Evaluate tool(s) by providing vendors with **Regional workflows** and requesting live demos.

Observations and Recommendations from Logical Application Mapping

2.1 Multiple tools exist to support the same / similar function. A **guideline** for which tool(s) to use needs to be defined.

2.3 An **Enterprise Service Bus** to connect disparate systems as well operationalize workflows and manual processes should be evaluated.

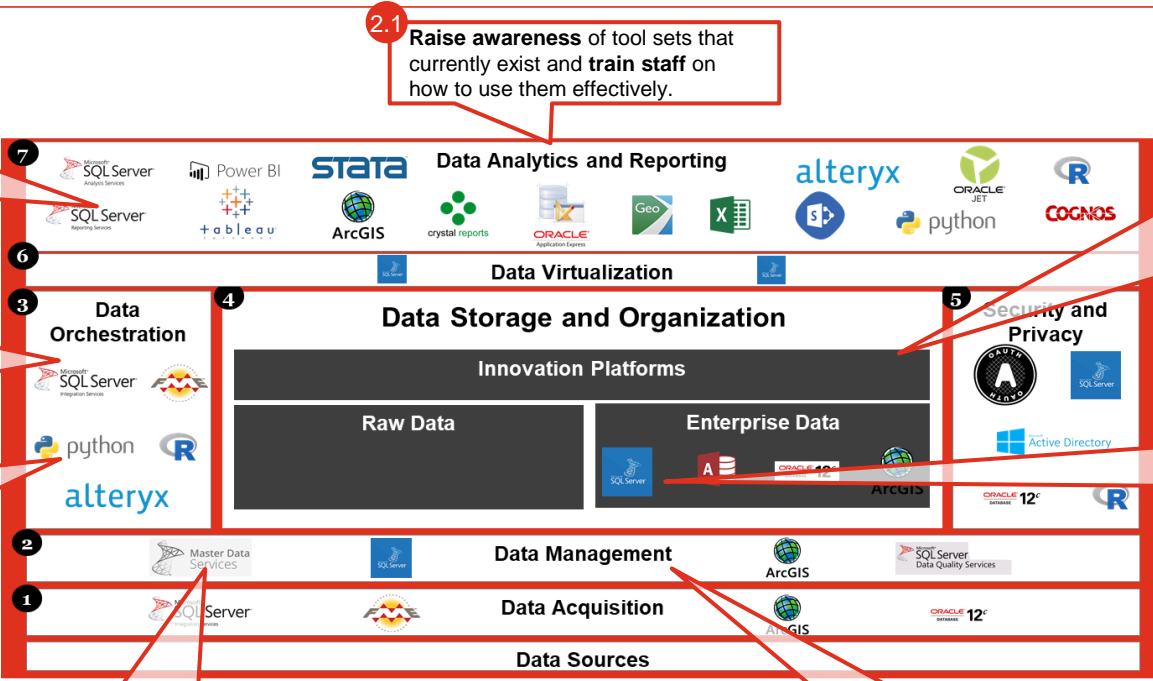
2.3 Analyze whether **current data orchestration tools** have the ability to create **detailed audit logs**.

2.X Mapping back to Technology recommendations

2.1 Raise awareness of tool sets that currently exist and **train staff** on how to use them effectively.

2.2 Procuring technology should be prioritized **based on business case needs**. If a business case requires it, procure a **Managed Service Data Platform** that is flexible, scalable and modular without needing to build a robust infrastructure support team.

2.5 Standardize the **structure and architecture** of departmental **data warehouses** through the creation of an enterprise data architecture.



2.1 Evaluate whether SQL Server 2017 Master Data Services and Data Quality Services will meet York's **master data** and **data quality** technical requirements.

2.4 Evaluate options for **operationalizing data management** and data governance frameworks through a holistic **data management solution**.

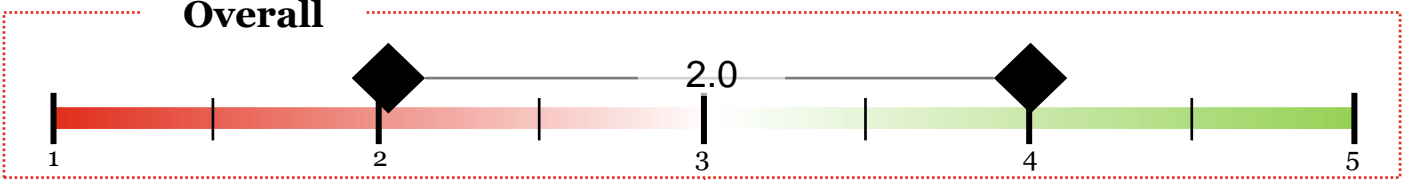
Observations and Recommendations: Process and Governance

SECTION 3.4

- Review where the Region is today and where it wants to be in 4 years
- Share observations focused on the root cause of pain points identified
- Share recommendations to close the gap in maturity
- Identify recommendations that have the highest impact in closing the gap
- Demonstrate what “good” looks like for the highest impact recommendation(s)
- Describe a practical approach for the Region to achieve the desired state



Process & Governance – Current and Future State



Data Asset Supervision - Providing supervision and overall strategic direction on how data assets are managed and utilized across the enterprise.



Policy, Standard and Procedure Development - Assessing current needs and practices in order to develop safeguards and guidance on how data assets are to be managed and used. This may include specific guidance through the development of standards and procedures.



Data Quality - Identifying, measuring and resolving quality issues related to data completeness, integrity, reliability and overall utility for a specific purpose.



Data Governance - Planning, supervision, and control over data management and use.



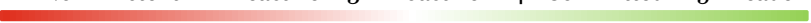
Access, Security and Privacy - Assessing, monitoring and assisting with the protection of data assets when being used for analytics purposes.



Project Prioritization – Ensuring projects / initiatives are strategically aligned and prove to have return on impact for staff and the greater community.

Legend

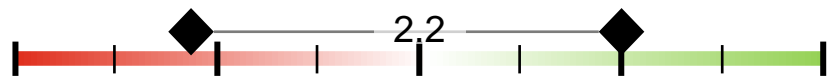
1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader



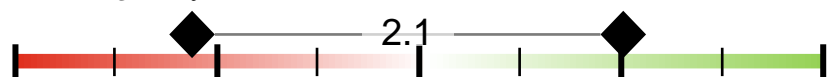
Data Asset Supervision



Policy, Standard and Procedure Development



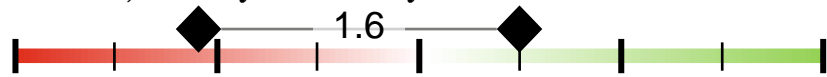
Data Quality



Data Governance



Access, Security and Privacy



Project Prioritization



Process and Governance – Sharing Observations and Recommendations

Root Cause in Maturity Gap

Roles and responsibilities associated to data management are inconsistently defined

- **Some data set “managers”** have been identified.
- **Roles and responsibilities** to maintain data sets have not been uniformly established, clarified or communicated.
- **Job descriptions** do not consistently articulate data maintenance responsibilities.



Staff are not aware of data governance components (including existing policies, standards and procedures) that may exist.

- **Staff are not aware** data standards exist, such as data quality.
- Users have to **seek** policies, standards and procedures out to incorporate them.
- Some policies, standards and procedures are **yet to be defined**.



Recommendations

3.1 Develop a data governance framework with clearly defined functions, roles and responsibilities for data management practices

- Identify high priority data management **functions** required.
- **Establish roles and responsibilities** for data governance.
- Eliminate the use of the term “data owner”.”
- Apply governance, privacy and security in a **just-in-time** manner where high value / risk data sets are the first to be governed.
- **Measure** the progress of operationalizing data governance - focus on realized benefits rather than volume of activity.

3.2 Create and incorporate policies, standards and procedures into existing workflows

- Utilize a **risk based approach** for the prioritization of policies.
- Identify where in the **data lifecycle** a policy, standard and / or procedure **need to be applied**.
- **Align data management** processes and workflows to roles within the **data governance framework**.
- Leverage technology to create a **central repository** of policies, standards and procedures.
- Operationalize policies through **workflows and business rules**.

Process and Governance – Sharing Observations and Recommendations

Root Cause in Maturity Gap

Data quality is difficult to monitor, assess and remediate.

- Data quality remediation is performed in a **manual, ad-hoc basis**.
- Data quality **metrics** have not been consistently established.
- **No standard tools** are available to support data quality management.



3.3 Establish a fit-for-purpose approach to data quality management

- **Prioritize** data quality efforts on high value / risk data sets.
- Identify **current and desired** data element quality scores.
- **Automate** data quality **validation**, using data management tools.
- **Continuously monitor** data quality scores at / after each step in the **data lifecycle** so contributors and users are consistently aware.
- **Educate** stakeholders on the importance of data quality.

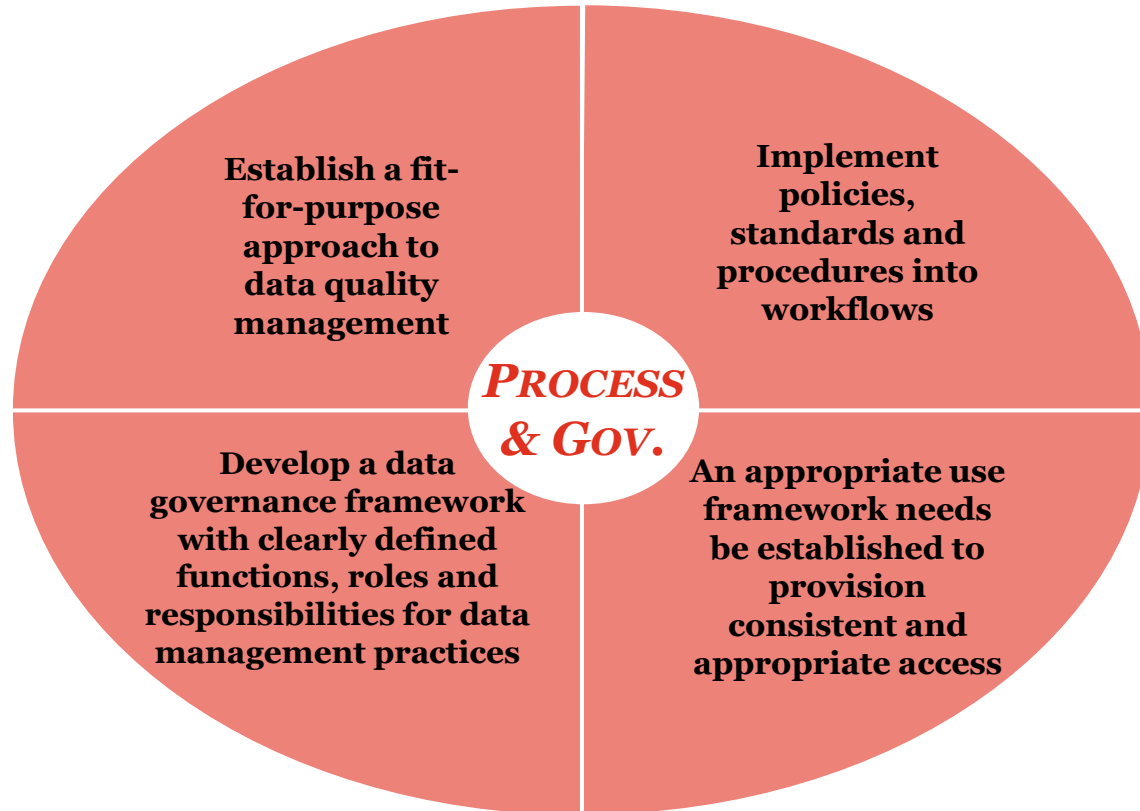
A standard approach to provisioning data access has not been established.

- Staff with **similar roles** do not have access to the **same data**.
- Staff rely on knowing the appropriate **contact person** to help provision access.
- Access is **user based**, rather than role based.
- **Privacy concerns** are sometimes used inappropriately and inconsistently to **limit access**.



3.4 An appropriate use framework needs be established to provision consistent and appropriate access

- A collaboratively agreed upon **confidentiality scale** needs to be defined, aligning with **legislative requirements** and expert opinions on **appropriate use of data**.
- **Develop access standards** based on varying confidentiality levels.
- Utilize **role based access controls** to operationalize consistent access.
- Leverage technological solutions to help support **privacy impact assessments, identify and mask personally identifiable information**.



PROCESS & GOVERNANCE - MATURITY GAP 2.0

Policy, Standard and
Procedure Development

Access, Security and
Privacy

Data Quality

Data Governance

Asset Supervision

Project Prioritization

Recommendation 3.1 – Develop a data governance framework with clearly established functions, roles and responsibilities for data management

A data governance framework must be collaboratively designed as it is a strategic initiative, impacting the enterprise.

Benefits



Accountability

Clear definitions of what each stakeholders' roles and responsibilities are in managing the data.



Compliance

The Region is able to consistently measure, monitor, assess, and control compliance risks and issues.



Fit for Purpose

Through a data governance framework, the Region is able to maximize the use of data, through awareness and provisioning access, to make decisions.



Improved Quality

Data governance supports identification of data quality issues by documenting where the data resides and who is responsible for it.

What does good look like?

NYC's Data Management Practices

NYCAnalytics

“Open Data didn’t become reality in NYC just because it is a best practice. The program thrives five years after the Open Data law, because New Yorkers are engaging openly with Government and the wealth of data it creates.”

What was the business problem?

The Mayor’s Office wanted to use data to solve problems in novel ways. With an endless list of issues to tackle, the city turned to its citizens to help solve complex business questions. These relate to taxi and ride-share, poverty reduction, racial discrimination, real-estate rental information, etc.

Successful Tactics Utilized

- Established an **Open Data Law** in 2012
- **Created a Vision** of “Open Data for All”
- Enabled the vision through online **data set publication and standard use policies**
- Facilitated **data literacy** through Open Data community engagement Activities – e.g. Bronx Open Data for All Workshop, CUNY Hack-a-thon, and Training Academy
- **Crowdsourced** technical data **standards**
- Committed and shared a **publication plan** for the release of data sets
- Collaborated with over **96 Agencies and Offices** (internal and external)

Outcome

- Used open data to **identify racial disparities** in enforcement based on geo-location, census tracts, and historical crime trends
- Performed safety and service tracking of taxi and ride-shares to **inform policy, reduce congestion, and protect driver income**

Transferable Benefits



Establishing a Unified Vision



Resourcing the Commitment



Creating Partnerships with the Community



Leveraging internal and external Talent

The goal of good governance is to produce **trusted, fit-for-purpose, analysis-ready data**. This is done through some of the functions listed below.



Leadership,
Oversight
and Strategic
Direction



Policy,
Standards
and Process
Development



Data Quality
Management



Data Access
and Storage
Practices



Authoritative
Record
Identification

Governance Body

Leadership and Guidance

- Champion data management leading practices across the Region
- Identify and track measures for success
- Prioritize policies, standards and procedures
- Capture stakeholder needs and assess options

Management

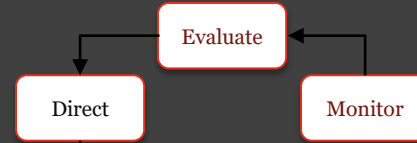
- Oversee development of data management policies, standards and procedures
- Reinforce leading practices for data management
- Develop metrics and measures to identify success
- Liaise with Leadership and Operations to track goals and objectives
- Pilot enhancements in a localized manner

Operations

- Develop data management policies, standards and procedures
- Apply data management practices into existing workflows
- Document localized needs that are not met by enterprise standards
- Identify enhancement needs

Responsibilities

Govern & Direct



Deliver



Operationalize



“Champion”

Stewards

Custodians

Data Management “Champions”

A Steering Committee comprised of business executives who champion a standard, integrated, operationally efficient and collaboratively designed approach to managing data.

Data Stewards

A set of Working Groups comprised of select data management experts and business users that regularly utilize data to make decisions. These stakeholders understand the nuances of Regional operations and project needs to inform data management functions and practices.

Operations

Comprised of frontline data and analytics representatives that apply recommendations into practice. These resources create a feedback loop to determine how well functions are being delivered.

Implementing

Monitoring and Enhancing

PROCESS & GOVERNANCE -
MATURITY GAP

2.0

Policy, Standard and
Procedure Development

Access, Security and
Privacy

Data Quality

Data Governance

Asset Supervision

Project Prioritization

Recommendation 3.3 – Establish a fit-for-purpose approach to data quality management

Create data quality targets for critical business data sets. Evaluate various cleansing methods based on data quality scores, business impact, complexity of data set and scope of remediation efforts.

Benefits



Return on Investment

Data quality management efforts are focused on data that is fit for use, based on the identified need.



Awareness

Staff are aware of the data quality that exists within a given data set.



Monitor

Monitoring data quality through tools enables the Region to assess quality on an ongoing basis instead of ad-hoc.

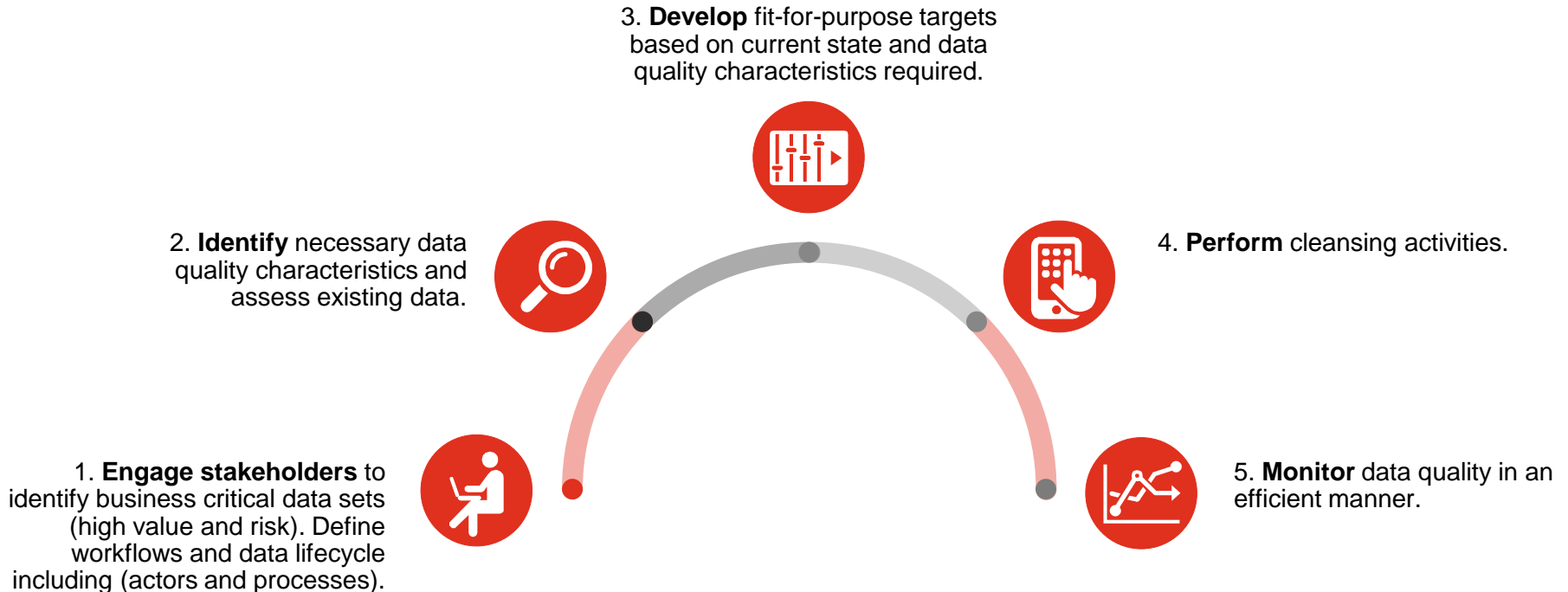


Informed

Contributors are aware of the data quality downstream impacts.

A fit-for-purpose Approach to Data Quality Management

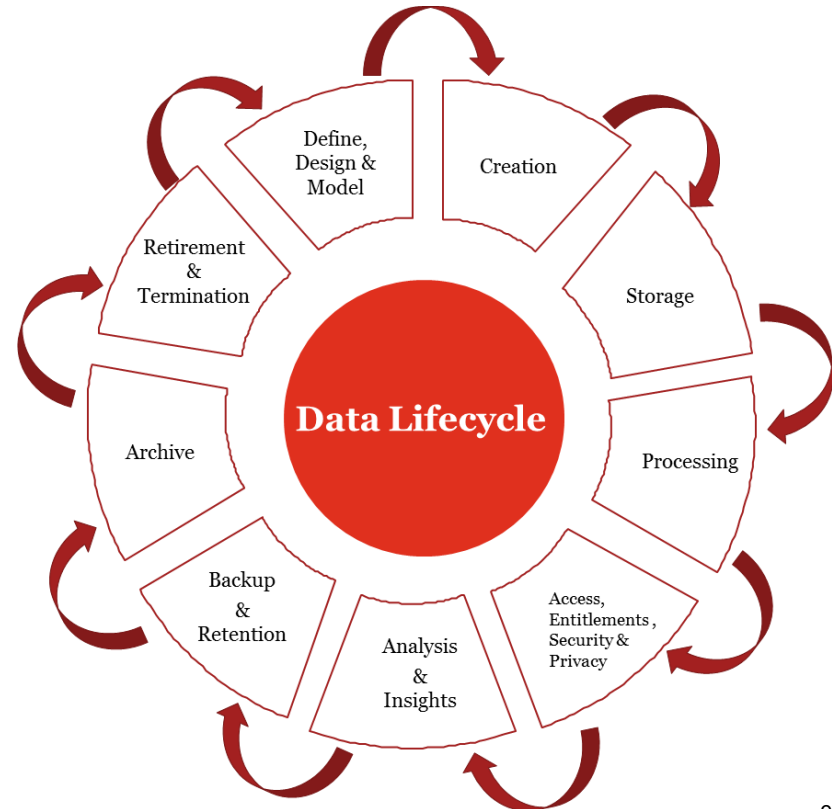
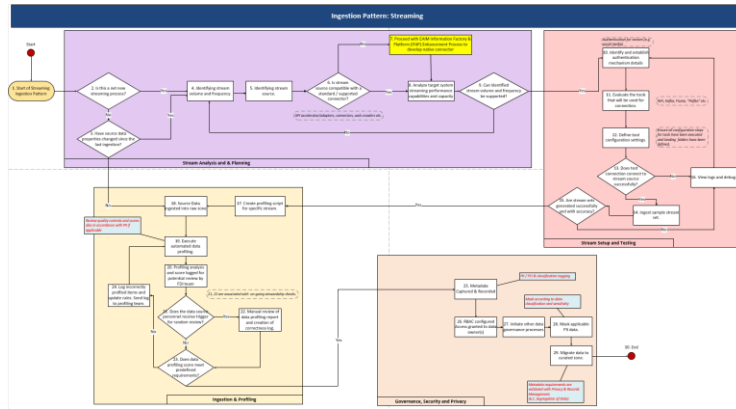
Data quality management efforts should have a direct correlation with business use of that data set. The steps below help facilitate a value-based approach to data quality management for the Region.



Step 1: Define the Data Lifecycle

Once critical business data, with high value and risk, is identified, document the data lifecycle, identifying **key actors** interacting with the data and **processes** used to manipulate the data.

This step should align with Step 4 of the Data Management Framework.



Step 2: Identify Data Quality Characteristic

Based on how the departments / organization uses the data set, various data quality **characteristics** can be assessed.

Characteristics

Definition

Existence

- Extent to which desired data is available on a system e.g. employee training attendance hours

Completeness

- Extent to which required data must be populated and the required history exists e.g. all employees have a location

Integrity

- Extent to which data adheres to defined business rules, accepted values and accepted formats e.g. employee gender is F, M or U

Consistency

- Extent to which identical data must have the same value wherever it is stored or displayed e.g. aggregated base salary by cost center is consistent between systems

Accuracy

- Degree to which data should match the agreed source e.g. initial base salary reflects amount on contract

Interpretability

- Extent to which data adheres to data management rules and requirements e.g. all employee related fields have a definition and data owner

Uniqueness

- Extent that data should be uniquely stored in one place and not duplicated e.g. there does not exist multiple records for the same employee

Availability

- Extent to which current and historic data must be available electronically for analysis e.g. headcount data can be easily queried to report headcount by region

Timeliness

- Extent to which the data is refreshed including acceptable systems 'lag' when values change e.g. base salary updated after promotion within x days

Step 3: Develop Data Quality Targets

Data quality **targets** should be data set or type specific.

Characteristics

- Existence
- Completeness**
- Integrity**
- Consistency
- Accuracy
- Interpretability
- Uniqueness**
- Availability
- Timeliness



Examples

Completeness Target

Examples:

- Data set A should have 95% of data fields completed.
-

Integrity Target

Examples:

- 75% of data must have appropriate format
 - 100% of Row AB should fall within 0-100 range
-

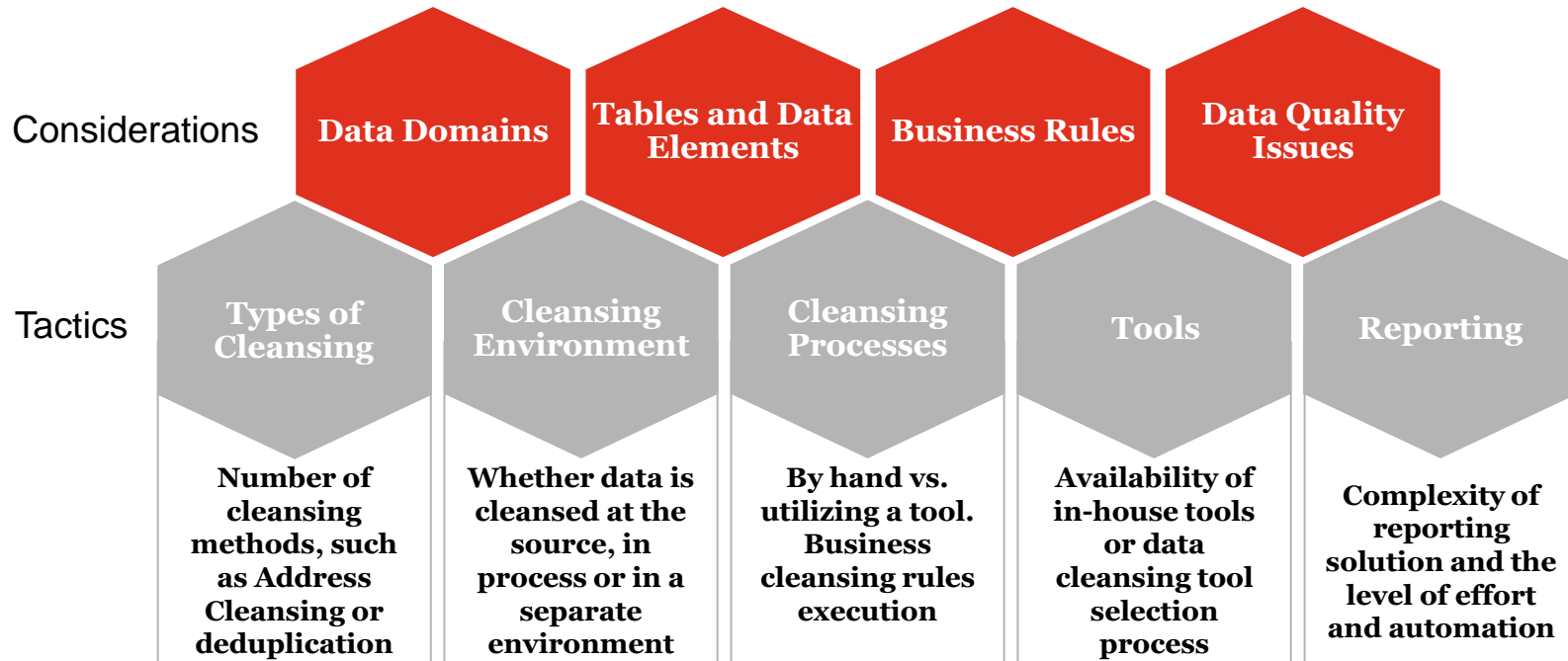
Uniqueness Target

Examples:

- No more than 200 duplicates should be found within data set A.
-

Step 4: Cleanse

Based on quantity and complexity of the data identify, identify remediation tools or tactic. These tools can be automated through business rules integration, machine learning or be performed manually. Consider the following when identifying cleansing tools / tactics.



Step 5: Monitor

Detailed report of data quality issues by week

Object ID	Object Title	Area	Attribute Name	Data Issue Description	11-01-2013-RUN
HTR-CHV-001	Person	HTR	ACTION_CODE	INCORRECT ACTION PERFORMED	81
			ACTUAL_TERMINATION_DATE	Terminations date is less than original hire date	13
			DATE_OF_BIRTH	Date of birth values after hire date	10
			HIRE_DATE	Cannot be Null or Blank	278
				Start Date must be greater than employee termination Date	8
			SEX	Cannot be Null or Blank	34
			TITLE	Gender and title mismatch	12
HTR-CHV-011	Performance Ratings	HTR	UNIQUE_IDENTIFIER	UNIQUE_IDENTIFIER cannot be NULL, '000000000', or '999999999	18
HTR-CHV-015	Qualifications	HTR	RATING_MEANING	CANNOT BE NULL	36
			ESTABLISHMENT	Trim all cols and remove blanks as NULL	53
			QUALIFICATION_TYPE	Qualification Type cannot be NULL	29
			START_DATE	START_DATE cannot be NULL	1,119

Using established **key performance indicators**, consistently measure data quality in a **proactive** manner. Generate data quality reports and distribute reports to relevant stakeholders, based on the **Data Governance structure**.

Management dashboard of data quality levels by week

Robust monitoring systems can be integrated with **autocorrect** functions. They can also send out **alerts and notifications** of unusual data quality activity that needs to be addressed urgently.

Object	Planned/ Actual	3-Feb	10-Feb	17-Feb	24-Feb	3-Mar	10-Mar	17-Mar	24-Mar	31-Mar	7-Apr	14-Apr	21-Apr	28-Apr	Count
Person	Planned	85%	70%	75%	80%	85%	90%	100%	100%	100%	100%	100%	100%	100%	1832
	Actual	88%	89%	89%	90%										1649
Assignment	Planned	85%	70%	75%	80%	85%	90%	100%	100%	100%	100%	100%	100%	100%	10858
	Actual	28%	31%	31%	33%										3488
Worker Address	Planned	85%	70%	75%	80%	85%	90%	100%	100%	100%	100%	100%	100%	100%	2976
	Actual	36%	38%	38%	64%										1901
Performance Ratings	Planned	85%	70%	75%	80%	85%	90%	100%	100%	100%	100%	100%	100%	100%	90
	Actual	60%	60%	60%	69%										53
Qualifications	Planned	85%	70%	75%	80%	85%	90%	100%	100%	100%	100%	100%	100%	100%	1518
	Actual	40%	97%	97%	97%										1479
Contact	Planned	85%	70%	75%	80%	85%	90%	100%	100%	100%	100%	100%	100%	100%	2425
	Actual	77%	100%	100%	100%										2425

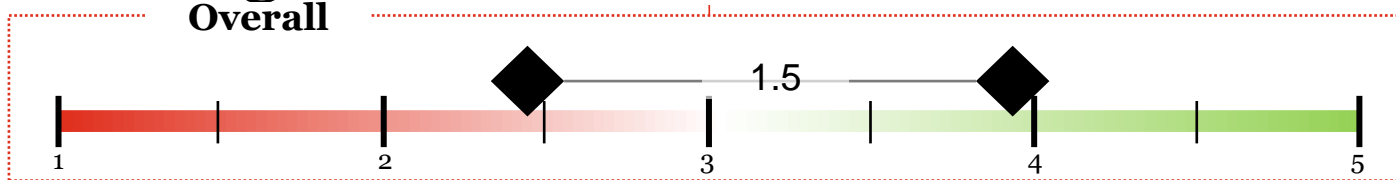
Observations and Recommendations: Talent and Organization

SECTION 3.5

- Review where the Region is today and where it wants to be in 4 years
- Share observations focused on the root cause of pain points identified
- Share recommendations to close the gap in maturity
- Identify recommendations that have the highest impact in closing the gap
- Demonstrate what “good” looks like for the highest impact recommendation(s)
- Describe a practical approach for the Region to achieve the desired state



Talent & Organization – Current and Future State



Decision Support - Supporting decision making opportunities across the organization with robust and consistent interpretation of analyses.



Advanced Analytics - Utilizing statistical modeling and algorithm generation in combination with programming capabilities to conduct diagnostic, predictive, and prescriptive analytics. This may include machine learning components.



Data and Analytics Training - Supporting and managing staff training related to data and analytics.



Technology Management - Organizing and managing software designs, technology support and procurement, as well as application inventory, including the provisioning to the access of technology.



Story Telling - Integrating a narrative with data and visuals to explain what is happening in the data and why a particular insight is important.



Consultation Services – Providing advice, information, or an opinion on a specified subject.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

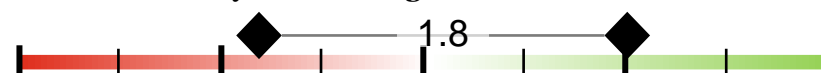
Decision Support



Advanced Analytics



Data and Analytics Training



Technology Management



Story Telling



Consultation Services



Root Cause in Maturity Gap

Skills and resources related to data and analytics capabilities are limited

- A **consultative manner** to share skills and resources **continues to be beneficial** within departments but relationships between departments / branches are based on personal relationships (i.e. **people who used to work together.**)
- The organization is structured in a way that allows staff to complete department level functions well, but **limits cross-departmental collaboration.**



Recommendations

4.1 Recognize that talented resources can offer value to the enterprise rather than only the department

- **Identify talent** and utilize existing staff in novel ways to deliver analytics value.
- Leverage **local universities and colleges** to identify sources of talent and value (capstone projects).
- Incorporate **informal titles** to support an understanding of staff skill sets.
- Secure a **portion** of each department / branch **budget** to using resources from other departments / branches.
- **Align** existing data and analytics resources with data **governance** roles and responsibilities.

Root Cause in Maturity Gap

Current services offered and the current deployment model may not meet the needs of the Region

- Services offered need to consider **existing staff skill** sets available within a department / branch.
- Roles and responsibilities in service delivery need to be clarified to **reduce duplication of efforts**.
- Departments / branches have varying levels of data and analytics maturity and have **different service requirements**.



Recommendations

4.2 Identify what services are needed and who can deliver them (*as part of this master plan*)

- Establish a delivery model to clarify “**who**” delivers a service and “**how**” the service is delivered.
- Consistently communicate the **different roles and responsibilities** associated to delivering services.
- Focus service delivery on **enabling capabilities** and **developing proficiency** rather than **executive / answering** business questions (e.g. for every 1 report generated by a central D&A body, the business unit is able to generate 9).
- As the complexity of the service required increases, **centralize efforts and resources**.
- **Leverage DLT** to ensure efforts are coordinated around **foundational enterprise services**.

Root Cause in Maturity Gap

Training courses currently delivered require a higher level of proficiency than what exists, for many staff

- The gap in entry-level, tailored, incremental training makes some of the courses **less accessible to staff** who don't yet have the **proficiency** to make use of the training materials.
- Tailored programs based on staff level would be beneficial to **increase data literacy**.
- Certification or the ability to **credentialize** training efforts is valuable.
- Two-way **communication channels** built in learning and development platforms can support data literacy.



Recommendations

4.3 A more tailored approach to training courses and program needs to be developed to serve varying skill sets

- **Work with local universities, colleges** and other programs to support your training needs.
- Support trained staff with **adoption tactics** including a project repository requiring various skills e.g. using a 70-20-10 model.
- Offer skill set training for **data communication, storytelling, business question development**, etc.
- Identify a **modern platform** to support learning and development for digital skills.
- Incorporate the ability to **share** articles, project artefacts, lessons learned, leading practices and other interesting materials by users.
- Update key staff members roles and responsibilities to **maintain and upgrade** the learning platform.
- Create a **detailed curriculum path and certification** program, within Data / Digital Academy, for staff that wish to enhance skills.

Talent and Organization – Sharing Observations and Recommendations

Root Cause in Maturity Gap

Some skill sets continue to be a gap to fill

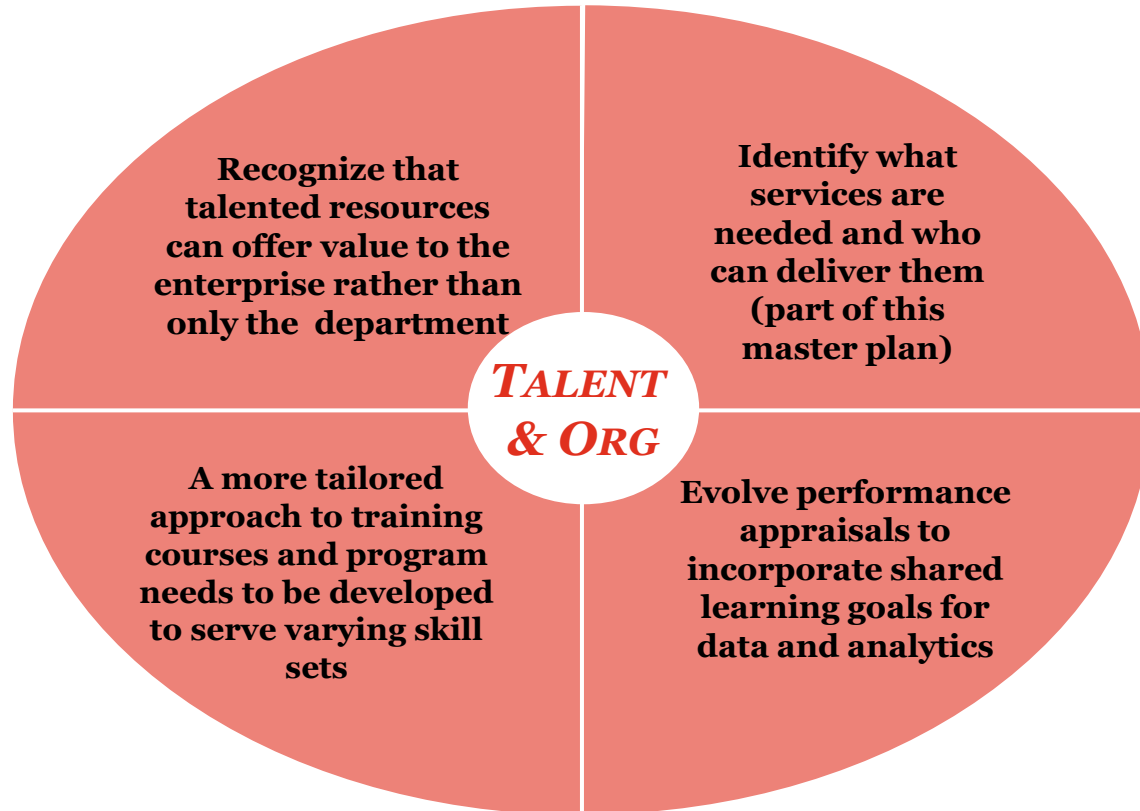
- Current **job descriptions are outdated** with data and analytics functions required, not clearly defined.
- Staff need to retire before their job descriptions can be **updated**.
- “Data Analyst” or similar roles sometimes **require** limited data analytics activities.
- Having a **data architect** continues to be a gap.
- An **executive champion / sponsor** is needed to support the use of data and creating a data-informed culture.



Recommendations

4.4 Evolve performance appraisals to incorporate shared learning goals for data and analytics

- Identify a **Chief Analytics Officer or Data Officer** to support the overall use of enterprise data and creating a data-informed culture (this does not have to be a **new position or a typical C-level position**).
- Leverage **DLT to support collaborative** data and analytics initiatives and efforts.
- **Update job descriptions** to reflect specific data and analytics needs.
- **Recruit a data architect** to create an enterprise standardized approach to accessing, storing and using data.
- **Create senior roles for technical specialists** to ensure talent can be retained with clear career trajectory.



What does good look like?

Edmonton's Analytics Centre of Excellence

Open Analytics

The Analytics Centre of Excellence (ACE) assists the City in understanding and leveraging analytics to improve outcomes for staff and citizens. ACE provides **leadership, best practices, research, support, and training** for analytics across the City.

What was the business problem?

To improve the lives of citizens and provide appropriate services, the ACE created a central repository of data where staff and citizens can collaborate, learn, and share knowledge to transform the city, by tackling real-world problems.

Successful Tactics Utilized

- Identified a **Chief Analytics Officer**
- Facilitated Analytics Special Interests groups where **projects are showcased** with other parts of the organization
- Obtained **support from the Mayor** in using data to inform decisions
- Focused on the **business value of a data set** rather than data in general
- Worked with **local groups to identify real-world community issues** worth solving'
- Created a **training program** addressing the needs of both **generalists** and **specialists**
- **Sustainable model** where ACE **focuses** efforts on **advanced analytics** applications, providing guidance, best practices and lessons learned for others

Outcomes

- Using **natural language processing**, ACE extracted key fields from surveys evaluating recommendations to **eliminate poverty** and uncovered unknown patterns in recommendations from previous years and trends
- Edmonton Police Services collect data on **social disorder** occurrences. This data is can be used to identify **hot-spots** in the community and local service requirements
- **Building inspections** are prioritized using builder information, "age of area," and occupancy.

Transferable Benefits



Supporting Literacy



Working with Rather than Working For



Identifying an Executive Champion



Building an Analytics Culture



Promoting Good Data Management

1.5

Advanced Analytics

Data & Analytics
Training

Story Telling

Decision Support

Technology
Management

Consultation Services

Recommendation 4.2 – Identify what services are needed and who can deliver them

Identifying the services required, under each function, and who has the maturity to support the delivery of these services is a major component of creating a Master Plan that facilitates collaboration.

Benefits



Return on Investment

Initiatives impacting multiple departments / branches can be better resourced and efficient with reduced duplication.



Scaling Capabilities

Existing capabilities can be shared across departments and enhanced through new perspectives.



Standardization

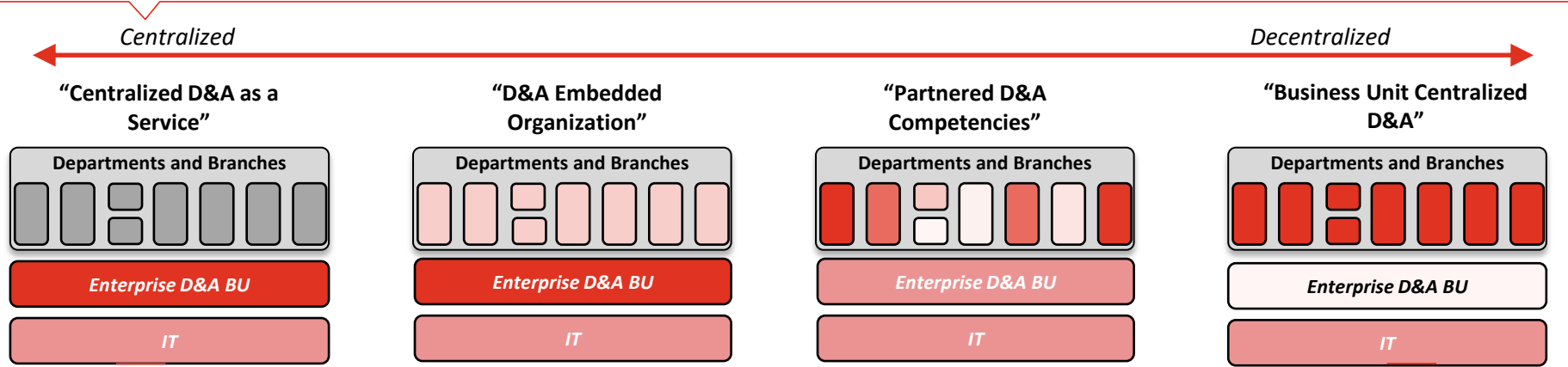
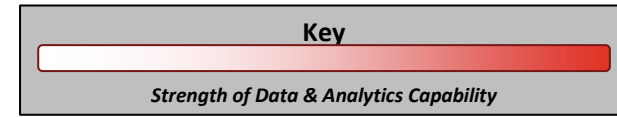
To facilitate innovation on all fronts, a level playing field is required where all departments / branches have a consistent foundation.



Sharing Leading Practices

Sharing learned experiences can help reduce friction and duplication when executing initiatives / projects.

Data and Analytics Operating Models



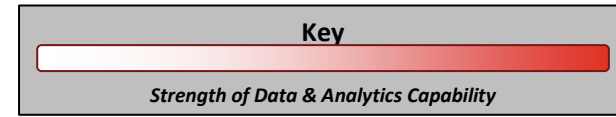
- Decoupled architecture: BU submits analytics requests to enterprise body who owns execution and delivers results
- Fully centralized shared service maximizes scale
- BUs outsource analytics questions to enterprise body
- Data procurement and quality owned by enterprise body

- BUs own business problems and some analytics capabilities
- BUs supported by enterprise body to deliver analytics
- Enterprise body incubates and augments BU analytics when necessary, using a standard practices
- Data managed by BUs with enterprise body advocacy

- BUs own business problems and varying levels of analytics capabilities
- Analytics capabilities highly specialized to BUs
- Enterprise body responsibilities include to innovation, consultation and support to BUs with higher levels of analytics capabilities

- All analytics capabilities owned by BUs
- Analytics capabilities highly specialized to BUs
- Enterprise body responsibilities focus on innovation and coordination support
- Data owned by BUs

The Region's Operating Model

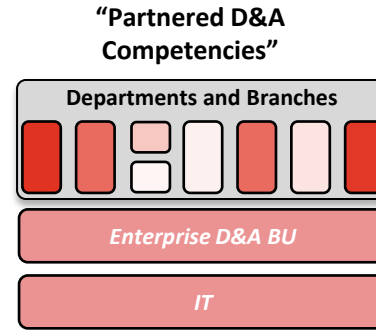


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● Enterprise Service Delivery



- BUs own business problems and varying levels of analytics capabilities
- Analytics capabilities highly specialized to BUs
- Enterprise body responsibilities include to innovation, consultation and support to BUs with higher levels of analytics capabilities



- All analytics capabilities owned by BU
- Enterprise body responsibilities focus on innovation and coordination support
- Data owned by BUs

● Localized Service Delivery

Service Delivery Model Determination

Input

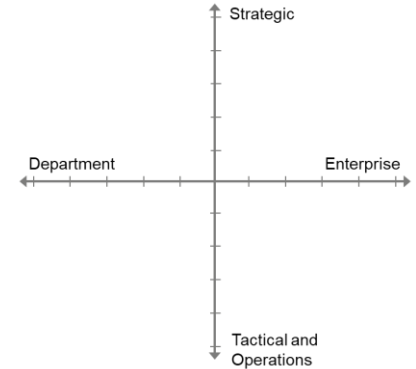
What

data and analytics functions and services are required at the Region?

Functions	Non Existent	Reactive	Proactive	Committed	Leader
Master Data Management	1.0		2.4		4.0
Data Asset Supervision		2.1		2.4	4.0
Policies, Standards and Procedures	1.8		2.2		4.0
Data Quality	1.8		2.1		4.0
Metadata Management		2.4		2.1	4.5

Where

should different data and analytics services be executed?



Output

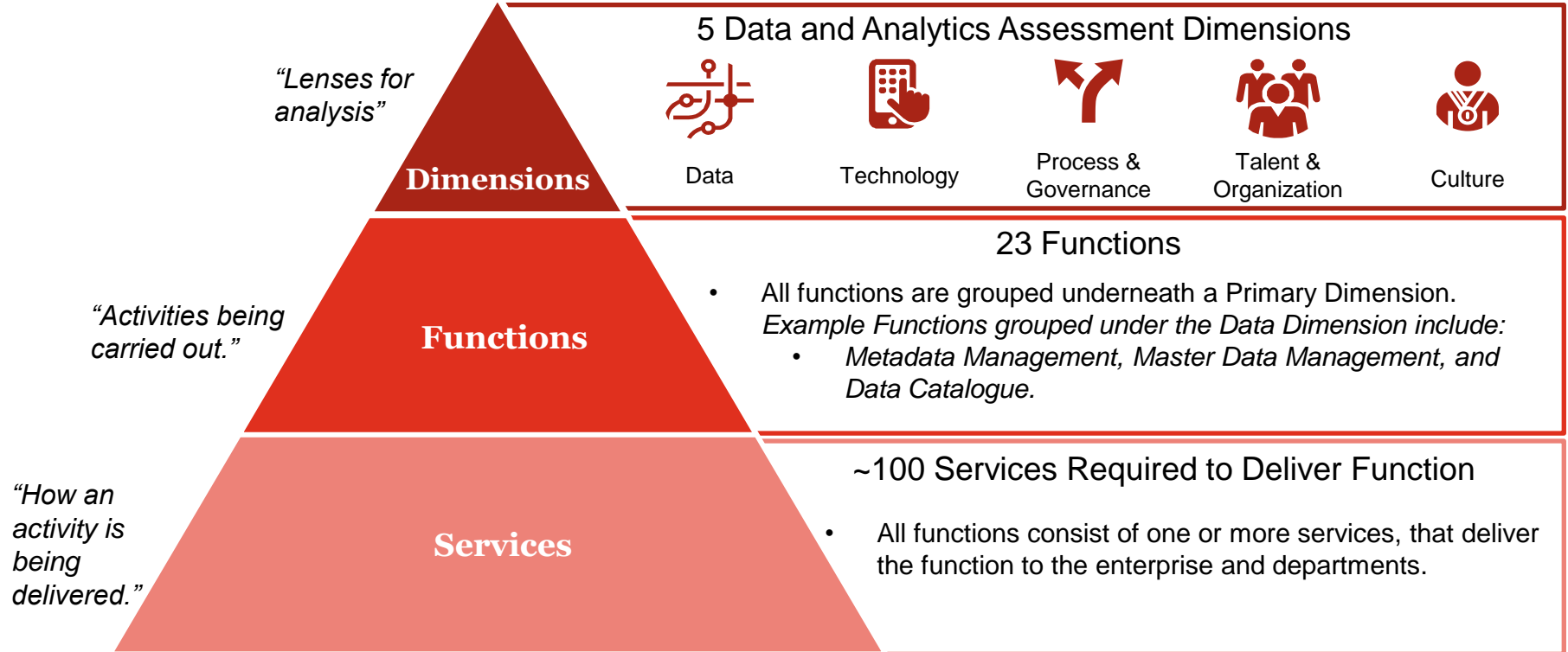
Who

should own (accountable and / or responsible) various data and analytics services?



Definition	Services
Providing processes to collect, aggregate, match, consolidate, and distribute data across the organization, ensuring consistent definitions and format of enterprise data assets.	● Reconciliation between multiple (same or similar) data sets / elements
	● Data modeling
	● Reference / relationship mapping

*Details related to all functional accountable owners and their services is found in Appendix B.



Observations and Recommendations: Culture

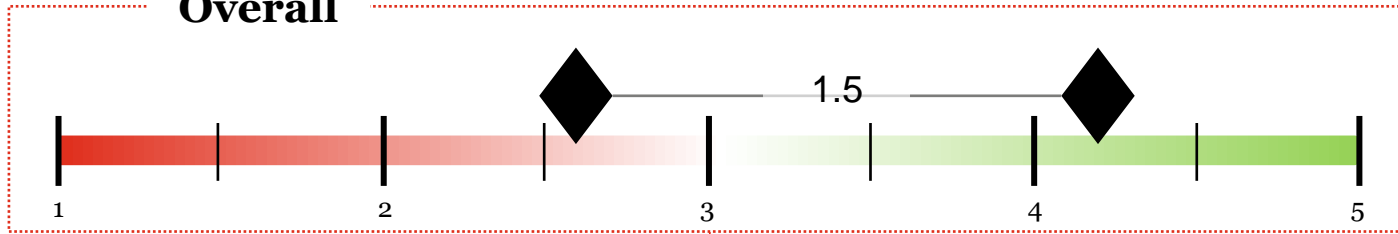
SECTION 3.6

- Review where the Region is today and where it wants to be in 4 years
- Share observations focused on the root cause of pain points identified
- Share recommendations to close the gap in maturity
- Identify recommendations that have the highest impact in closing the gap
- Demonstrate what “good” looks like for the highest impact recommendation(s)
- Describe a practical approach for the Region to achieve the desired state



Culture – Current and Future State

Overall



Data and Analytics Coordination- Providing processes to collect, aggregate, match, consolidate, and distribute data across the organization, ensuring consistent definitions and format of enterprise data assets.



Data Partnership - Establishing data-oriented partnerships with external organizations such as municipalities, universities, research institutes, and private sector organizations, as well as internal departments, branches and divisions.

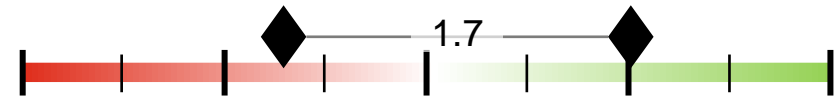


Leadership and Decision-Making - Oversight, strategic direction, and support / sponsorship in transforming the use and capabilities of data and analytics functions.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Data and Analytics Coordination-



Data Partnership



Leadership and Decision-Making



Root Cause in Maturity Gap

The Region is internally competitive but externally collaborative

- Multiple initiatives have been **adopted by local municipalities.**
- Regional initiatives **support external information sharing.**
- Most departments focus on improving **their business units.**
- Organizational structure and priorities are **department / branch based.**

Multiple initiatives focus on the same objectives

- Initiatives deliver on **department objectives** rather than organizational objectives.
- High impact initiatives required **collaborative rigour** to streamline efforts.

Recommendations

5.1 Develop a set of shared goals / objectives

- **Share** the responsibility of delivery.
- **Showcase** high value projects internally.
- Continue to expand community partnerships through **data-driven innovation.**
- Task staff with **participation in local activities.**
- **Iterate performance appraisals** to incorporate shared goals / objectives.

5.2 Gain support and supervision from DLT for high impact initiatives

- Identify initiatives that will **affect multiple** departments / branches.
- Consider the impacts of **initiative overload.**
- Define **outcomes and metrics for success** collaboratively.
- **Distribute** responsibilities to identify and deliver business value.

Root Cause in Maturity Gap

Resources are generally dedicated to departmental / branch priorities only

- Budgets can **restrict** enterprise use of staff.



5.3 Leverage a Community Practice model to utilize D&A SMEs

- Acknowledge resources as **enterprise assets**.
- **Data management** resources are highly valuable – identify SMEs and share their knowledge.

An unanimous commitment to becoming a data-informed does not exist yet

- **Some** leaders use data more often than others.
- Having only a single champion **limits impact**.
- A unified commitment focusing on **data management and foundational enablement** needs to be established.



5.4 Organizational leadership must commit to becoming a data-informed organization

- Connect data and analytics activities to a **proof of value**, delivering on a service outcome.
- Recognize the value and effort to becoming **data-literate**.
- **Stimulate learning** and provide challenging opportunities.
- Identify **change champions** at all levels of the Region.

Summary of Recommendations

- **Share** the responsibility of delivery.
- **Showcase** high value projects internally.
- Continue to expand community partnerships through **data-driven innovation**.
- Task staff with **participation in local activities**.

Gain support and supervision from DLT for high impact initiatives

Develop a set of shared goals / objectives

- Acknowledge resources as **enterprise assets**.
- **Data management** resources are highly valuable – identify SMEs and share their knowledge.

CULTURE

- Identify initiatives that will **affect multiple** departments / branches.
- Consider the impacts of **initiative overload**.
- Define **outcomes and metrics for success** collaboratively.
- **Distribute** responsibilities to identify and deliver business value.

Organizational leadership must commit to creating a data-informed organization

Leverage a Community Practice model to utilize D&A SMEs

- Connect data and analytics activities to a **proof of value**, delivering on a service outcome.
- Recognize the value and effort to becoming **data-literate**.
- **Stimulate learning** and provide challenging opportunities.
- Identify **change champions** at all levels of the Region.

What does good look like?

Data-Driven Collaboration through the Guelph Lab



What was the business problem?

To effectively identify community issues and address these challenges locally, a medium of collaboration needed to be established.

- The Guelph Lab brings together the tech community, University of Guelph, and the city of Guelph to leverage open data to address local needs by developing local solutions.
- An illustrative project to demonstrate the value of data-driven collaboration is **The Sharing Economy** project. This project focused on understanding and responding to a “sharing economy” with companies like Uber and Airbnb.



What does good look like?

Montefiore Health System's Shared Objectives

Montefiore
Inspired Medicine

What was the business problem?

Local leaders from the Bronx and Montefiore Health System joined forces to **Improve Community Housing, Reduce Asthma Hospitalization, and Create Green Jobs**

Together, Montefiore's Health System took up the challenge to deliver on 3 strategic outcomes simultaneously. This required strong and consistent collaboration.

“Working together with our community partners, we plan to tackle the conditions that affect asthma in the place where sufferers spend much of their time: at home. We will implement interventions to improve **housing conditions, improve health, and reduce the costs associated with frequent and preventable hospitalizations.**” – Marina Reznik, M.D.



A Framework to help Create a Data-Informed Culture

The **single biggest driver** of successful strategy implementations and propelling business impact is the persistence of an **organization's culture**.

Creating a Data-Informed Culture:

Through a commitment to building a strong, caring and safe community, Regional staff have a clear sense of purpose which can be enabled through the Data and Analytics Master Plan.

This can continue to inspire staff to bring **energy** and **creativity** to their jobs. When the Region's staff feel their work has meaning and can be enabled through Data and Analytics, they become more **committed** and **engaged**. They take risks, learn, and raise their game.



Step 1: Envision an enabled workforce

Envision the Region enabled to leverage data and analytics to support evidence-informed decision-making, at all levels.

Envision data and analytics leading practices scaled out across the region.

Seek out positive examples – a person, a team, or unit that exceeds the norms and can inspire others with their use of data and analytics in daily activities.



Step 2: Connect activities to measurable outcomes

To deliver best-in-class public service, measurable outcomes need to be clearly defined. These should define and drive activities that are undertaken.



Step 3: Stimulate individual learning and application

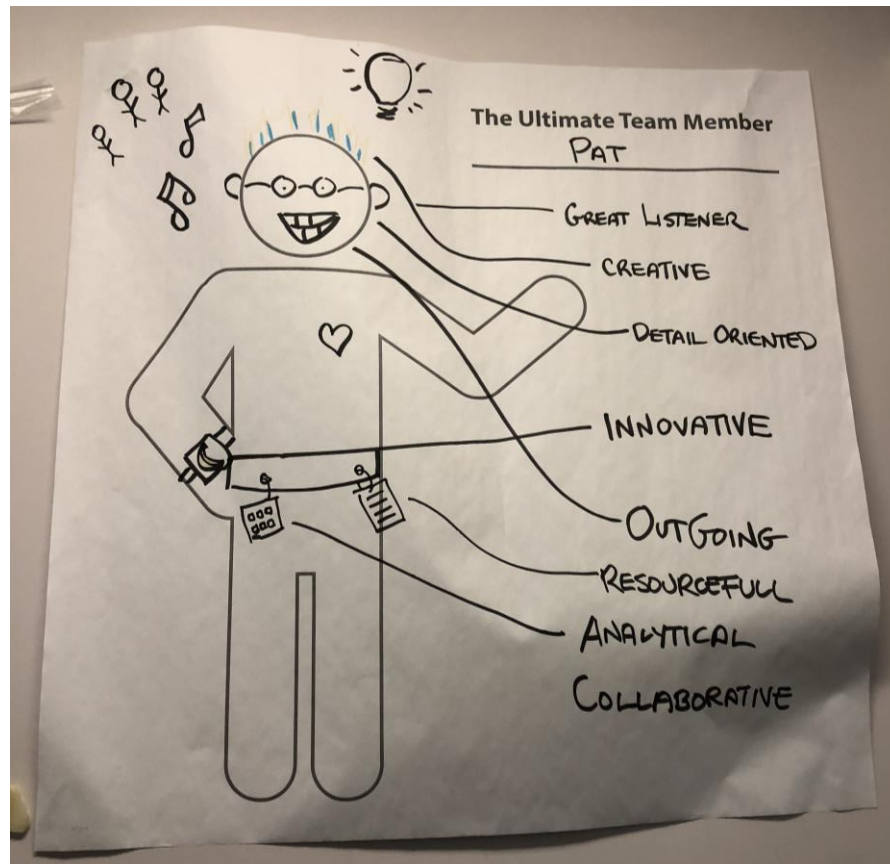
Train employees at the Region to utilize their data and analytics training to take on challenges, allowing them to demonstrate their commitment and skills to deliver on public service outcomes.

The 70-20-10 model can be used as an example of stimulating individual learning and providing a platform to apply these learnings.



Step 4: Enable data-informed leaders

To build an inspired, committed workforce, you'll need to equip, encourage and celebrate leaders from various levels using good data and analytics practices to support outcome delivery and finding operational efficiencies.



Step 5: Embrace purposeful change with action

**Good data and analytics practices
should lead to good insight
generation. To complete the
transformation, insights must be
taken to action.**



Step 6: Unleash positive energizers

Utilize your change agents as positive energizers to assist with every step of the data-informed cultural movement.

Energizers go out and share ideas, and return with feedback, new ideas, and innovative solutions to problems.



Section 4: Implementation Plan

Approach to Developing the Roadmap

Overview of the Roadmap

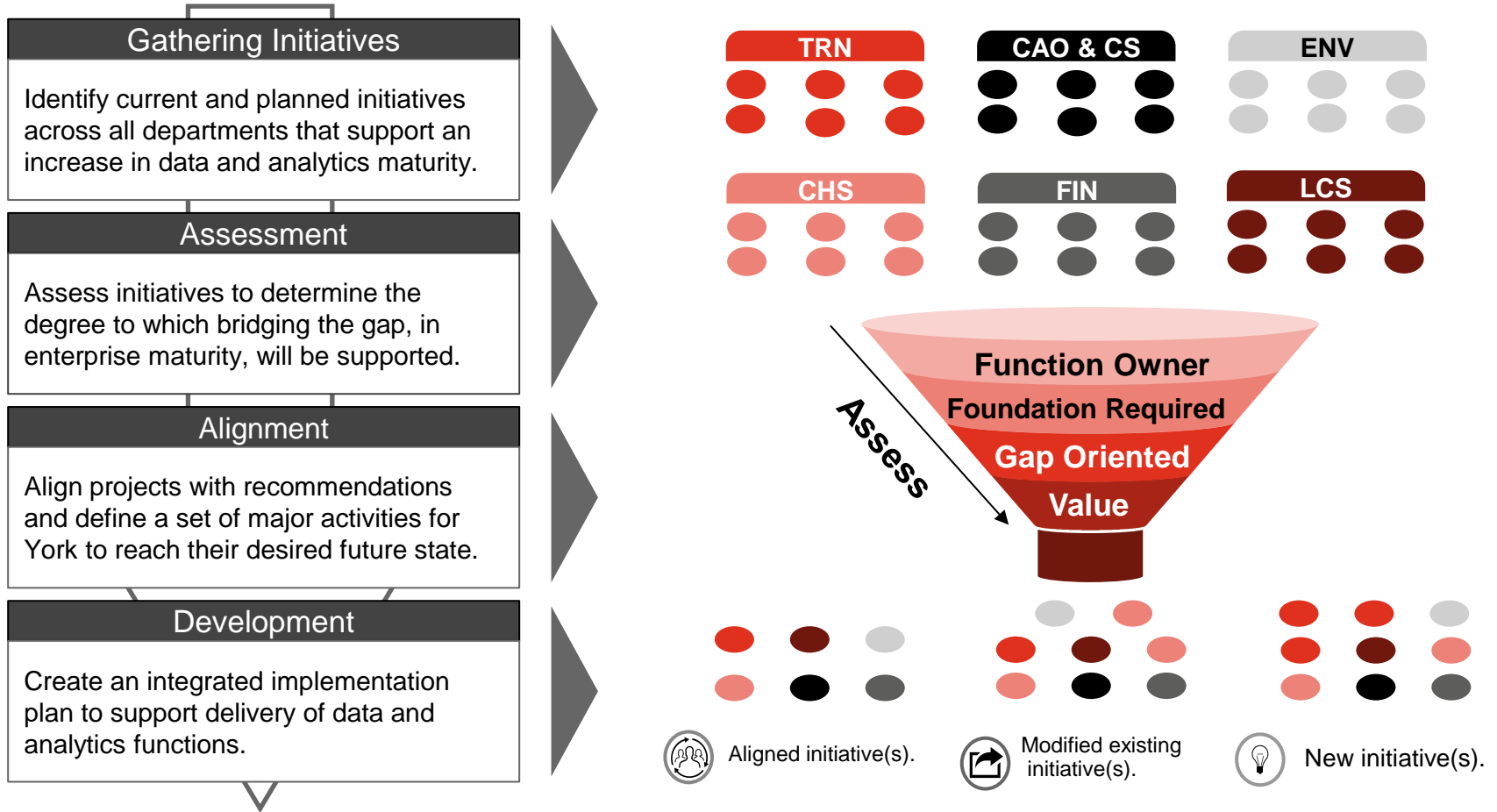
Personas

Approach to Developing the Roadmap

SECTION 4.1



Creating an Integrated Implementation Plan



To develop the implementation plan the following set of assumptions were used:

- All initiatives provided by departments / branches had accurate descriptions and timelines.
- All initiatives provided by departments / branches had dedicated resourcing and funding for the initiatives.
- All initiatives provided by departments / branches were accounting for the workload of other initiatives on their individual work plans.
- All initiatives provided by departments / branches will be able to accept the modifications required to obtain enterprise enablement from their investment.
- All initiatives provided by departments / branches had accurately defined who the collaborating departments were for the delivery of the initiative.
- All initiatives provided by departments / branches have dedicated project managers and supporting resources who will coordinate with the D&A Master Plan PMO to ensure the parties within the RACI chart are included during the delivery of the project.
- Based on the function accountable owner discussion on January 14th, 2019 at the DLT, initiatives were aligned so that function / service owners were appropriately engaged.

Approach to Building the Roadmap

The following process was utilized to develop the roadmap:

1 Analyze Aspirations and Current Gaps

Requirements were generated through the engagement of department / branch.

2 Develop Recommendations

Recommendations were developed based on our assessment dimensions for data and analytics.

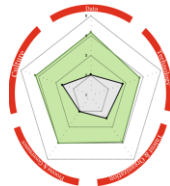
3 Identify Projects and Business Outcomes

Recommendations were converted into programs and projects. Outcomes for specific projects were illustrated through personas.

100+ staff contacted
30+ sessions
80+ projects analyzed

23 sets of recommendations
13 programs

40 projects
5 personas



GAP ANALYSIS FOR FUNCTION MATURITY AND FUNCTION DELIVERY STRUCTURE

Root Cause in Maturity Gap	Recommendations
<ul style="list-style-type: none"> Roles and responsibilities associated to data management are inconsistently defined Some data not "managed" (not identified) Roles and responsibilities for various data users have not been sufficiently established, defined or communicated The development to not consistently articulate data management responsibilities. 	<ul style="list-style-type: none"> Develop a data governance framework with clearly defined functions, roles and responsibilities for data management practices Identify high priority data management functions required Establish a data management function governance Develop data user role matrix Apply governance privacy and security to just the data sources where high value risk data are or can be to be Review Assess the progress of operationalizing data governance across various levels rather than reliance on audits
<ul style="list-style-type: none"> Staff are not aware of data governance components (including existing policies, standards and procedures) that may exist. Staff do not aware data management exist, need to data quality Clear lines to seek policies, standards and procedures out to management level. Some policies, standards and procedures are yet to be defined. 	<ul style="list-style-type: none"> Create and incorporate policies, standards and procedures into existing workflows Communicate approach for the operationalization of policies to staff Develop training on data literacy to public, internal and / or external to need to be applied Align the management structure and workflow to data Utilize the data governance framework Develop techniques to ensure a central responsibility of policies, standards and procedures Communicate policies through workflows and business plans

RECOMMENDATION OUTLINE



PERSONAS FOR PROJECTS

The following process was utilized to develop the roadmap:

4 Analyze Factors and Prioritize

Projects were analyzed through a set of assessment factors.

10+

factors analyzed



VARIETY OF FACTORS ASSESSED

5 Sequencing, RACI generation and Skill-sets Required

Once filtered, projects were then sequenced with a RACI developed for each department / branch.

Responsible
Accountable
Consulted
Informed

RACI CHART FOR PROJECTS

6 Develop Coordinated Master Plan Roadmap

The Roadmap and Implementation Plan bring together an actionable set of projects that will allow York Region to achieve their aspirations. Change Management and PMO activities are also defined.



YORK REGION DATA AND ANALYTICS
MASTER PLAN DOCUMENT

Key Factors Assessed during Roadmap Development



Project Details

Descriptions provided of each project and whether the project was currently underway or is a planned initiative.



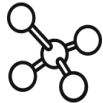
Collaboration

How well the project fosters collaboration between multiple departments / branches.



Timeline

The logical sequencing of projects to facilitate a better use of resources and a more coordinated delivery.



Function Enhancement and Delivery

How well the project will enhance core data and analytics functions.



Alignment to Recommendations

The maturity gap closure based on the projects and associated recommendations.



Workload

To avoid burnout and initiative overload, specific projects were used from across the Region to focus efforts on data and analytics enhancements.

Trends and Themes Observed Through Initiative Prioritization

Through the analyses of more than 80 projects and initiatives provided by each department and branch the following observations were made:



Redundancy: Multiple projects / initiatives focus on enhancing the same or similar functions.

- **3 projects** (Data Governance, Data Management Strategy and Information Governance Framework) focus on enhancing data governance.
- Self service dashboards are planned to be delivered through Financial and Operational Dashboards (Legal and Court Services), Self Service Data Delivery (ENV), HR dashboard, etc.
- Approximately **8 projects / initiatives** require data functions such as a data catalogue and master data management service to identify a single source of truth.



Siloed Focus: Foundational enablement projects focus on the departmental need rather than the greater enterprise need.

- **Multiple strategy** development projects including the Data Strategy (CHS) and Data Management Strategy (ENV) can provide value to other departments / branches.



Integration: Similar projects / initiatives can benefit from shared oversight and accountability.

- Each department / branch is focused on projects which can deliver value for more than their area. **Distributing activities and empowering a diverse team** with shared accountabilities improves synergies and return on investment.

Overview of the Roadmap

SECTION 4.2



Hierarchy within the Implementation Plan

The Implementation Plan projects are grouped together based on the 5 data and analytics dimension, then into 13 programs based on high impact recommendations and projects for the 4-year period.

Dimension

Each set of recommendations have been grouped based on the primary data and analytics dimension that they impact. The dimensions include:



Data



Technology



Process &
Governance



Talent &
Organization



Culture

Program

Based on our set of recommendations, programs were identified that deliver on each of the D&A assessment dimensions. These programs are vital to closing the gap in maturity. Programs can include one or more projects and have outcomes to measure progress towards meeting objectives.

Project

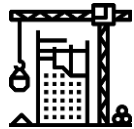
Programs are then distilled into projects which require major activities to be completed, to enhance specific data and analytics functions. Projects are categorized into 3 groups - foundational enablement projects, building on the foundation or business projects.



FOUNDATIONAL ENABLEMENT

Defining frameworks, practices, policies and standards as well as core technologies required to enhance enterprise wide maturity.

- These projects create the “Foundational Info-structure,” building the foundation required for Business Project execution
- *Examples: Data Management Strategy, Data Catalogue, Data and Analytics Service Definitions*



BUILDING ON THE FOUNDATION

Sustainment activities related to enhancing on the foundational enablement elements.

- The “Data Discovery and Exploration” and “Data-Driven Innovation and Partnerships” phases build on the foundation to increase operational efficiencies, foster community engagement and scaling capabilities
- *Examples: Digital Academy, Self-Service Enablement Through AI, Citizen Data Science Engagement, Partnership Development*



BUSINESS PROJECTS

Business value driving projects that require a data and analytics foundation.

- This set of projects exist currently on departmental work plans which will be leveraging, testing and refining the foundational elements. This approach encourages iteration, adoption and provides business value.
- *Examples: Community Services Asset Database, Facility Energy Consumption, Customer Experience, Security Analytics*

High Impact Recommendations

Dimension	High Impact Recommendations
Data	Develop and adopt an enterprise-wide data management framework integrated with Open Data.
	Establish the authoritative record for business critical data sets.
Technology	Prioritize technology procurement based on business case needs .
	Ensure a enterprise-wide data management tools exist.
Process and Governance	Develop a data governance framework with clearly defined functions, roles and responsibilities.
	Utilize a fit-for-purpose approach to data quality management.
Talent and Organization	Identify the data and analytics services that are required by the organization and who can offer them .
	Recognize human resources that can offer value to the enterprise .
Culture	Develop a set of shared goals / objectives .
	Leverage the Community Practice model to share data and analytics subject matter expertise.

High Impact Foundational Enablement Programs

Dimension	High Impact Recommendations	Programs
Data	Develop and adopt an enterprise-wide data management framework integrated with Open Data.	Enterprise Data Management
	Establish the authoritative record for business critical data sets.	Open Data
Technology	Prioritize technology procurement based on business case needs .	Authoritative Record
	Ensure a enterprise-wide data management tools exist.	Analytics Technology Enablement
Process and Governance	Develop a data governance framework with clearly defined functions, roles and responsibilities.	Data Management Enablement
	Utilize a fit-for-purpose approach to data quality management.	Data Storage and Integration
Talent and Organization	Identify the data and analytics services that are required by the organization and who can offer them .	Innovation and Exploration
	Recognize human resources that can offer value to the enterprise .	Data Quality
Culture	Develop a set of shared goals / objectives .	Data Governance
	Leverage the Community Practice model to share data and analytics subject matter expertise.	Modernize PSPs
		Data and Analytics Service Delivery
		Data Literacy and Talent Development
		Community of Practice and Partnerships

High Impact Foundational Enablers

Dimension	High Impact Recommendations	Programs	Projects
Data	<p>Develop and adopt an enterprise-wide data management framework integrated with Open Data.</p> <p>Establish the authoritative record for business critical data sets.</p>	<p>Enterprise Data Management</p> <p>Open Data</p> <p>Authoritative Record</p>	<p>Data Catalogue</p> <p>Construction Asset Lifecycle Management</p>
Technology	<p>Prioritize technology procurement based on business case needs.</p> <p>Ensure a enterprise-wide data management tools exist.</p>	<p>Analytics Technology Enablement</p> <p>Data Management Enablement</p> <p>Data Storage and Integration</p> <p>Innovation and Exploration</p>	<p>Data Strategy - Self-Service Focus</p> <p>Case Management Implementation</p> <p>Self-Serve Data Delivery</p> <p>Access to Data for Ad-hoc Projects</p>
Process and Governance	<p>Develop a data governance framework with clearly defined functions, roles and responsibilities.</p> <p>Utilize a fit-for-purpose approach to data quality management.</p>	<p>Data Quality</p> <p>Data Governance</p> <p>Modernize PSPs</p>	
Talent and Organization	<p>Identify the data and analytics services that are required by the organization and who can offer them.</p> <p>Recognize human resources that can offer value to the enterprise.</p>	<p>Data and Analytics Service Delivery</p> <p>Data Literacy and Talent Development</p>	
Culture	<p>Develop a set of shared goals / objectives.</p> <p>Leverage the Community Practice model to share data and analytics subject matter expertise.</p>	<p>Community of Practice and Partnerships</p>	

High Impact Foundational Enablers

Dimension	High Impact Recommendations	Programs	Projects
Data	<p>Develop and adopt an enterprise-wide data management framework integrated with Open Data.</p> <p>Establish the authoritative record for business critical data sets.</p>	<p>Enterprise Data Management</p> <p>Open Data</p> <p>Authoritative Record</p>	<p>Open Data - Strategy</p> <p>Water Demand Forecasting</p>
Technology	<p>Prioritize technology procurement based on business case needs.</p> <p>Ensure a enterprise-wide data management tools exist.</p>	<p>Analytics Technology Enablement</p> <p>Data Management Enablement</p> <p>Data Storage and Integration</p> <p>Innovation and Exploration</p>	<p>Data Cooperative</p> <p>Open Data - Platform Enhancements</p> <p>Citizen Data Science</p>
Process and Governance	<p>Develop a data governance framework with clearly defined functions, roles and responsibilities.</p> <p>Utilize a fit-for-purpose approach to data quality management.</p>	<p>Data Quality</p> <p>Data Governance</p> <p>Modernize PSPs</p>	
Talent and Organization	<p>Identify the data and analytics services that are required by the organization and who can offer them.</p> <p>Recognize human resources that can offer value to the enterprise.</p>	<p>Data and Analytics Service Delivery</p> <p>Data Literacy and Talent Development</p>	
Culture	<p>Develop a set of shared goals / objectives.</p> <p>Leverage the Community Practice model to share data and analytics subject matter expertise.</p>	<p>Community of Practice and Partnerships</p>	

High Impact Foundational Enablers

Dimension	High Impact Recommendations	Programs	Projects
Data	<p>Develop and adopt an enterprise-wide data management framework integrated with Open Data.</p> <p>Establish the authoritative record for business critical data sets.</p>	<p>Enterprise Data Management</p> <p>Open Data</p> <p>Authoritative Record</p>	<p>Data Strategy - MDM</p>
Technology	<p>Prioritize technology procurement based on business case needs.</p> <p>Ensure a enterprise-wide data management tools exist.</p>	<p>Analytics Technology Enablement</p> <p>Data Management Enablement</p> <p>Data Storage and Integration</p> <p>Innovation and Exploration</p>	<p>HR Dashboard</p> <p>Operations data access for decision support</p>
Process and Governance	<p>Develop a data governance framework with clearly defined functions, roles and responsibilities.</p> <p>Utilize a fit-for-purpose approach to data quality management.</p>	<p>Data Quality</p> <p>Data Governance</p> <p>Modernize PSPs</p>	
Talent and Organization	<p>Identify the data and analytics services that are required by the organization and who can offer them.</p> <p>Recognize human resources that can offer value to the enterprise.</p>	<p>Data and Analytics Service Delivery</p> <p>Data Literacy and Talent Development</p>	
Culture	<p>Develop a set of shared goals / objectives.</p> <p>Leverage the Community Practice model to share data and analytics subject matter expertise.</p>	<p>Community of Practice and Partnerships</p>	

High Impact Foundational Enablers

Dimension	High Impact Recommendations	Programs	Projects
Data	<p>Develop and adopt an enterprise-wide data management framework integrated with Open Data.</p> <p>Establish the authoritative record for business critical data sets.</p>	<p>Enterprise Data Management</p> <p>Open Data</p> <p>Authoritative Record</p>	
Technology	<p>Prioritize technology procurement based on business case needs.</p> <p>Ensure a enterprise-wide data management tools exist.</p>	<p>Analytics Technology Enablement</p> <p>Innovation and Exploration</p> <p>Data Storage and Integration</p> <p>Data Management Enablement</p>	<p>Roads Operations Data Analytics</p>
Process and Governance	<p>Develop a data governance framework with clearly defined functions, roles and responsibilities.</p> <p>Utilize a fit-for-purpose approach to data quality management.</p>	<p>Data Quality</p> <p>Data Governance</p> <p>Modernize PSPs</p>	
Talent and Organization	<p>Identify the data and analytics services that are required by the organization and who can offer them.</p> <p>Recognize human resources that can offer value to the enterprise.</p>	<p>Data and Analytics Service Delivery</p> <p>Data Literacy and Talent Development</p>	
Culture	<p>Develop a set of shared goals / objectives.</p> <p>Leverage the Community Practice model to share data and analytics subject matter expertise.</p>	<p>Community of Practice and Partnerships</p>	

High Impact Foundational Enablers

Dimension	High Impact Recommendations	Programs	Projects
Data	<p>Develop and adopt an enterprise-wide data management framework integrated with Open Data.</p> <p>Establish the authoritative record for business critical data sets.</p>	<p>Enterprise Data Management</p> <p>Open Data</p> <p>Authoritative Record</p>	
Technology	<p>Prioritize technology procurement based on business case needs.</p> <p>Ensure a enterprise-wide data management tools exist.</p>	<p>Analytics Technology Enablement</p> <p>Innovation and Exploration</p> <p>Data Storage and Integration</p> <p>Data Management Enablement</p>	<p>Emerging Technology - IoT</p> <p>Expand GIS Platform - All Pipes Augmented Reality</p>
Process and Governance	<p>Develop a data governance framework with clearly defined functions, roles and responsibilities.</p> <p>Utilize a fit-for-purpose approach to data quality management.</p>	<p>Data Quality</p> <p>Data Governance</p> <p>Modernize PSPs</p>	<p>Security Analytics</p> <p>Self-Service Enablement</p>
Talent and Organization	<p>Identify the data and analytics services that are required by the organization and who can offer them.</p> <p>Recognize human resources that can offer value to the enterprise.</p>	<p>Data and Analytics Service Delivery</p> <p>Data Literacy and Talent Development</p>	
Culture	<p>Develop a set of shared goals / objectives.</p> <p>Leverage the Community Practice model to share data and analytics subject matter expertise.</p>	<p>Community of Practice and Partnerships</p>	

High Impact Foundational Enablers

Dimension	High Impact Recommendations	Programs	Projects
Data	<p>Develop and adopt an enterprise-wide data management framework integrated with Open Data.</p> <p>Establish the authoritative record for business critical data sets.</p>	<p>Enterprise Data Management</p> <p>Open Data</p> <p>Authoritative Record</p>	
Technology	<p>Prioritize technology procurement based on business case needs.</p> <p>Ensure a enterprise-wide data management tools exist.</p>	<p>Analytics Technology Enablement</p> <p>Innovation and Exploration</p> <p>Data Storage and Integration</p> <p>Data Management Enablement</p>	<p>Data Architecture</p>
Process and Governance	<p>Develop a data governance framework with clearly defined functions, roles and responsibilities.</p> <p>Utilize a fit-for-purpose approach to data quality management.</p>	<p>Data Quality</p> <p>Data Governance</p> <p>Modernize PSPs</p>	<p>Community Services Asset Database</p> <p>Water and Wastewater - State of Infrastructure</p>
Talent and Organization	<p>Identify the data and analytics services that are required by the organization and who can offer them.</p> <p>Recognize human resources that can offer value to the enterprise.</p>	<p>Data and Analytics Service Delivery</p> <p>Data Literacy and Talent Development</p>	<p>Strategy and Long-Term Transportation Planning (W)</p>
Culture	<p>Develop a set of shared goals / objectives.</p> <p>Leverage the Community Practice model to share data and analytics subject matter expertise.</p>	<p>Community of Practice and Partnerships</p>	

High Impact Foundational Enablers

Dimension	High Impact Recommendations	Programs	Projects
Data	<p>Develop and adopt an enterprise-wide data management framework integrated with Open Data.</p> <p>Establish the authoritative record for business critical data sets.</p>	<p>Enterprise Data Management</p> <p>Open Data</p> <p>Authoritative Record</p>	
Technology	<p>Prioritize technology procurement based on business case needs.</p> <p>Ensure a enterprise-wide data management tools exist.</p>	<p>Analytics Technology Enablement</p> <p>Innovation and Exploration</p> <p>Data Storage and Integration</p> <p>Data Management Enablement</p>	<p>Data Management Technology Enablement</p>
Process and Governance	<p>Develop a data governance framework with clearly defined functions, roles and responsibilities.</p> <p>Utilize a fit-for-purpose approach to data quality management.</p>	<p>Data Quality</p> <p>Data Governance</p> <p>Modernize PSPs</p>	<p>Water Facilities Inspection Data Automation</p>
Talent and Organization	<p>Identify the data and analytics services that are required by the organization and who can offer them.</p> <p>Recognize human resources that can offer value to the enterprise.</p>	<p>Data and Analytics Service Delivery</p> <p>Data Literacy and Talent Development</p>	
Culture	<p>Develop a set of shared goals / objectives.</p> <p>Leverage the Community Practice model to share data and analytics subject matter expertise.</p>	<p>Community of Practice and Partnerships</p>	

High Impact Foundational Enablers

Dimension	High Impact Recommendations	Programs	Projects
Data	<p>Develop and adopt an enterprise-wide data management framework integrated with Open Data.</p> <p>Establish the authoritative record for business critical data sets.</p>	<p>Enterprise Data Management</p> <p>Open Data</p> <p>Authoritative Record</p>	
Technology	<p>Prioritize technology procurement based on business case needs.</p> <p>Ensure a enterprise-wide data management tools exist.</p>	<p>Analytics Technology Enablement</p> <p>Innovation and Exploration</p> <p>Data Storage and Integration</p> <p>Data Management Enablement</p>	
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Talent and Organization	<p>Identify the data and analytics services that are required by the organization and who can offer them.</p> <p>Recognize human resources that can offer value to the enterprise.</p>	<p>Data and Analytics Service Delivery</p> <p>Data Literacy and Talent Development</p>	
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Talent and Organization	<p>Identify the data and analytics services that are required by the organization and who can offer them.</p> <p>Recognize human resources that can offer value to the enterprise.</p>	<p>Data and Analytics Service Delivery</p> <p>Data Literacy and Talent Development</p>	
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Culture	<p>Develop a set of shared goals / objectives.</p> <p>Leverage the Community Practice model to share data and analytics subject matter expertise.</p>	<p>Community of Practice and Partnerships</p>	<p>Communities of Practice - Data and Analytics</p> <p>Partnership Development</p>

Program Alignment to Goals and Objectives

The Goals and Objectives are the outcomes that York Region will achieve at the end of the Master Plan through the successful completion of the programs and the associated projects.

	 Culture Data Informed Culture	 Process & Governance Establish Governance	 Talent & Organization Enhance Capability and Literacy	 Data Appropriate Access to Trusted and Timely Data	 Technology Tools for Self-Service Data and Analytics
Program					
Enterprise Data Management	✓	✓	✓	✓	
Authoritative Record	✓	✓	✓	✓	
Open Data	✓	✓	✓	✓	✓
Analytics Technology Enablement	✓		✓		✓
Data Management Technology Enablement	✓	✓	✓	✓	✓
Data Storage & Integration Technology Enablement	✓			✓	✓
Innovation and Exploration	✓		✓		✓
Data Quality	✓	✓	✓	✓	✓
Data Governance	✓	✓	✓	✓	
Modernize Policies, Standards and Procedures	✓	✓		✓	✓
Data and Analytics Service Delivery	✓	✓	✓	✓	✓
Data Literacy and Talent Development	✓		✓		✓
Community of Practice and Partnerships	✓		✓		✓

Roadmap Introduction: Themes of Each Year



Foundational Infrastructure

2019 - 2020

Strengthening the core through foundational elements.

Programs include:
Data Management, Data Governance, Data Quality, and D&A Service Transformation

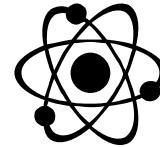


Data Discovery and Exploration

2021

Leveraging analytics to move from data to insights. Transform the Region by taking insights to action.

Programs include:
Self-Service Data Delivery and Open Data Enhancements



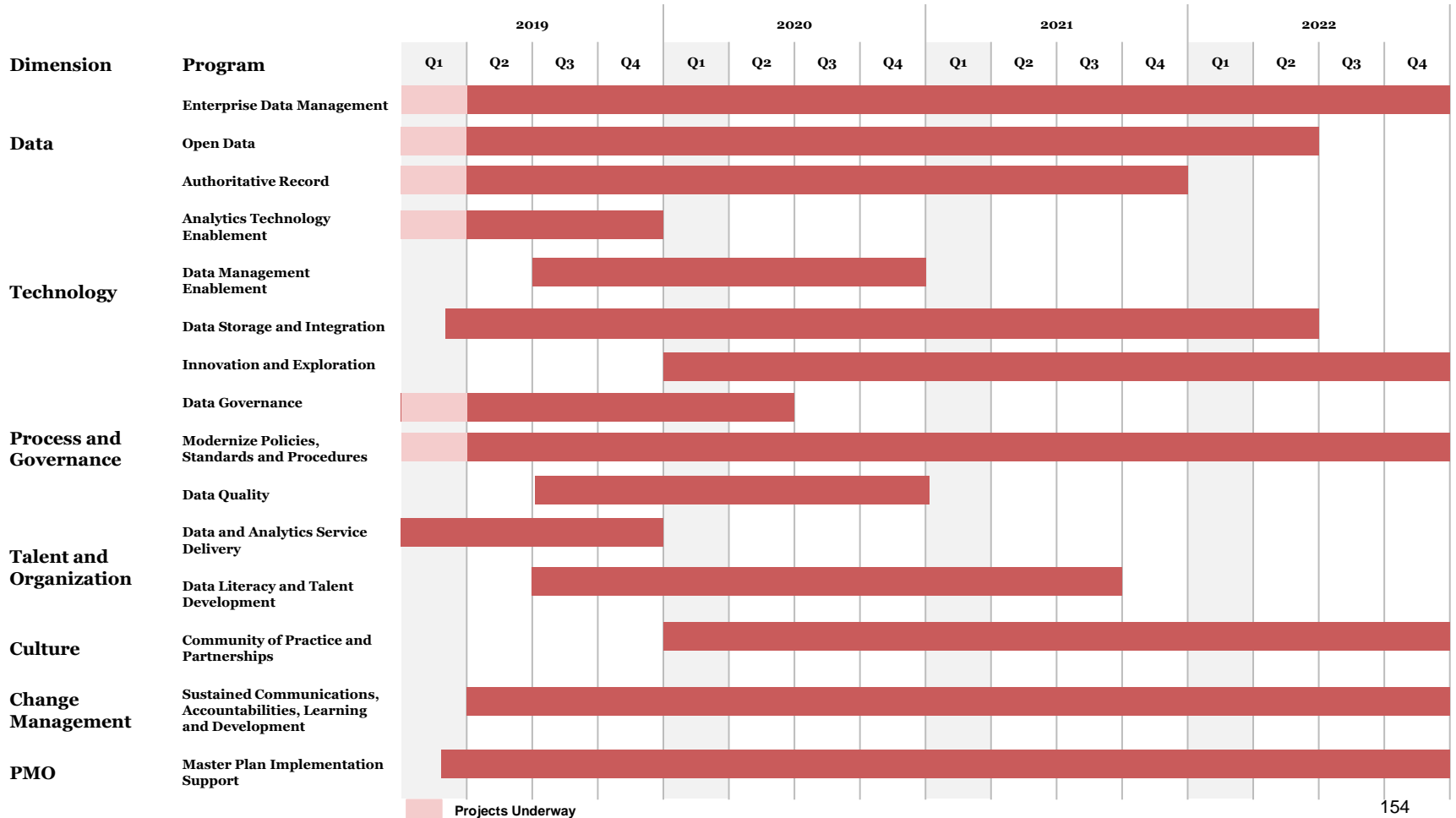
Data Driven Innovation and Partnerships

2022 +

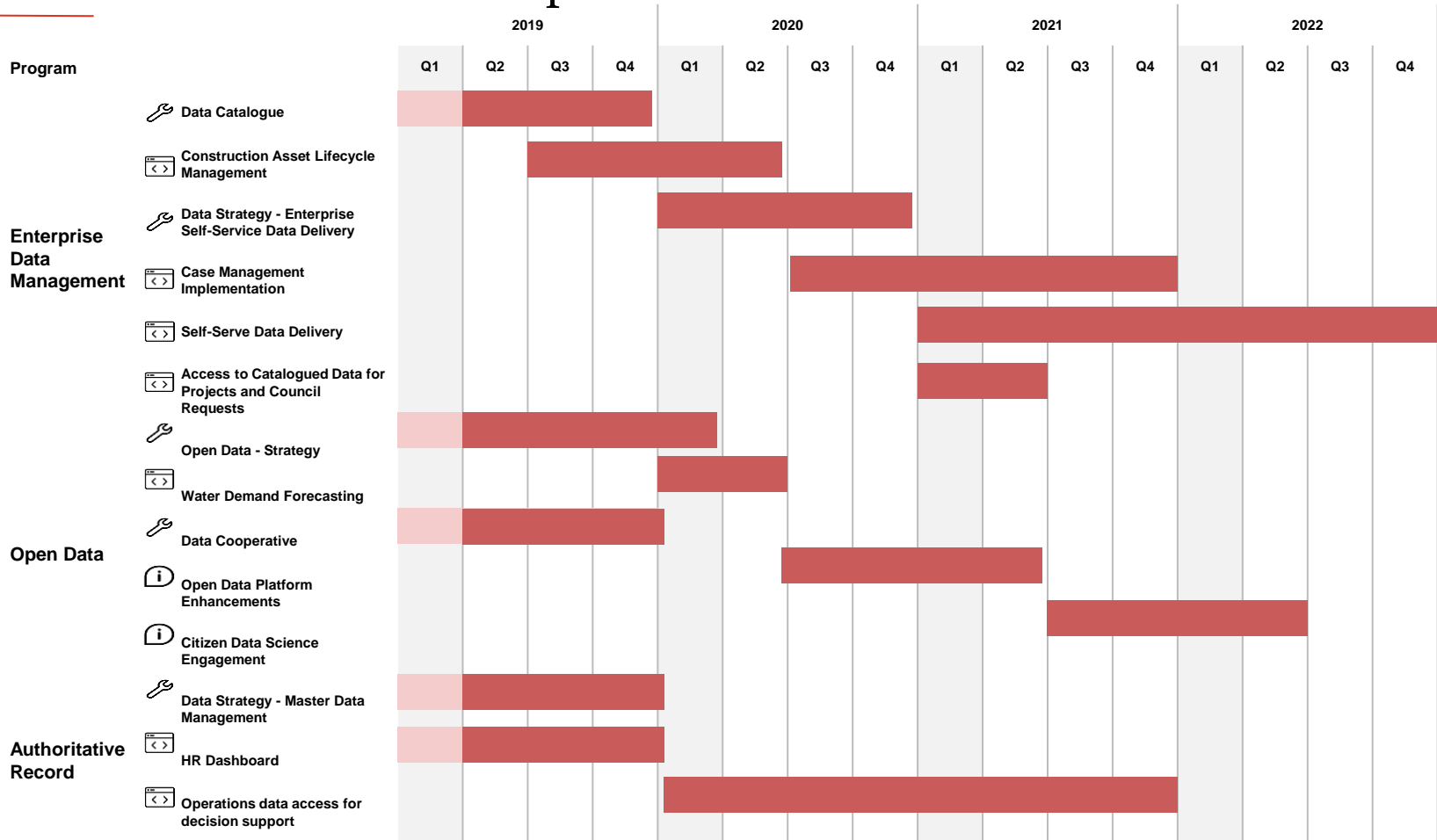
Targeting innovation activities and fostering mutually beneficial partnerships.

Programs include:
Citizen Data Science Engagement and Partnership Development

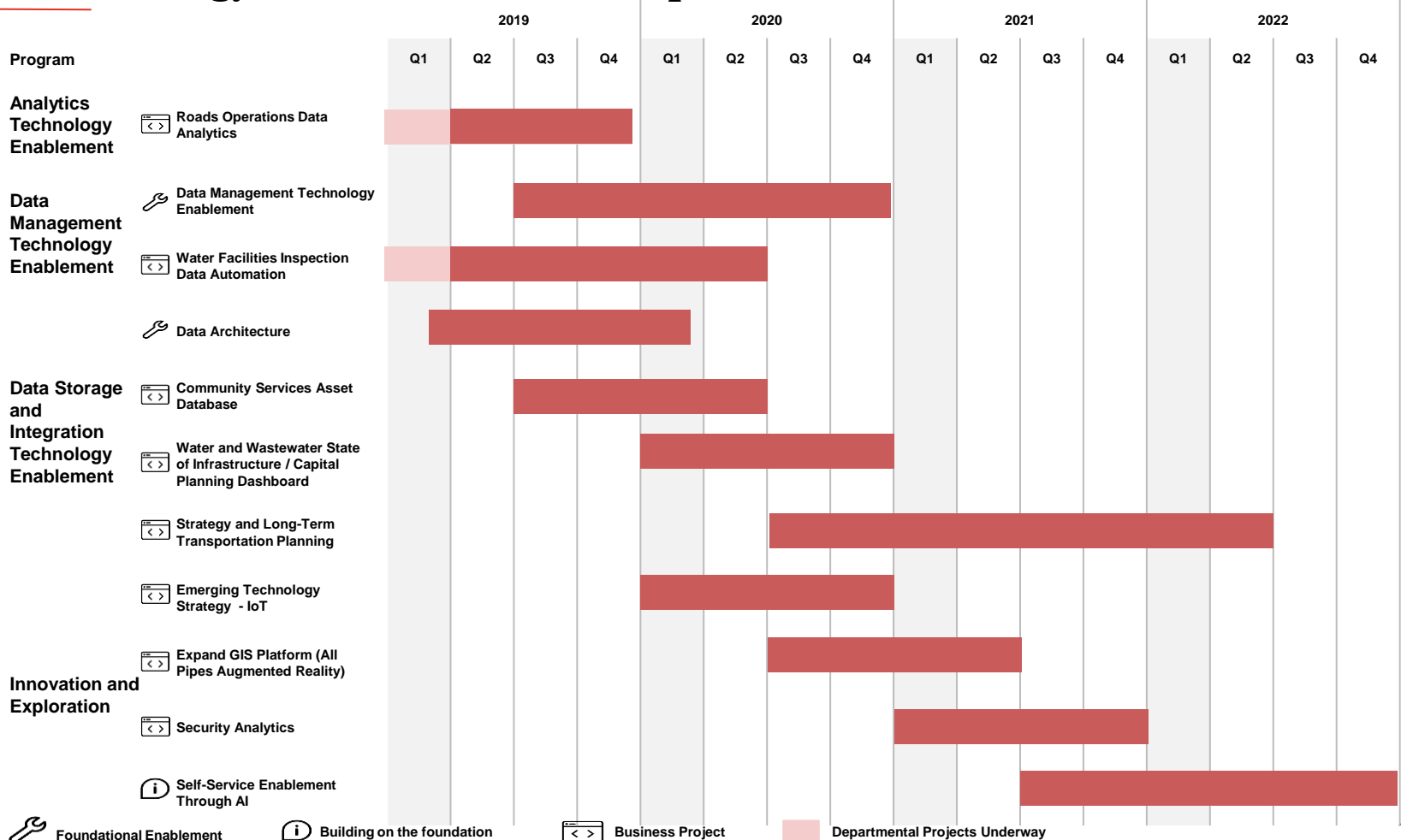
York Region Data and Analytics Roadmap



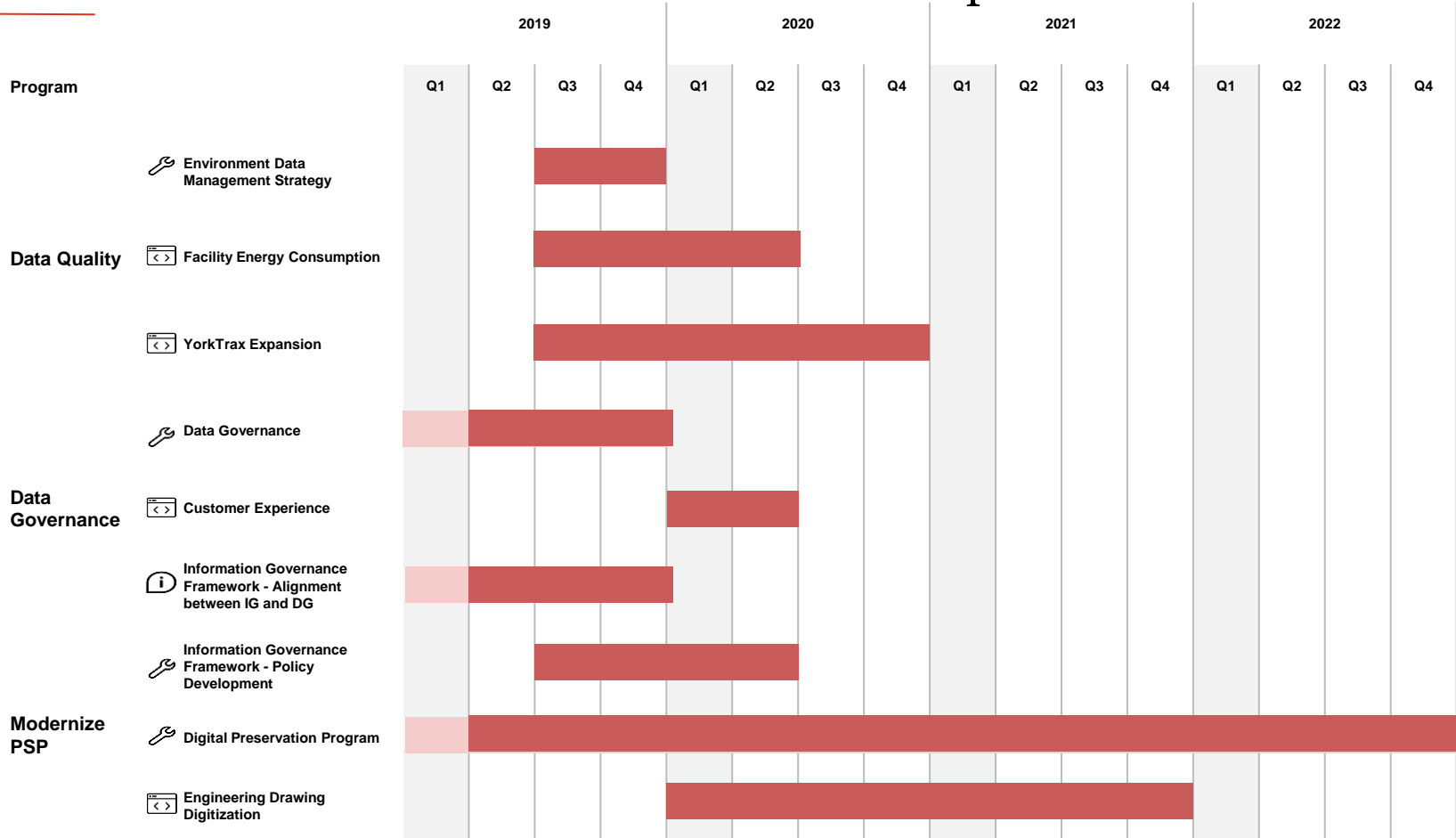
Data Dimension Roadmap



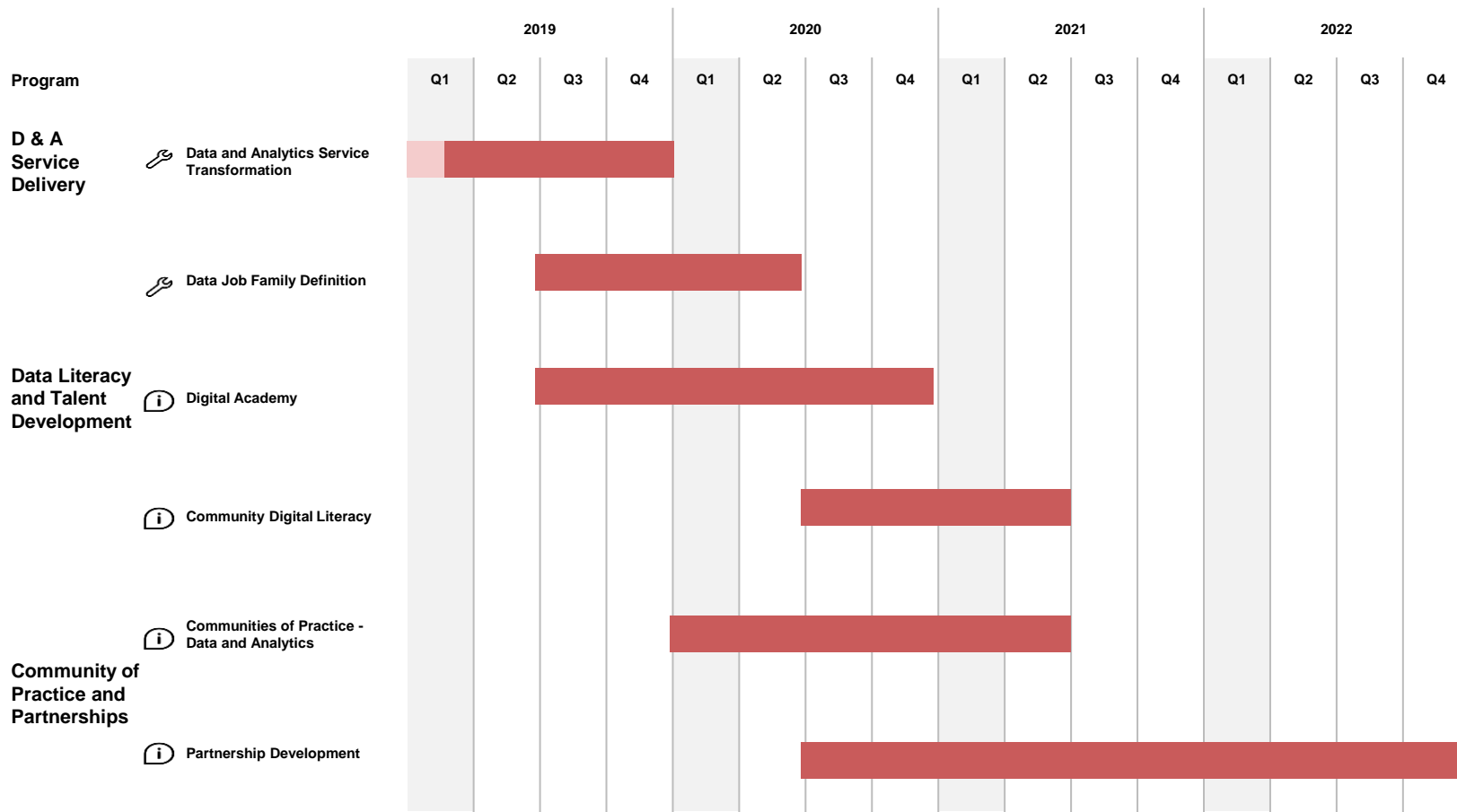
Technology Dimension Roadmap



Process and Governance Dimension Roadmap



Talent and Organization, Culture Dimension Roadmap



Personas

SECTION 4.3



What does success look like?

This section identifies key personas and how delivering on the Data and Analytics Master Plan will support their needs and the Region's journey in becoming a data-informed culture.

At each major milestone of the Data and Analytics Master Plan the value of embarking on this journey is highlighted for each of the key personas.

The following personas are built on the Region's organizational charts and the unique data and analytics needs that are required at each level.



Francesca
Local Resident



Deborah
Commissioner



Steven
Manager



Mira and Ali
Frontline Staff



Jonathan
External Partner

Stakeholder Benefits from the Master Plan

What needs will the Data and Analytics Master Plan address?



Community Member	Commissioner	Manager	Frontline Staff	External Partner
Needs: Access to regional data to inform personal and business decisions	Needs: Reliable, consistent and timely answers	Needs: Generating reports that tell a consistent and clear story for SMT	Needs: Self-service access to data to discover operational efficiencies	Needs: Seeing the whole picture through integrated and shared data

“I plan to open a new restaurant in the Region. What location is best suited for my business?”

“I have data at my fingertips to answer Council or Citizen questions, and meet my legislative needs.”

“I can report to my commissioner what land assets and liabilities we have.”

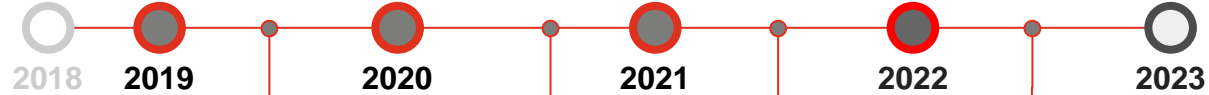
“I can prioritize my workload based on real-time data, providing better customer service.”

“I can now prioritize my development inspections.”

Impact to Persona: Community Member



Francesca is new to Canada and lives in York Region. To support her family, she has decided to open up a new restaurant. Deciding on where to open the restaurant is difficult and she is debating whether York Region is the most suitable location for her restaurant to be successful. To help her decide, Francesca uses York's easy to navigate open data website to gain an overview of restaurants in the area, as well as upcoming residential and commercial development plans. This data combined with demographic data provided through the portal supplies Francesca with what she needs to make a data-informed decision.



Project
 **Open Data**

Francesca can find the data she is interested in quickly and easily. She knows how to read and interpret the data to answer the questions she needs.

Project
 **Fostering Citizen Data Scientists**

On a customer experience phone call with Viva's customer experience representative, Francesca discusses her experience. She is informed that a chatbot is listening in on the conversation and learning about the resolution provided. Now the chatbot is ready to answer the same or similar issues as the ones raised by Francesca and Francesca has an understanding on how AI can be applied.

Project
 **Self-Service Enablement Through AI**

Francesca needs to coordinate receiving vaccinations for her new born child. She is able to speak to York's chatbot, find the services required and make an appointment. York Region is the right place for her and her growing family.

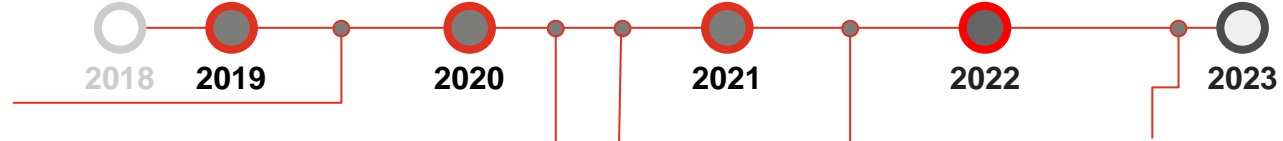
Project
 **Community Digital Literacy**

Francesca wants to learn about how to use data to decide whether it is a good idea to open a second restaurant. She goes to the Open Data website to find data sets and tools to support basic scenario planning based on opening the restaurant in different locations.

Impact to Persona: Commissioner



Deborah is the Commissioner of Environmental Services at York Region. The first task she does on her daily routine is to check her dashboard, illustrating key performance indicators on how each of the 6 branches within the department are operating. These indicators also focus on the customer experience, recording customer complaints and overall volumes. A question by the Council focuses on energy planning. Deborah nudges the Commissioner of Transportation Services and both leverage their dashboards to report progress on the energy saving activities.



Project

Data Catalogue

Deborah navigates the data catalogue to look up the data she requires regarding past water quality scores. Through the catalogue she knows when the last update was made to this data set, and when the next update is expected.

Project

Customer Experience

Deborah has a single source of truth related to customer experience data, including a net promoter score through which she can drill down on based on her needs.

Project

Facility Energy Consumption

Energy conservation becomes a growing priority. Deborah is able to view a forecast of how much energy her facilities will be consuming, and what the budgetary impacts will be. She is able to report to Council, with confidence, that the Region is on track with the energy target established.

Project

Self-Serve Data Delivery

Deborah is able to access data within an easy to use visualization tool. When questions from other members of SMT arise, she is able to direct them with a link to the data analysis she is referring to.

Project

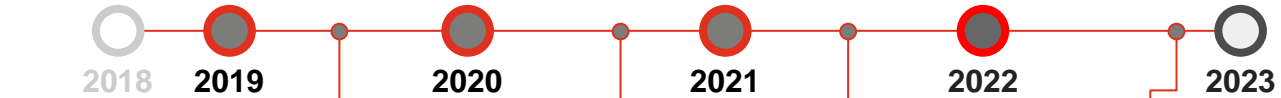
Partnership Development

Deborah attends a meeting with local high schools, sharing information about an analytics competition based on a real-world problem, related to forestry. The students are excited for the opportunity and a partnership is forged.

Impact of Projects to Personas: Manager



Steven is a manager within Transportation Services. Innovation is a priority for him. He has a good handle on operations running smoothly but he wants to find innovative ways to improve the customer experience without increasing expenditures. His team generate reports for him but the story or “so what” of the story is not clear. He needs to ensure that his team are generating reports that tell a consistent, clear story so that an opportunity to explore an innovative idea is clear. Steven plans to showcase some of these opportunities to his Director before further exploration.



Project

Data Management Strategy

Data quality gaps in the data are identified in a proactive manner. With the right frameworks and procedures, his team has what they need to identify a single source of truth for business critical data sets. They are able to fill in the data gaps and relay the full story.



Project

Emerging Technology Strategy - Internet of Things

With pilot projects demonstrating the value of connected devices, Steven has a sense of how he can store, access and use sensor and Internet of Things data to support decision-making. Steven intends to use his learnings to inform a policy on autonomous vehicles.



Project

Self-Serve Data Delivery

Steven has access to data through the open data portal. He has access to the necessary attributes related to that data and can answer ad-hoc questions from SMT. He is confident in the answer he provides and knows that the answers will be consistent every time.



Project

Strategy and Long-Term Transportation Planning

Steven can use data from across various departments to inform his strategy and long-term plan from transportation. Data is accessible and fit for consumption.



Foundational Enablement



Building on the foundation

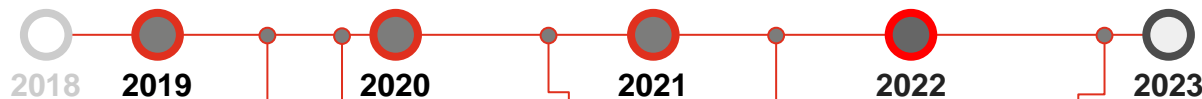


Business Project

Impact to Persona: Frontline Staff



Mira has been working at York Region as a Data Analyst within Community and Health Services. **Ali** is contracted by the Region to provide social services. Mira loves working at the Region and strives to provide the community with client-centred care. Mira would like information to be accurate, complete, and easier to find from a single, reliable data source. Ultimately, she wants to spend more time analyzing and less time wrangling data. Ali does his job well but sometimes forgets to complete certain fields within the transactional system he uses. Since no one has discussed the downstream impacts of missing certain fields, he continues to input data the same way.



Project

Data and Analytics Service Transformation

Struggling with data wrangling efforts, Mira now knows who to contact about master data management and data quality remediation. She learns of a new process to support the identification of a single source of truth and exercises it.

Project

Digital Academy

Mira has access to courses that help her achieve her goals as she works on her digital literacy. She can share articles, YouTube videos and other material relevant to her area of expertise. She is currently completing the Introduction to Data Science curriculum and feels motivated to keep learning.

Project

Self-Service Enablement Through AI

Ali called on his trusty chatbot to help him find mental health services in the Region for a child that needs support. He connects with the provider directly and makes his follow up appointment at the same location as the provider service location.

Project

Data Management Technology Enablement

Ali has a tool that is boot-strapped to the transactional application which he uses to enter client information. The tool informs him of the level of data quality of his report, as he is completing it. This way Ali is fully informed of the data quality he contributes towards.

Project

Citizen Data Science

Mira is able to share her insights with the community and host a workshop that increases citizen data literacy. Her passion for open data is shared with a local school, and she is inspired by the ideas that students bring forward on how to improve social services in the Region.



Foundational Enablement



Building on the foundation

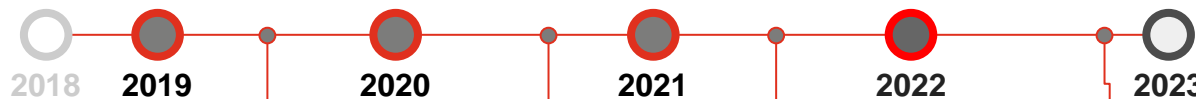


Business Project

Impact of Projects to Personas: External Partner



Jonathan is an inspector working with the city of Markham. He inspects building permits, and must have clear oversight into zoning requirements, conservation authority laws and utility information when conducting construction and building inspections. He relies on having a single source of truth regarding all these data sets, and being able to access them securely using one platform. Jonathan also manages the needs of his team such as getting them access to facilities, route optimization, task allocation, and prioritizing inspections. To improve the team's efficiency he knows he must look to data.



Project
 **Data Coop**

Jonathan's team is able to seamlessly share quality data within the Data Coop. His team works with the Region to create an integrated view of building permits within York Trax.

Project
 **Open Data Platform Enhancements**

Through York's new Open Data website, Jonathan's team is able to drag and drop reusable artefacts for an Open Data application created by Community and Health Services to help with the prioritization of restaurant inspections and tailor it so that his team's work orders are equitably prioritized.

Project
 **Partnership Development**

Jonathan's wife Karen, a University Professor, is able to access and share data as a part of the Data Coop. Karen uses this data to have her students conduct their capstone projects using Regional data to solve community challenges. These projects are shared with the Region and one of them is turned into a program within the Region, focused on tailoring service offerings to seniors.

Project
 **Community Digital Literacy**

Jonathan is able to create a partnership with York Region to join the York Digital Academy. His staff now have access to training materials through the Digital Academy, and he is able to jointly fund this venture by splitting the cost with 6 other municipalities. His staff feel empowered, supported and encouraged by working on projects that are of interest to them.

What is the return on investment for executing on the D&A Master Plan?

The investment required to realize the return on investment is the modification in orientation required to incorporate enterprise requirements and needs into a departmental project. Since the vast majority of projects used in the Master Plan were already on departmental / branch work plans, resources were already secured. Therefore, the investment required is the difference between already dedicated resources and what is required for those initiatives to represent a wider, enterprise disposition.

Examples of some of the benefits intended, using an enterprise disposition to project execution, have been illustrated through the various personas on the previous slides.

Each of these benefits must be tracked and monitored to ensure that it represents the benefits intended and can be fully realized.



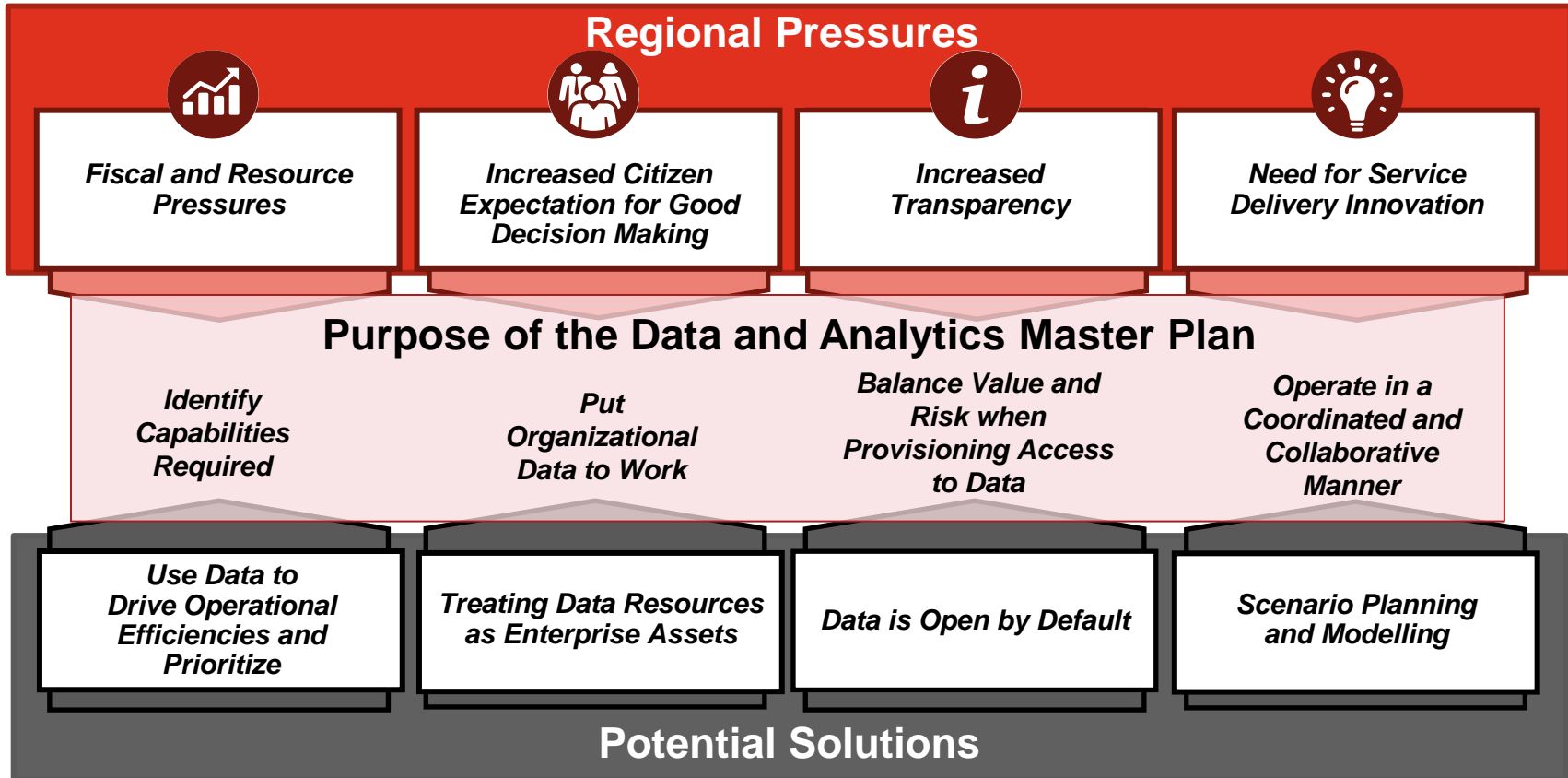
Section 5: Risk Analysis

What is a Risk Analysis?

The purpose of a risk analysis is to identify potential problems before they arise and identify risk-handling activities that can mitigate the risk.

This risk analysis includes:

- The context of the Data and Analytics Master Plan, including the Regional pressures and challenges
- An identification of the risks associated with delivering the Master Plan, through the Strategic Influence Buy-In Model (4 Box Model), as well as project risks and lessons learned from previous projects
- An assessment and categorization of various risks
- Suggested mitigation tactics to lower the overall risk profile of implementing the Master Plan



Regional Pressures



Fiscal and Resource Pressures

- Misalignment in services offered to the community
- Burnout and staff morale associated with delivery
- Fiscal constraints will require reactive mitigation



Increased Citizen Expectation for Good Decision Making

- Making decisions in the absence of good data
- Continued focus on measuring activity rather than outcomes
- Applying decisions in a siloed manner when a holistic view is required
- Sharing clear rationale to why decisions are made



Increased Transparency

- Data is not effectively shared to support decision-making
- Potentially inconsistent and poor quality data being used and consumed
- Erosion of citizen confidence due to suboptimal decisions



Need for Service Delivery Innovation

- Inability to determine the impact of changing services or service delivery
- Inability to identify potential efficiencies
- Limiting the agility and flexibility in priorities and tools

RISKS

4 Box Model - The Risk of Status Quo

+ Advantages

+ Advantages

Status Quo

<p><i>4. What is good about the current model that we will preserve?</i></p> <ul style="list-style-type: none"> ● Department autonomy for their work plans and business needs (i.e. control of their transactional systems, data quality thresholds) ● Pockets of excellence will be nurtured and sustained ● Strong regional interest to collaborate with external partners, especially local municipalities, will continue 	<p><i>2. What are the benefits of the Master Plan?</i></p> <ul style="list-style-type: none"> ● Fostering a unified approach to enhancing D&A ● Creating operational efficiencies through collaborative and coordinated efforts ● Supporting stakeholders required to make informed decisions with access to the right data, tools, and talent to deliver cost effective, high quality services ● Establishing a robust data management foundation with consistently trusted, usable data for multiple purposes (i.e. scenario planning, reporting, etc.)
<p><i>1. What is the case for change?</i></p> <ul style="list-style-type: none"> ● Fiscally restrained current state requires a better understanding and use of existing resources ● Absence of horizontal collaboration for strategic direction on data challenges ● Lack of enterprise data governance to support appropriate, timely access and effective use of data ● Limited data literacy and capabilities ● Limited use of data collected due to poor / unknown data quality 	<p><i>3. What concerns may exist?</i></p> <ul style="list-style-type: none"> ● Trade-offs related to initiative / project execution will occur ● A new mindset of working together towards shared objectives / goals, rather than departmental ones ● A new operating model for program, projects and service delivery will need to be adopted ● Mature departments may find it resource-intense to support less mature departments

Change

- Disadvantages

- Disadvantages

Through a preliminary risk analysis, using our experience working with the Region, past projects, and insights from Regional staff, the following risks were grouped and identified:



Leadership and Strategic Oversight

Corporate Initiatives at the Region have a need for consistent, aligned and sustainable leadership that will endorse the project while providing strategic oversight.



Strategic Alignment

In order for the departments to develop foundational components that will be adopted by the enterprise, there needs to be alignment at all levels of the organization on programs and project activities.

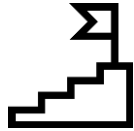


Communication and Collaboration

To deliver foundational enablement elements in a coordinated manner with business projects stress testing enablers, a logical sequence of activities is a focus.

Risks Identified - Leadership

The following risks were identified for the leadership and strategic oversight category. The risks are numbered, and these numbers are used within the risk assessment.



1. Departmental work plans can divert focus and investments from Master Plan projects.



2. Obtaining a holistic view of the Master Plan is difficult. Tracking projects may be complex, due to modifications made to departmental projects (e.g. changes to project activities, timelines, and RACI).



3. If responsibilities and accountability are not clarified, delivering the project on time and within budget will be difficult.



4. Competing corporate and departmental priorities may limit a sustained commitment and resource availability to deliver the Master Plan.

Risks Identified - Strategic Alignment

The following risks were identified for the strategic alignment category. The risks are numbered, and these numbers are used within the risk assessment.



5. If the business value to a project is not clearly articulated, benefit realization is at risk.



6. Without a clear understanding of stakeholder needs, DLT and departmental / branch specific priorities may not be shared, limiting resource investment and overall commitment.



7. Similar initiatives across various departments risk a high use of resources, increased duplication, and lead to narrowly defined solutions when other departments can benefit.

Risks Identified - Communication and Collaboration

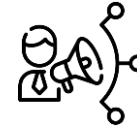
The following risks were identified for the communication and collaboration category. The risks are numbered, and these numbers are used within the risk assessment.



8. Data and analytics functions and services may not be clearly defined, readily available and trackable.



9. A large volume of diverse stakeholders without a clear objective can risk delivering projects on time.

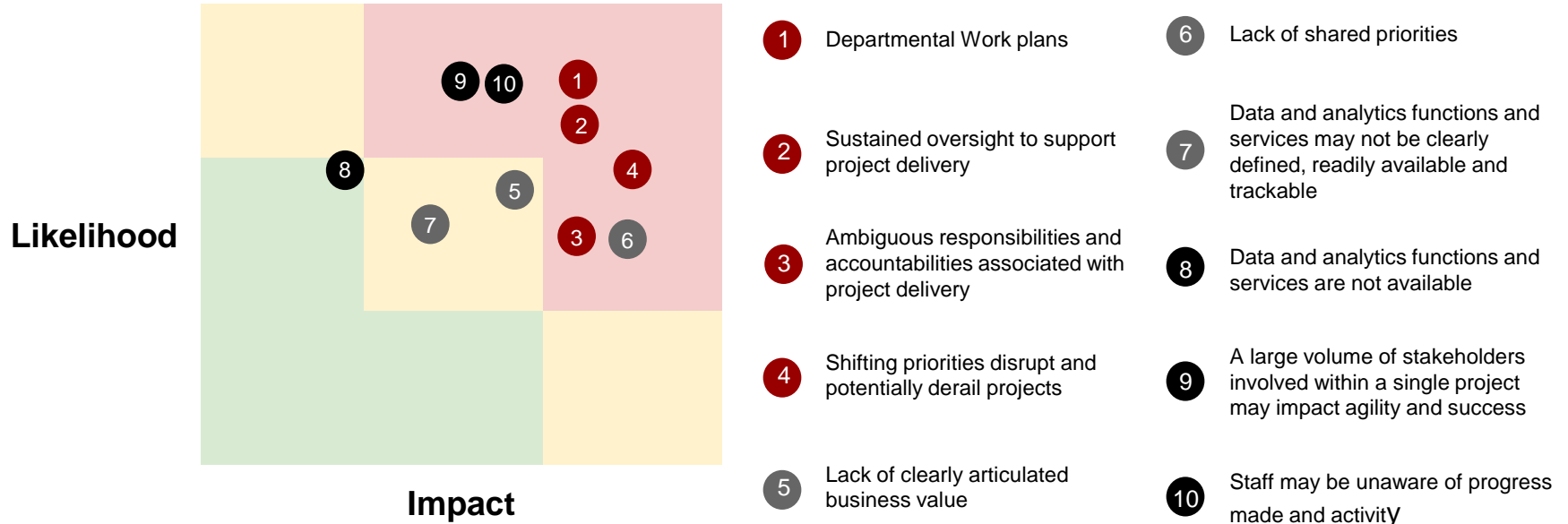


10. Staff not being aware of activities and / or progress made on the D&A Master Plan detract the value of the Service offerings.

Risk Assessment - Risk Profiles Prior to Mitigation Tactics

Using a risk assessment model the risks identified were analyzed for the **likelihood** of the risk occurring and the **impact** it could have on that project and overall Master Plan.

We recommend conducting an in-depth Risk Assessment with the Program team once the execution of the Implementation Plan has kicked off. The risks below correspond to the risks outlined in previous slides.



Risks and Mitigation Tactics - Leadership

Risk

Mitigation Tactic



Departmental work plans can divert focus and investments from Master Plan projects



Solicit support from the CAO and Commissioners to undertake this initiative and monitor progress.

DLT is provided dedicated resources to ensure focus is sustained and a trade off mechanism for prioritizing Commissioner needs is established.



Obtaining a holistic view of the master plan is difficult. Tracking projects may be complex, due to modifications made to departmental projects (e.g. changes to project activities, timelines, RACI)



DLT must consistently check-in to determine if the projects are on track; having this project as a standing agenda item would be highly beneficial for 2019. A dedicated PMO should be assigned to this initiative and RAID logs must be consistently maintained.

Consider incorporating portion of the Master Plan into Performance Appraisals for DLT members.



If responsibilities and accountability are not clarified, delivering the project on time and within budget will be difficult



The impact of the project's outlined must be clearly understood and existing project plans for projects on the D&A Master Plan should be updated with staff members assigned to components.



Competing corporate and departmental priorities may limit a sustained commitment and resource availability to deliver the Master Plan



Consider and communicate disruptions or urgent priorities which impact the Master Plan delivery.

Continue to have “trade-off” conversations related to the implementation plan, where projects can be sequenced differently but still support the same outcome and aspiration.

Risks and Mitigation Tactics - Strategic Alignment

Risk

Mitigation Tactic



If the business value to a project is not clearly articulated it risks benefit realization of the initiative



Each foundational enablement program is tethered to one or more business projects which require those functions in order to deliver the project. This will provide tangible business value to all foundational components.



Without a clear understanding of stakeholder needs, DLT and departmental / branch specific priorities may not be shared, limiting resource investment



An in depth current state assessment was conducted, identifying key challenges related to data and analytics across all departments / branches. Projects within work plans were also used to identify the needs of stakeholder groups.



Similar initiatives across various departments risk a high use of resources, increased duplication, and lead to narrowly defined solutions when other departments can benefit from a more comprehensive approach



Similar initiatives on work plans have been consolidated to focus on enterprise foundational enablement of specific data and analytics services, that can then be scaled across to others.

Risks and Mitigation Tactics - Collaboration and Communication

Risk

Mitigation Tactic



Data and analytics functions and services may not be clearly defined, readily available and trackable



Each function and service has an owner who is accountable and / or responsible. A function delivery model template has been created. An initiative exists to define all functions and services.

Based on the data and analytics areas of strength identified, function accountability and service responsibilities were distributed amongst the departments / branches.



A large volume of diverse stakeholders without a clear objective can risk delivering project on time



A diverse group of stakeholders are involved in delivering on each program, ensuring the foundation is flexible enough to accommodate for varying departmental needs.



Staff not being aware of activities and / or progress made on the D&A Master Plan detract the value of the Service offerings

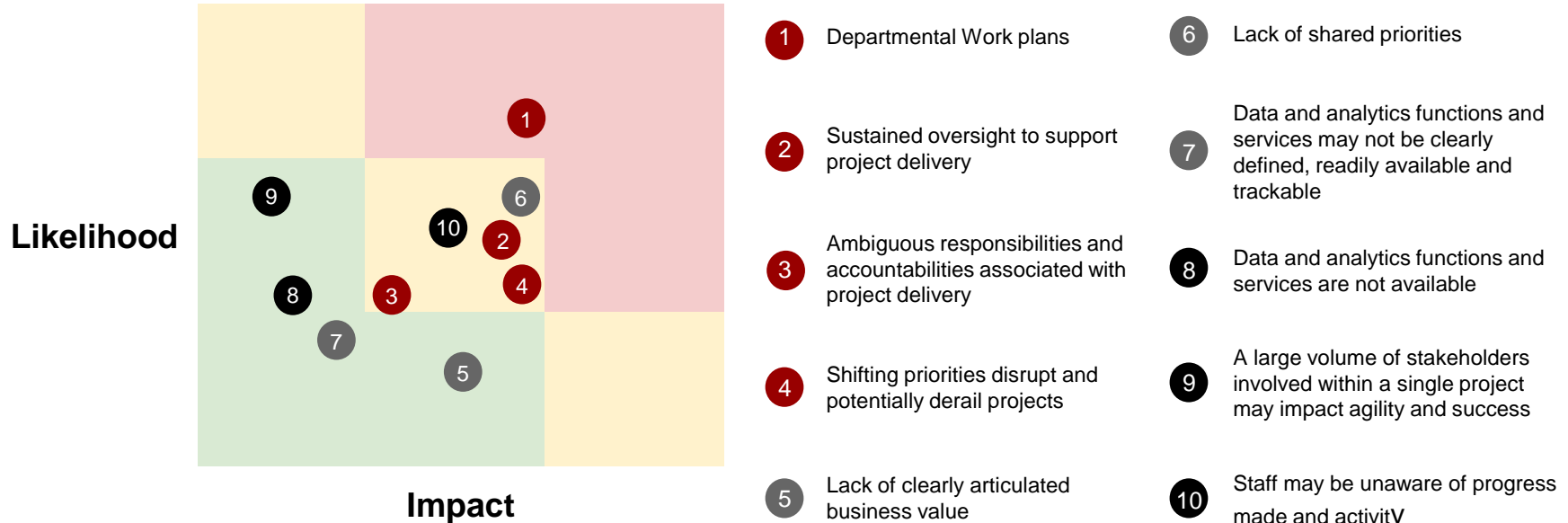


A digital service catalogue can support the organization with a one-stop-shop to see what services can be currently obtained and which services are in development for future use.

Through robust change management tactics including a communication plan, staff can be made aware of progress on executing the plan.

Risk Assessment - Risk Profiles After Mitigation Tactics

Upon using the identified Risk Mitigation tactics identified in previous slides, we identify that the risks profiles would decrease for all risks analyzed. We recommend conducting an in-depth Risk Assessment with the Program team once the execution of the Implementation Plan has kicked off.



Section 6: Change Management Plan

Our approach to change management focuses on the people, both those driving the change as well as those who will be impacted. In order to realize the full benefits of this transformation, the underlying cultural change must be supported through sustained communication, clear accountabilities, as well as learning and development opportunities. Further details on each activity associated with change management and the Portfolio Management Office can be found in the Implementation Plan spreadsheet in **Appendix C1**.



Sustained Communications

Communicating early and often, especially during the initial phases of implementation, is crucial to drive towards a successful outcome.

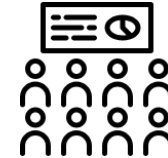
Staff want to be involved with a change that is sustained and supported by the Region, which has clear value on their daily activities.



Accountabilities

All staff at the Region have a part to play in creating a more data-informed organization.

Incorporating desired behaviours and activities into accountabilities help ensure that the changes “stick” and momentum is fostered.



Learning and Development

Improving data literacy and the Regional proficiency of D&A functions requires staff to incorporate new learnings and training into their daily activities.

Learning, development and adoption of learnings is vital to improving the data literacy and culture.



DLT Check-ins

Establishing **routine and frequent DLT check-ins** to update on progress, share challenges, and develop and deploy key performance indicators to track program success. Support DLT with trade-off mechanisms to support changing priorities.

- *Examples: A standing agenda item for DLT over the next year would be the execution of the Master Plan.*
- *Start date and Frequency: March 2019; monthly*



Digital Program Plan

Create a **digitized work plan and service catalogue** where staff can track progress and service availabilities.

- *Examples: Publish service release plans.*
- *Start date and Frequency: March 2019; monthly*



Marketing and Communications

Communicate progress of the Master Plan through business project success, where novel techniques and tools were used to manage data better, conduct analyses and find operational efficiencies.

- *Examples: Create marketing materials and videos to share benefit stories. Road show business projects successfully using D&A services.*
- *Start date and Frequency: June 2019; bi-annually*



Performance Appraisals

Incorporate implementation plan components, service catalogue development and desired behaviours to foster the cultural changes required into **performance appraisals**.

- *Examples: Integrate desired behaviours into performance appraisals*
- *Start date and Frequency: February 2019; annually*



Publish Function Owners

Publish owners for D&A functions with a proposed schedule for delivery of services within.

- *Examples: Use digitized service catalogue to share function owner department / branch contact person*
- *Start date and Frequency: April 2019; quarterly*



Assign Staff Members

Leverage the implementation plan RACI to **assign specific** staff to roles.

- *Examples: Tag staff member to specific deliverable or milestone.*
- *Start date and Frequency: April 2019; as required*



Support Learning and Adoption

Identify **change champions** from the leadership team that communicate the value of developing data and analytics skills.

- *Examples: Incorporate messaging regarding the importance of training within SMT and DLT communications*
- *Start date and Frequency: March 2019; quarterly*



Learning Goals

Incorporate learning and development goals into the **performance appraisals**.

- *Examples: Establish 70;20;10 model for staff to secure mandated time to learn*
- *Start date and Frequency: June 2019; continuous*



Measure Data Literacy

Measure and monitor data literacy levels over time to ensure training is leading up to the desired outcomes.

- *Examples: Leverage the service catalogue intake request to trend requests versus enablement over time, to create a data literacy quotient*
- *Start date and Frequency: April 2019; bi-annually*

Key Performance Indicators for D&A Transformation

Categories

Examples



Implementation Plan

Measuring progress of the overall Master Plan (programs and projects).

- Number of:
 - Gates passed, milestones achieved, business projects executed using foundational components, foundational components refined based on business project
- Percentage of:
 - Staff impacted within business units
 - Budget variance



Service Catalogue

Measuring how well functions and their respective services are being delivered across the enterprise.

- Number of:
 - Service requests, complaints, services being redesigned
- Percentage of:
 - Services available, services being met within time specified by SLA, services delivered through intake method, services completed correctly the first time
 - Average service quality rating (net promoter score), average time saved through service delivery model



Behaviours and Culture

Measuring how behaviours are changing to adopt a self sustainable data informed culture.

- Number of:
 - Change agents identified within each business unit, number of energizers / ambassadors identified across the organization
 - Projects being postponed by DLT as a trade-off decision
 - Roadshows and presentations on business projects
 - Users of the Digital Academy and Open Data Catalogue (internal and external)
 - D&A Community of Practice members
 - New staff recruited / oriented to the Region's data and analytics needs
- Percentage of:
 - Regional staff trained through learning and development portal, staff assigned to corporate initiatives
 - Trained staff using their gained knowledge
 - Data literacy quotient

Section 7: Jurisdictional Scan

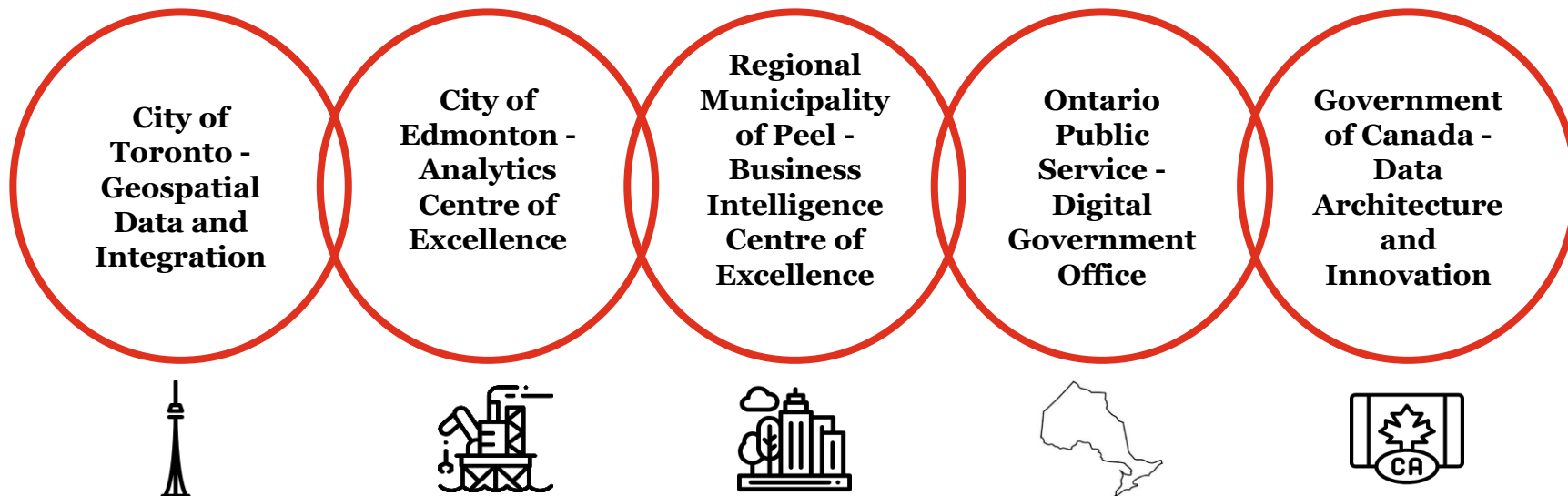
In November and December 2018, PwC conducted a jurisdictional scan investigating data and analytics capabilities across various public sector institutions including:

- City of Toronto - Geospatial Data and Integration
- City of Edmonton - Analytics Centre of Excellence
- Regional Municipality of Peel - Business Intelligence Centre of Excellence
- Ontario Public Sector - Digital Government Office
- Federal Government of Canada - Data Architecture and Innovation

A set of 14 open ended questions were developed, focusing on critical components to create a data informed organization. With this list of questions, a series of 45-minute interviews were conducted with most of the organizations listed above. Those that did not participate in an interview format provided their responses in documentation format.

Once interviews / responses were collected, PwC conducted a qualitative analysis to identify common themes and insights as well as strengths and opportunities for improvement within each organizations.

Sections of the report



Jurisdictional Scan | Key Themes



Themes

Alignment, Organization and Governance

Many organizations have not been able to establish supportive, **horizontal governance** structures which empower the workforce.

Community Engagement

Municipalities are exploring engagement opportunities with the community to help identify **real-world problems**. This enables us to generate solutions that meet citizen expectations.

Insight Focused

Aspirationally, all organizations accept that **data should be treated as an asset** but insights have the spotlight.

Foundational Priorities

Technology and info-structure continues to be a **limiting factor** in enhancing Data and Analytics capabilities. Learning and development of the existing workforce is becoming more of a **priority**.

Insights

- Federated models are commonly found but they often exist as an **unintended consequence** of a centralized body not being able to support the service needs of the organization.
- All respondents are currently focusing on or about to start a **data strategy initiative** to better support their data and analytic needs.

- Partnership with **academic institutions and the private sector** are common when identifying real-world problems.
- Some organizations support staff participating in the **community** through discussion groups, Meetups, etc.
- Establishing relationships between Regional and Local municipalities can be improve coordination of activities and knowledge sharing.

- Insights continue to be highly sought after to make evidence-informed decisions, but an understanding of the **data management practices** that are required to **support insight generation** have not been clearly articulated.
- Data management practices vary, resulting in the development of insights that cannot be consistently **reproduced and recreated**.

- Some organizations take a siloed approach to **developing solutions to symptoms, as opposed to problems**. This creates a foundation that does not enable enterprise benefits or ROI.
- More groups are using “**open**” **solutions** to resolve their challenges and / or streamline efforts.
- Academic institutions are being leveraged to **train** staff.

City of Toronto



Areas of Strength

- Training staff by leveraging local academic institutions
- Proof of concepts are well utilized
- Data “owner” is seen as a limiting term and is not used

Opportunities for Improvement

- Business value to measurement and KPIs needs to be articulated
- Procurement rules need to be modernized

Data and Analytics Leadership
CIO is leading D&A enhancements

Organizational Structure
Decentralized

Alignment, Organization and Governance

Organizational Structure

- Decentralized structure with fragmented teams across the organization - 44 divisions exist within the organization
- Currently transitioning towards a centralized model

Leadership

- No Chief Data / Analytics Officer currently exists; these functions fit under the CIO’s authority who works with individual divisions
- Open Data Master Plan has been established
- Service plans for analytics centre of excellence are in development

Insights Focused

Data used as an Asset

- Data is being used more often and efficiently to support decision-making
- A wide range of data management practices exist with portions of the organization still collecting data manually
- An enterprise business information project is underway to support metadata needs
- Best practices are well adopted compared to standards

Community Engagement

Open Data

- Data sets are being migrated from the existing catalogue to an Open Data Portal
- Features of the portal include APIs, geospatial data through Arc, data stories, data set previews, etc.
- 14 data sets exist on the open data portal, with 9 geospatial and 5 in tabular format

Foundational Priorities

Info-structure

- Procurement rules mandate a specific lifetime for a solution that is developed using a vendor. These rules focus on ROI for the individual division rather than the enterprise.
- Tools are usually acquired first, then talent is sought after. The desire is to move towards open source tools.

Data Literacy

- Broad training exists but nothing targeted to support analytics enablement. Tuition reimbursements exist for D&A talent being hired.
- The organization intends to become more measurement focused but the business value has not been well articulated.

City of Edmonton



Areas of Strength

- Data scientists have a career path established
- Roadshows are used to gain traction
- ACE's efforts focus on enablement rather than "do it for you"

Opportunities for Improvement

- Data governance / management on the data inventory can be improved

Data and Analytics Leadership

Chief Analytics Officer identified in charge of the Analytics Center of Excellence

Organizational Structure

Hybrid of Centralized and Decentralized Model

Alignment, Organization and Governance

Organizational Structure

- Hybrid model of centralized and decentralized structure exists
- As complexity and proficiency of the request increases more centralization is required
- Technology is managed centrally

Leadership

- Current Director of the Analytics Centre of Excellence is the Chief Analytics Officer, reporting into the CIO
- Mayor's office is committed to using analytics to inform the community

Insights Focused

Data used as an Asset

- Internal catalogue is well utilized and supported with a certification process to check data quality and metadata characteristics
- Directors and seniors leaders are committed to leveraging D&A
- 3 staff members are dedicated to data management efforts, including governance
- Just in time method to applying data management practices is utilized

Community Engagement

Engagement

- Single data hub for the city exists
- University students from Edmonton leverage ACE's assets
- Staff members are involved in local start-ups, universities, schools, and other discussion groups which help identify real-world problems / solutions
- Existing data catalogue has over 300 data sets

Foundational Priorities

Info-structure

- Initially departments chose to deploy department-based data management practices but with ACE's more robust data management framework and support, momentum grew.
- ACE uses a vertically focused approach where the foundational enabling components are applied project by project basis.

Data Literacy

- Analytics Special Interest group meets every other month with 50-60 D&A frontline staff. Half the presentation is focused on sharing leading practices, tools, and techniques; the other half is focused on business projects that can add value to the business units attending the session.

Region of Peel



Areas of Strength

- An enterprise business intelligence strategy was developed with a focus on value generation through proof of concepts
- The Peel Data Center has a well maintained data dictionary

Opportunities for Improvement

- A governance structure needs to be established
- Data sharing practices are limiting

Data and Analytics Leadership:
Commissioner of Digital and Information Services

Organizational Structure:
Decentralized with a Center of Excellence to support building enterprise capabilities

Alignment, Organization and Governance

Organizational Structure

- Decentralized structure with a BI Center of Excellence supports enterprise initiatives, with staff with D&A skills in a few other service areas
- Currently piloting a new hub and spoke operating model

Insights Focused

Data used as an Asset

- Parts of the organization share data more readily than others. Privacy is sometimes used as a rationale not to share.
- Staff are interested in using data for action-ability
- Collaborative approaches to improving service efficiency are becoming more widely adopted. A project focused on Homelessness in Peel is an example of collaboration across different service areas to support a term of council priority.

Foundational Priorities

Info-structure

- Communication between departmental leadership regarding BI requirements needs to occur more often and consistently.
- Enterprise Business Intelligence Strategy identified a need for an “Enterprise Standardized, Locally Optimized” approach to a strong foundation.

Leadership

- No Chief Data / Analytics Officer currently exists; functions are under the Commissioner of Digital and Information Services.
- An Enterprise Digital Strategy and Enterprise Business Intelligence strategy are in place to transform service delivery

Community Engagement

Open Data

- An open data website is currently being piloted by the Peel Data Center
- An enterprise-wide understanding or agreement on data being open by default is not yet established

Data Literacy

- There is currently a limited amount of formal data management, data reporting and data analytics training offerings within the Region.
- Understanding of data and analytics concepts varies across the enterprise.

Ontario Public Service



Areas of Strength

- Communities of Practice conduct ad hoc training for OPS staff
- Well-connected internal data sharing platform

Opportunities for Improvement

- Varying levels of maturity among ministries
- No central data governance structure and policies exist

Data and Analytics Leadership

Corporate Chief Information Officer, Chief Digital Officer, and the Chief Privacy Officer sharing components of the D&A portfolio

Organizational Structure

Decentralized

Alignment, Organization and Governance

Organizational Structure

- Federated model exists, with each ministry developing their own organizational structures for program area analytics support
- At a Ministry level internal divisions, branches or units exist building data and analytics, or business intelligence competencies

Insights Focused

Data used as an Asset

- Limited formal recognition of data as a corporate (provincial-level) asset, meaning policies typically vary from ministry to ministry
- Data governance committees and policies exist at a ministry level, not a provincial level
- Value from data is derived from faster decision-making, an increase in data/evidence-based decision-making, improved efficiencies and workflows

Foundational Priorities

Info-structure

- CollabON is in the process of linking to local / program-specific data holdings to provide a one-window view for employees into data holdings across the OPS.
- Data exists in varying formats on varying portals, and is consolidated annually to update the public catalogue.

Leadership

- No Chief Data / Analytics Officer currently exists; there are select executive positions related to data and analytics within some ministries
- In February 2019 Ontario launched public Data Strategy consultations

Community Engagement

Open Data

- Open Data Directive in 2016 requires data to be inventoried and shared publicly
- Ontario has an enterprise level public data catalogue that lists data in the custody and control of government ministries
- Ministries and agencies individually maintain public data catalogues on which the data is available for consumption

Data Literacy

- Foundational data and analytics curriculums exist within specific program areas.
- Certain ministries have created formal data and analytics working groups dedicated to promoting and providing data literacy to their staff.
- No corporate curriculum to train staff on advanced capabilities exists.

Federal Government



Areas of Strength

- Data strategies have been established or are underway, focusing on people development
- Stewards and custodians are being identified for some data assets

Opportunities for Improvement

- Departmental views stagnate data management efforts
- A federated model makes collaboration difficult

Data and Analytics Leadership

A discussion for a CDO / CAO is underway

Organizational Structure

Federated Model

Alignment, Organization and Governance

Organizational Structure

- Federated model exists with communities of practice within departments
- Data strategies are mostly being developed at a departmental level
- Management accountability frameworks enforce alignments into the greater corporate need

Insights Focused

Data used as an Asset

- There is no enterprise view that exists of all the data assets used
- Some frameworks have been developed with standards and policies to support the implementation of the framework e.g. standards for the data catalogue
- A strict data architecture does not meet the changing needs

Foundational Priorities

Info-structure

- The recognition of data moving freely to support the need of the organization exists but legacy silos and structures will require a long term transformation.

Leadership

- Discussions are underway to determine the need for a Chief Data / Analytics Officer, that may exist within Stats Canada
- Data strategies focus on people and skill set development

Community Engagement

Open Data

- An open data and open government analytics portal has been established
- Over the past 6 months approximately 55,000 data sets have been downloaded
- 82, 044 data sets have been published on the portal
- Data sets that have not been published can be suggested for future publication

Data Literacy

- Stats Canada is leading the effort to improve data literacy. Modules are currently being developed which will be delivered through mandatory training programs.
- A Digital Academy has been established to increase the digital acumen of public servants.

List of Interview Questions for Jurisdictional Scan

Jurisdictional Scan Interview Questions

The following questions were asked to all jurisdictions covered in the scan above.

1. What organizational structure do you have to coordinate Data and Analytics ? (e.g. Centralized / decentralized / support branches)
2. Is there an executive position responsible for data and analytics functions?
3. How is data recognized as a corporate asset?
4. Are there standardized methods of data management in place or envisioned?
5. Is there a data catalogue? (answers could include - % completed, enterprise coverage)
6. Does the organization have, or is developing, Data and/or Analytics strategies?
7. What governance structures have been adopted? For which aspect of data and analytics? (can they share policy/strategy?) Are these governance structures adopted at both the organization and departmental level?
8. What investment has the organization made/envision in Data and Analytics technology? e.g. Data management software suite, analytics and visualization suite, etc.
9. What Data and Analytics specific training is in place, or envisioned? Is it promoted for all staff?
10. Is there a Data and Analytics specific recruitment strategy? Is this an area of concern to the organization?
11. Is data freely shared across your organization, and how did you break silos for collaboration? Is there collaboration between departments for analytics?
12. Is there a program to increase data literacy across your organization?
13. How is the value of Data and Analytics to your organization demonstrated? (e.g. business cases / KPI's, etc.).
14. Is the business value of analytics widely understood and accepted?

Appendix A: Current State Assessment Details

Function Current State, Future State and
Gap Analysis Assessment Scores

Function Based View of the Current
State Assessment

Department Based View of the Current
State Assessment

Function Current State, Future State and Gap Analysis Assessment Scores

APPENDIX A.1



Current State Function View

Dimension	Function	Maturity Score
Culture	Data Partnership	2.9
Culture	Leadership and Decision-Making	2.7
Culture	Data and Analytics Coordination	2.3
Data	Master Data Management	1.6
Data	Metadata Management	2.4
Data	Data Catalogue	2.1
Process and Governance	Data Asset Supervision	2.1
Process and Governance	Access Security and Privacy	1.9
Process and Governance	Data Governance	2
Process and Governance	Policy Standard and Procedure Development	1.8
Process and Governance	Data Quality	1.9
Process and Governance	Project Prioritization	2.5

Dimension	Function	Maturity Score
Talent and Organization	Decision Support	2.5
Talent and Organization	Advanced Analytics	2
Talent and Organization	Technology Management	2.7
Talent and Organization	Data and Analytics Training	2.2
Talent and Organization	Story Telling	2.4
Talent and Organization	Consultation Services	2.9
Technology	Extract Transform Load and Preparation	2.7
Technology	Report Generation	2.8
Technology	Data Integration	2.3
Technology	Solution Architecture	2.4
Technology	Geo-spatial Information Systems	4

Future State Function View

Dimension	Function	Maturity Score
Culture	Data Partnership	4.5
Culture	Leadership and Decision-Making	4
Culture	Data and Analytics Coordination	4
Data	Master Data Management	4
Data	Metadata Management	4.5
Data	Data Catalogue	4
Process and Governance	Data Asset Supervision	4.5
Process and Governance	Access Security and Privacy	3.5
Process and Governance	Data Governance	4
Process and Governance	Policy Standard and Procedure Development	4
Process and Governance	Data Quality	4
Process and Governance	Project Prioritization	4

Dimension	Function	Maturity Score
Talent and Organization	Decision Support	4.5
Talent and Organization	Advanced Analytics	4
Talent and Organization	Technology Management	4
Talent and Organization	Data and Analytics Training	4
Talent and Organization	Story Telling	3.5
Talent and Organization	Consultation Services	3.5
Technology	Extract Transform Load and Preparation	4
Technology	Report Generation	4
Technology	Data Integration	3.5
Technology	Solution Architecture	3.5
Technology	Geo-spatial Information Systems	4

Function Gap Analysis

Dimension	Function	Gap
Data	Master Data Management	2.4
Process and Governance	Data Asset Supervision	2.4
Process and Governance	Policy Standard and Procedure Development	2.2
Data	Metadata Management	2.1
Process and Governance	Data Quality	2.1
Talent and Organization	Decision Support	2
Talent and Organization	Advanced Analytics	2
Process and Governance	Data Governance	2
Data	Data Catalogue	1.9
Talent and Organization	Data and Analytics Training	1.8
Culture	Data and Analytics Coordination	1.7
Culture	Data Partnership	1.6

Dimension	Function	Gap
Process and Governance	Access Security and Privacy	1.6
Process and Governance	Project Prioritization	1.5
Technology	Extract Transform Load and Preparation	1.3
Talent and Organization	Technology Management	1.3
Culture	Leadership and Decision-Making	1.3
Technology	Report Generation	1.2
Technology	Data Integration	1.2
Technology	Solution Architecture	1.1
Talent and Organization	Story Telling	1.1
Talent and Organization	Consultation Services	0.6
Technology	Geo-spatial Information Systems	0

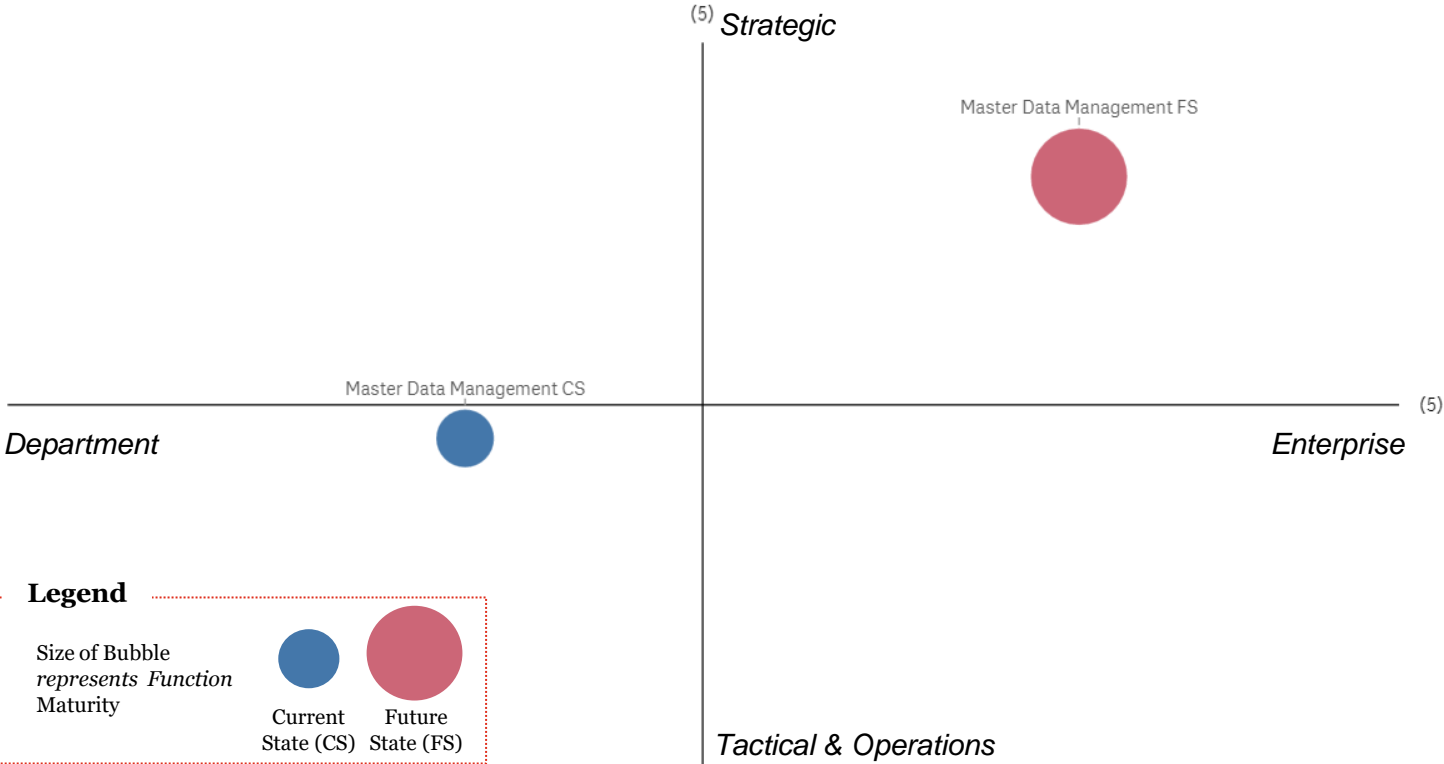
Function Based View of the Current State Assessment

APPENDIX A.2



Data – Master Data Management Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

5.7

Maturity Gap

2.4

Current State Maturity

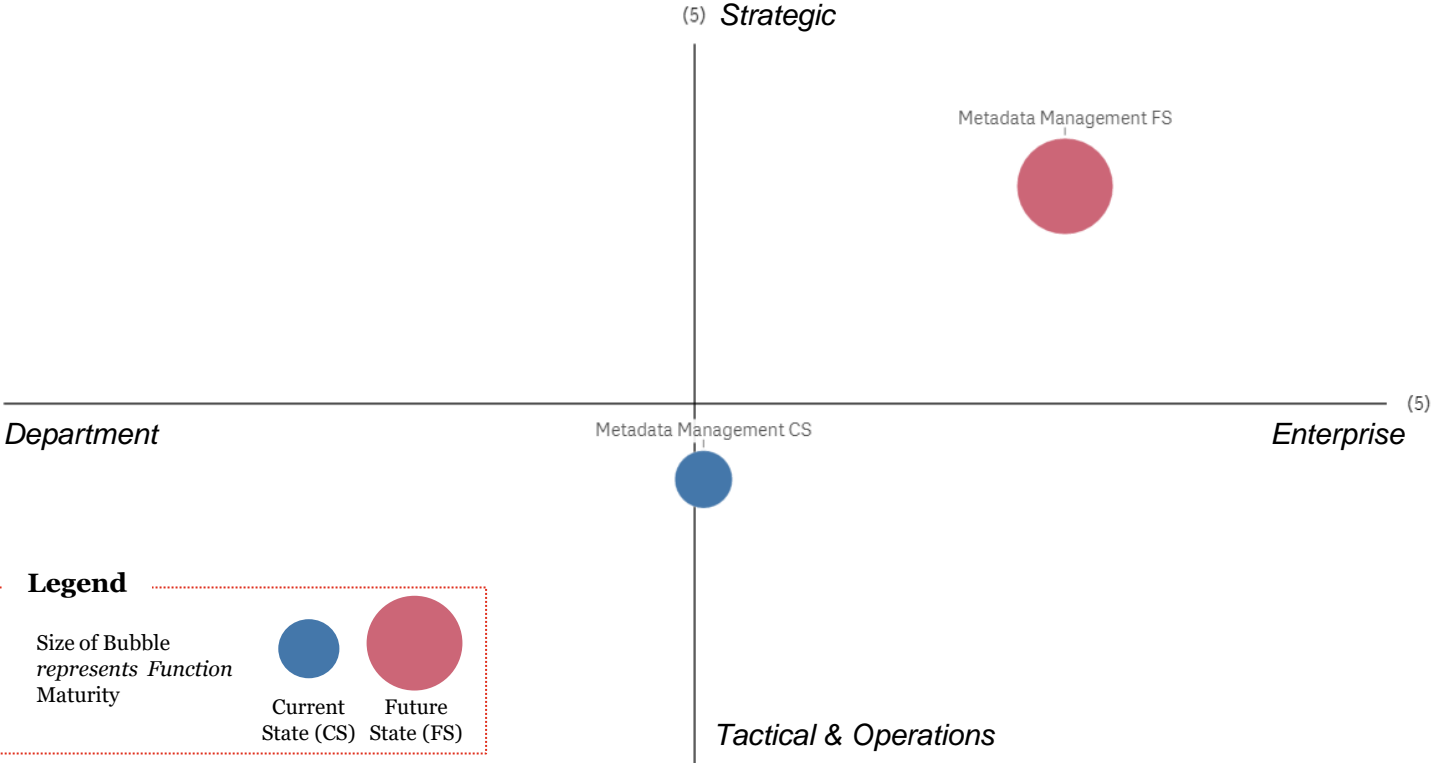
1.6

Future State Maturity

4

Data - Metadata Management Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

4.83

Maturity Gap

2.1

Current State Maturity

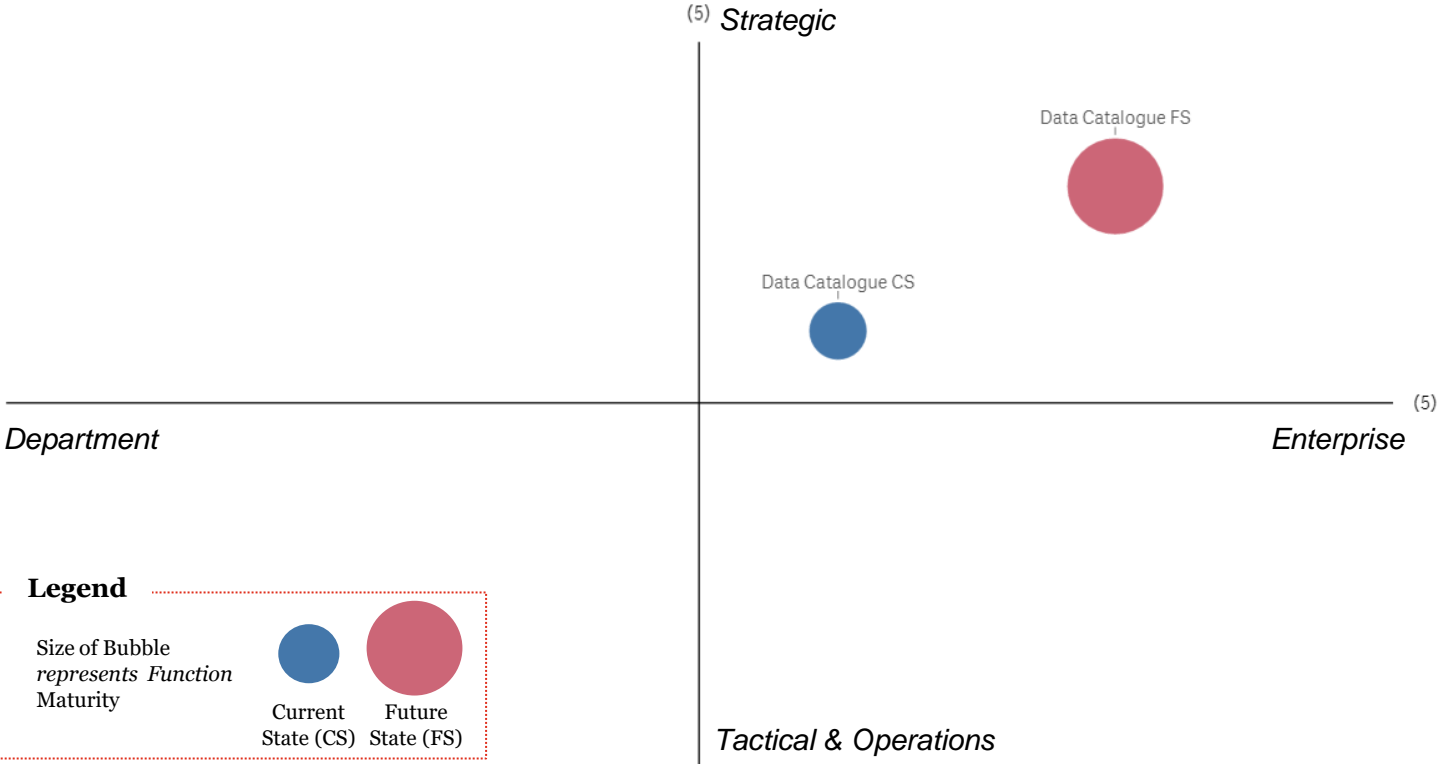
2.4

Future State Maturity

4.5

Data – Data Catalogue Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

2.83

Maturity Gap

1.9

Current State Maturity

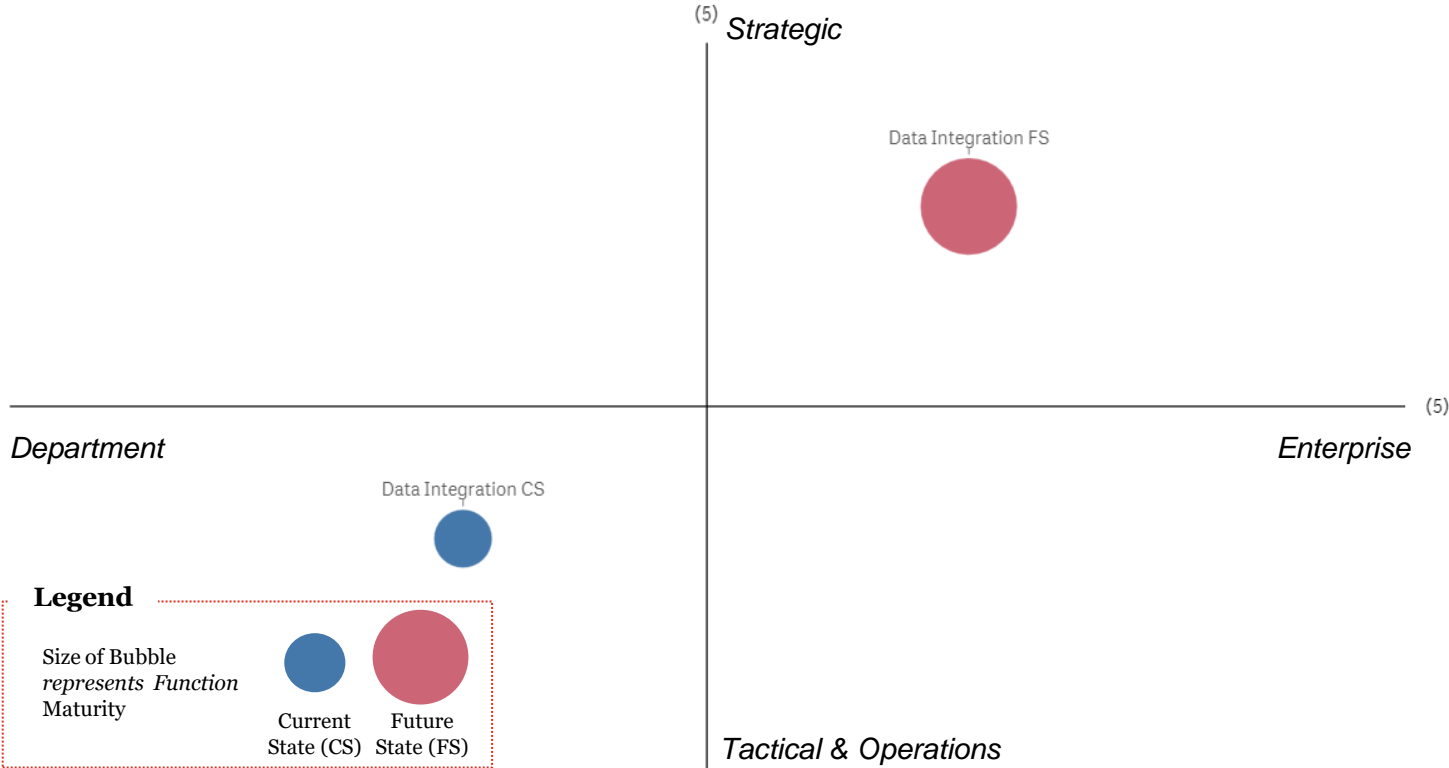
2.1

Future State Maturity

4

Technology – Data Integration Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

5.83

Maturity Gap

1.2

Current State Maturity

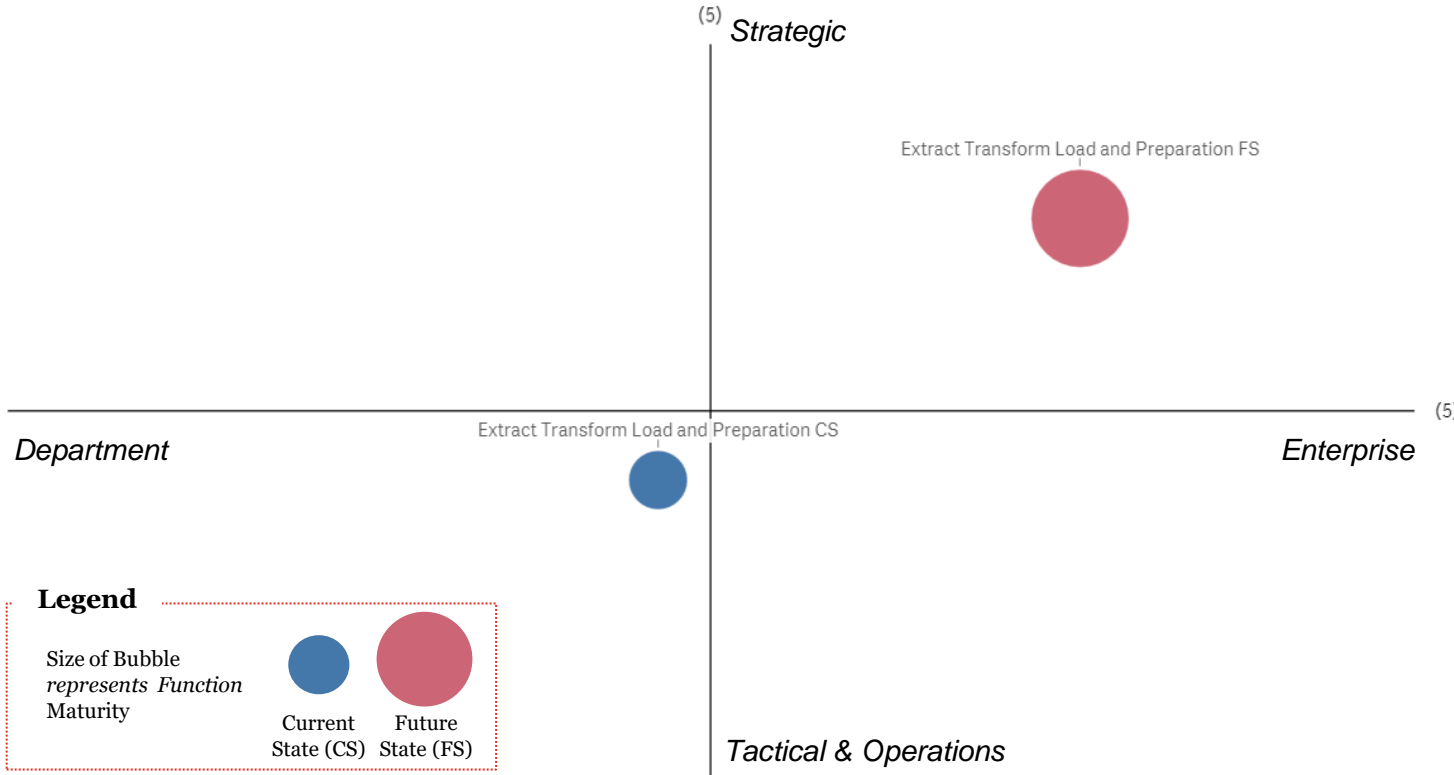
2.3

Future State Maturity

3.5

Technology – Extract, Transform, Load and Prepare Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

4.66

Maturity Gap

1.3

Current State Maturity

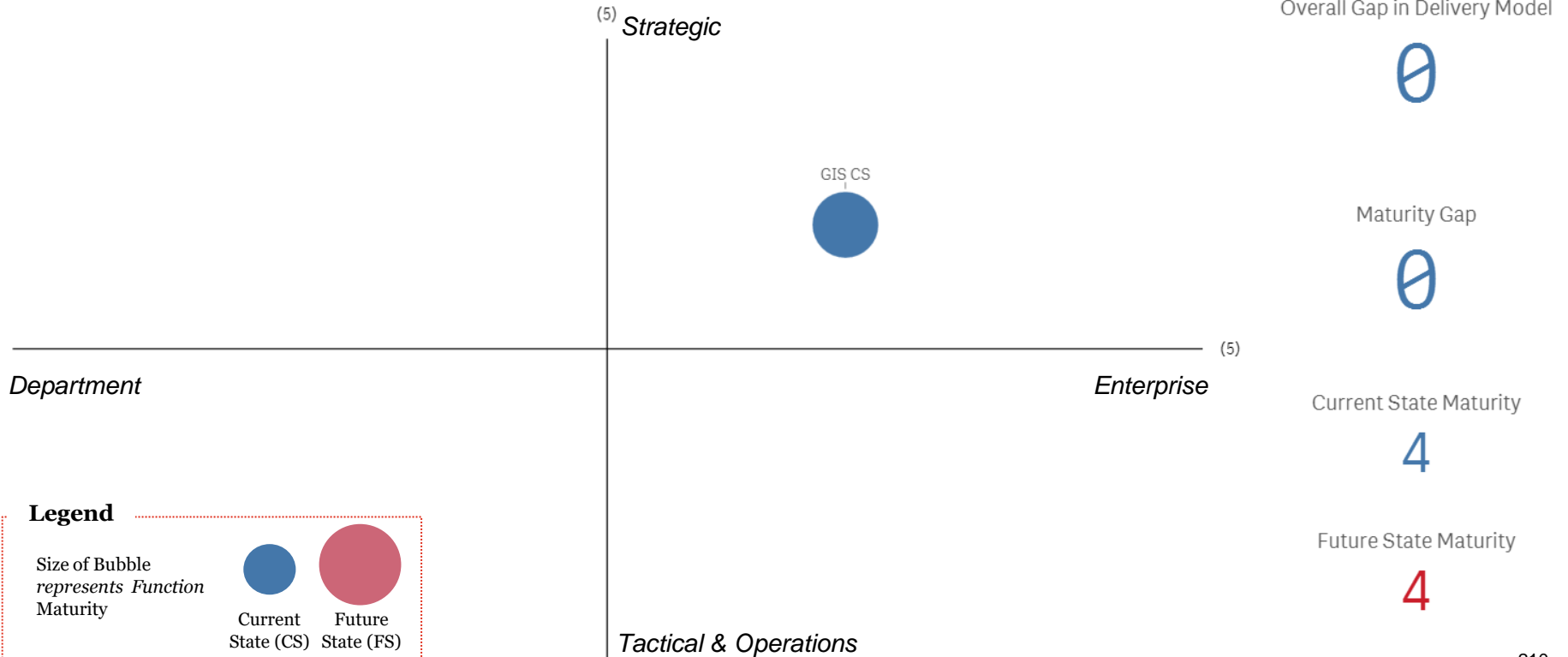
2.7

Future State Maturity

4

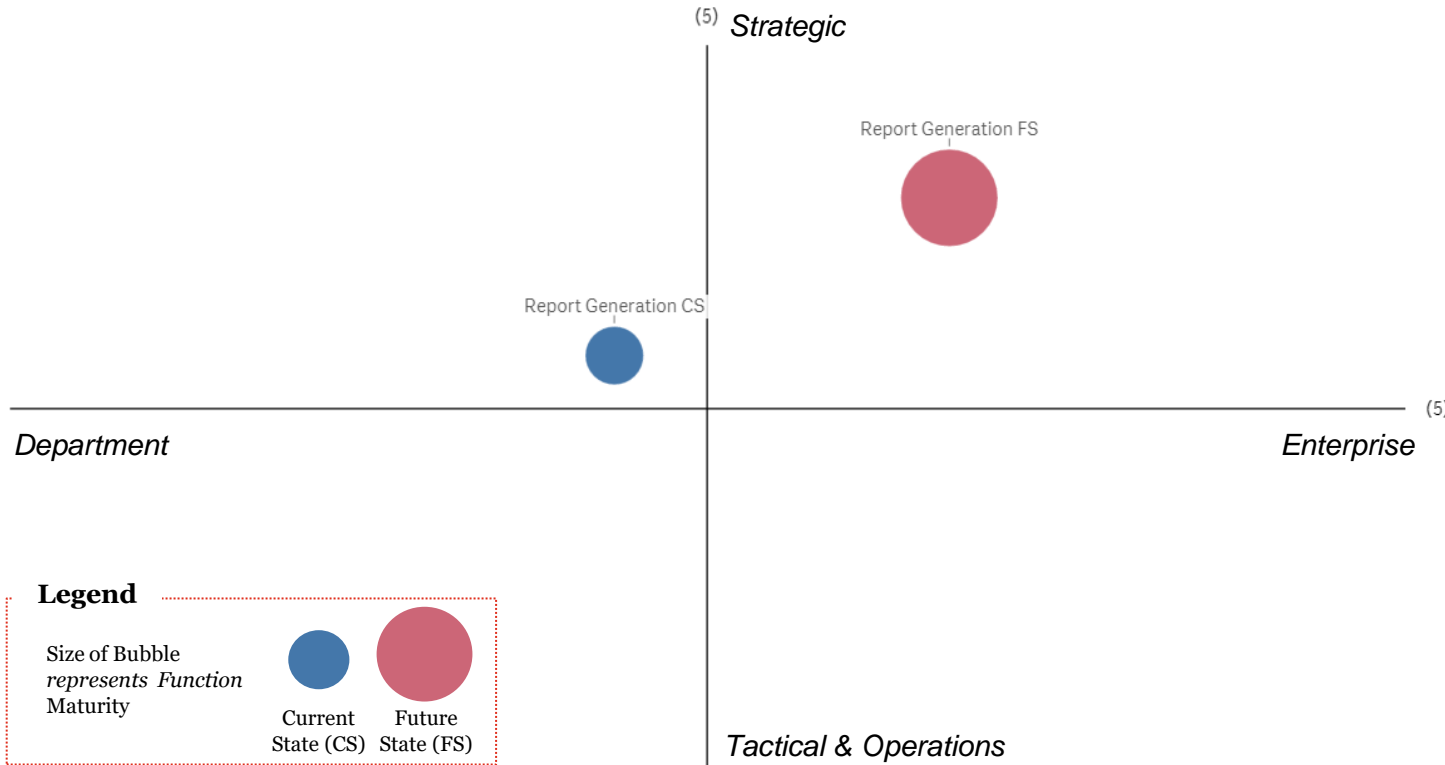
Technology – Geo-spatial Information Systems Function Summary

Delivery Model Mapping



Technology – Report Generation Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

3.23

Maturity Gap

1.2

Current State Maturity

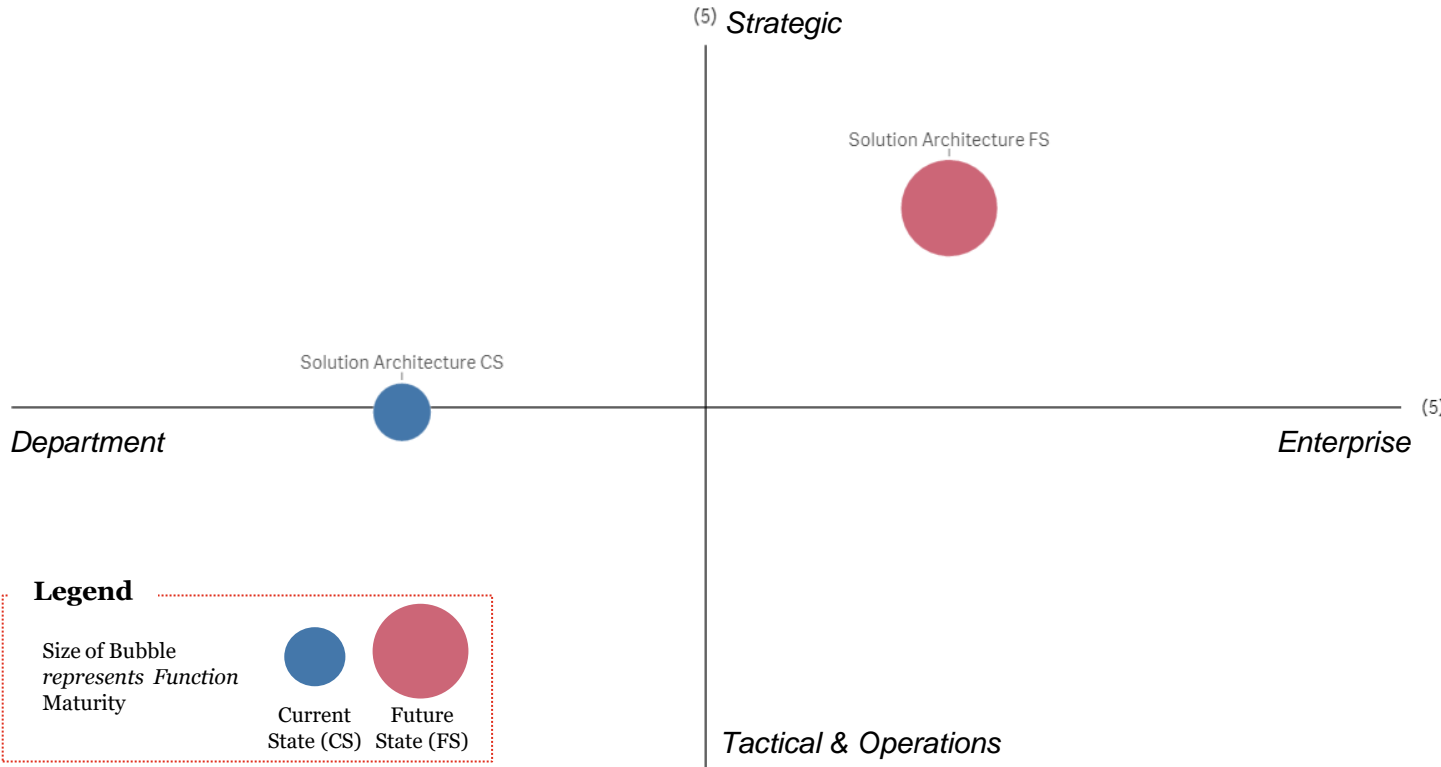
2.8

Future State Maturity

4



Technology – Solution Architecture Function Summary

Delivery Model Mapping



Legend

Size of Bubble represents Function Maturity

 Current State (CS)
  Future State (FS)

Overall Gap in Delivery Model

4.84

Maturity Gap

1.1

Current State Maturity

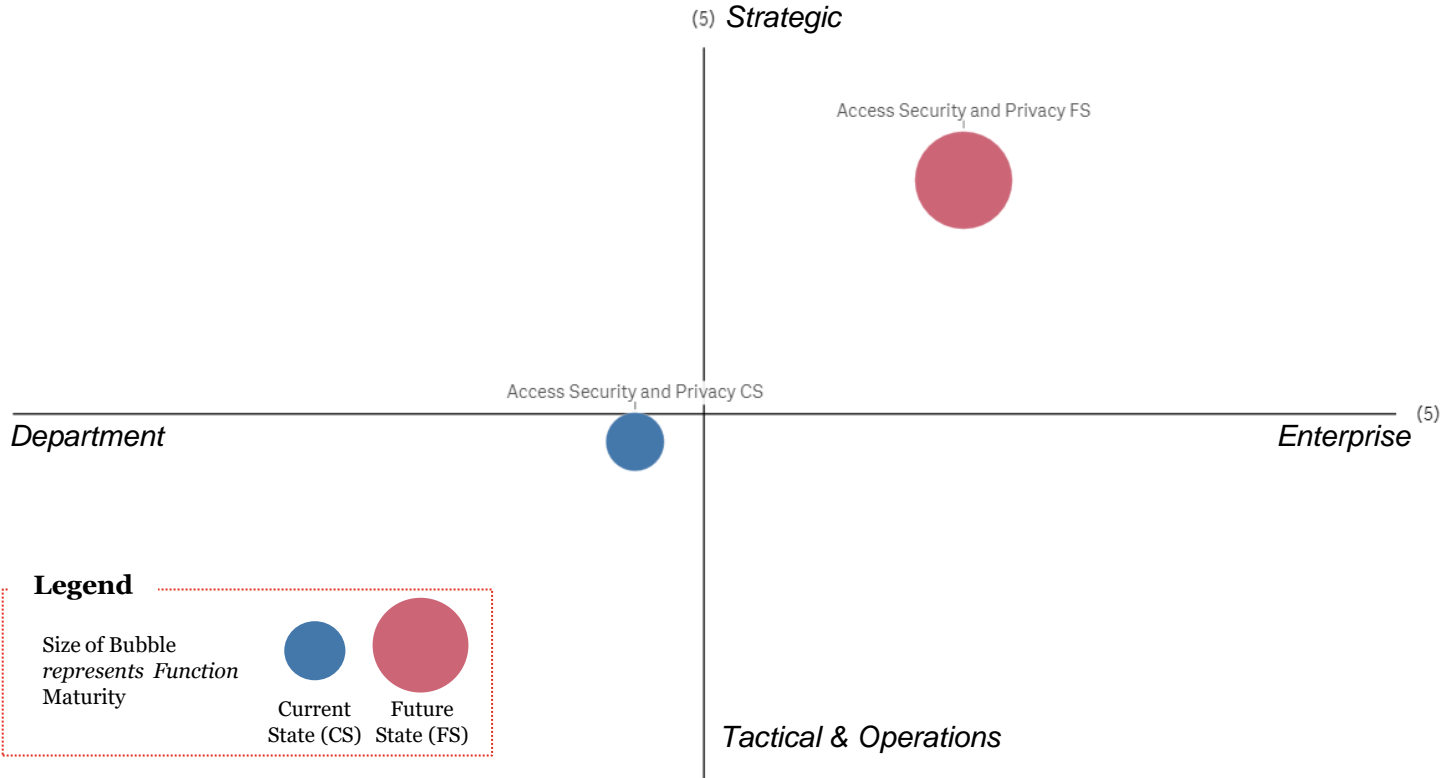
2.4

Future State Maturity

3.5

Process and Governance – Access Security and Privacy Function Summary

Delivery Model Mapping



Legend

Size of Bubble represents Function Maturity

Current State (CS)
 Future State (FS)

Overall Gap in Delivery Model

4.28

Maturity Gap

1.6

Current State Maturity

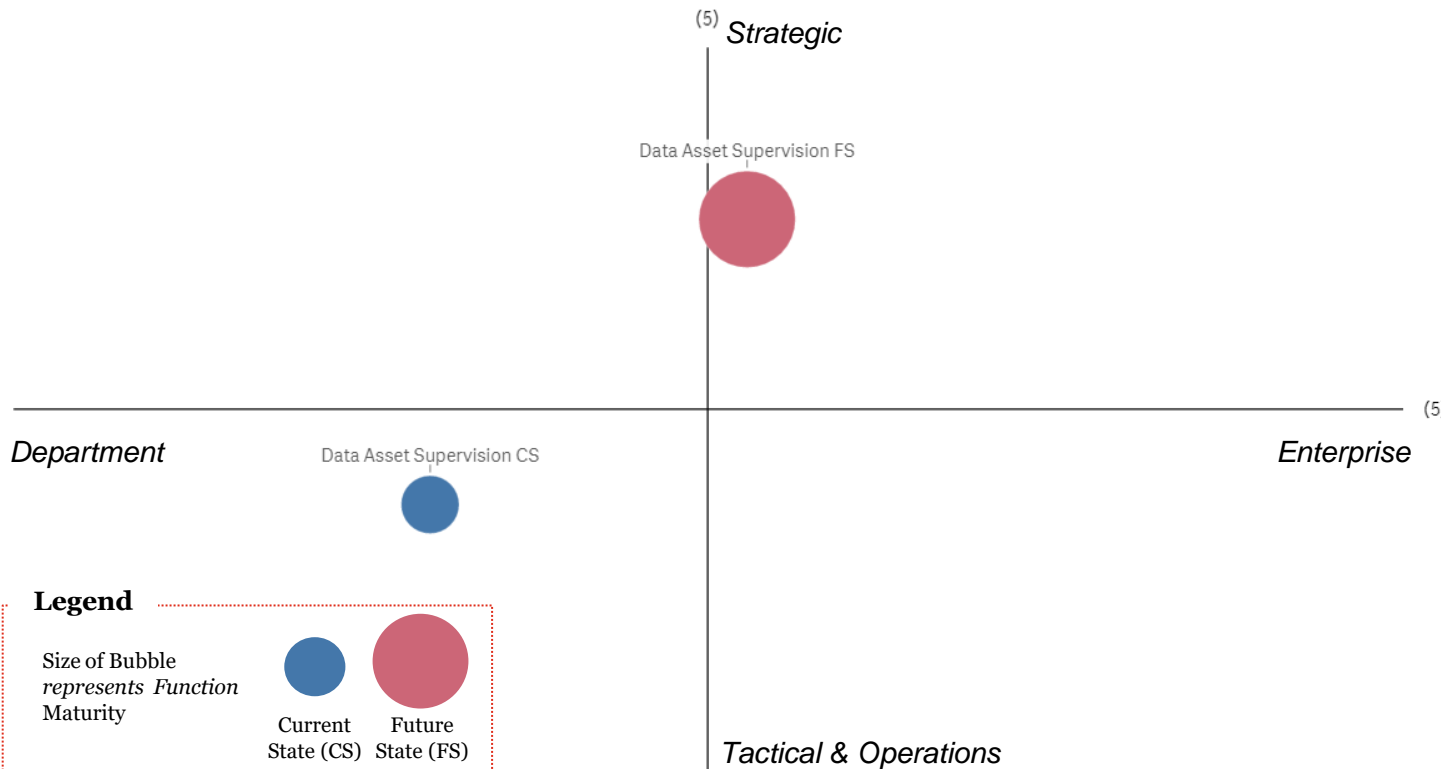
1.9

Future State Maturity

3.5

Process and Governance – Data Asset Supervision Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

4.55

Maturity Gap

2.4

Current State Maturity

2.1

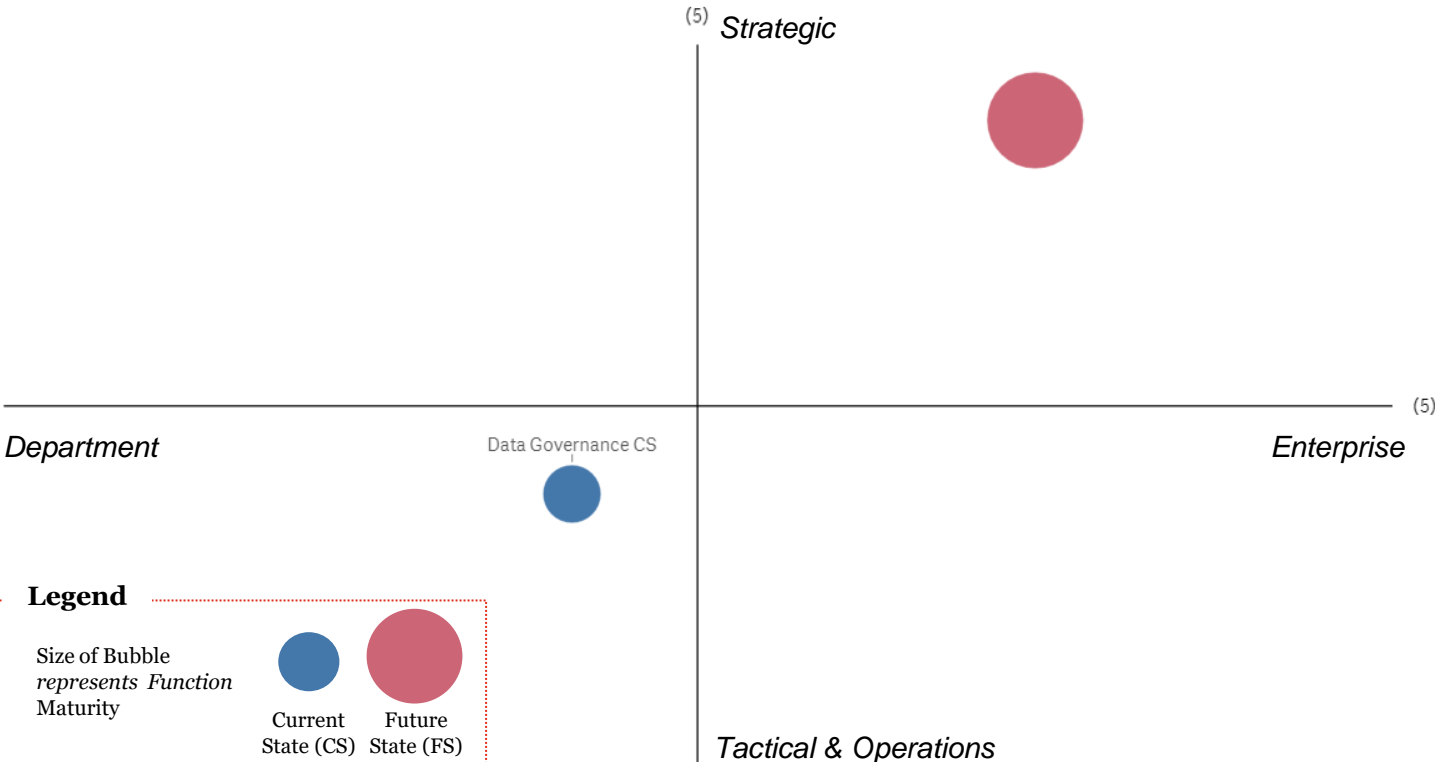
Future State Maturity

4.5

Process and Governance – Data Governance Function Summary



Delivery Model Mapping



Legend

Size of Bubble represents Function Maturity

● Current State (CS)
 ● Future State (FS)

Overall Gap in Delivery Model

6.14

Maturity Gap

2

Current State Maturity

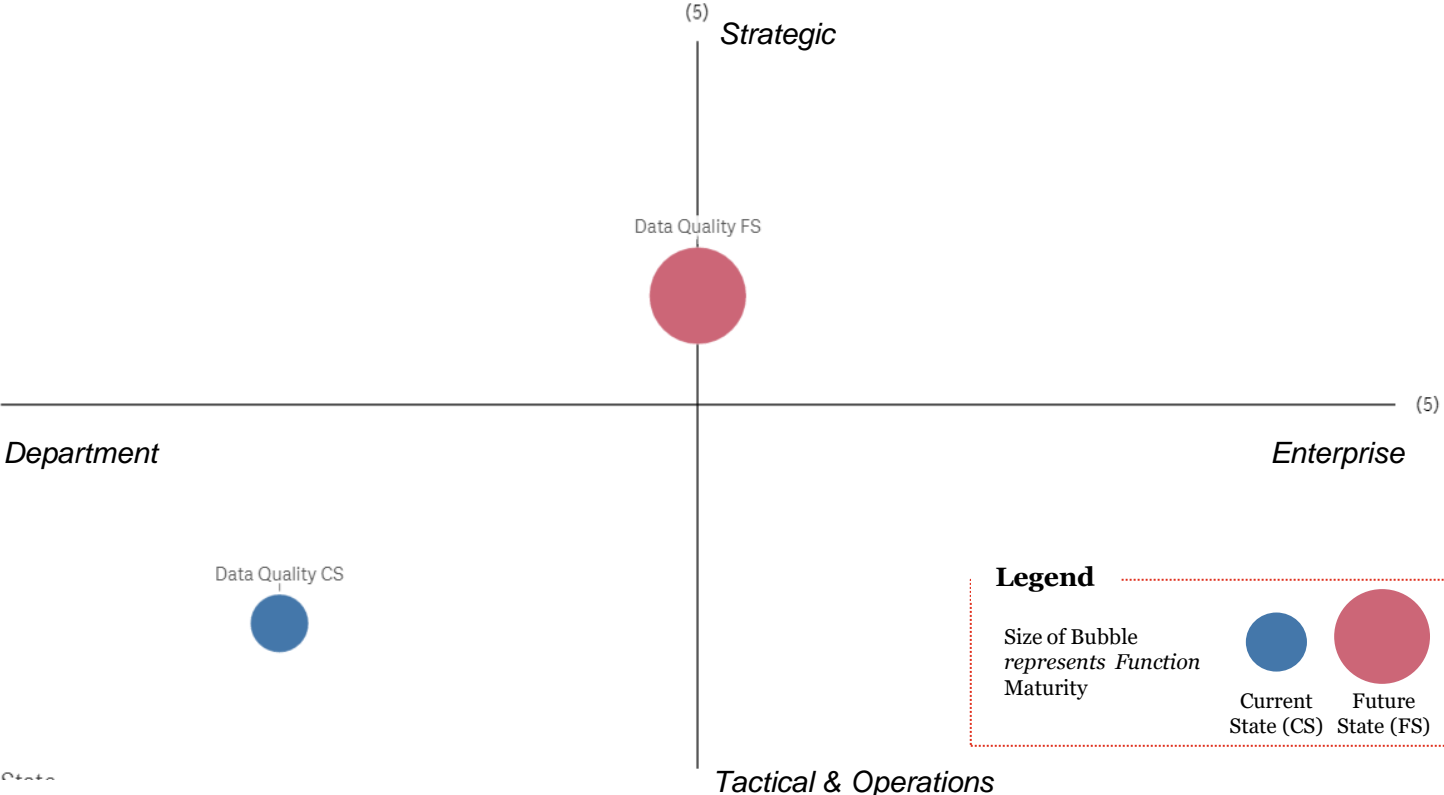
2

Future State Maturity

4



Process and Governance – Data Quality Function Summary

Delivery Model Mapping



Legend

Size of Bubble represents Function Maturity

 Current State (CS)
  Future State (FS)

Overall Gap in Delivery Model

5.41

Maturity Gap

2.1

Current State Maturity

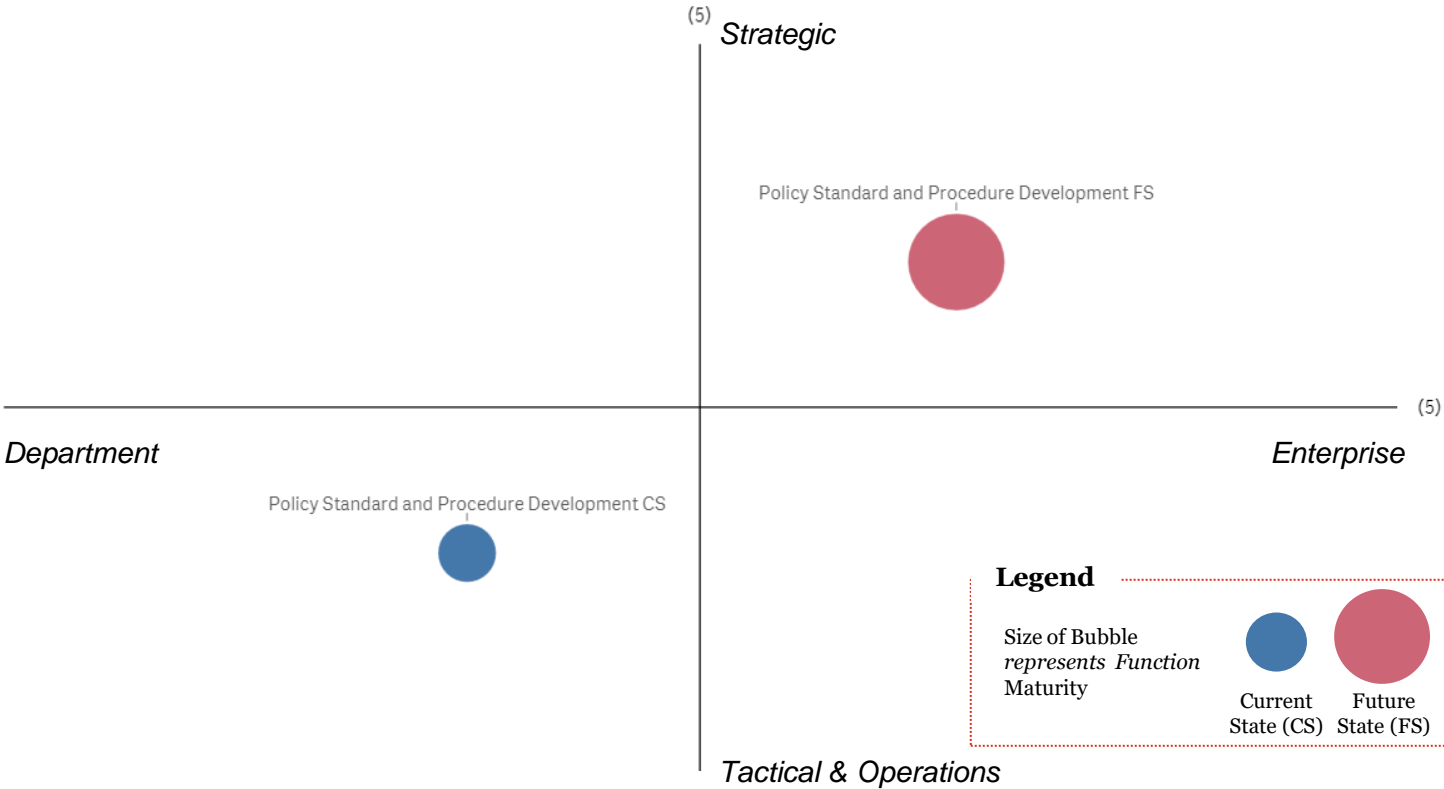
1.9

Future State Maturity

4

Process and Governance – Policy, Standard and Procedure Development Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

5.32

Maturity Gap

2.2

Current State Maturity

1.8

Future State Maturity

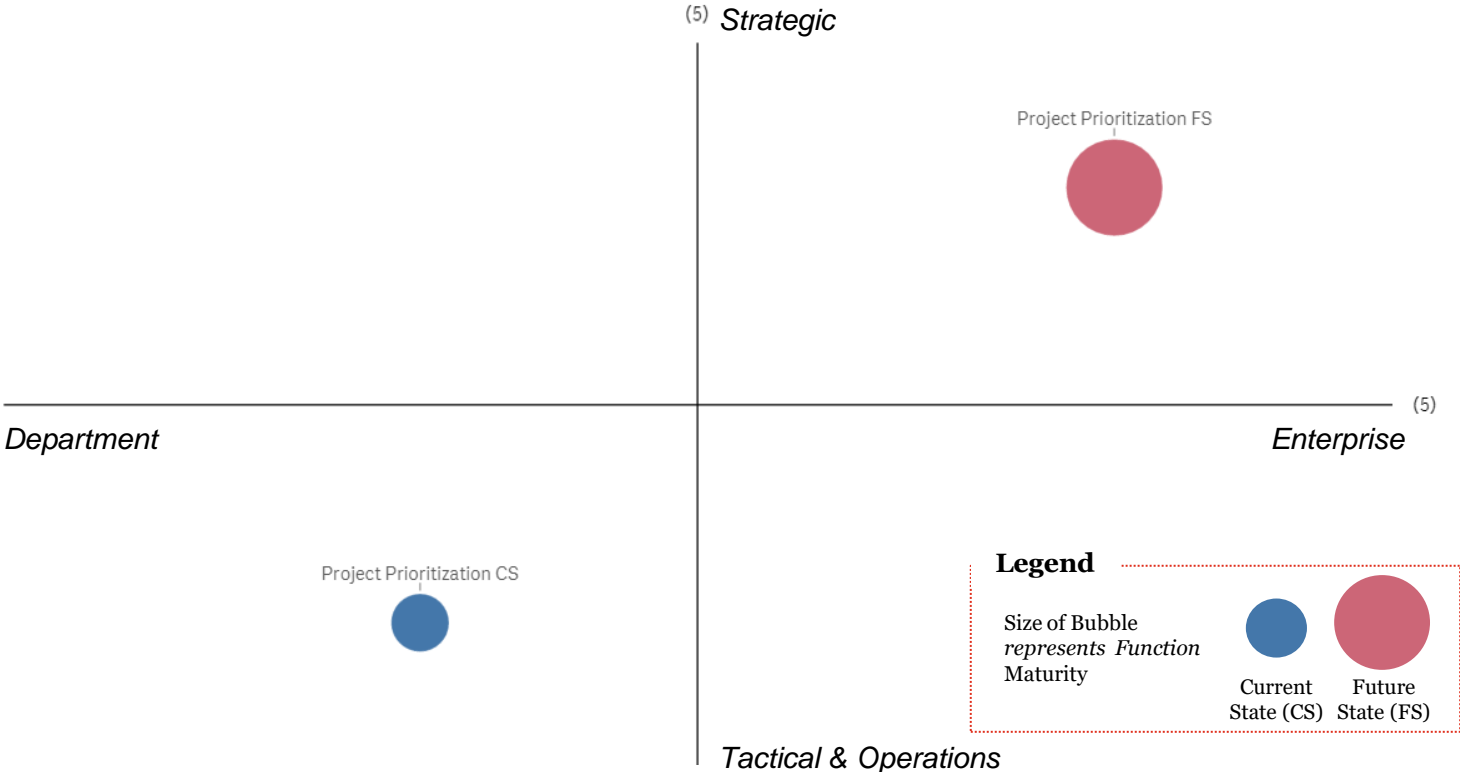
4

Process and Governance – Project Prioritization

Function Summary



Delivery Model Mapping



Overall Gap in Delivery Model

7.81

Maturity Gap

1.5

Current State Maturity

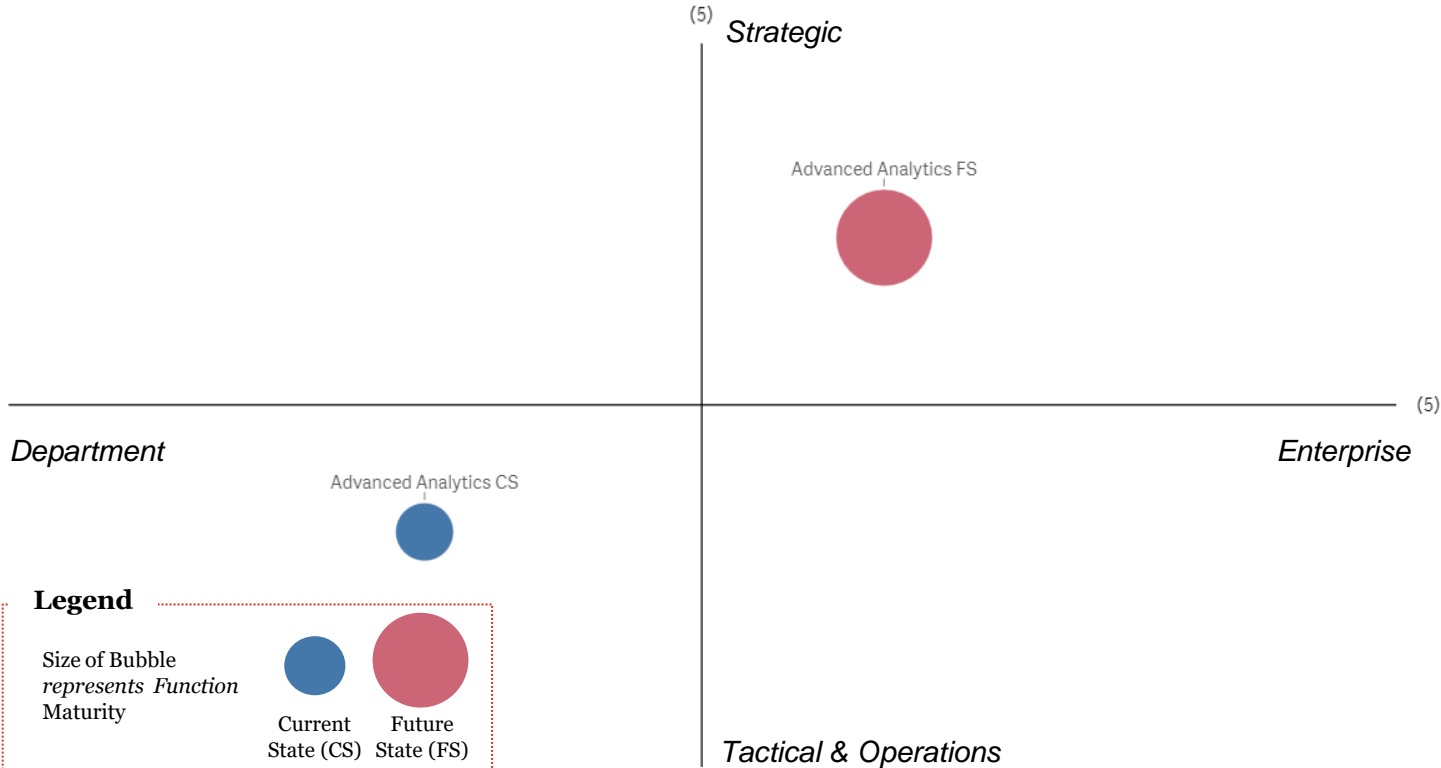
2.5

Future State Maturity

4

Talent and Organization – Advanced Analytics Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

5.24

Maturity Gap

2

Current State Maturity

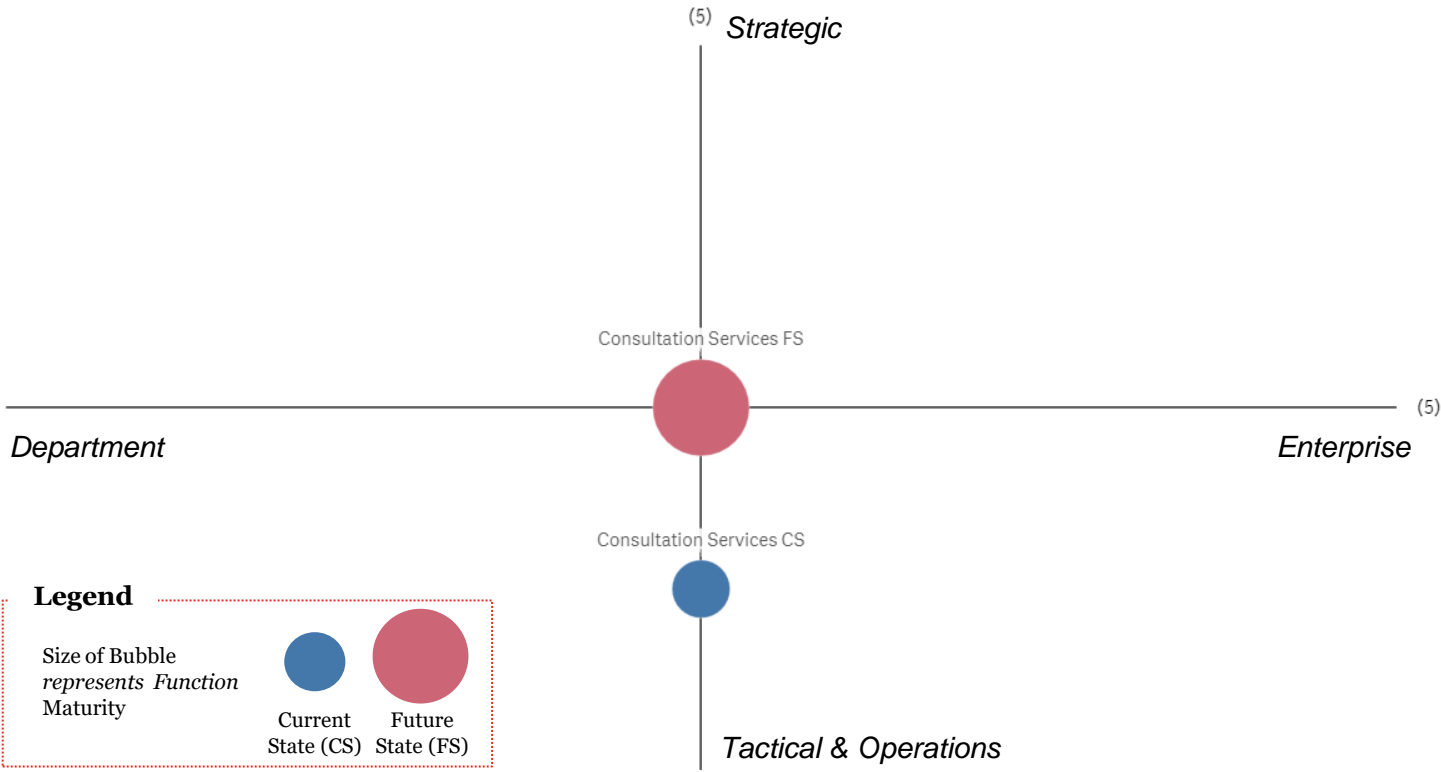
2

Future State Maturity

4

Talent and Organization – Consultation Services Function Summary

Delivery Model Mapping



Department

Enterprise

(5) Strategic

Consultation Services FS

Consultation Services CS

Tactical & Operations

Overall Gap in Delivery Model

2.5

Maturity Gap

0.6

Current State Maturity

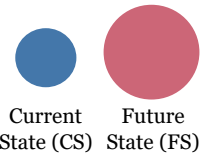
2.9

Future State Maturity

3.5

Legend

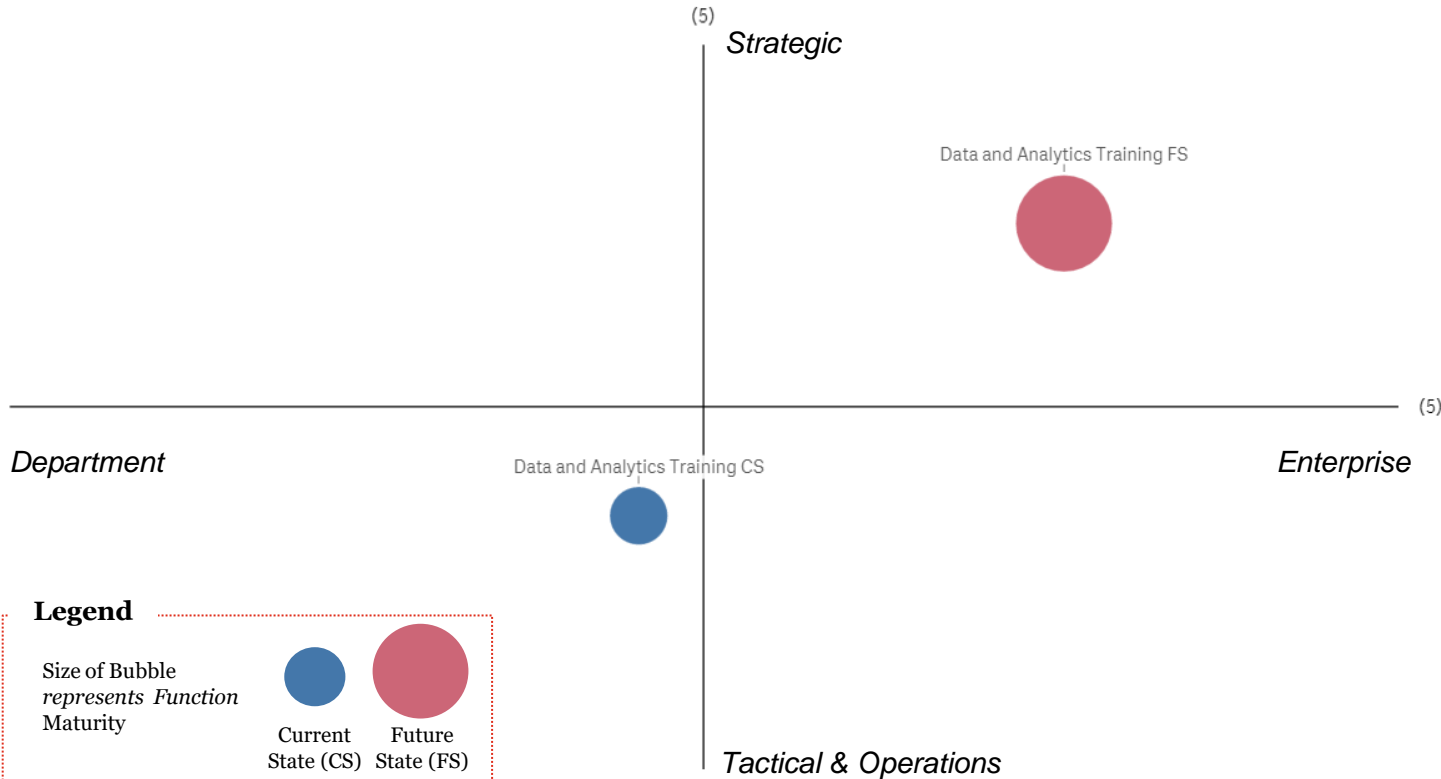
Size of Bubble represents Function Maturity



Current State (CS) Future State (FS)

Talent and Organization – Data and Analytics Training Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

5.06

Maturity Gap

1.8

Current State Maturity

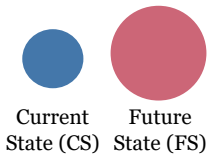
2.2

Future State Maturity

4

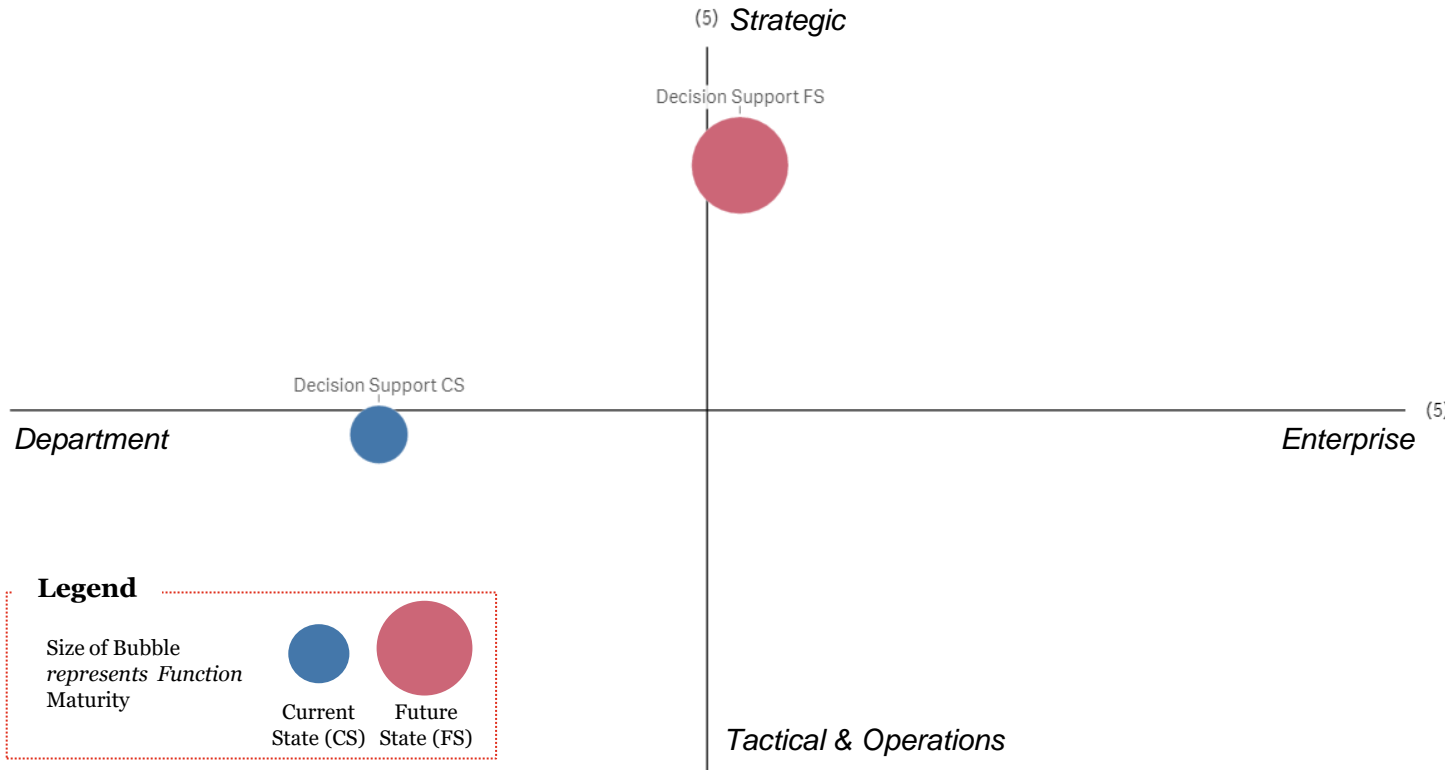
Legend

Size of Bubble represents Function Maturity



Talent and Organization – Decision Support Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

4.51

Maturity Gap

2

Current State Maturity

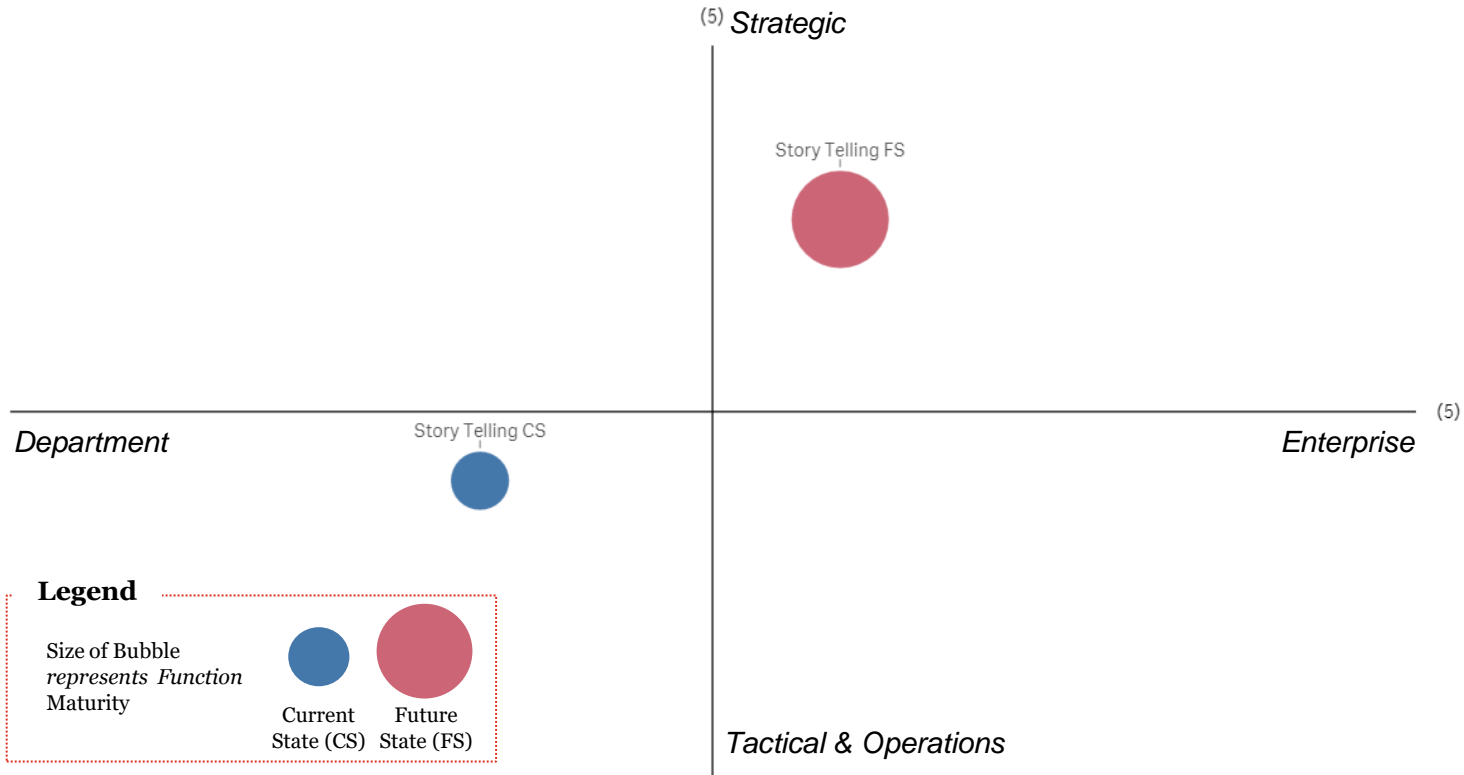
2.5

Future State Maturity

4.5

Talent and Organization – Story Telling Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

4.39

Maturity Gap

1.1

Current State Maturity

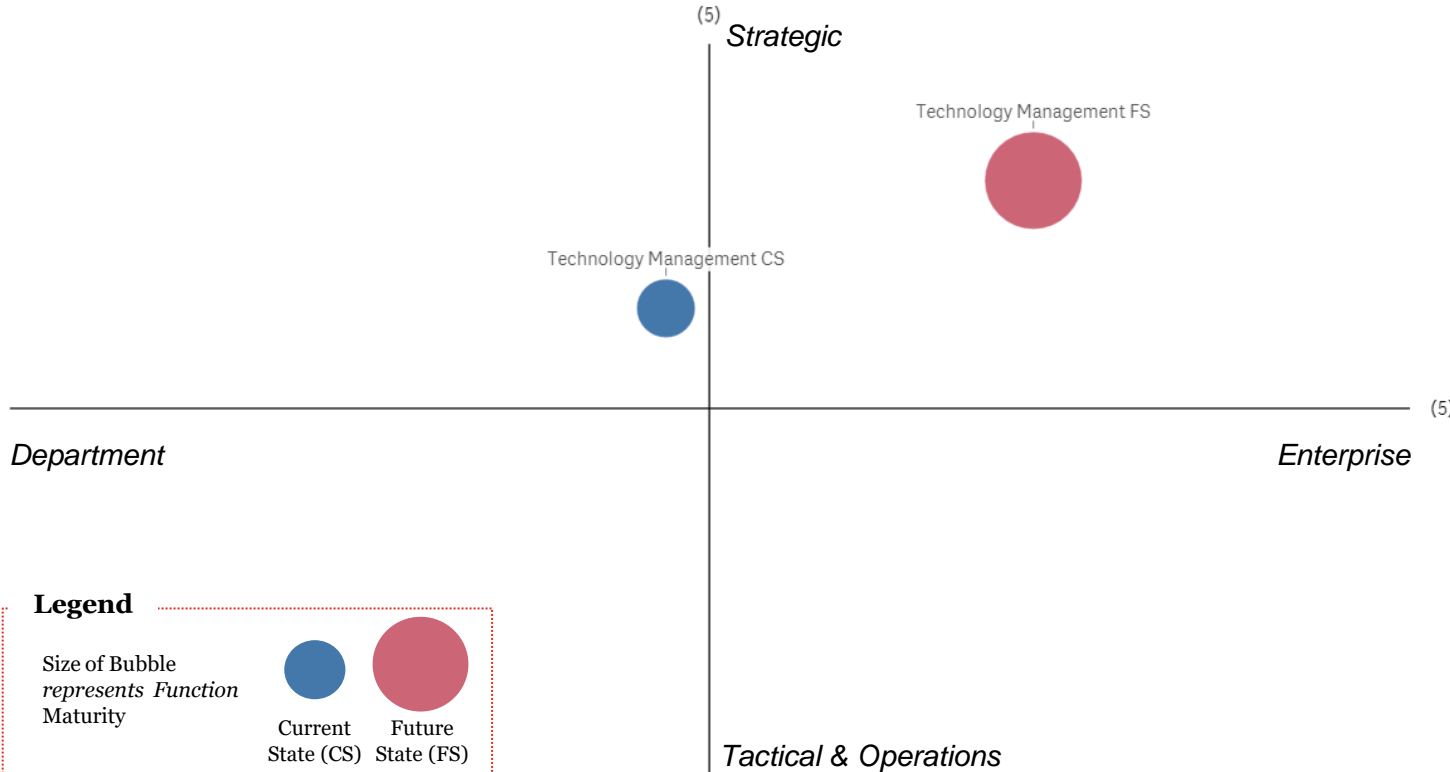
2.4

Future State Maturity

3.5

Talent and Organization – Technology Management Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

3.15

Maturity Gap

1.3

Current State Maturity

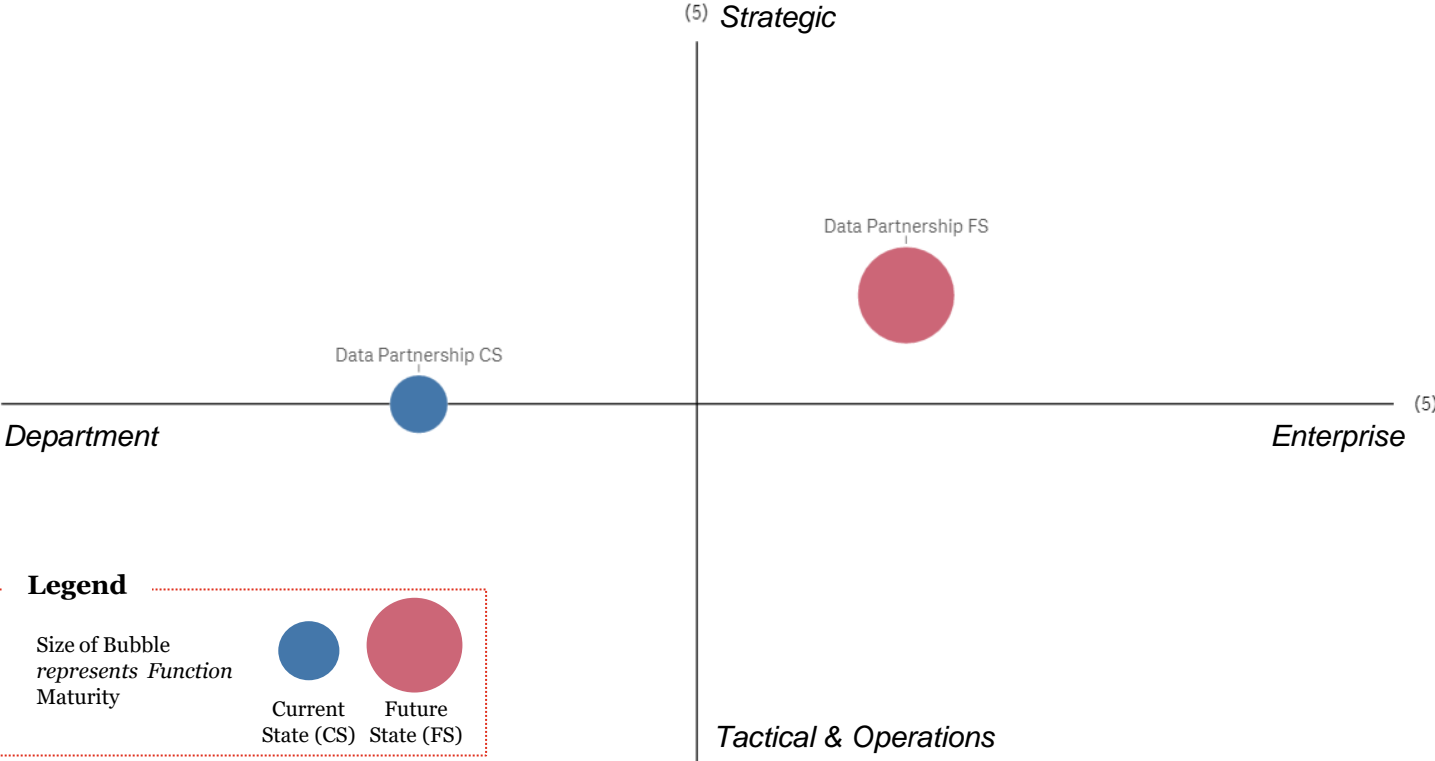
2.7

Future State Maturity

4

Culture – Data Partnerships Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

3.81

Maturity Gap

1.6

Current State Maturity

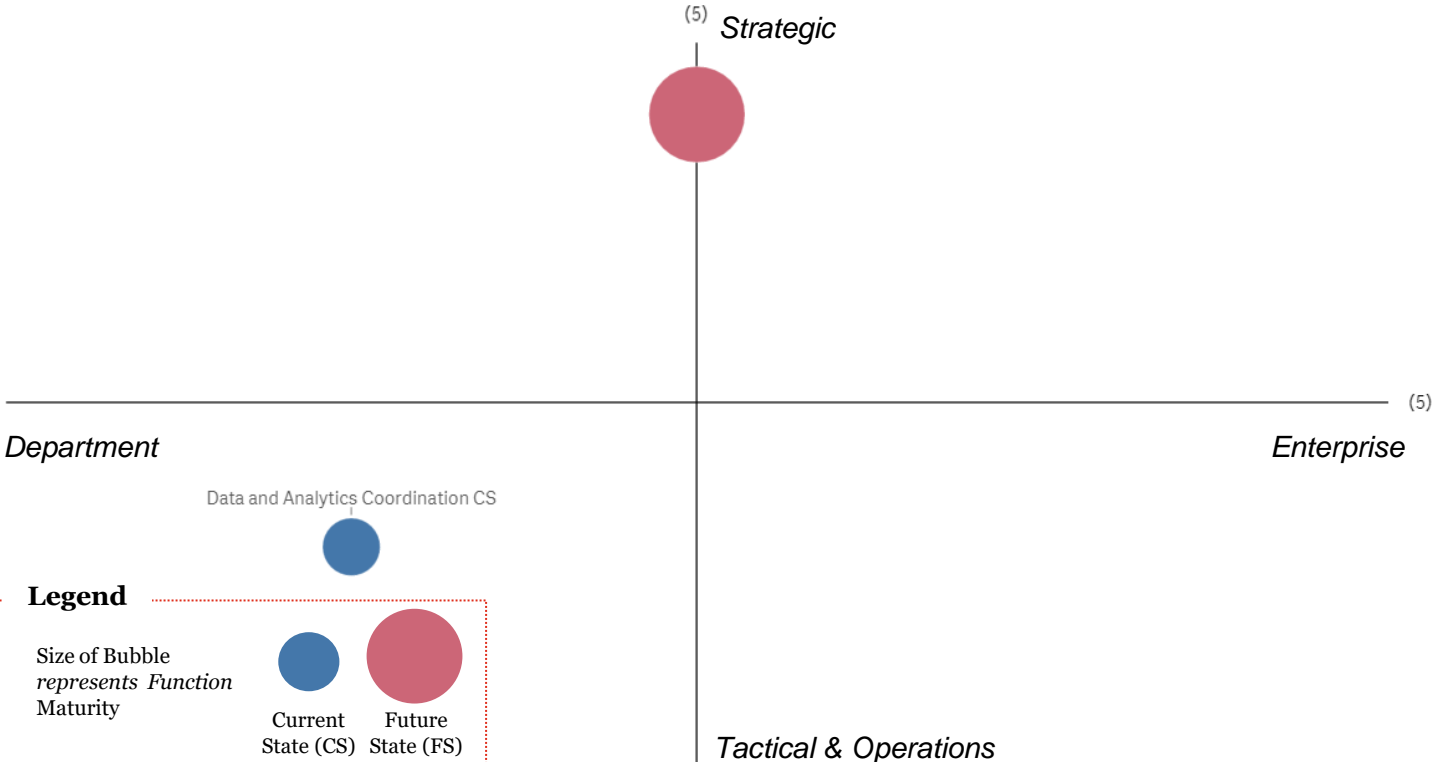
2.9

Future State Maturity

4.5

Culture – Data and Analytics Coordination Function Summary

Delivery Model Mapping



Overall Gap in Delivery Model

6.5

Maturity Gap

1.7

Current State Maturity

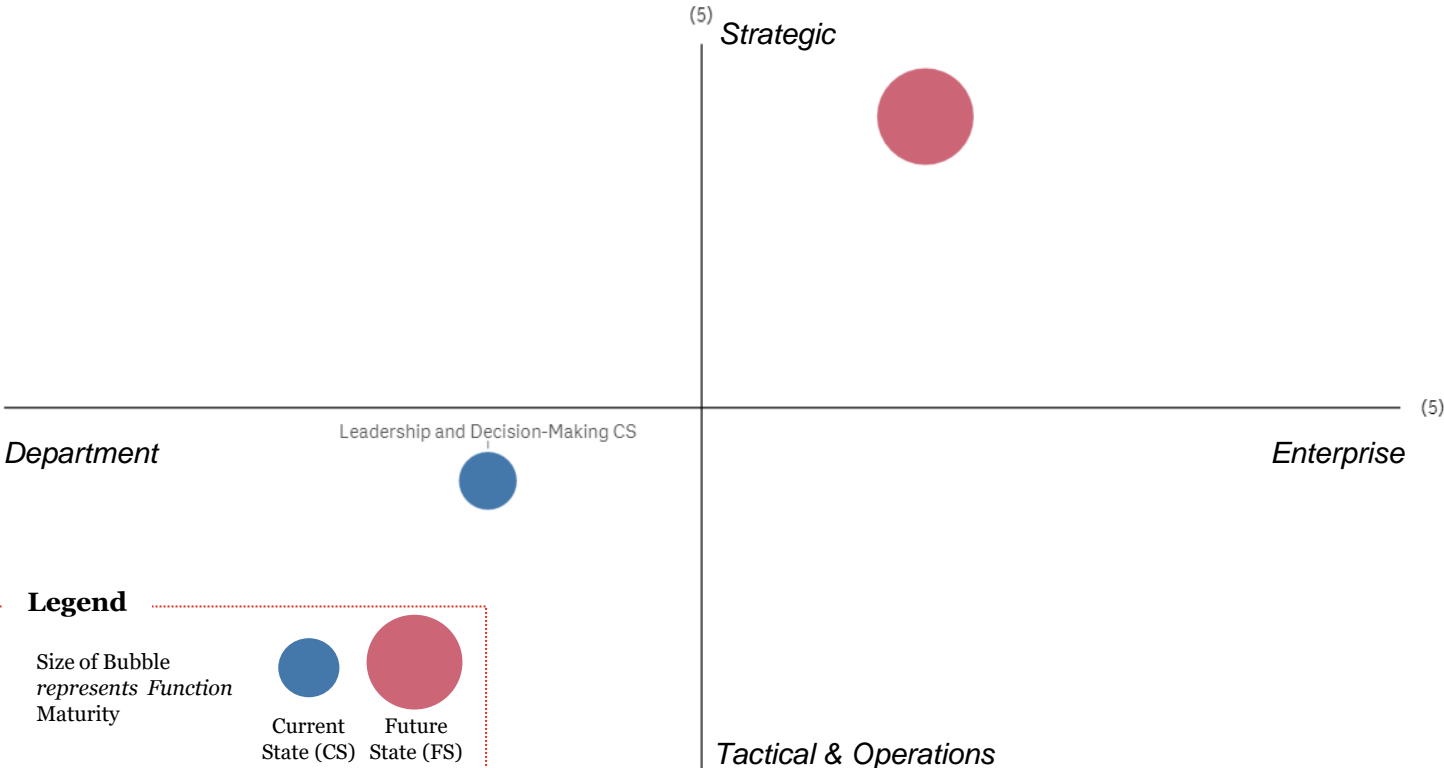
2.3

Future State Maturity

4



Culture – Leadership and Decision-Making Function Summary

Delivery Model Mapping



Legend

Size of Bubble represents Function Maturity

 Current State (CS)
  Future State (FS)

Overall Gap in Delivery Model

5.9

Maturity Gap

1.3

Current State Maturity

2.7

Future State Maturity

4

Department Based View of the Current State Assessment

APPENDIX A.3



CAO's Office - Corporate Services - Courts and Legal Services*

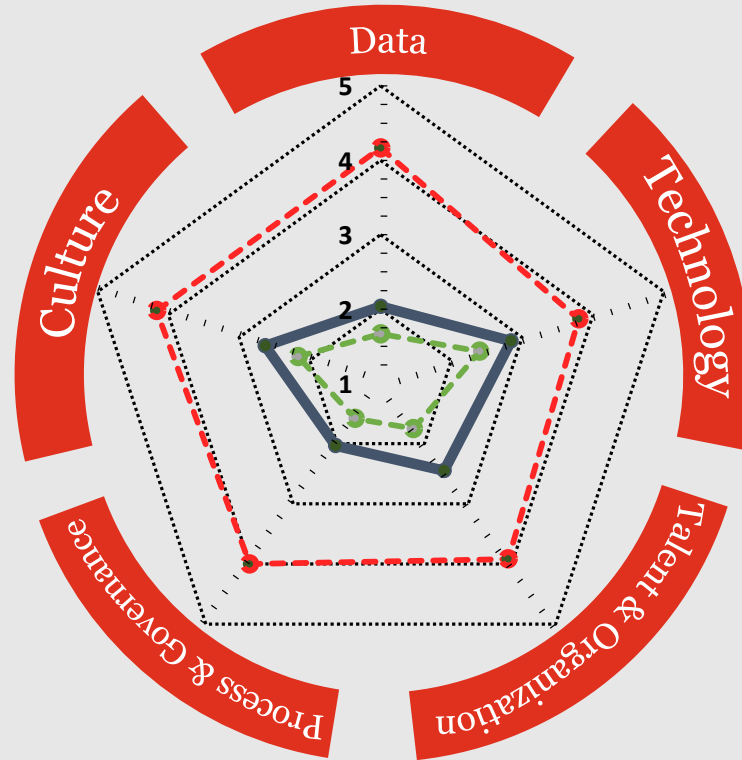
Corporate Services, Courts and Legal Services, and the CAO's Office were analyzed as a single business unit due to:

- The similarity in current state maturity;
- Limited data and analytics focused initiatives; and
- A lack of statistical significance based on limited representation in terms of volume of participants at workshops.

CAO – CS – LCS*

Relative to the enterprise, CAO – CS – LCS is less mature in all analytics dimensions. Many of the functions are not well connected, standardized or applied in a consistent manner. Data literacy and knowledge of data and analytics concepts impedes the adoption of many functions.

The largest gap currently exists in the talent and organization dimension. This is mainly due to a lack of skills available, training for new tool-sets, and bandwidth for existing resources. Another contributor to the low maturity is a lack of adoption of policies, standards and procedures.



Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

CAO – CS – LCS

90% of frontline staff felt that data stewardship has not been clearly defined.

Data is used to support a decision already made rather than inform a decision.

“As for collaborated efforts we definitely embrace any opportunity to collaborate as do some of our counterparts in the Departments but I wouldn't say that is a universal feeling in the organization.”

Areas of Strength

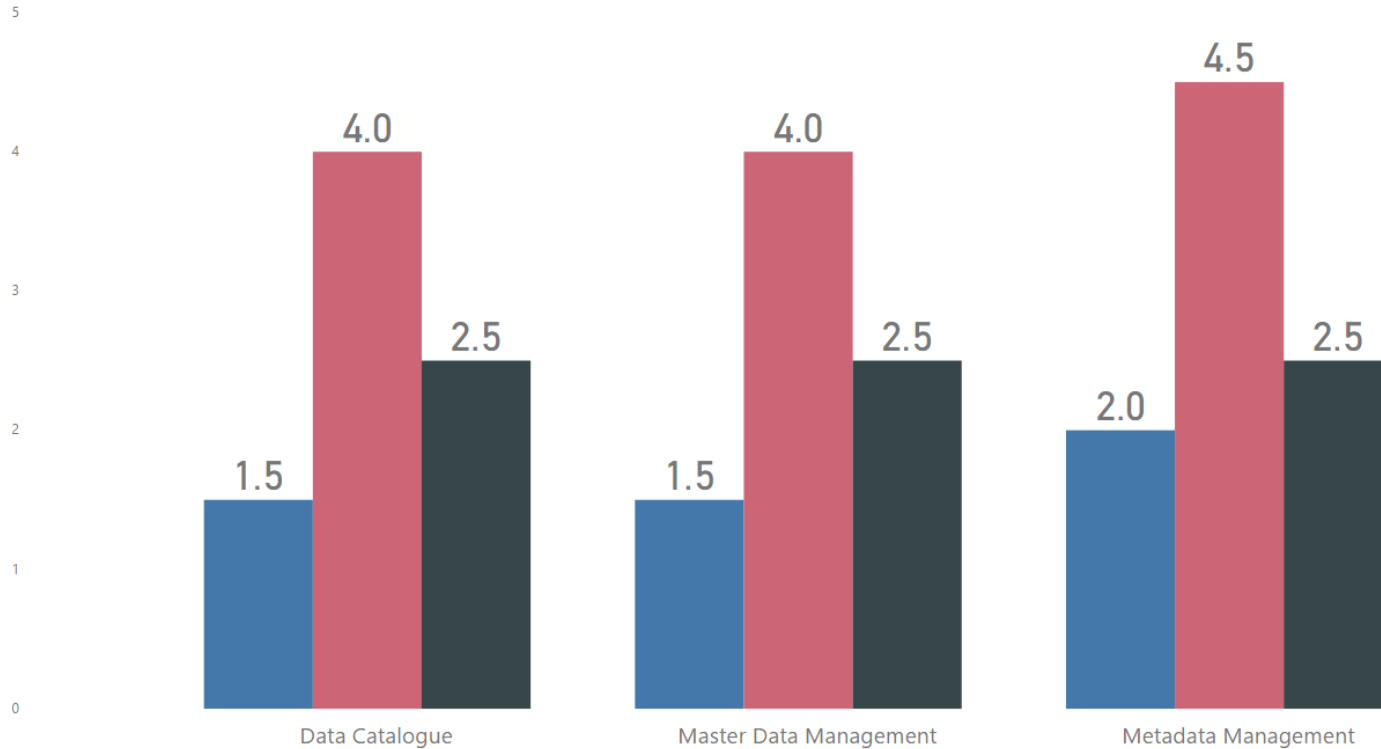
- Staff from CAO – CS – LCS demonstrated a high desire for learning and improve their business through data and analytics.
- CAO – CS – LCS collaborates well with other departments, providing them data and leveraging artefacts where they can be used.
- Specific staff members from CAO – CS – LCS demonstrate a high level of competency in data and analytics functions.

Opportunities for Improvement

- Staff with high levels of proficiency in data and analytics exist but they are limited in volume and capacity. Existing staff need to be trained to conduct basic data and analytics functions.
- Clearly defining a service catalogue / offering could enhance data and analytics capabilities within CAO – CS – LCS by knowing who to contact for assistance.
- Regulatory and legislative policies need to be consistently adopted with a clear understanding of appropriate and inappropriate use. Integrating legislative requirements into data management practices will ensure all department meet minimum regulatory standards.

CAO – CS – LCS: Gap Analysis - Data

Maturity ● Current State ● Future State ● Gap



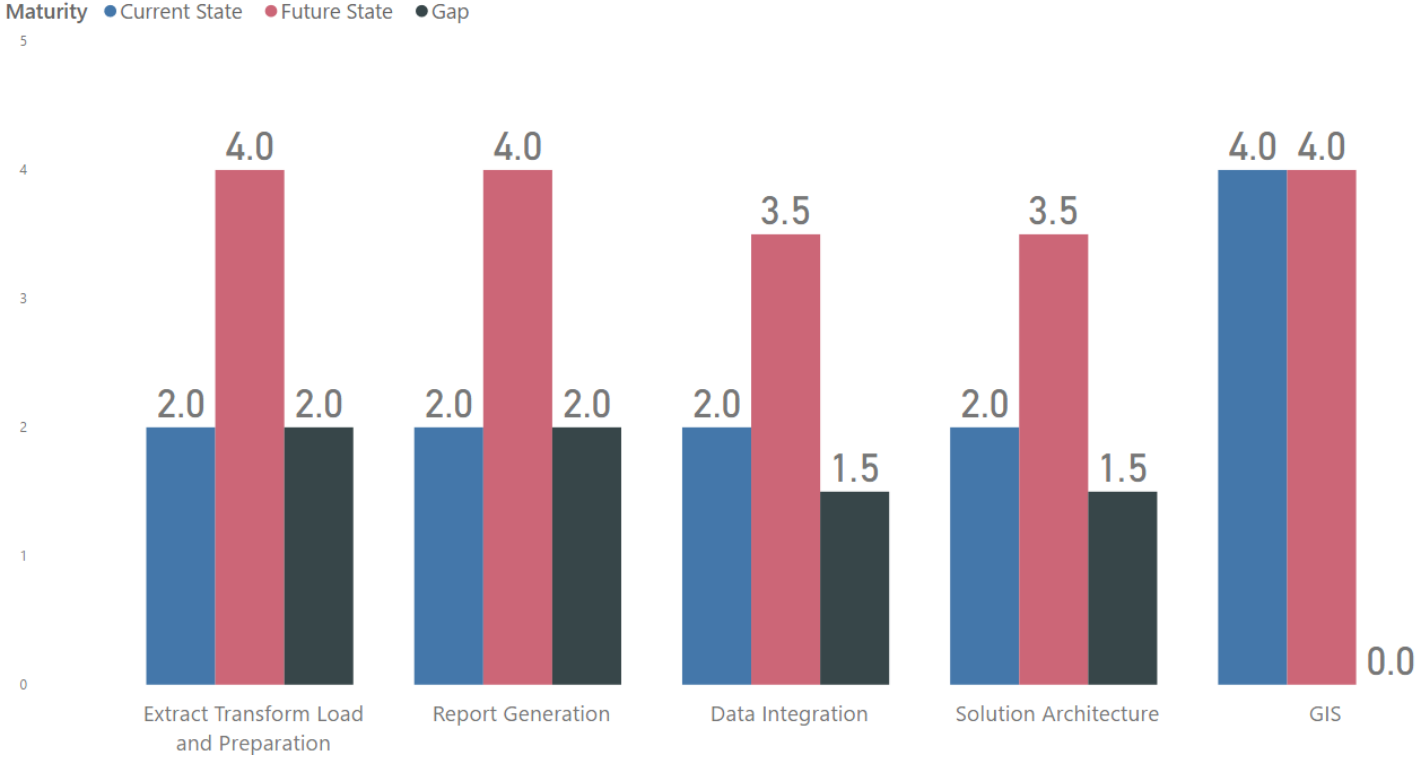
NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

CAO – CS – LCS: Gap Analysis - Technology



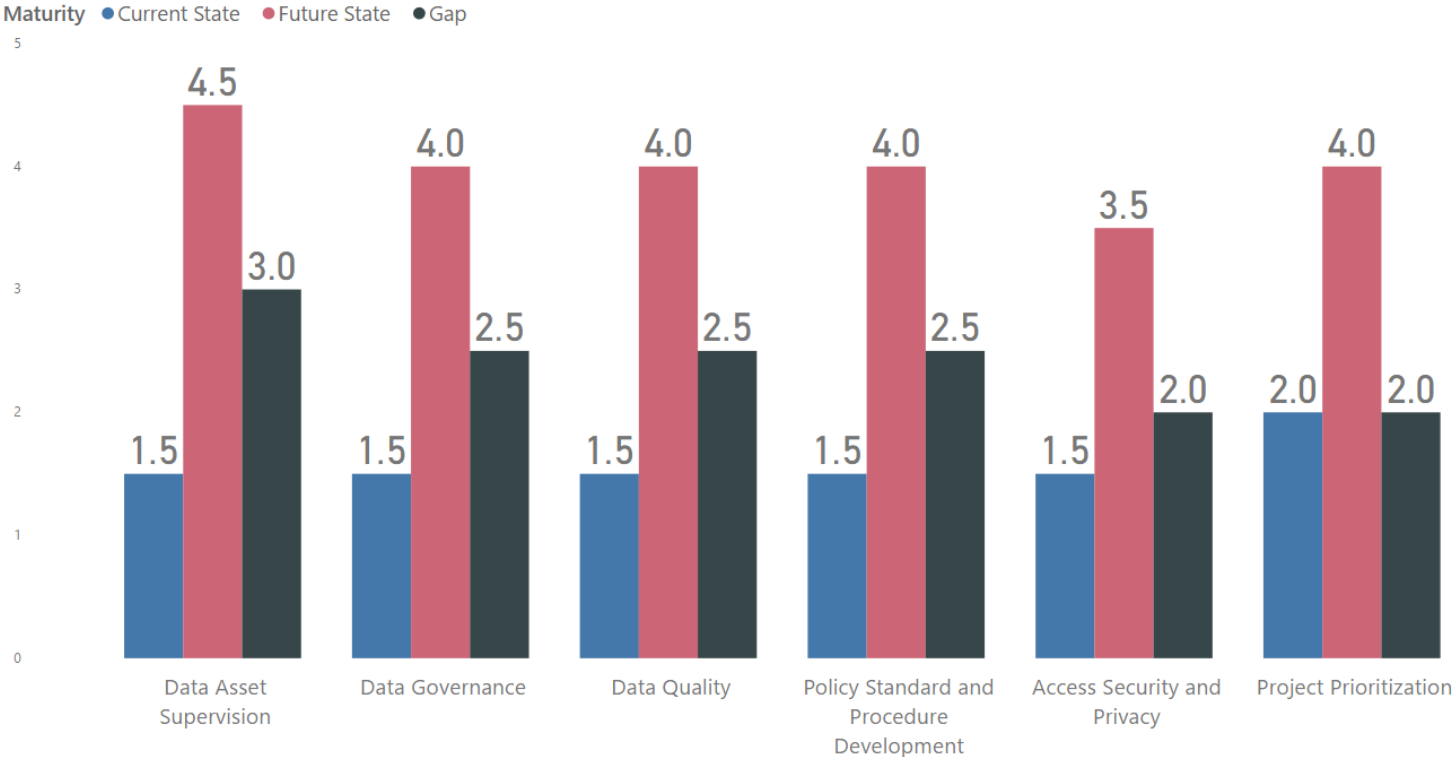
NOTE: Legend only applies to Current and Future State Maturity.

Legend
1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

D&A functions are defined in the Current State section.

CAO – CS – LCS:

Gap Analysis – Process and Governance



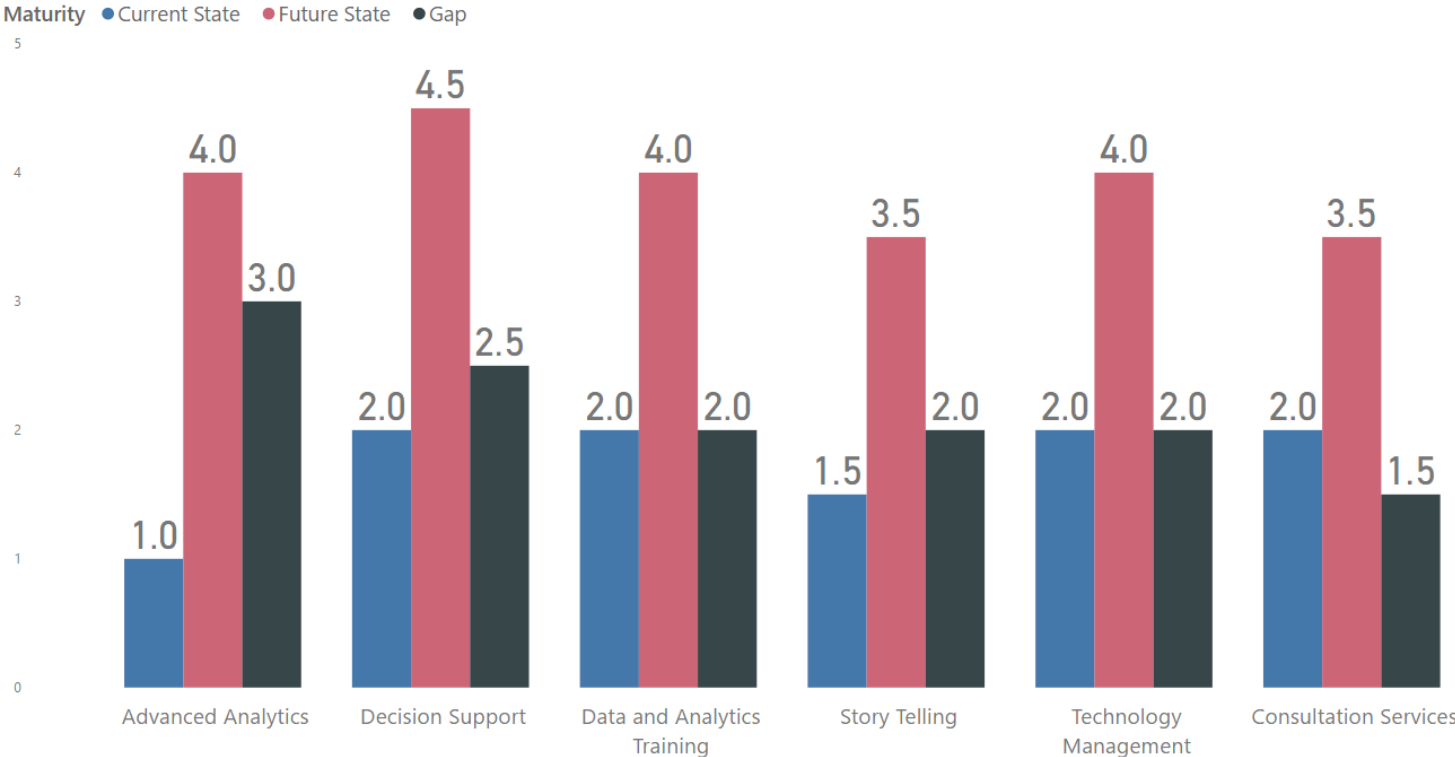
NOTE: Legend only applies to Current and Future State Maturity.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

D&A functions are defined in the Current State section.

CAO – CS – LCS: Gap Analysis – Talent and Organization



NOTE: Legend only applies to Current and Future State Maturity.

Legend

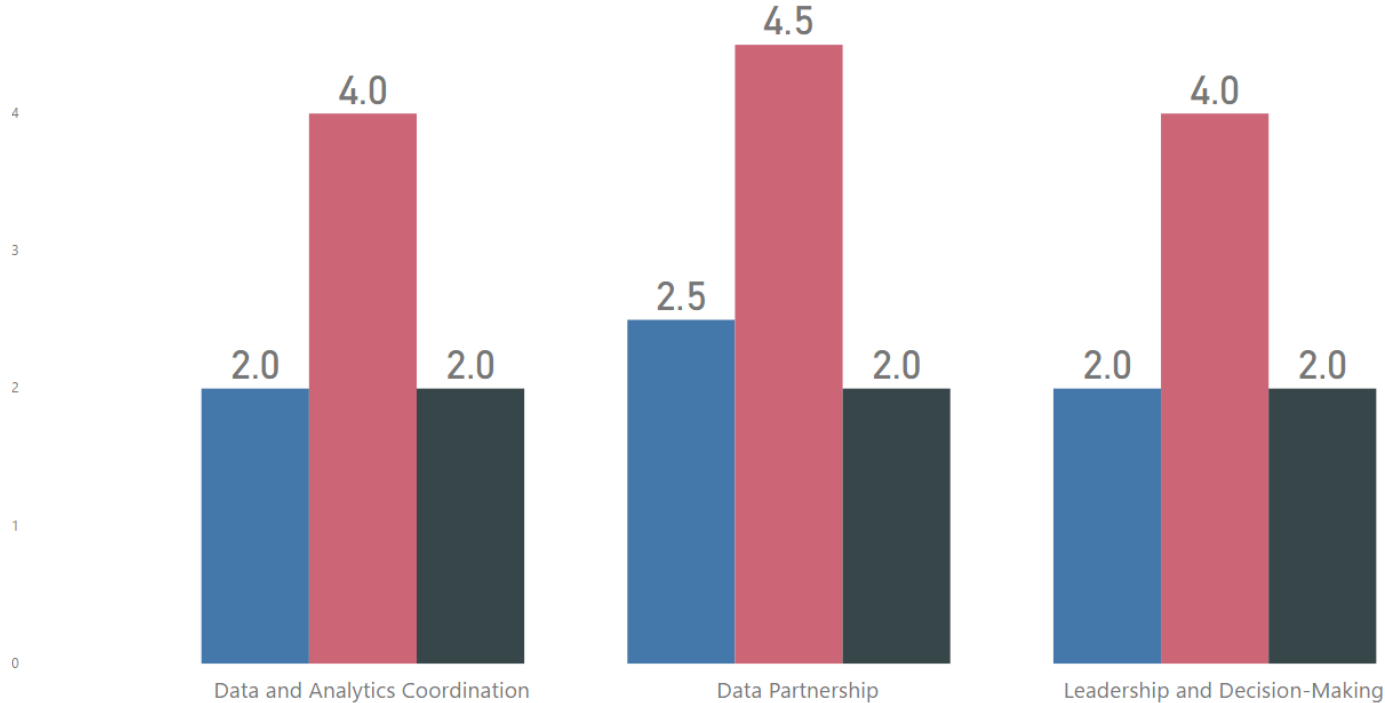
1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

D&A functions are defined in the Current State section.

CAO – CS – LCS: Gap Analysis – Culture

Maturity ● Current State ● Future State ● Gap

5



NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

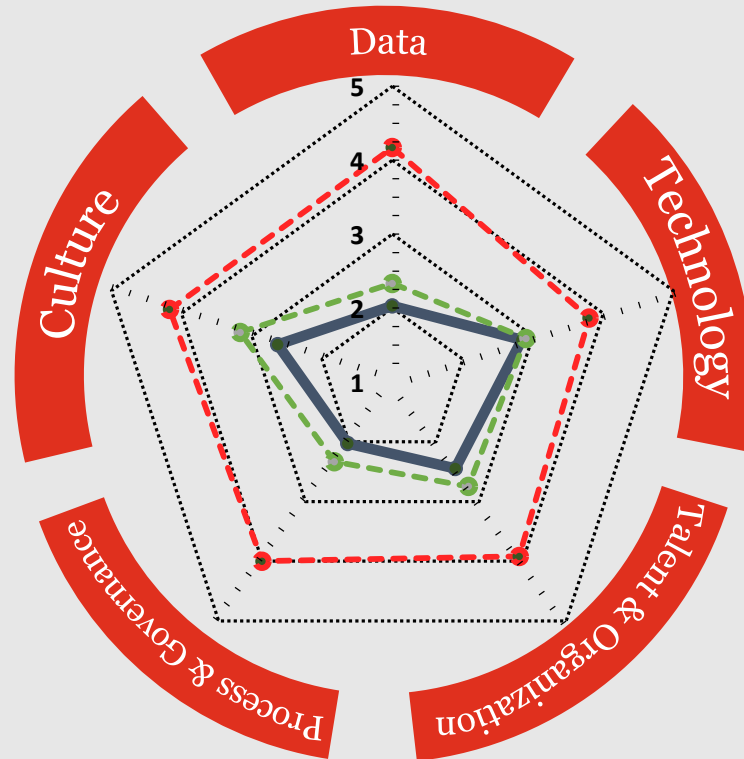
1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

DAVS

DAVS

DAVS is currently a leader at the majority of analytics dimensions relative to the organization, fulfilling the mandate of their branch. DAVS is particularly noted as a leader within the culture dimension, with a high desire for collaboration, improving data literacy through provisioning training (i.e. Data Academy) and support for data and analytics initiatives across the organization.

DAVS also focuses on raising awareness of data and analytics initiatives (i.e. Data Heroes).



DAVS

Greater than 75% of data assets have an owner / steward. DAVS has owners identified; some level of informal stewardship, doing many of the steward activities. Process documentation ranges from clearly defined, to none at all.

Majority of staff surveyed during drop-in sessions identified challenges associated with determining a single source of truth for data.

80% of DAVS respondents feel that current tools and technologies are sufficient to perform reporting, visualizations and story telling activities.

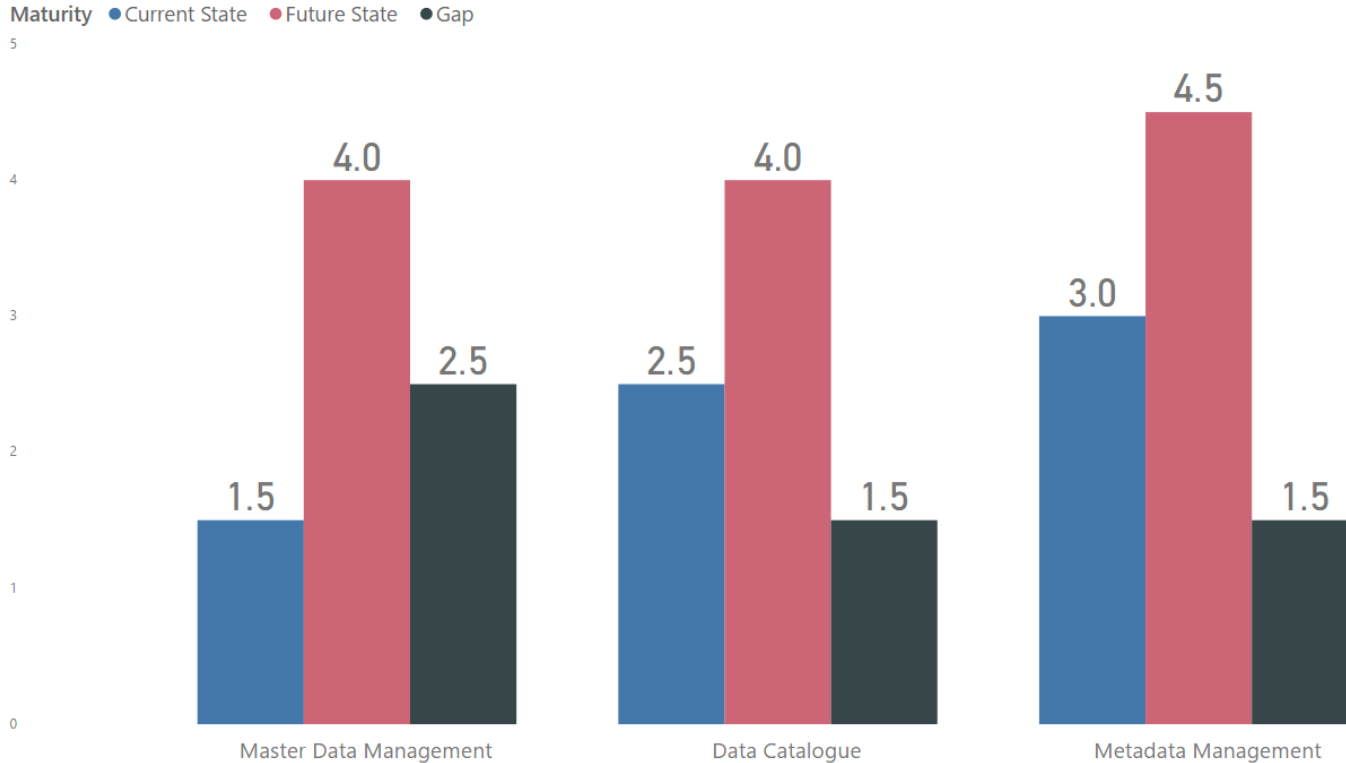
Areas of Strength

- The Spatial Data Warehouse and other GIS technologies are well-leveraged, connected and shared across departments. Initiatives such as York Trax, York Maps, Data Co-op, and All Pipes are a testament to utilizing GIS to deliver business value.
- General oversight and support / sponsorship exists, with a willingness to transform the way that data and analytics functions are delivered.
- Consultation services and advice are provided to projects / requests effectively and consistently.
- The “purpose” field being collected in the new data catalogue supports an understanding of business context to the data set.

Opportunities for Improvement

- In addition to services offered, a clear delineation of activities should be established to focus efforts and reduce work duplication.
- DAVS has established some policies, standards and procedures for enterprise use, however the communication, implementation and overall operationalization of these policies, standards and procedures is limited.
- Once policies, standards and procedures are defined, they can be operationalized through business rules and workflows within a data management tool set.
- As the data academy matures, the training offered should have greater breadth and tailoring. A learning curriculum could equip staff and motivate learning.

DAVS: Gap Analysis - Data



NOTE: Legend only applies to Current and Future State Maturity.

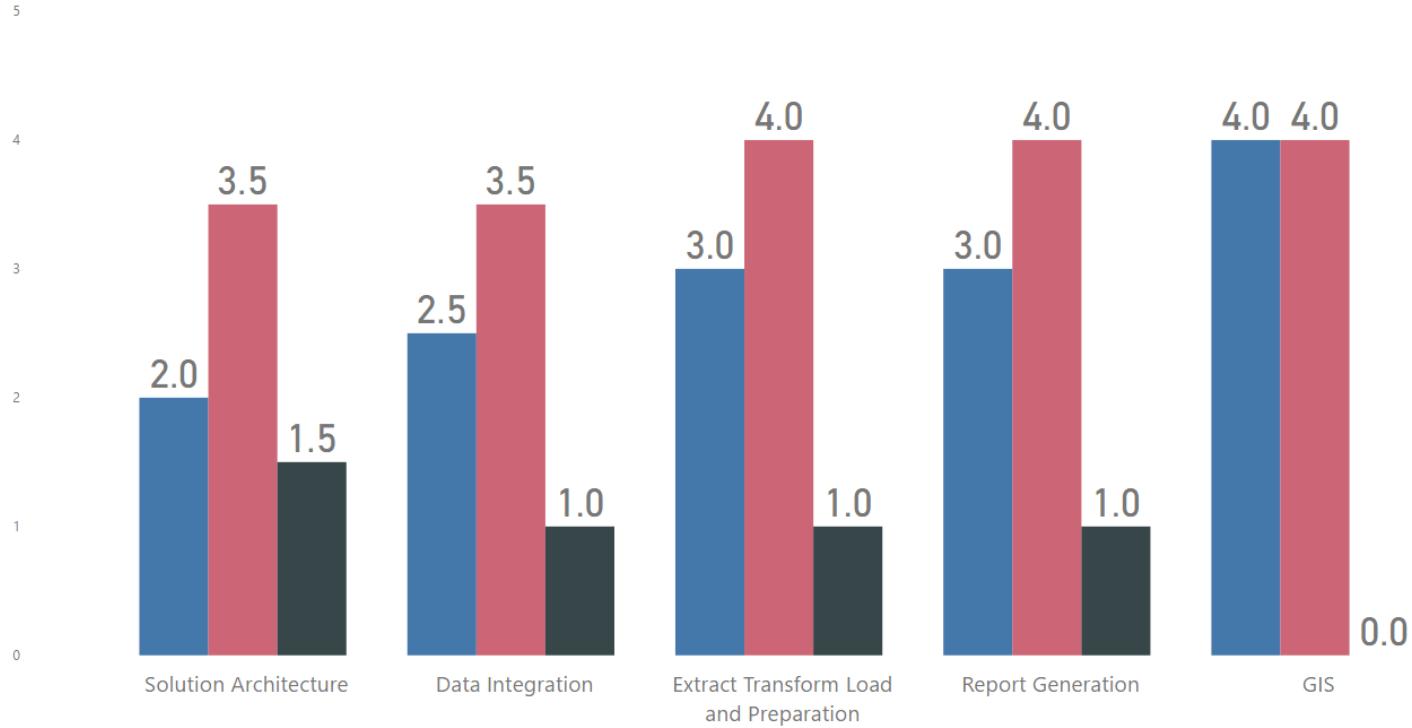
D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

DAVS: Gap Analysis - Technology

Maturity ● Current State ● Future State ● Gap



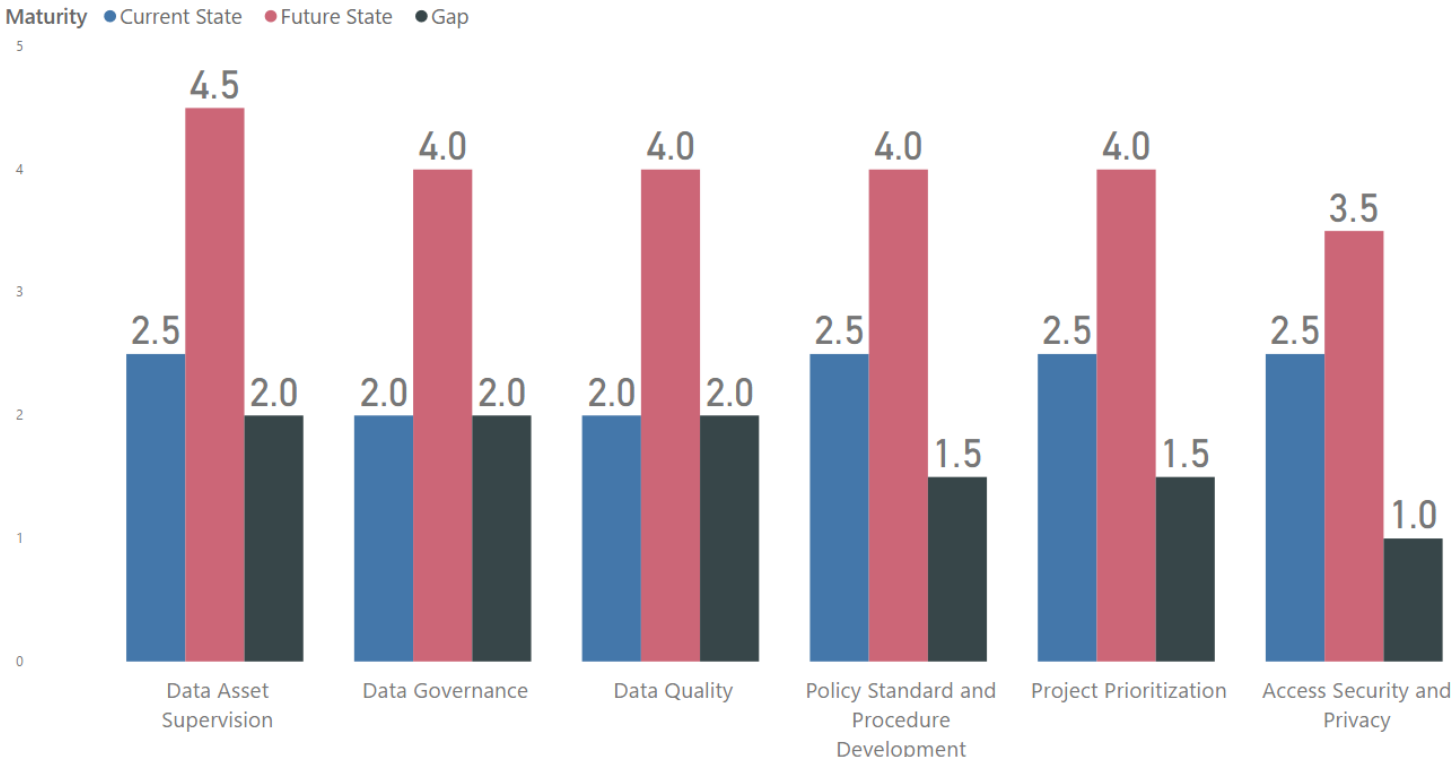
NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

DAVS: Gap Analysis – Process and Governance



NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

DAVS: Gap Analysis – Talent and Organization



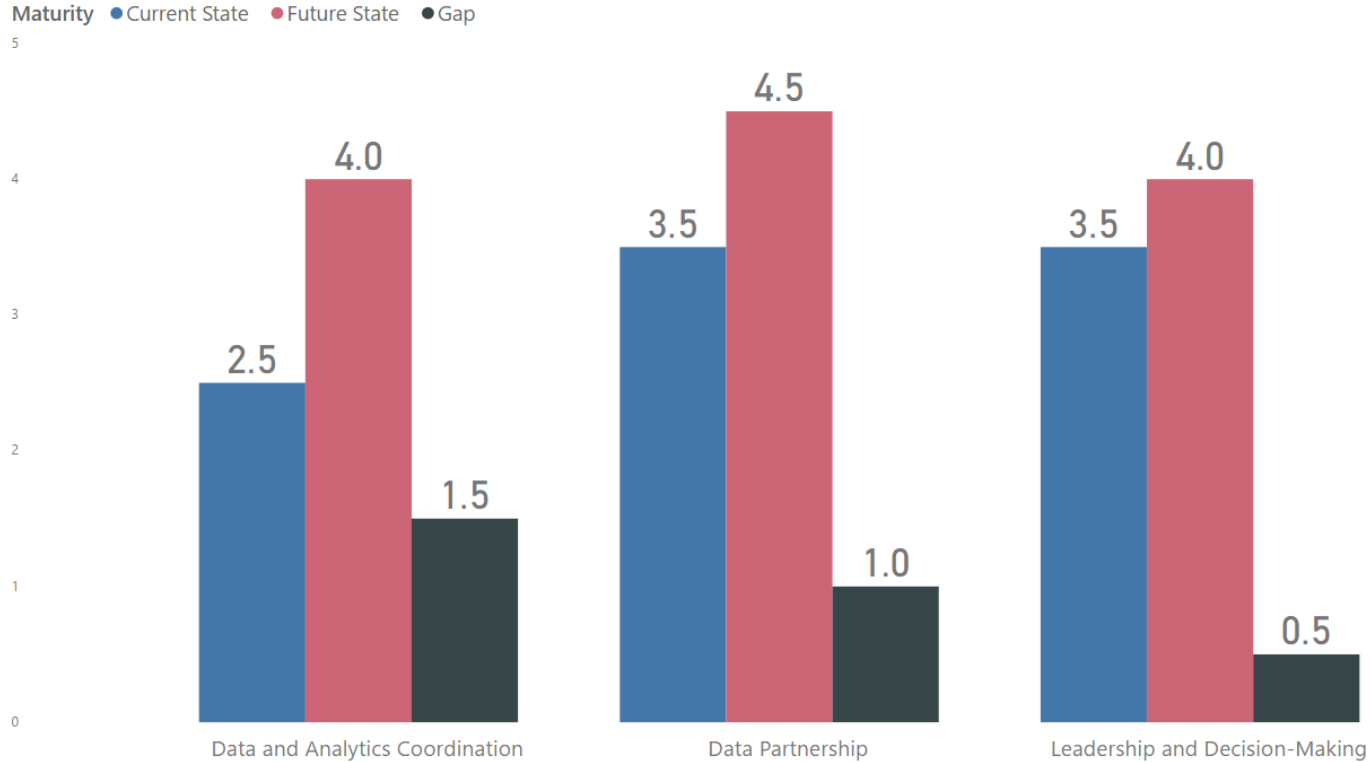
NOTE: Legend only applies to Current and Future State Maturity.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

D&A functions are defined in the Current State section.

DAVS: Gap Analysis – Culture



NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

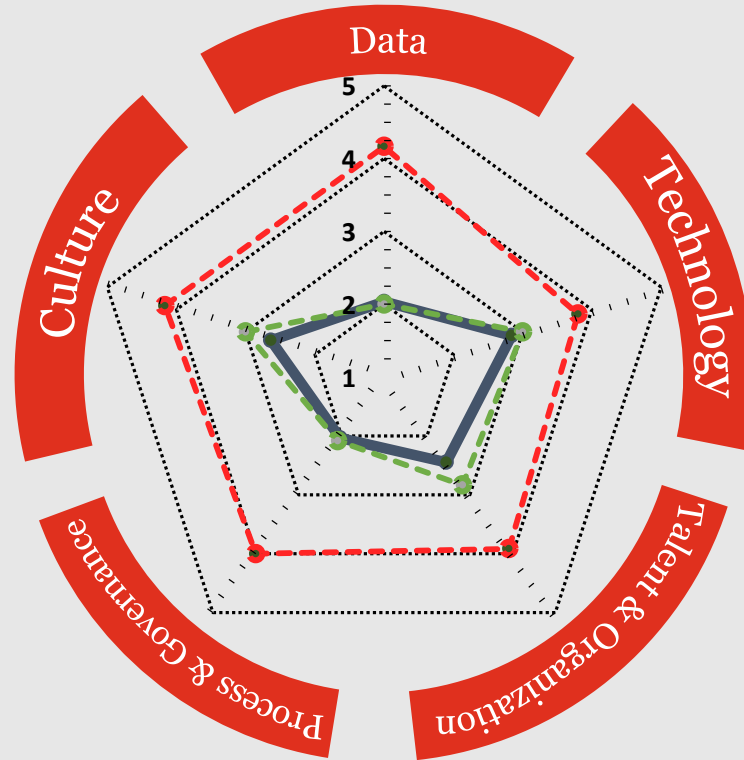
1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Transportation Services

Transportation

The Transportation department demonstrated a higher degree of maturity in the culture dimension. This can be attributed to the on-going focus on data and analytics activities, deriving business value and quantifiable improvements in operations. The cultural maturity of Transportation is also attributed to talent being well utilized within the department and beyond.

The greatest current pain-point exists within the process and governance as well as data dimensions. A governance structure is currently lacking. Due to this gap, the use and maintenance of data is not clearly defined.



Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Transportation

Many groups are producing reports, dashboard and models, but a process to share does not exist. The technologies used vary depending on when the work was started.

General consensus exists that data quality is largely dependent on transactional systems. Resolving data quality issues is done through knowing who to contact.

70% of drop-in session attendees do not think that access and sharing of information is done effectively.

Over 50% of staff disagree that a data catalogue exists with an associated dictionary. Minimum metadata requirements have not been clearly defined.

Areas of Strength

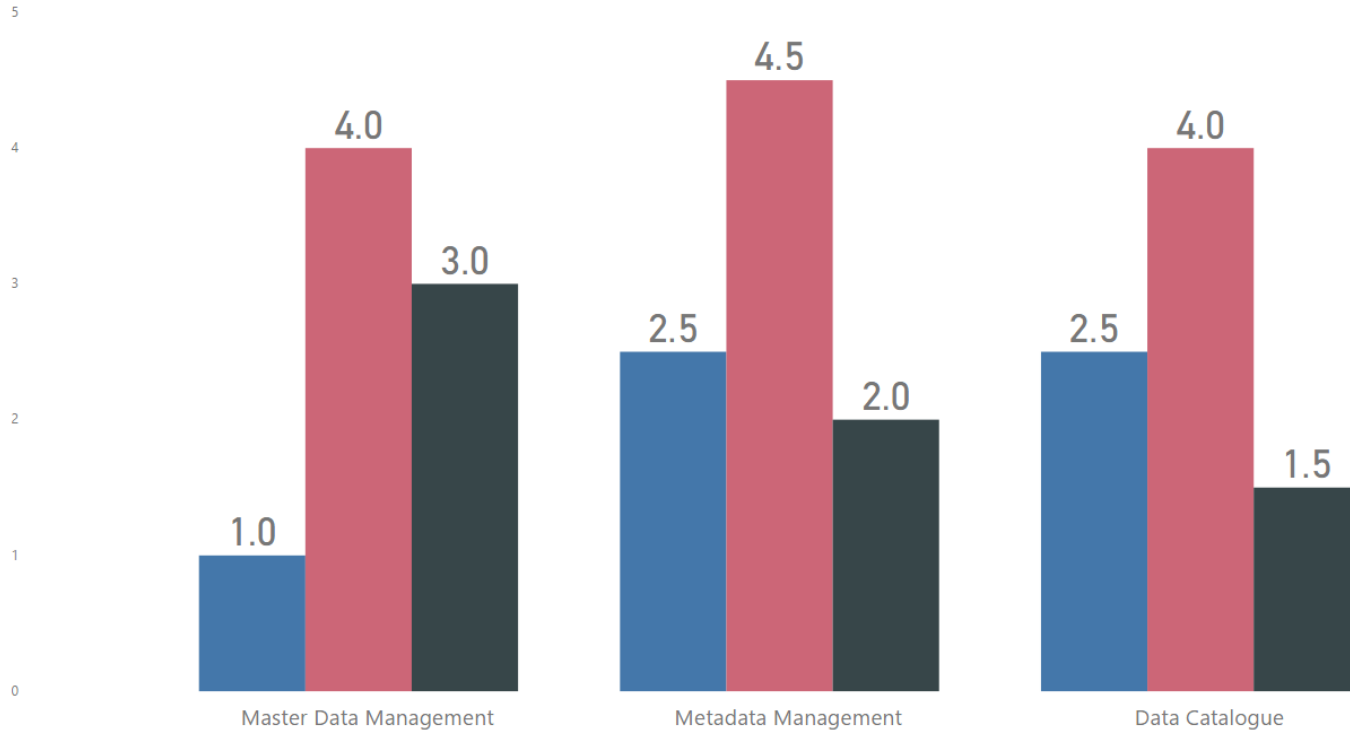
- Robust partnerships exist and continue to be highly valuable for the Region. These include internal (i.e. HR, Courts, Finance, and DAVS) and external partnerships (i.e. local municipalities, police services, Waze, and Google).
- Ingestion and integration of transit data from INIT into the data warehouse is done effectively with daily updates. Consistent interpretation is supported through a clearly defined data dictionary.
- Tools such as PowerBI, Tableau, and SharePoint are well utilized to create interactive and automatically refreshed dashboards.
- Vendor / contract management is done in an efficient manner with clearly defined KPIs that are available to track and monitor in near real time.

Opportunities for Improvement

- A single source of truth (authoritative record) will instill confidence in insights gathered from analysis and reduce the propagation of inaccurate data duplicates.
- Data stewardship with associated roles and responsibilities needs to be defined to improve existing data quality.
- Manual collection / extraction causes inefficiencies in ability to analyze data. Automation of data integration can support a greater focus on analyses.
- A governance structure can aid in the creation and implementation of policies, standards and procedures.

Transportation Services: Gap Analysis - Data

Maturity ● Current State ● Future State ● Gap



NOTE: Legend only applies to Current and Future State Maturity.

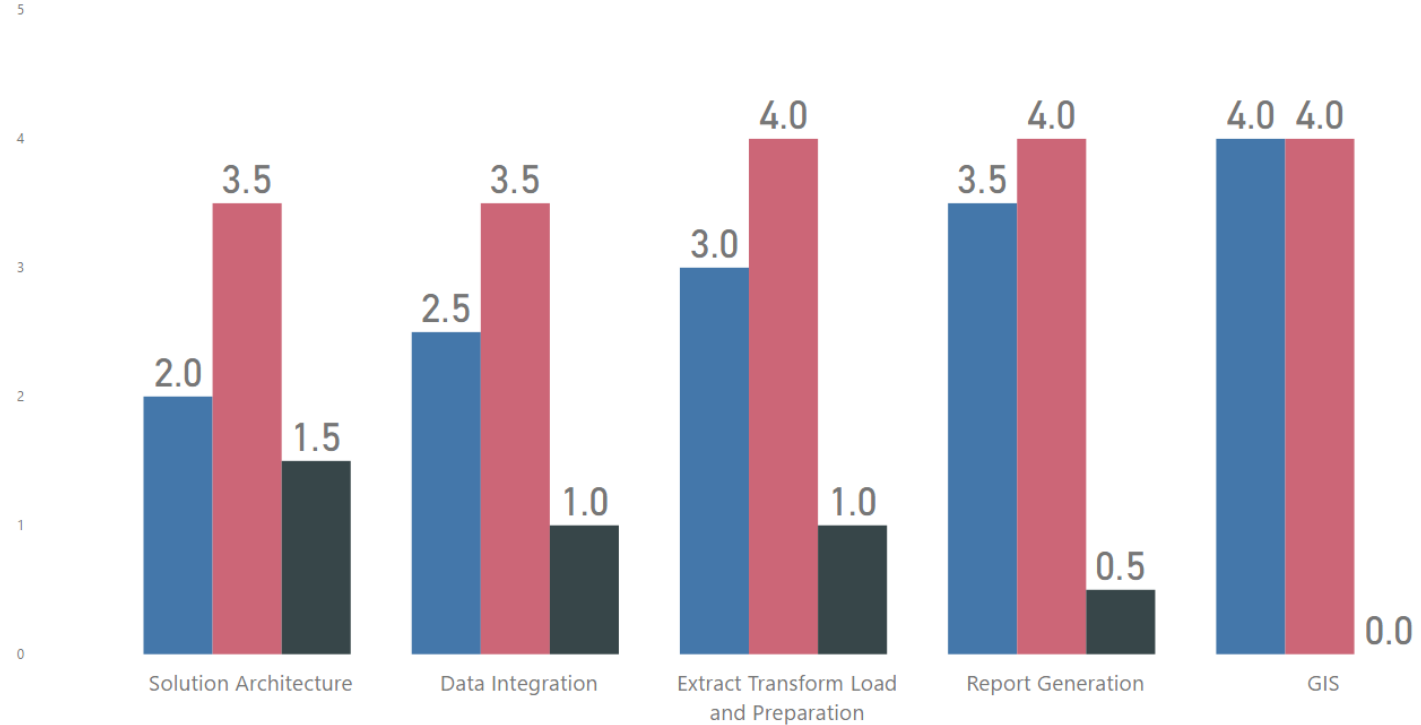
D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Transportation Services: Gap Analysis - Technology

Maturity ● Current State ● Future State ● Gap



NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Transportation Services: Gap Analysis – Process and Governance



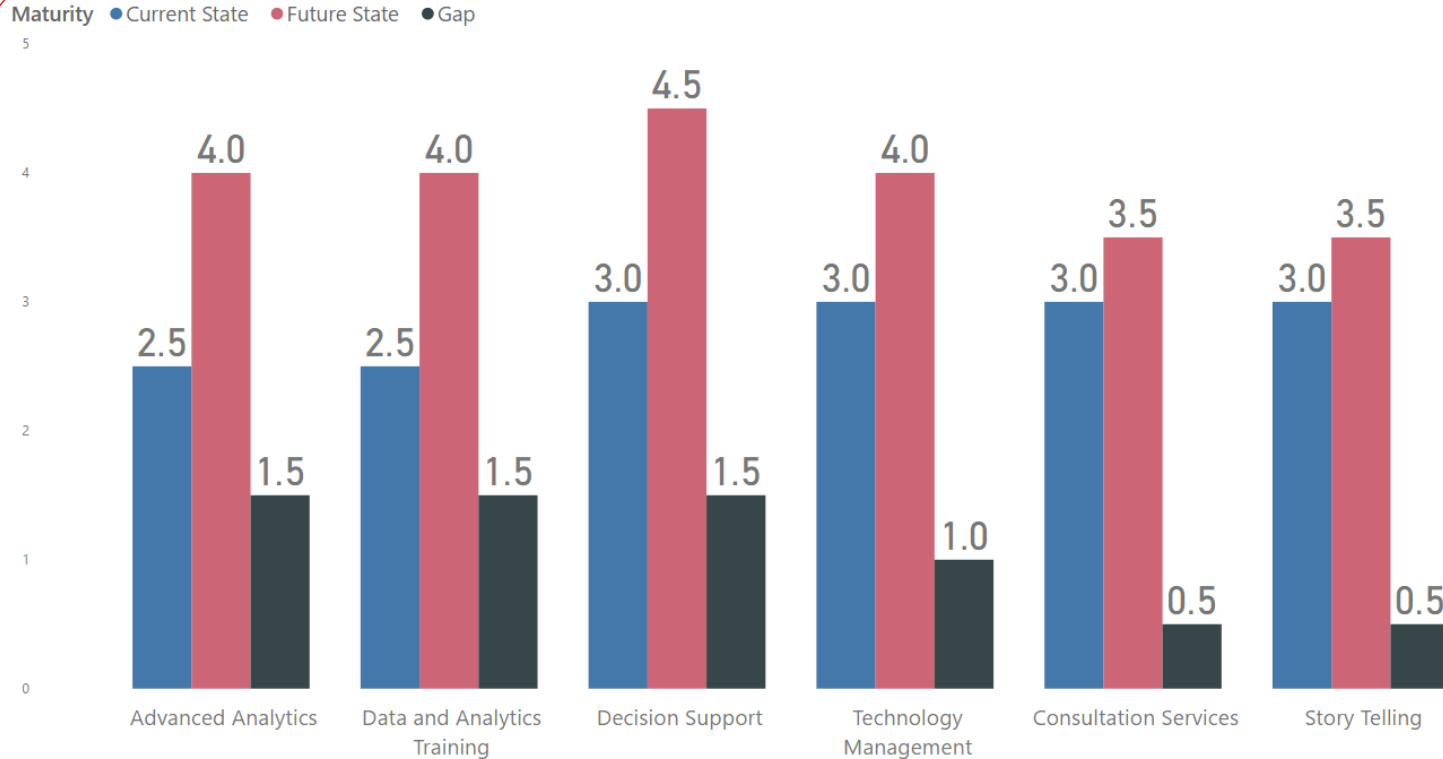
NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Transportation Services: Gap Analysis – Talent and Organization



NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Transportation Services: Gap Analysis – Culture



NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

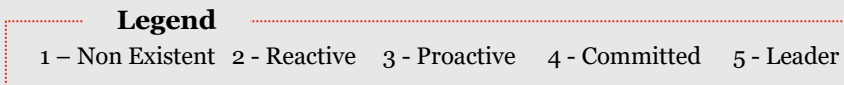
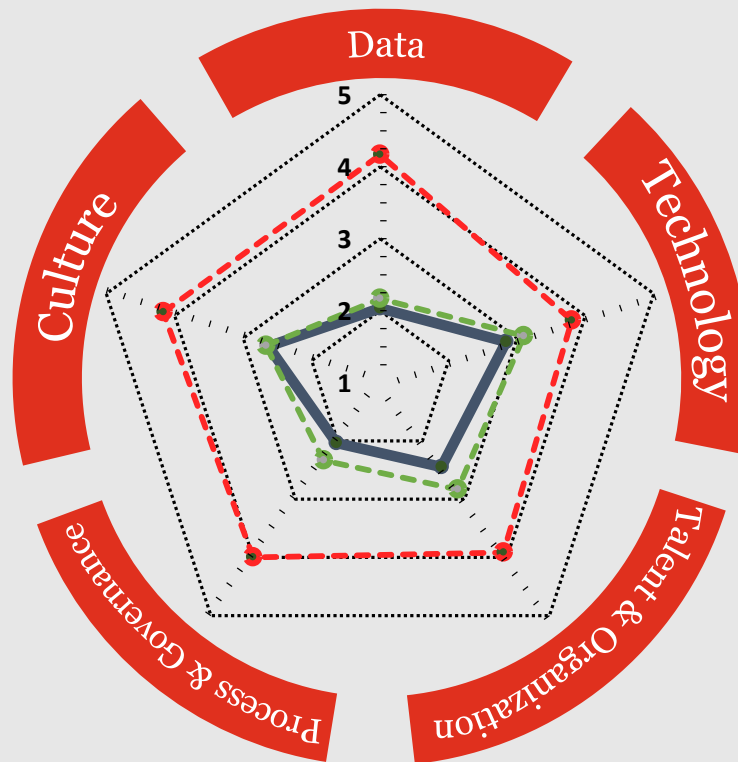
1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Environmental Services

Environment

Through our current state assessment we identified strengths in available technology as well as localized areas of process and governance relative to the enterprise. Environment services has the shortest gap in maturity (from current to future state) across the technology dimension.

The existing data governance structure and data standards for the All Pipes program are great starting points for the development of policies, standards and procedures required to increase maturity in the data dimension. As a data and analytics leader in the organization, Environment services can assist less mature areas of the Region.



Environment

Although management felt that data and analytics training is accessible and sufficient, over 70% of frontline staff disagree that training is currently available and / or sufficient.

Staff at all levels identified a lack of a departmental single source of truth for data.

Approximately 80% of frontline staff do not feel that a data catalogue exists with clearly identified metadata.

Data standards for All Pipes have been published and adopted by local tier municipalities.

Areas of Strength

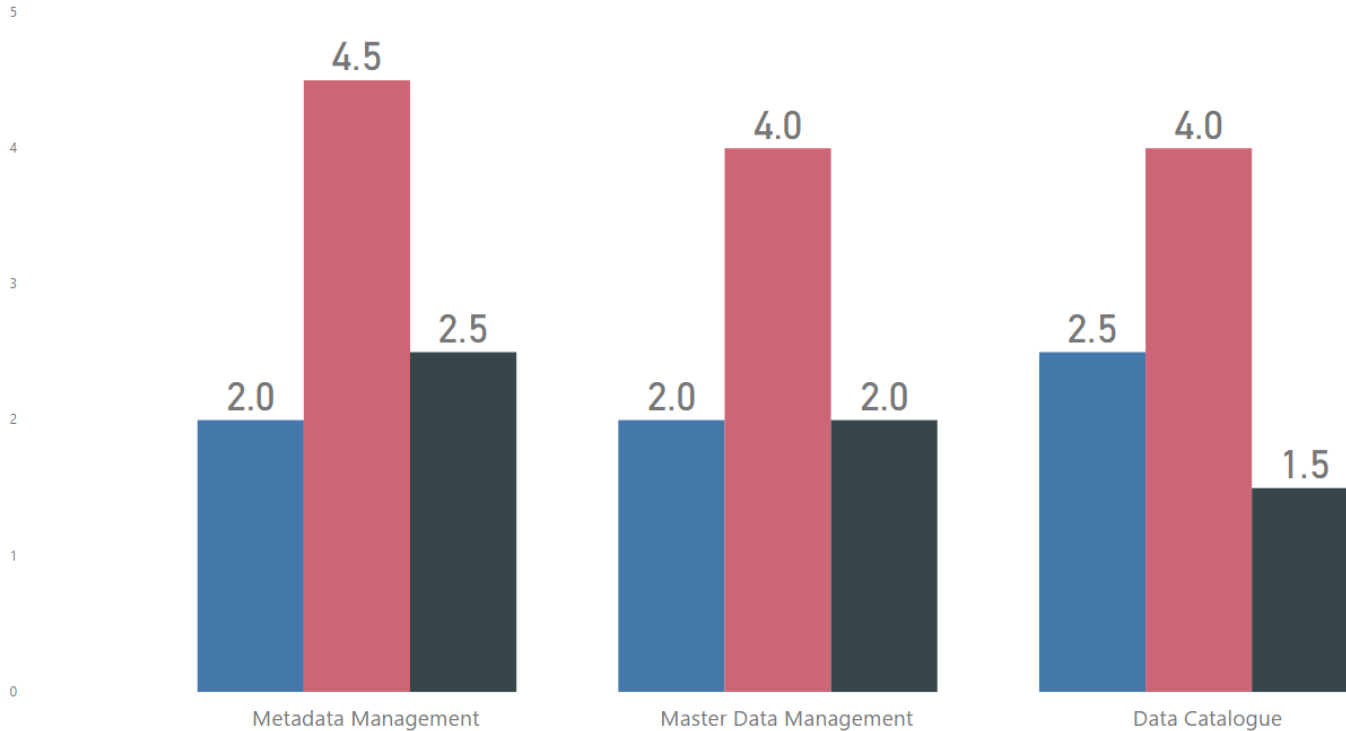
- Data standards for specific programs exist and have been adopted within the department and some local municipalities.
- Integration of data from transactional systems is done effectively, particularly for spatial SCADA data.
- Technology proficiency allows staff to handle large volume and velocity of data despite not leveraging a Big Data technology.
- Solution architecture and the organization of current technology stack allows timely and relatively automated integration of data.
- Environment services feel that their data and analytics efforts are well received as high value activities by organizational leadership.

Opportunities for Improvement

- Clear rules and policies for data access and data sharing will enable breadth in proficiency. Establishing rules and policies can also improve collaboration within the department and beyond.
- Staff may adhere to retention policies once a clear understanding of what data-sets or databases exist. Metadata fields need to exist within the data catalogue for confidentiality, completeness, retention, quality and integrity.
- Environment services can assist in data training and literacy across the Region by advising on content within the Data Academy.
- Assigning data quality scores to critical data assets will prioritize stewardship of data, as well as increase trust in accuracy of data assets and corresponding findings.

Environment Services: Gap Analysis - Data

Maturity ● Current State ● Future State ● Gap



NOTE: Legend only applies to Current and Future State Maturity.

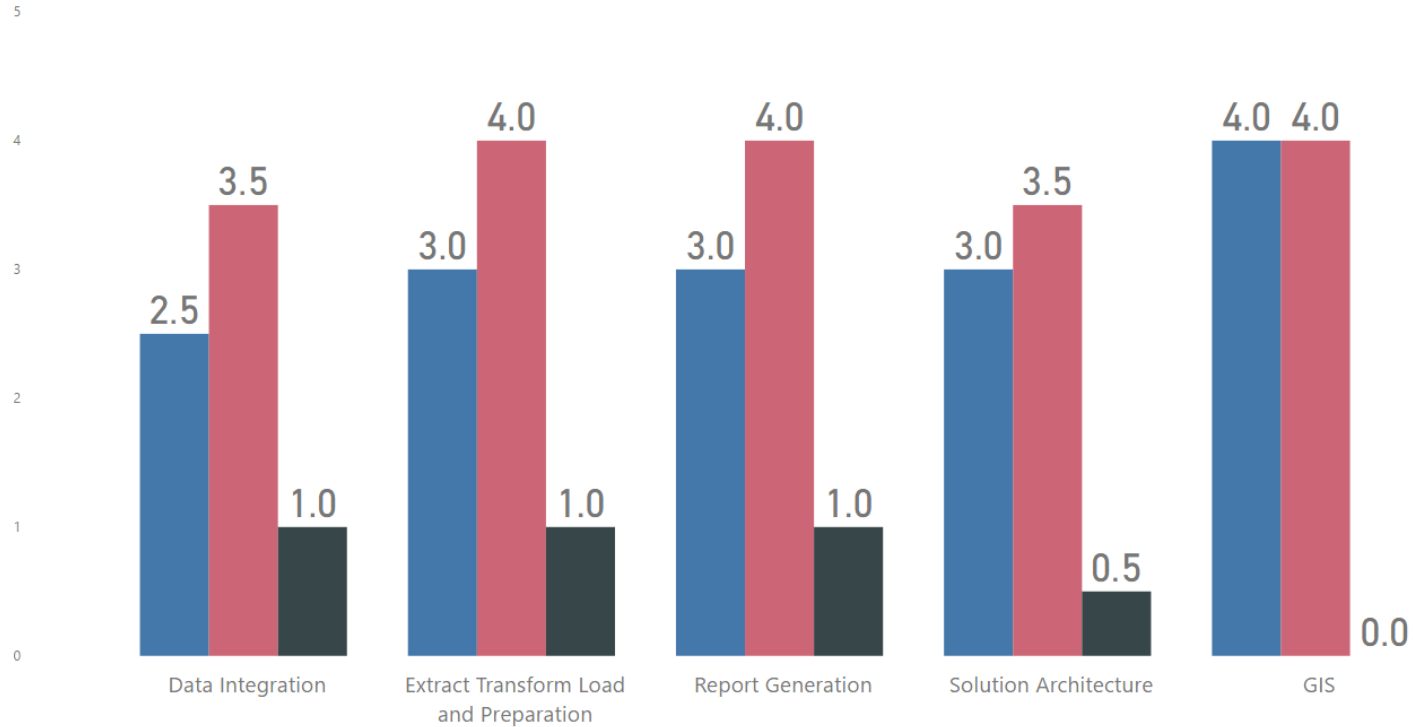
D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Environment Services: Gap Analysis - Technology

Maturity ● Current State ● Future State ● Gap



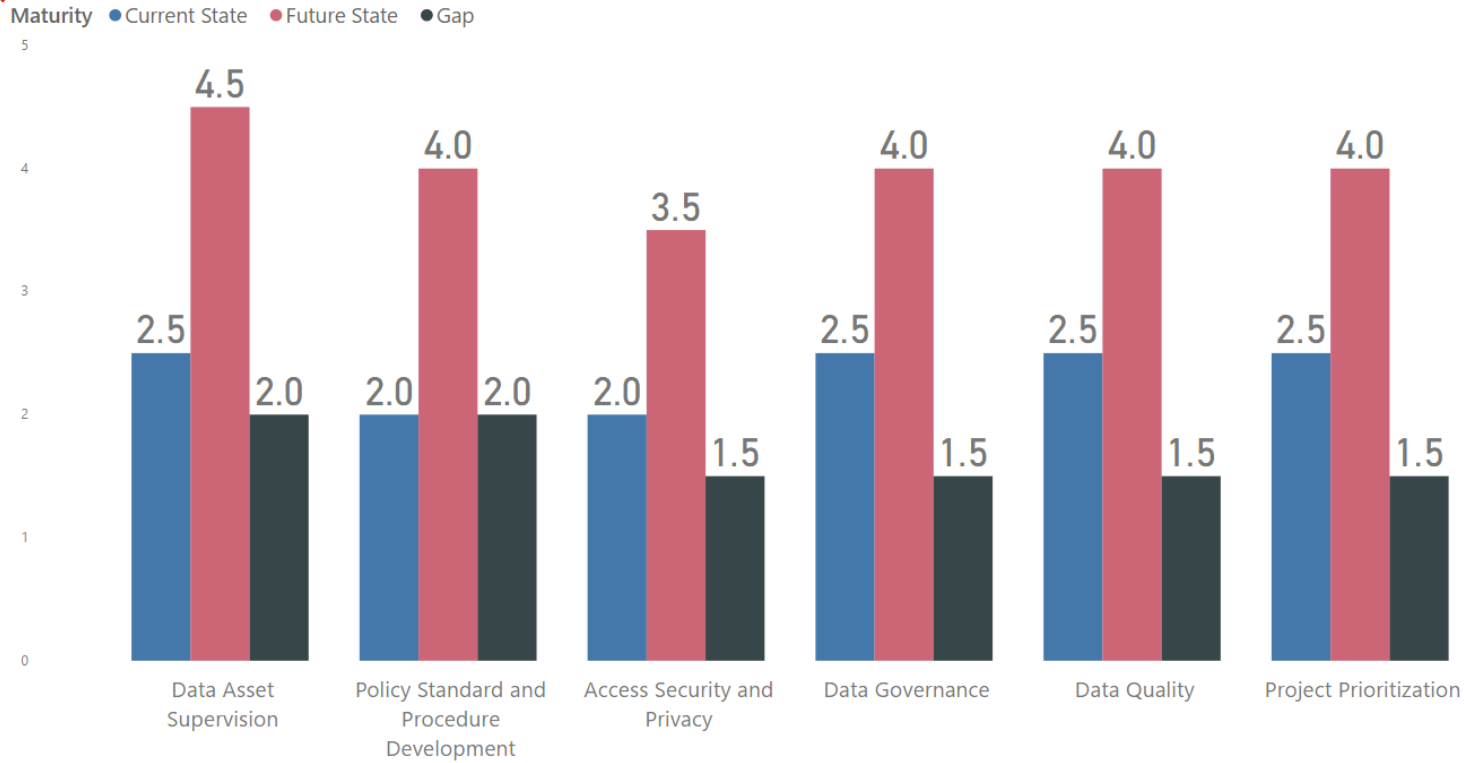
NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Environment Services: Gap Analysis – Process and Governance



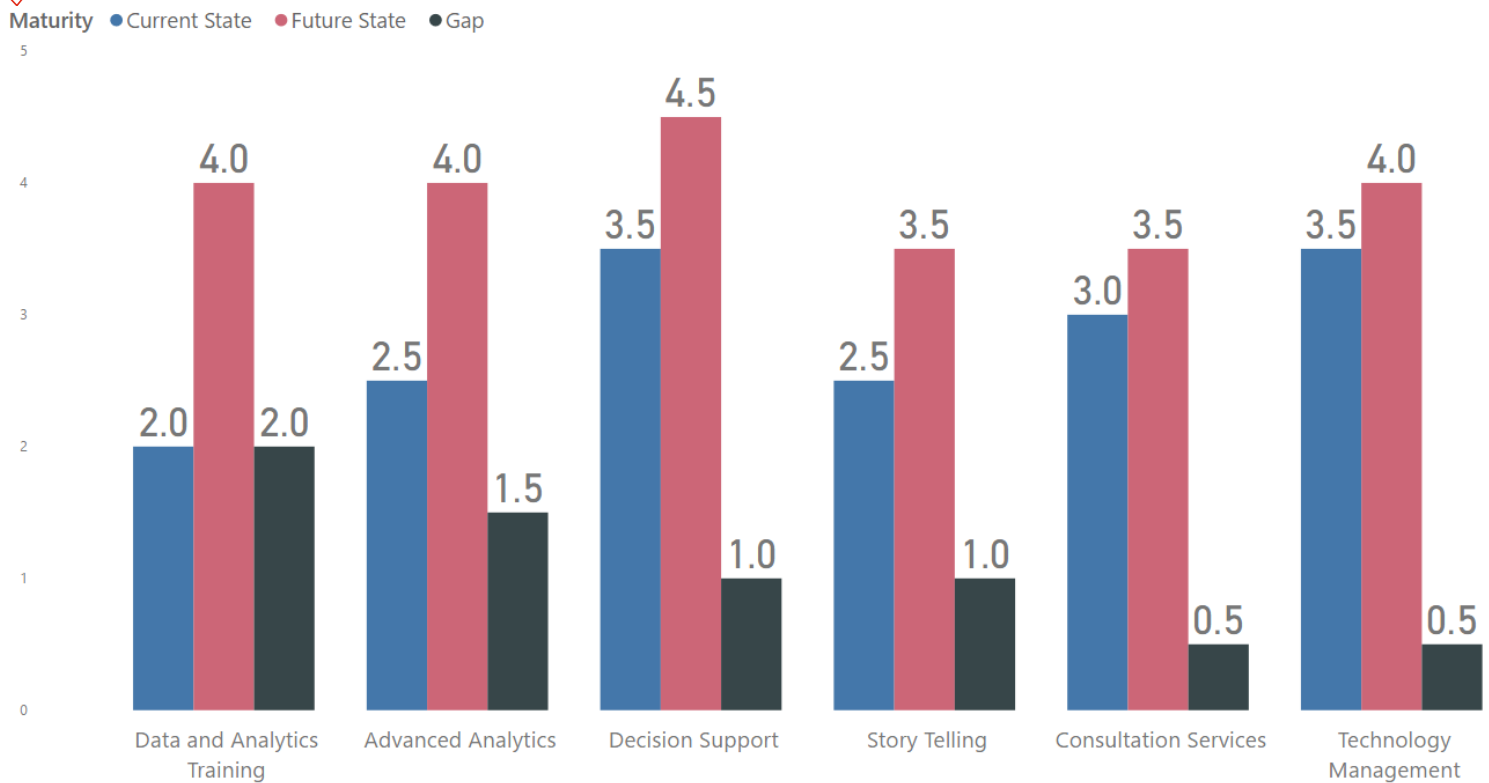
NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Environment Services: Gap Analysis – Talent and Organization



NOTE: Legend only applies to Current and Future State Maturity.

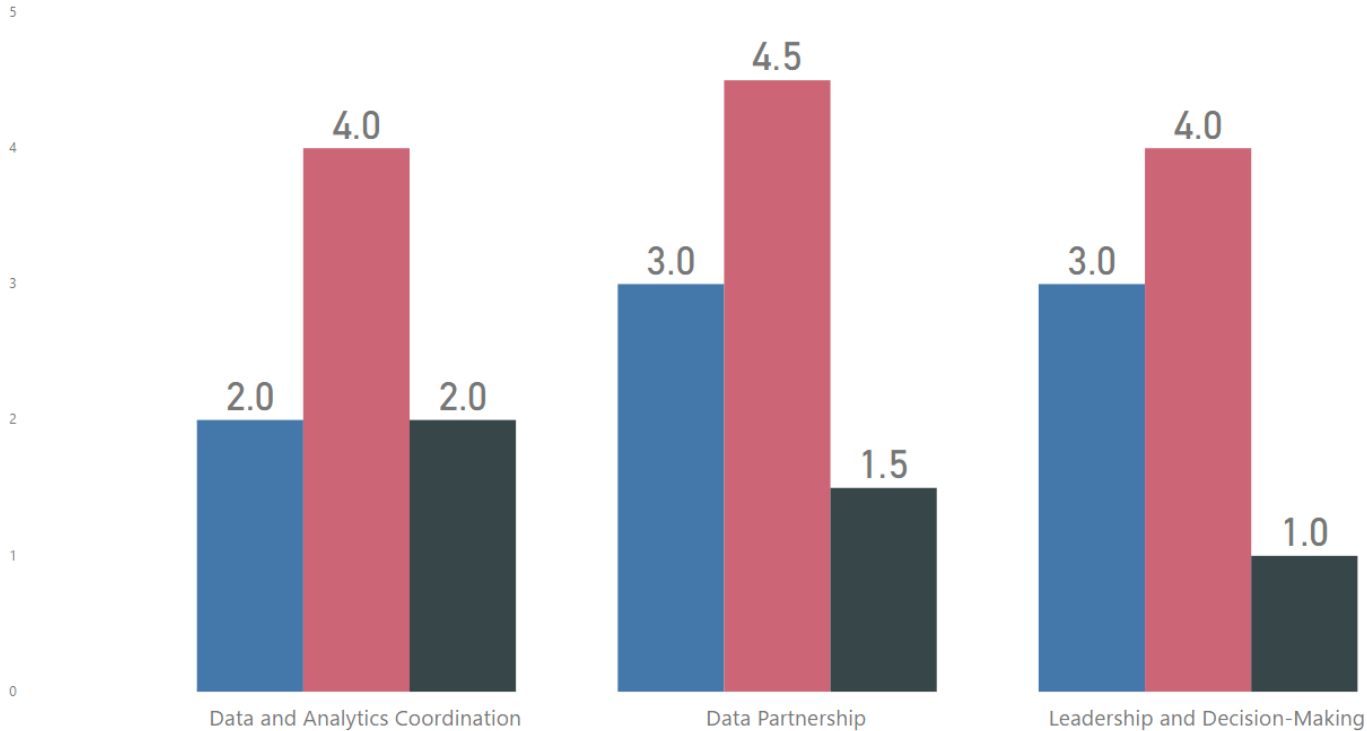
Legend

1 – Non Existent
2 - Reactive
3 - Proactive
4 - Committed
5 - Leader

D&A functions are defined in the Current State section.

Environment Services: Gap Analysis – Culture

Maturity ● Current State ● Future State ● Gap



NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

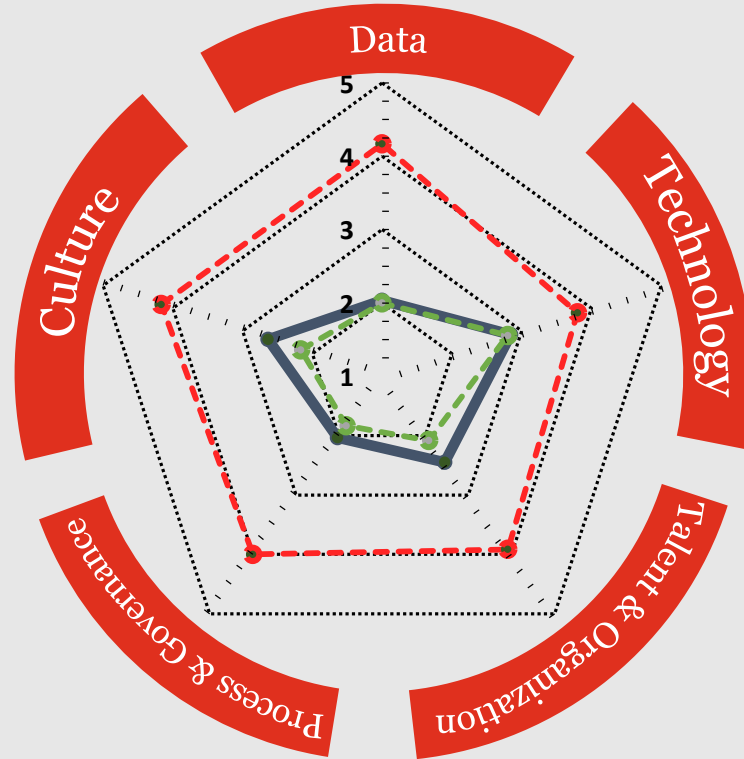
1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Community Health Services

Community Health Services

Community Health Services has a consistent maturity score with the enterprise on the technology dimension. This is due to consistent technologies being available across the organization even though some staff were not aware of them.

Pockets of data and analytics talent exist but a gap in the distribution (organization) impedes dissemination of these skills. Training to support data and analytics functions also limits proficiency.



Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Community Health Services

The majority of staff are not aware of governance policies, standards and procedures.

85% of frontline staff feel that accessing and sharing information is more hindrance to data analytics activities.

Frontline staff felt identifying a single / authorized source of truth needs to be made a priority.

30% of survey respondents did not feel confident in their data due to similar versions of the information existing.

Areas of Strength

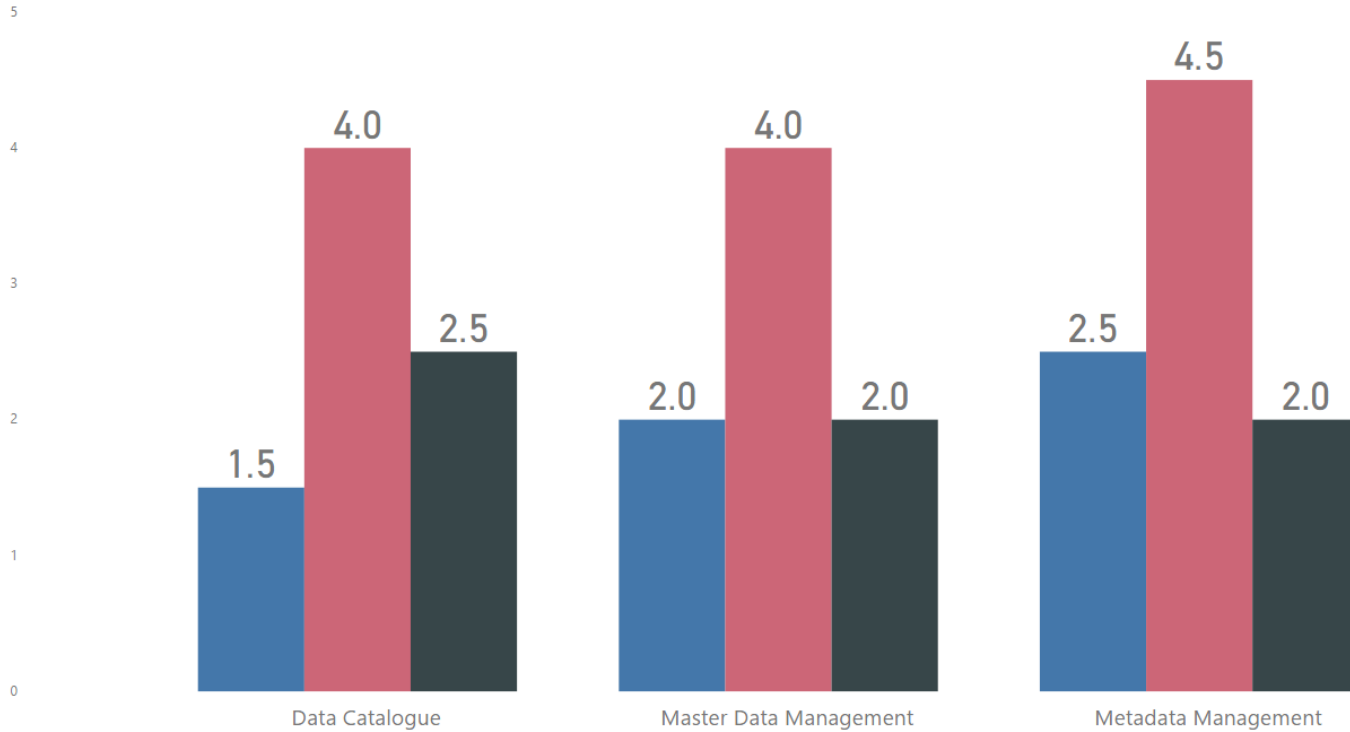
- CHS is very open to working with other departments / branches to support data and analytics needs.
- Staff who are aware of data reporting / visualization tools that exist feel that these tools are sufficient for their needs. York Property Inc. and Day Care services available are examples of initiatives where existing tools are well utilized.
- Some business units within the department support each other well through awareness of skill-sets available.

Opportunities for Improvement

- Although pockets of talent exist, some of these individuals are limited in providing assistance to those in need.
- PHIPA or other privacy regulations are often used to impede access to critical data assets. Clarity on patient health information can help alleviate sharing issues.
- Many data-sets are stored on desktops or shared folders without others knowing where / how to access them.
- Established CHS processes and procedures are currently not well adopted. Educating staff on policies, standards and procedures will increase standardization and use.
- Once a governance structure is established, assigning data owners, stewards and custodians to data assets will increase data quality and ensure policies, standards and procedures are operationalized.

Community and Health Services: Gap Analysis - Data

Maturity ● Current State ● Future State ● Gap



NOTE: Legend only applies to Current and Future State Maturity.

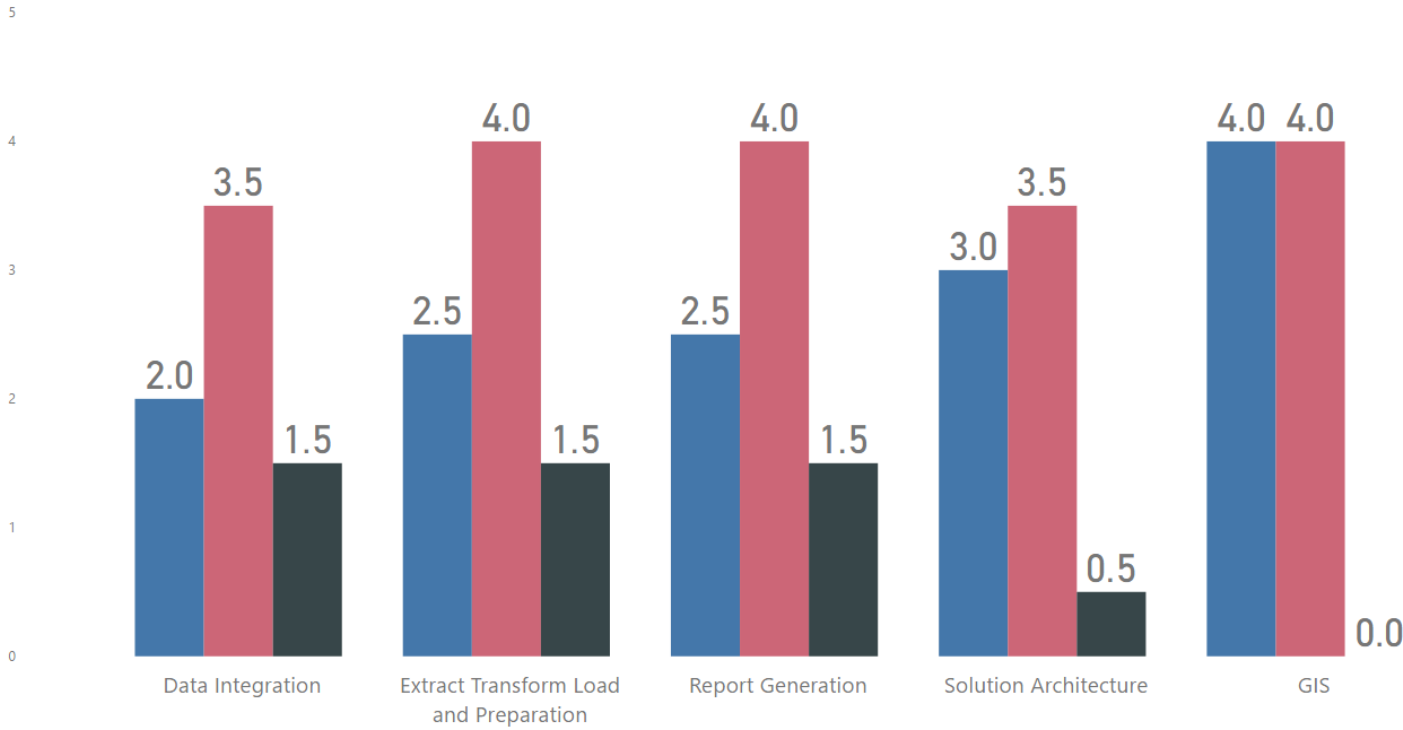
D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Community and Health Services: Gap Analysis - Technology

Maturity ● Current State ● Future State ● Gap



NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Community and Health Services: Gap Analysis – Process and Governance



NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Community and Health Services: Gap Analysis – Talent and Organization



NOTE: Legend only applies to Current and Future State Maturity.

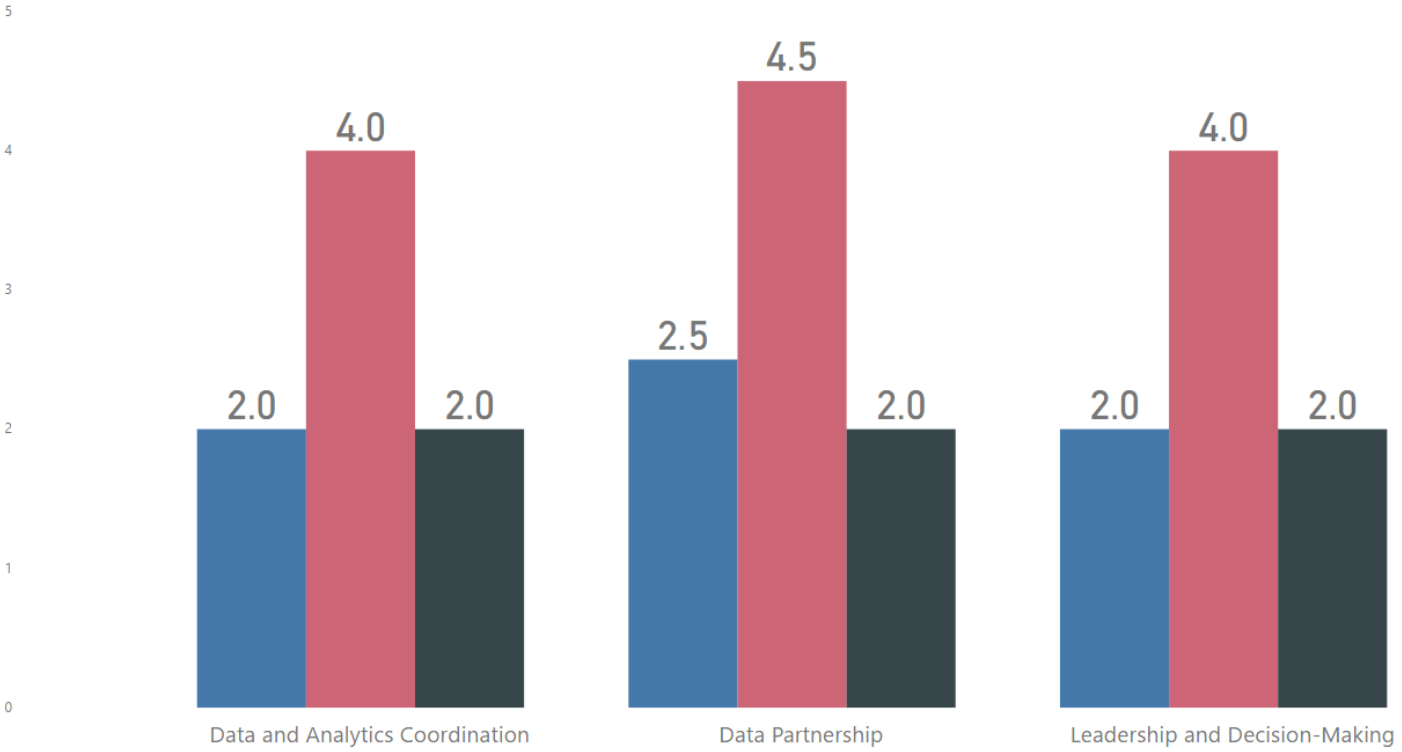
Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

D&A functions are defined in the Current State section.

Community and Health Services: Gap Analysis – Culture

Maturity ● Current State ● Future State ● Gap



NOTE: Legend only applies to Current and Future State Maturity.

Legend
 1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

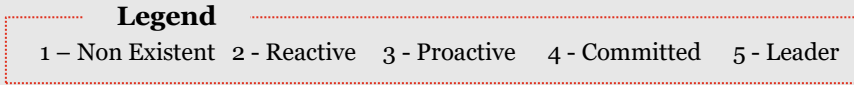
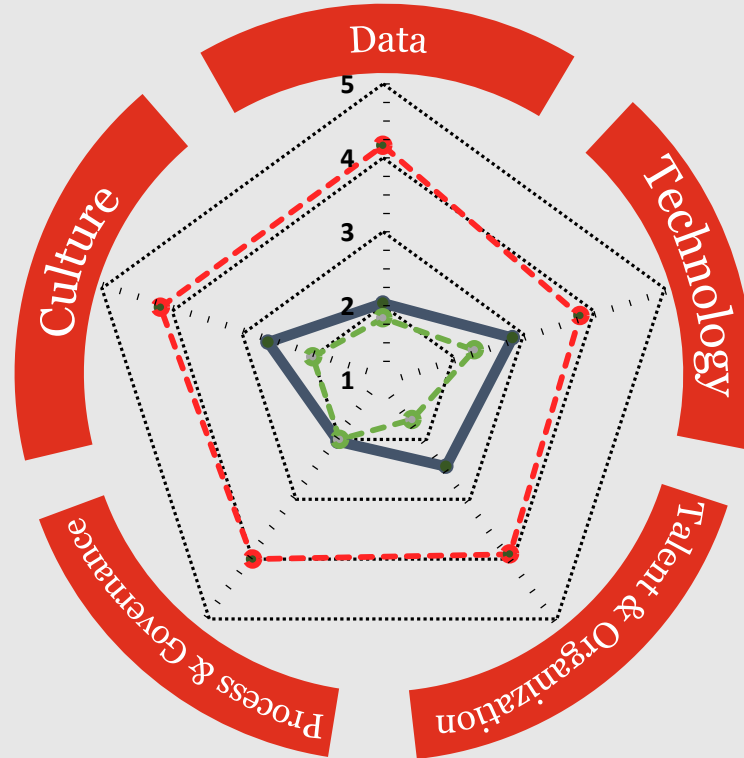
D&A functions are defined in the Current State section.

Finance & ITS

Finance & ITS

Finance and ITS has a consistent maturity score with the enterprise on the process and governance, as well as the data dimension. This is due to a lack of enterprise policies, standards and procedures being established and disseminated.

Pockets of data and analytics talent exist, particularly from a technology proficiency standpoint, but a gap in the deployment impedes distribution of these skills.



Finance & ITS

The majority of data is not being accessed, logged or utilized to it's full potential. Any data catalogue comes from transactional systems and is often not up to date.

Manual efforts are required to communicate between different systems.

“Each data has an owner but it is not really documented and maintained.”

Analysis is conducted on an ad-hoc basis. Metadata required for analysis is not clearly defined, creating inconsistent reporting.

Areas of Strength

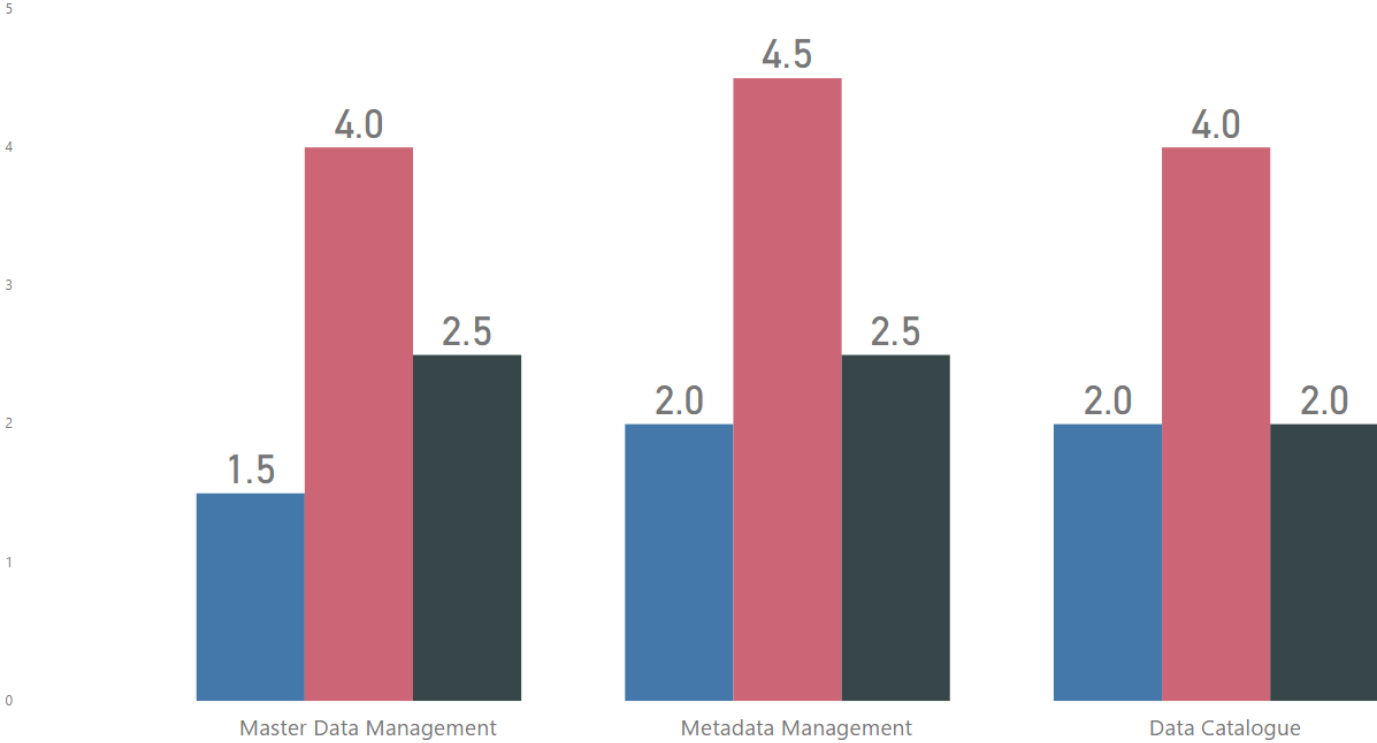
- Operational departments leverage skillsets within ITS to support solution delivery such as integrated reporting and dash boarding.
- The nature of the departments / branches is highly collaborative, where many initiatives require assistance / provide assistance to another.
- Initiatives are re-prioritized based on organizational value and priority.

Opportunities for Improvement

- An integrated data architecture would support the organization with an awareness of data and analytics tools. This would help create an enterprise standardized set of tools for data and analytics.
- Augmenting a data catalogue with business context allows for more robust and consistent analysis of data.
- Once a governance structure is established, assigning data owners, stewards and custodians to data assets will increase data quality and ensure policies, standards and procedures are operationalized.
- A suite of data management tools will aid in creating a single source of truth and the documentation of a enterprise data model. This will be key in increasing confidence in the quality of data used in the generation of reports.

Finance and ITS: Gap Analysis - Data

Maturity ● Current State ● Future State ● Gap



NOTE: Legend only applies to Current and Future State Maturity.

Legend
1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

D&A functions are defined in the Current State section.

Finance and ITS: Gap Analysis - Technology

Maturity ● Current State ● Future State ● Gap



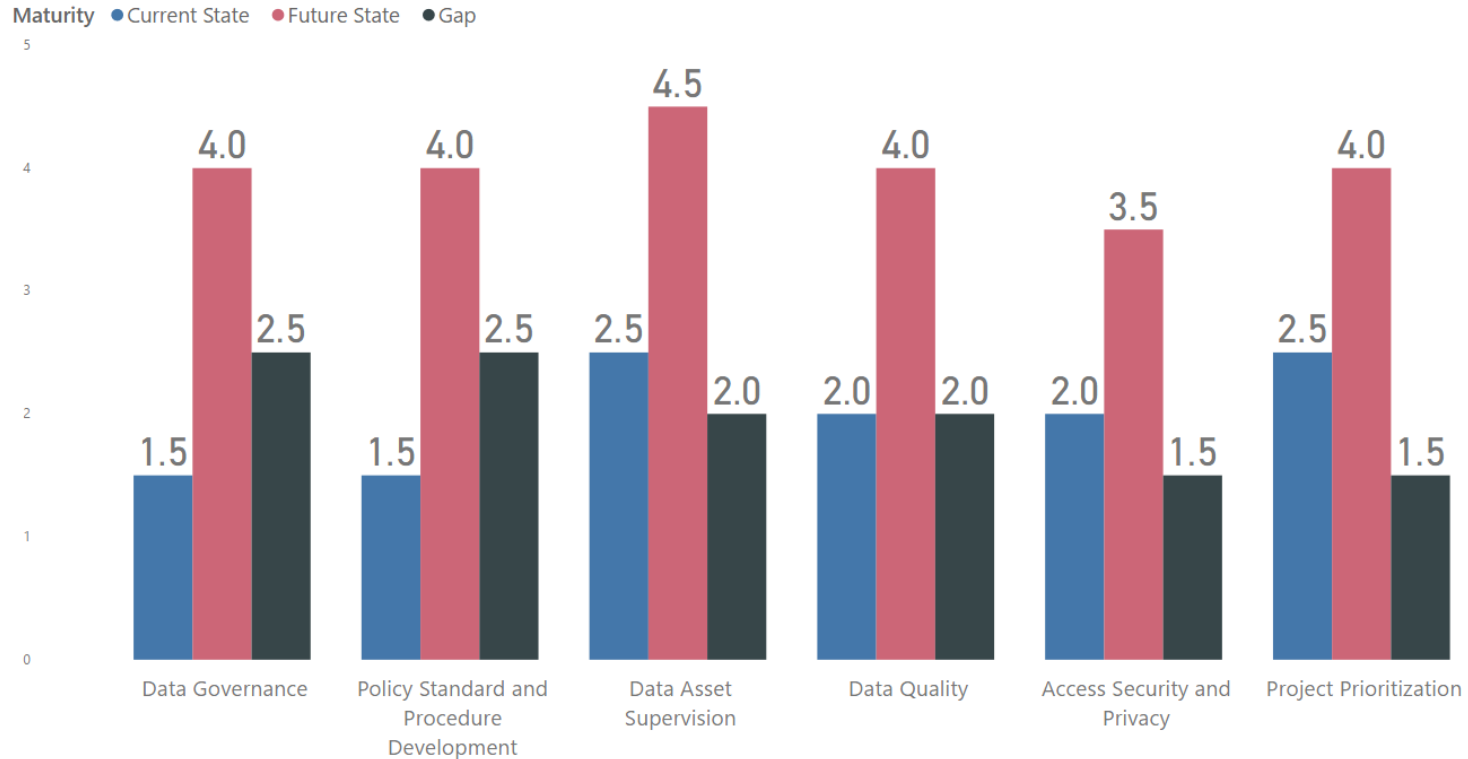
NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Finance and ITS: Gap Analysis – Process and Governance



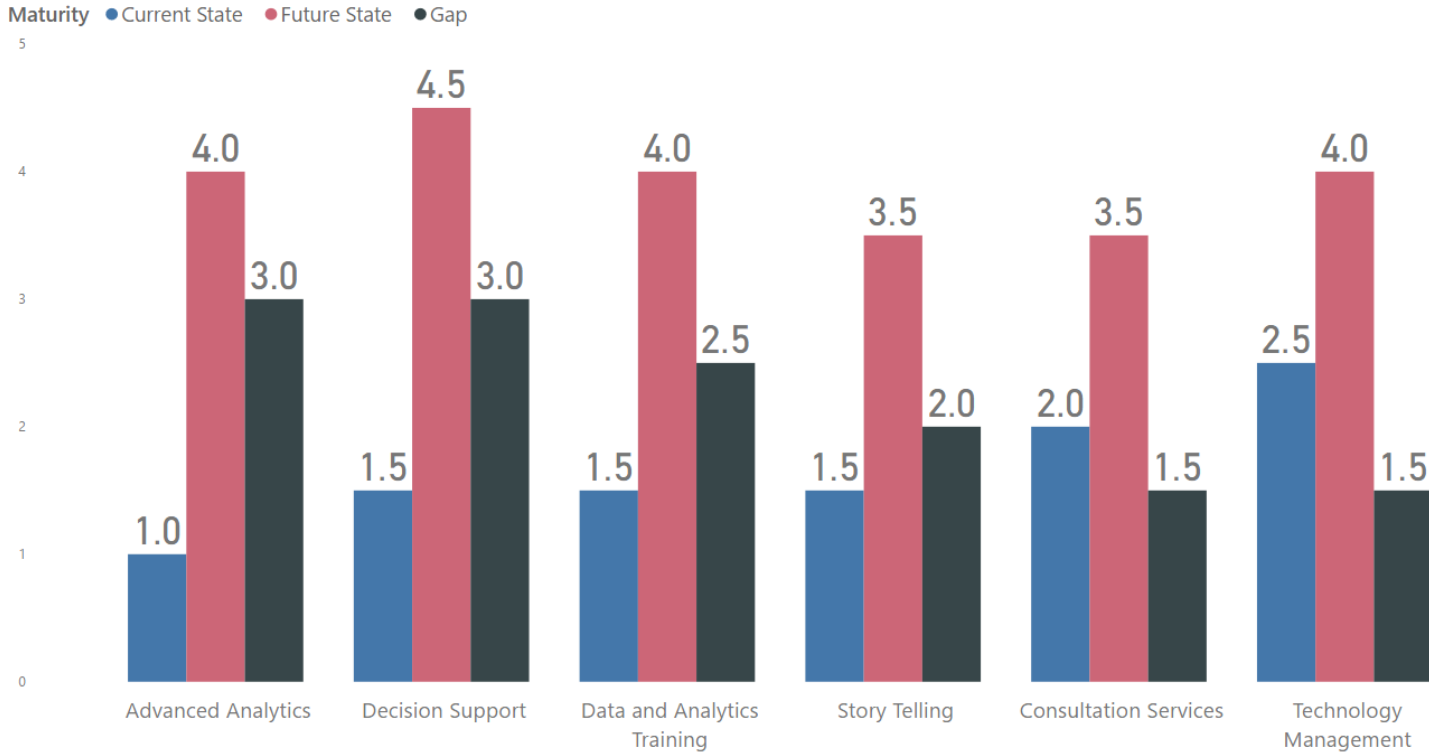
NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Finance and ITS: Gap Analysis – Talent and Organization



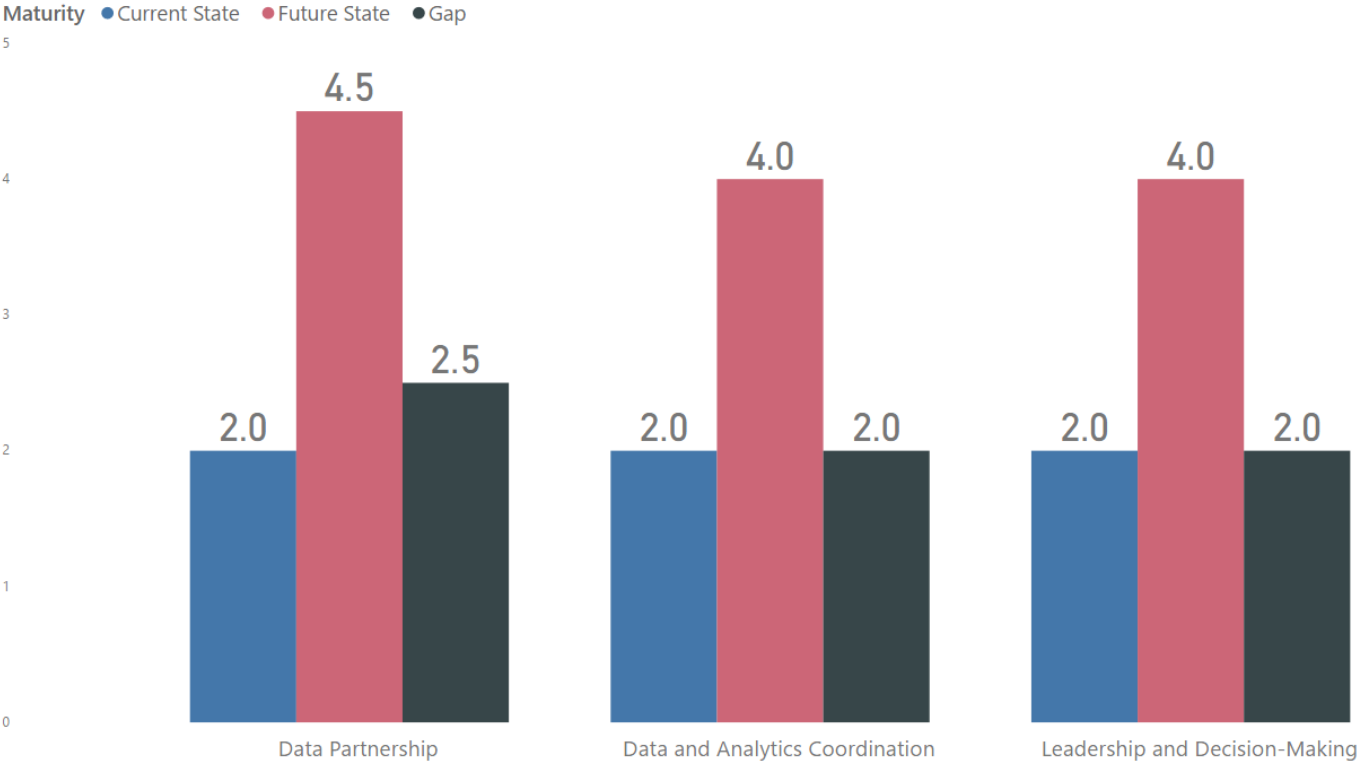
NOTE: Legend only applies to Current and Future State Maturity.

D&A functions are defined in the Current State section.

Legend

1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

Finance and ITS: Gap Analysis – Culture



NOTE: Legend only applies to Current and Future State Maturity.

Legend
 1 – Non Existent 2 - Reactive 3 - Proactive 4 - Committed 5 - Leader

D&A functions are defined in the Current State section.

Appendix B: Function Delivery Details

Function and Service Ownership
Catalogue

Function and Service Profiling Template

Function and Service Ownership Catalogue

APPENDIX B.1



What does an “Accountable” business unit mean? What does it entail?

An accountable business unit is ultimately answerable for the provision of the function across the enterprise.

This entails:

- **Identifying and defining** services needs
- **Establishing** the service delivery model and service providers
- **Coordinating** service delivery
- **Measuring** performance and quality of the services offered
- **Managing** the extent and frequency that services are offered

In the proposed service catalogue each function, has **one and only one accountable business unit**. This is listed in the catalogue as seen below.

Dimension	Function	Service	Delivery Model	Department ABC
Process and Governance	Policies, Standards and Procedure (PSP) Development	Accountability Owner for Function	Enterprise	Providing to Enterprise

What does a “Responsible” business unit mean? What does it entail?

A responsible business unit provides the service.

This entails:

- **Clarifying** service delivery roles and responsibilities
- **Managing** expectations and service requests
- **Delivering or brokering** the service

In the proposed service catalogue, depending on the service delivery model (enterprise or localized), services can be provided to yourself, yourself and some business units, or to yourself and the enterprise.

Dimension	Function	Service	Delivery Model	DAVS	TRANS	ENV	CHS
Data	Master Data Management	Reference / relationship mapping	Enterprise	Receiving	Receiving	Receiving	Providing to Enterprise

As a part of the consultations for the Data and Analytics Master Plan, the services required to delivery each function were defined. The service disposition was recommended (enterprise or localized), and responsible or accountable owners were recommended. The spreadsheet enclosed includes recommendations that need to be validated and designed as per the methodology for the “Function and Service Profiling Template” in Appendix B2.



Function and
Service Mapping

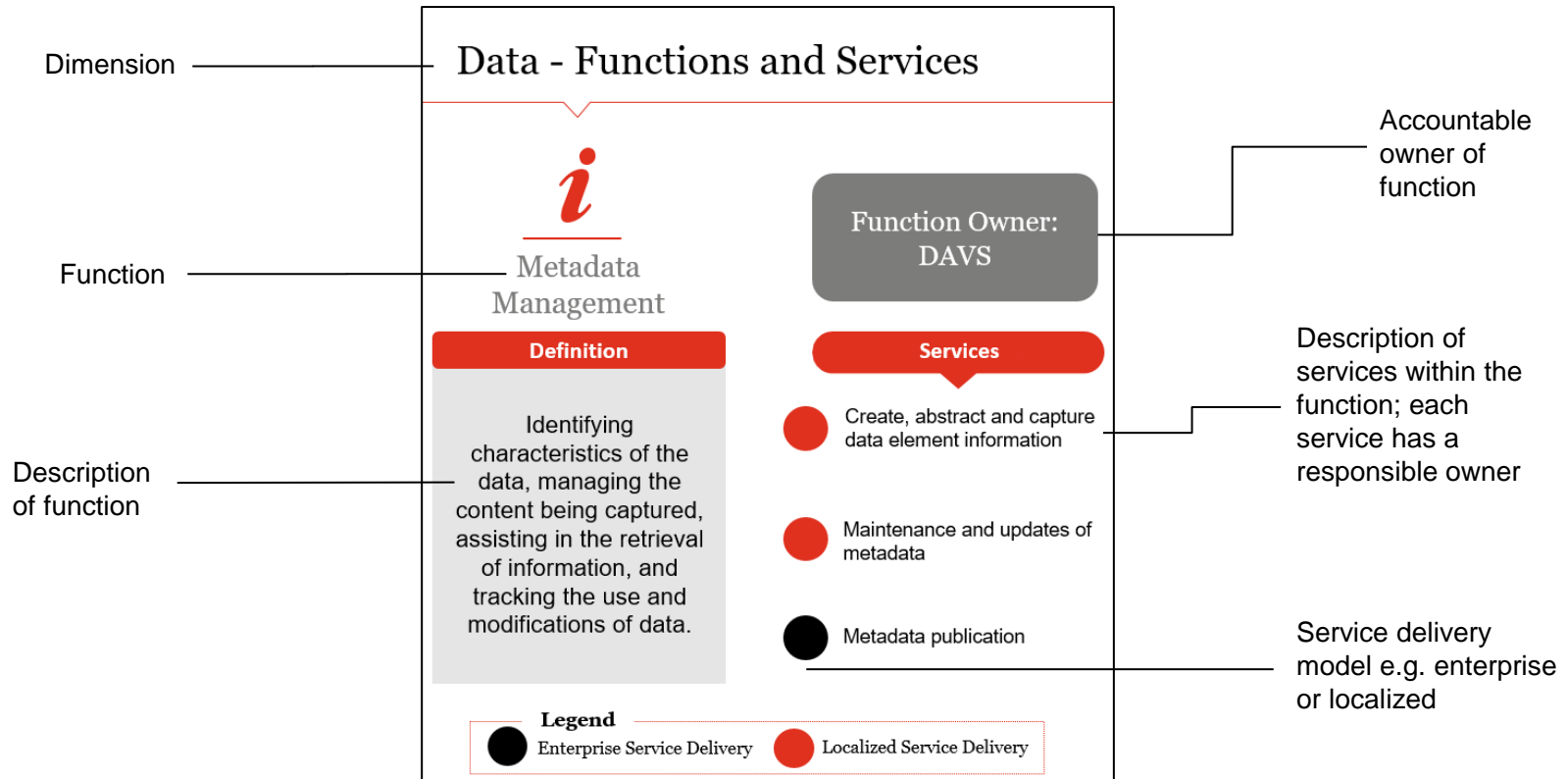
Service Catalogue Design - Ownership

Each function has a accountable business unit. This business unit coordinates and manages the function for the enterprise.

Dimension	Function	Service	Enterprise	Department A	Department B	Department C	Department D	Department E	Department F	Department G	Department H
Technology	Extract Transform Load and Preparation	Accountability Owner for Function	Enterprise	Receiving	Receiving	Receiving	Receiving	NA	Receiving	Receiving	Providing to Enterprise
Technology	Extract Transform Load and Preparation	ETL and preparation for single purpose and exploration	Localized	Providing to Self	Providing to Self	Providing to Self	Providing to Self	NA	Receiving	Receiving	Providing to Self
Technology	Extract Transform Load and Preparation	ETL for multiple uses within a single department	Localized	Providing to Self	Providing to Self	Providing to Self	Providing to Self	NA	Receiving	Receiving	Providing to Self
Technology	Extract Transform Load and Preparation	ETL for multiple uses across the enterprise	Enterprise	Receiving	Receiving	Receiving	Receiving	NA	Receiving	Receiving	Providing to Enterprise
Technology	Report Generation	Accountability Owner for Function	Enterprise	Providing to Enterprise	Receiving	Receiving	Receiving	NA	Receiving	Receiving	Receiving
Technology	Report Generation	Report Generation for single purpose and exploration	Localized	Providing to Self	Providing to Self	Providing to Self	Providing to Self	NA	Receiving	Providing to Self	Providing to Self
Technology	Report Generation	Report Generation for multiple uses within a single department	Localized	Providing to Self	Providing to Self	Providing to Self	Providing to Self	NA	Receiving	Receiving	Providing to Self
Technology	Report Generation	Report Generation for multiple uses across the enterprise	Enterprise	Providing to Enterprise	Receiving	Receiving	Receiving	NA	Receiving	Receiving	Receiving

Enterprise or localized service delivery

Departments are either Receiving Services, Providing them to themselves, Providing to Enterprise, or Providing to themselves and others





Metadata Management

Definition

Identifying characteristics of the data, managing the content being captured, assisting in the retrieval of information, and tracking the use and modifications of data.

Function Owner:
DAVS

Services

- Create, abstract and capture data element information
- Maintenance and updates of metadata
- Metadata publication



Master Data Management

Definition

Providing processes to collect, aggregate, match, consolidate, and distribute data across the organization, ensuring consistent definitions and format of enterprise data assets.

Function Owner:
CHS

Services

- Reconciliation between multiple (same or similar) data sets / elements
- Data modeling
- Reference / relationship mapping

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Data Catalogue

Definition

Identifying organizational data-sets or databases as well as their appropriate metadata. This may include business context to the data-set or database.

Function Owner:
DAVS

Services

- Document data set characteristics and details
- Maintain and update of the data catalogue
- Prioritize mandatory and optional data catalogue fields
- Establish gating checks, controls and overall process workflows
- Enforce gate checks, controls and overall process adherence and compliance

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Extract, Transform,
Load and Prepare

Definition

Extracting, transforming and loading data into a format ready for analysis.

Function Owner:
Finance ITS

Services

- ETL and preparation for single purpose and exploration
- ETL and preparation for multiple uses within a single department
- ETL and preparation for multiple uses across the enterprise



Report
Generation

Definition

Managing the creation, visualization and distribution of standard reports and self-service portal(s) for users to gain access to information.

Function Owner:
Corporate Services

Services

- Report Generation for single purpose and exploration
- Report Generation for multiple uses within a single department
- Report Generation for multiple uses across the enterprise

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Data Integration

Definition

The collection of data from various sources into one uniform record. Integration methods may include physical and virtual integration.

Function Owner:
Finance ITS

Services

- Identifying common units for integration
- Facilitating physical or virtual integrations
- Identifying appropriate tools and tactics for integration



Solution Architecture

Definition

Leveraging a set of technologies to connect disparate applications and data sources to answer a business question.

Function Owner:
Finance ITS

Services

- Gather requirements and business questions
- Design and develop architecture for solution
- Deploy the solution

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Geo-spatial Information Systems

Definition

Ensuring a reliable and effective Geo-spatial Information Systems technology infrastructure exists to support the organizational needs.

Function Owner:
DAVS

Services

- System design and implementation
- Cloud and web services management
- Internal and external partnership management
- Infrastructure administration

Legend

- Enterprise Service Delivery
- Localized Service Delivery

Process and Governance - Functions and Services



Data Asset Supervision

Definition

Providing supervision and overall strategic direction on how data assets are managed and utilized across the enterprise.

Function Owner:
DAVS

Services

- Setting goals and objectives for the use of data sets / systems
- Identifying KPIs measuring progress to target
- Monitoring and adjusting goals and objectives based on feedback



Access, Security and Privacy

Definition

Assessing, monitoring and assisting with the protection of data assets when being used for analytics purposes.

Function Owner:
Clerks

Services

- Establishing data access standards
- Establishing access framework and data publishing tool kit
- Provisioning access to data
- Monitoring access rights, logs and other information
- Create and integrate PIA (Privacy Impact Assessment) and TRA (Threat Risk Assessment) into workflow³⁹⁰

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Data Governance

Definition

Planning, supervision, and control over data management and use.

Function Owner:
DLT

Services

- Setting goals and strategic direction
- Reinforcing data management practices and developing metrics
- Operationalize data management practices and measure progress



Policy, Standard and
Procedure
Development

Definition

Assessing current needs and practices in order to develop safeguards and guidance on how data assets are to be managed and used. This may include specific guidance through the development of standards and procedures.

Function Owner:
Clerks

Services

- Priority, objective determination and setting targets
- Developing policies and standards
- Periodic review to support measuring and modifying PSPs
- Deploying and enforcing PSPs
- Developing procedures

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Data Quality

Definition

Identifying, measuring and resolving quality issues related to data completeness, integrity, reliability and overall utility for a specific purpose.

Function Owner:
Environment
Services

Services

- Developing goals and objectives
- Developing quality thresholds, measuring and monitoring progress to goals (KPIs)
- Defining methods for measuring quality
- Remediation of data quality issue
- Identifying relevant data quality characteristics



Project Prioritization

Definition

Ensuring projects / initiatives are strategically aligned and prove to have return on impact for staff and the greater community.

Function Owner:
DLT

Services

- Identifying prioritization criteria
- Measuring success based on business benefit for the Region
- Prioritizing and re-prioritizing initiatives

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Decision Support

Definition

Supporting decision making opportunities across the organization with robust and consistent interpretation of analyses.

Function Owner:
Transportation
Services

Services

- Analysis interpretation
- Data analysis



Advanced Analytics

Definition

Utilizing statistical modeling and algorithm generation in combination with programming capabilities to conduct diagnostic, predictive, and prescriptive analytics. This may include machine learning components.

Function Owner:
DAVS

Services

- Business case development
- Statistical analysis
- Operationally integrating algorithms
- Artificial intelligence and machine learning

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Technology Management

Definition

Organizing and managing software designs, technology support and procurement, as well as application inventory, including the provisioning to the access of technology.

Function Owner:
Finance ITS

Services

-  On-demand technical assistance
-  Technology procurement
-  Technology administration
-  Creation and enforcement of baseline technology standards



Data and Analytics Training

Definition

Supporting and managing staff training related to data and analytics.

Function Owner:
DAVS

Services

-  Data and Analytics Core Training and Facilitation
-  Curriculum development and determination of who is responsible for creating content
-  Course and content Development
-  Custom training facilitation
-  Identifying communication channels and tactics

Legend

-  Enterprise Service Delivery
-  Localized Service Delivery



Story Telling

Definition

Integrating a narrative with data and visuals to explain what is happening in the data and why a particular insight is important.

Function Owner:
Transportation
Services

Services

- Generating guidelines and training for story telling with data
- Support for story telling with data
- Sharing insight



Consultation Services

Definition

Providing advice, information, or an opinion on a specified subject.

Function Owner:
DAVS

Services

- Consultation on D&A practices

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Data Partnerships

Definition

Establishing data-oriented partnerships with external organizations such as municipalities, universities, research institutes, and private sector organizations, as well as internal departments, branches and divisions.

Function Owner:
DAVS

Services

- Facilitating and coordinating data-oriented partnerships for the benefit of the Region



Leadership and Decision-making

Definition

Oversight, strategic direction, and support / sponsorship in transforming the use and capabilities of data and analytics functions.

Function Owner:
DLT

Services

- Identifying and adopting leading practices to enhance data and analytics
- Facilitating the data informed cultural transformation
- Establishing and maintaining shared goals

Legend

- Enterprise Service Delivery
- Localized Service Delivery



Data and Analytics Coordination

Definition

Support planning and coordination of data and analytics initiatives within and across multiple departments and / or branches.

Function Owner:
DLT

Services

- Holistic oversight and evaluation of initiatives / projects
- Identifying KPIs measuring progress to targeted outcomes
- Communication of D&A services
- Establishing and maintaining a D&A “Community of Practice”

Legend

- Enterprise Service Delivery
- Localized Service Delivery

Function and Service Profiling Template

APPENDIX B.2

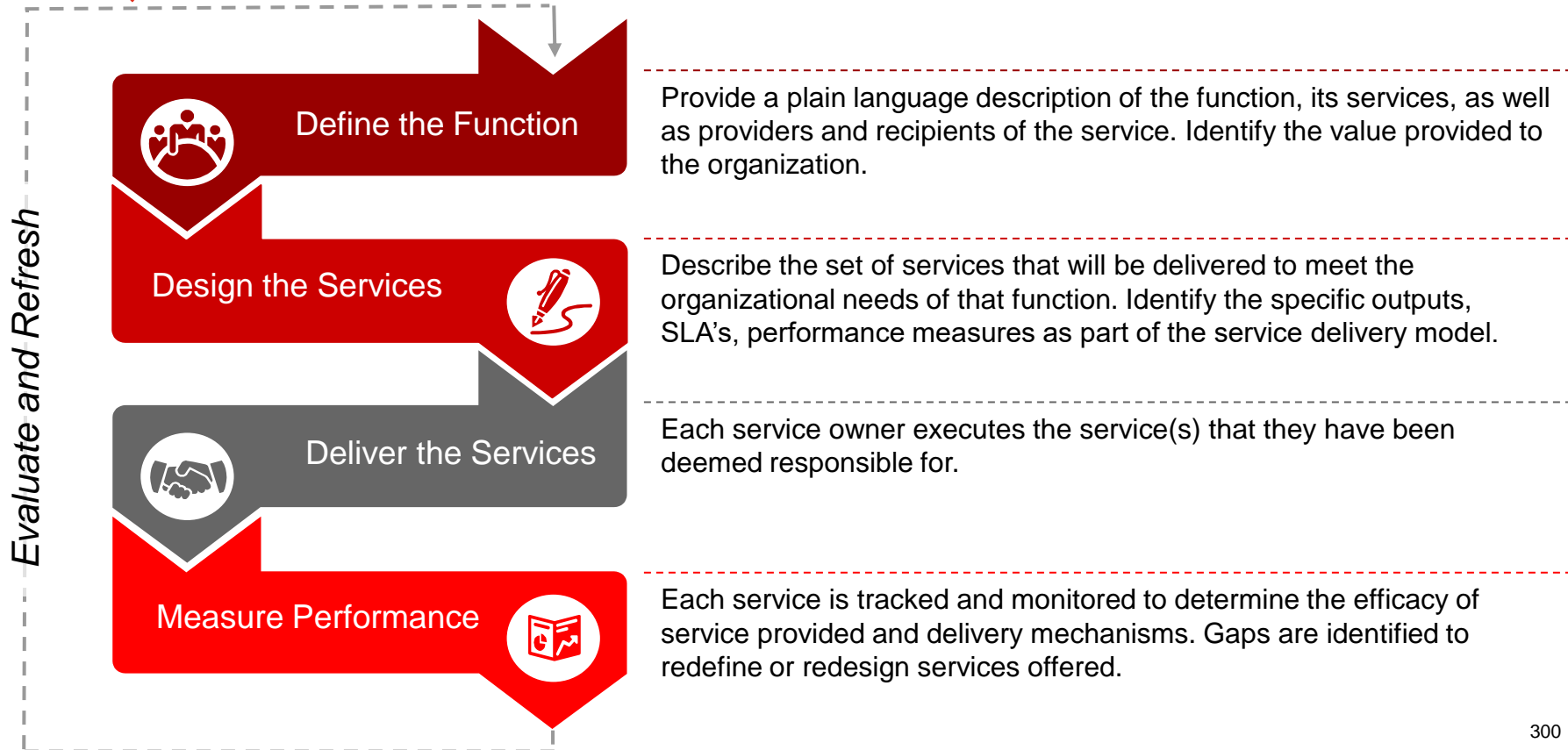


Purpose:

This template provides the accountable function owner a logical methodology to leverage when defining and designing services within a function.

Each phase in the proposed methodology requires specific questions to be answered in order to support the delivery of services as well as facilitate the adoption of service delivery responsibility.

Methodology for Service Delivery



Purpose:

The following slides detail the key questions to consider when defining and designing the function / service delivery.

Some of these considerations focus on:

- Refining the function and service offering
- Gauging the volume and impact of service requests
- Identifying candidates that could be responsible for delivering services
- Developing a service delivery model
- Defining metrics and measure to track progress over time



Define the Function and Services within



Questions

- What services are required to perform the function well?

- Does the service definition need to be redefined?

- What is the organizational need for the service?

- Who can provide this service?

Examples

- What are some of the core requirements to support the generation of reports?
- Do these requirements fulfill the organizational need?

- Based on the organizational requirements and activities, is the current description of the function and services within adequate?

- What are the requirements for this service?
- How much effort would be required to deliver on these requirements?
- Which departments / branches need this service the most?

- Who has a strong foundation in generating reports?
- What is their capacity and desire to provide their expertise to other parts of the organization?



Design Inputs and Outputs



Questions

- What are the objectives related to service delivery?
- How will the service be offered to recipients?

- What channels will be used to deliver the service?

- What is the intake process for requests?
- What funding model supports service delivery on an ongoing basis?

- How will potential recipients be made aware of services available?

Examples

- How do the services add value to the business?
- Does the service need to be offered in a standardized or customized manner?

- How will service providers interact with recipients and vice versa?
(e.g. face to face, online, demonstrative workshop, etc.)

- How do we manage stakeholder expectations and prioritize requests?
- What contingencies are in place to support an unmanageable volume of requests?
- How will this service be funded or charged?

- How will recipients be notified of services that are available to them?
- How will recipients be made aware of services currently in development?



Design the Process



Questions

- What roles and responsibilities need to be established?
- How do we know when we have completed delivering the service?
- How are the Service Level Agreements structured to support us in a sustainable manner?
- What stress testing needs to be performed to identify gaps in the service offering and delivery?
• What priority exists for the roll out of services?

Examples

- How are roles and responsibilities delineated between service providers and recipients?
- What quantifiable service output defines service delivery completion?
• How can we track this over time?
- What service standards support delivery?
• How often are reviews conducted of the services required?
• What change process is in place to make modifications to services?
- What services need to be piloted before fully operationalizing them?
• How long does the service need to be piloted?
• What evaluation criteria will be used to determine pilot success?



Design the Evaluation



Questions

- How will metrics be tracked over time?
- What metrics quantify the service delivery output?
- What feedback will be solicited?
• How will feedback be solicited?
- Do the same services still need to exist?

Examples

- How do we know whether the existing processes and services need to be refined?
- How do we intend to use metrics and indicators?
- How many reports have been generated through service utilization?
- How are service requests from the same area trending over time?
- Do service providers feel adequately equipped to continue offering the service?
- Do recipients feel that the service is being adequately delivered?
- What method should be used to capture feedback?
- With increased proficiency in the ability to generate reports, do the same services still need to exist?

Appendix C: Implementation Plan

Implementation Plan Excel Document

Data and Analytics Skill Sets

Implementation Plan Details

APPENDIX C.1



The spreadsheet enclosed includes the Implementation Plan in a spreadsheet format.



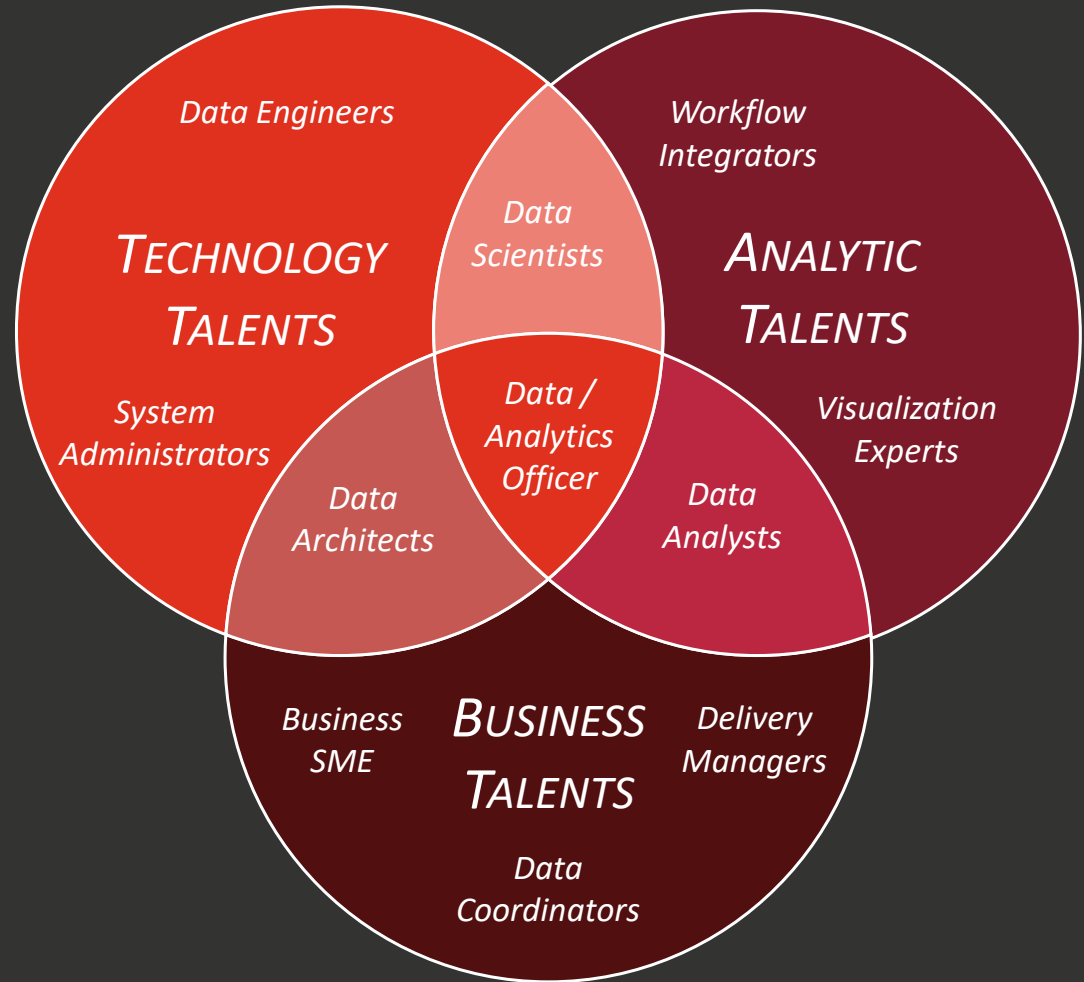
Implementation
Plan V2.0

Data and Analytics Skill Sets

APPENDIX C.2



Positions Required for a Data and Analytics Operating Model



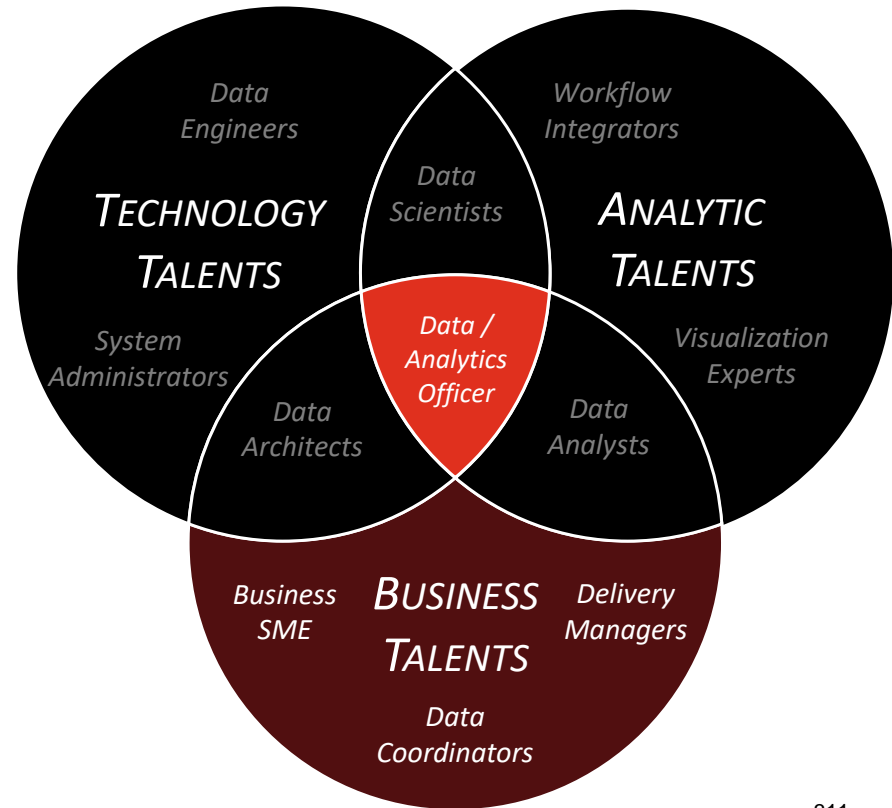
Business Talents

Data /Analytics Officer - A senior executive who is responsible for the governance and implementation of data and analytics strategies, mandates and programs

Business SME - Can provide context and insights to business rules related to data systems for more relevant analysis

Delivery Managers - Analyze the problems that exist within the organization to develop initiatives that leverage data analytics to create insights and solve those problems

Data Coordinators - Collects, manages and integrates data to operationalize the data management and governance frameworks across the organization

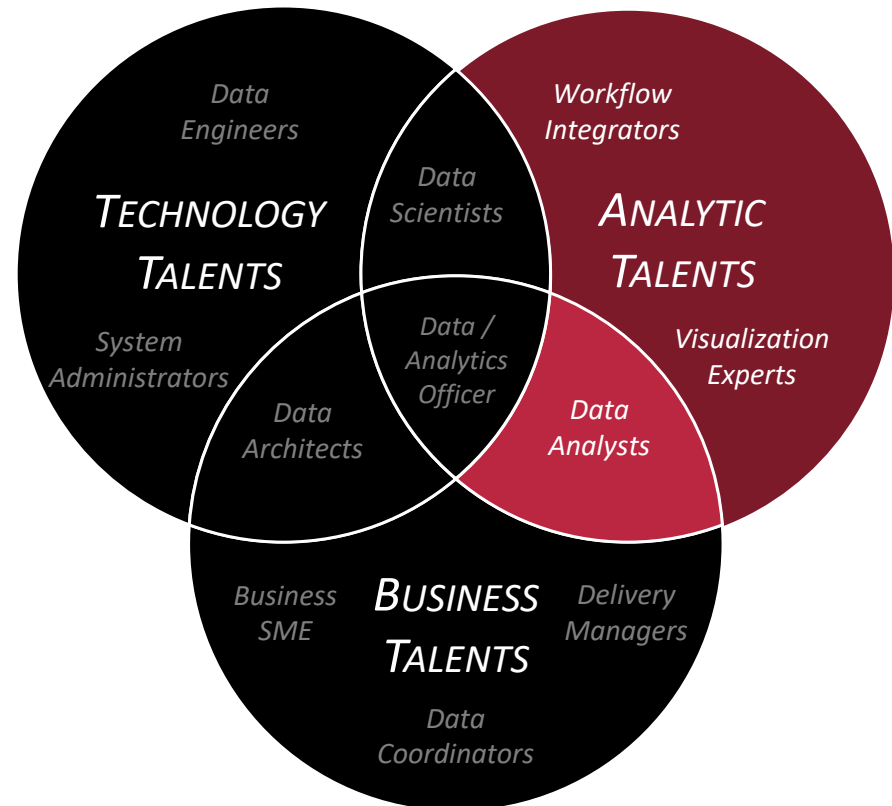


Analytic Talents

Visualization Experts - Generate insights using data to tell a easy to understand story that answers the business problems

Workflow Integrators - Build interactive and business logic based workflows to monitor, alert and drive decisions based on insights

Data Analysts - Ensure the right kind of analytics are used (i.e right metrics) to solve business problems



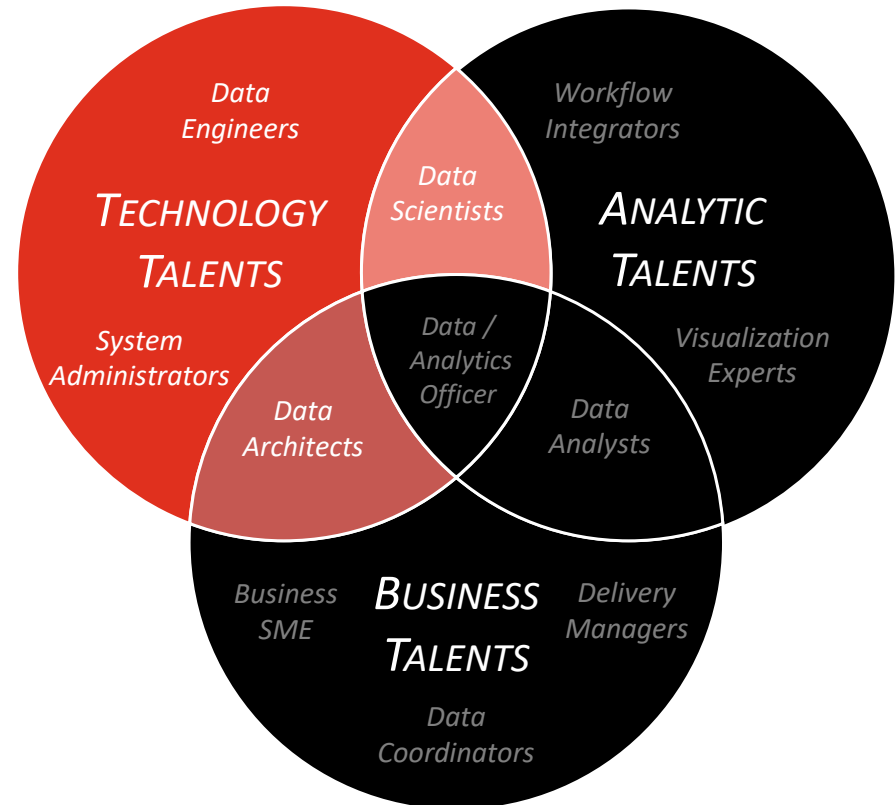
Technology Talents

Data Engineers - Collect, prepare and organize data for analysis

System Administrators - Integrate disparate systems and grant access to data, maintaining a stable and healthy technology stack

Data Architects - Ensure consistent, quality and structured information is accessible in a timely manner and that tools for data consumption are available to all users

Data Scientists - Develop advanced analytics and statistical models or algorithms to answer critical business questions



Thank you!

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