Corporate Technology Strategic Plan 2020-2025

Finance, Budget & Information Technology Services

Information Technology Services

Version: 3.3 FINAL

Date: May 2020

Table of Contents

Glossary and Acronyms

Acronym	Definition	Acronym	Definition
AMO	Association of Municipalities Ontario	**ITS**	Information Technology Services
BCP	Business Continuity Plan	**ITSSC**	IT Strategic Steering Committee
BI	Business Intelligence	**JDE**	JD Edwards
BIA	Business Impact Assessment	**KPI**	Key Performance Indicators
BU	Business Units	**LoRaWAN**	Long Range Wide Area Network
CIRA	Canadian Internet Registration Authority	**Mbps**	Megabit Per Second
CMMI	Capability Maturity Model Integration	**MCK**	Municipality of Chatham-Kent
COBIT	Control Objectives for Information and Related Technologies	**NIST**	National Institute of Standards and Technology
CRTC	Canadian Radio-television and Telecommunications Commission	**PEST**	Political Economic Socio-cultural and Technological
CTSP	Corporate Technology Strategic Plan	**PIPEDA**	Personal Information Protection and Electronic Documents Act
DRP	Disaster Recovery Plan	**PMO**	Project Management Office
EMT	Executive Management Team	**RFP**	Request for Proposal
ERDMS	Electronic Record and Document Management System	**RPO**	Recovery Point Objectives
ERM	Enterprise Risk Management	**RTO**	Recovery Time Objectives
FCM	Federation of Canadian Municipalities	**SaaS**	Software as a Service
FTTP	Fibre-to-the-premise	**SDLC**	Software Development Life Cycle
GPS	Global Position System	**SLA**	Service Level Agreement
HDL	High Level Design	**SWIFT**	Southwestern Integrated Fibre Technology
HR	Human Resources	**SWOT**	Strengths, Weaknesses, Opportunities and Threats
HRIS	Human Resources Information System	**TBD**	To Be Determined
HROD	Human Resources and Organizational Development	**TCO**	Total Cost of Ownership
HTRA	Harmonized Threat Risk Assessment	**TRA**	Threat Risk Assessment
IES	Infrastructure and Engineering Services	**WEF**	World Economic Forum
IOT	Internet of Things	**WOWC**	Western Ontario Wardens' Caucus Inc.
IT	Information Technology	**YoY**	Year over Year
ITIL	Information Technology Infrastructure Library	**YTD**	Year-to-date

Executive Summary

This is the Municipality of Chatham-Kent's (MCK or Municipality) Corporate Technology Strategic Plan (CTSP). It outlines MCK's new vision for Information and Technology Services (ITS), its alignment with MCK's priorities, the strategic technology initiatives for the next five years and a set of initiatives to achieve it.

In formulating the Corporate Technology Strategic Plan, MCK used both external and internal factors as key inputs.

Influencing Factors - External

Changes are happening to MCK. External factors are having an impact on the Municipality and consequently on ITS. Most notably:

The recently elected Provincial government has a cost cutting and efficiency agenda and has been assertive on their expectations from municipalities to identify efficiencies.

MCK's population is aging and access to skilled labour is a challenge given the proximity of the Municipality to higher education institutes and metropolitan areas.

Technology is becoming more pervasive and employees expect to be able to integrate such technologies into their day to day work routines.

Expectations are changing; residents expect access to digital services. This is particularly true for younger and working segments of the population, as well as individuals who may have moved to MCK from bigger cities that previously had access to online services.

Influencing Factors - Internal

ITS in recent years has made some significant gains in providing MCK with value. They have achieved great success from a strategic and operational standpoint. They have achieved successes in providing value in day-to-day support and operations to MCK, as well as building a comprehensive, resilient and secure technology infrastructure. That said, ITS is at risk of value erosion.

It is at a tipping point, where the role of ITS in the corporation and the appropriate operating model will be key to help ensure ITS continues to provide value. In addition, business units within MCK have a stronger desire to adopt technology to either improve service delivery or to increase efficiencies. Changes to the ITS governance model are required in order to successfully deliver the Corporate Technology Strategic Plan and achieve the vision.

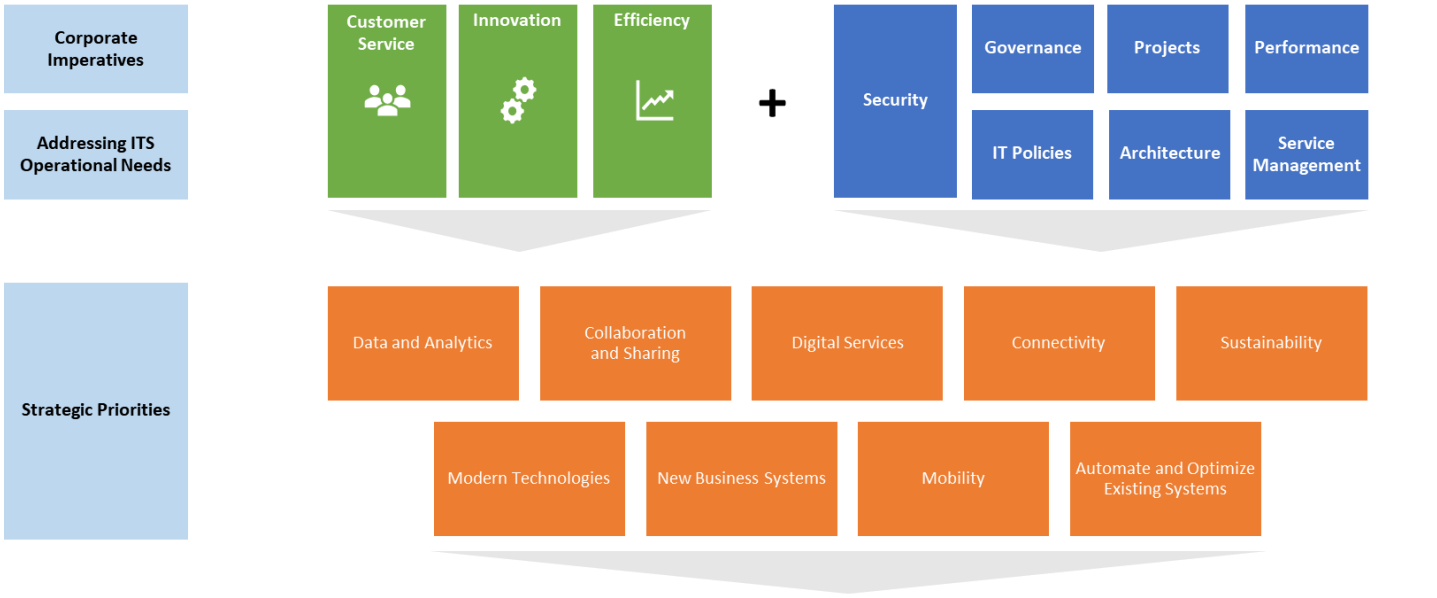
Strategy on a Page

The Corporate Technology Strategic Plan is a five-year strategy that proposes a bottom up approach for ITS to continue providing high value to MCK. By tackling the initiatives in this plan and making changes to the governance structure, ITS can fulfil its vision:

An innovation partner providing strategic services and solutions

The vision of ITS is one that aligns with the overall vision of MCK – "A welcoming, healthy, prosperous community that is culturally rich and naturally innovative". The ITS vision drives the Corporate Technology Strategic Plan and the strategic priorities, and therefore directs where ITS focuses its resources.

The diagram below summarizes how the current overarching corporate imperatives and operational needs distill down to create nine strategic priorities that ITS should focus on.



The corporate imperatives (informed by stakeholder consultations) on the left along with the gaps in current ITS operations (informed by ITS operational assessment) together formulate nine strategic priorities. The Corporate Technology Strategic Plan initiatives align to the strategic priorities; in most cases each aligns to multiple priorities.

Current Situation

This section outlines the internal and external factors that MCK faces. Externally, it includes a Political, Economic, Social, and Technological (PEST) analysis. Moreover, we conducted research to highlight pervasive technological trends occurring in the industry. Internally, it includes a Strength, Weakness, Opportunity, Threat (SWOT) analysis and a summary of the current state of ITS' operations.

External Factors

Environmental Analysis

Changes are happening to MCK. External factors are having an impact on the Municipality and consequently on ITS. Below are some of those key factors.

Political 	• **A focus on efficiency**[1] – the current provincial government plans clearly state that modernization is important to eliminate inefficiencies resulting in cost savings. While grants are available to municipalities there is also a desire by the province to see savings or efficiency. • **Environmental sustainability** – flooding is having profound impact on the Thames River and Lake Erie shorelines. Environmental sustainability is one of four pillars of the CKPlan2035 and technology may support achieving it. The World Economic Forum suggests that clean energy and low-carbon technologies are key to tackling and disrupting climate change.[2]
Economical 	• **Canadian economy** – with the arrival of COVID-19, the Canadian economy is expected to contract. With increasing unemployment rates and high debt levels (both private and public), resident spending on discretionary goods and services is likely to decline. • **Labour market** – access to talent and skills for roles may continue to be difficult given the lack of proximity to higher education institutes and metropolitan areas. This has been a challenge previously for ITS, when hiring for both junior and senior positions.
Social 	• **Increasing service expectations** – individuals have higher expectation of services they receive. Mostly from comparing not to other municipalities but to their experience with banks, retailers and organizations such as Amazon and Uber. While technology has been a key driver of this, it implies the City will have to balance the adoption of technology and the costs associated with it. • **Aging population** – MCK's population is aging, and the fastest growing segment are seniors and older adults. The total population between 2011 and 2016 declined by 2%. The composition breakdown shows that the 0-14 years and 15-64 years categories have both declined (0.6% and 2.5% respectively), while the 65+ years has increased (3.1%)[3]. • **Changing workforce** – over the next three to five years, MCK's workforce will shift to a younger demographic that have grown up with the internet. They will be more advanced users of technology.

[1] https://budget.ontario.ca/2019/fallstatement/pdf/bg-government.pdf
[2] https://www.weforum.org/agenda/2019/11/how-technological-innovation-can-disrupt-climate-change/
[3] https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3536020&Geo2=PR&Code2=01&Data=Count&SearchText=chatham%20kent&SearchType=Begins&SearchPR=01&B1=All&Custom=&TABID=1

Technological 	• **Rate of technology advancement** – the rate of technology advancement is faster than organizations can keep up. This makes it difficult to match user / resident expectations and keep a secure IT environment. • **Rise of digital channels** – increasing use of technology creates demand for easy and accessible services / information. This will have implications on municipal service delivery. • **Broadband access limitations** – a challenge residents face is access to high speed internet. This constraint creates a barrier for uptake of digital services.

Technology Trends

In addition to the above, there are a number of other technology trends that this strategy considers:

Topic	Summary
 **5G Technology**	5G connectivity will transform how devices connect and transmit data; but it is false to assume that 5G will completely replace fibre. 5G is currently prototyped across Canada, but it is not widespread, and implementation has been slow. The success of 5G in rural areas will depend on the investment from all stakeholders.
 **Cloud**	The move to Cloud is almost inevitable. In response to this, Governments around the world are creating avenues to adopt it more securely and efficiently. Canadian municipalities can use criteria from FedRamp (US framework – publicly available) to assess local Canadian cloud service providers when assessing vendors.
 **Data Analytics and Big Data**	The abundance of data gives municipalities avenues to learn, organize and innovate. However, before governments can reap the rewards, they need to be an intelligent consumer, and senior leaders within governments will likely need to be literate in the methodology and confident in combining data with judgement.
 **Future IT Organization**	As the role of technology within organizations continues to become a necessity, access to modern skills such as digital, data, and security is fundamental. Access to these skills may or may not be internal resources but third parties.
 **Internet of Things**	There are many global examples, where cutting-edge technology like “Internet of Things” (IoT) is being deployed to increase efficiency and improve quality of service delivery. It is important to lay a solid foundation and perform proper due diligence before embarking on any transformative technology as failure to do so can be costly and pose security risks.
 **IT Outsourcing**	IT outsourcing can be a strong avenue for transformative growth and value creation for organizations. These are usually large investments and execution is key to mitigate against risks. It is important to invest appropriate effort during the initial stages to ensure maximum benefits.

 **Security**	Cybercrime is on the rise; continued investment in cybersecurity resources is fundamental. Adopting existing methodologies and tools can be beneficial as it is industry recognized and more cost effective. Adoption should not stifle growth and innovation of business.
 **SWIFT**	SWIFT's objective is to provide and expand broadband networks across Southwestern Ontario; however, progress remains contingent on securing funding. Most recently, SWIFT released a number of RFPs - totalling approximately $20 million in value - with the objective of expanding broadband across participating municipalities.

Internal Factors

Internal factors include a SWOT analysis of ITS and a summary of an assessment of the ITS department.

Strengths

- There is a strong team culture within the ITS department; a strong sense of teamwork and the willingness to help each other.
- ITS staff have access to resources to engage in training. Management are supportive of staff training and acquiring new skills, such as the ITIL training that all staff underwent.
- There are several tools that ITS uses to manage IT service delivery and day to day operations. These tools streamline operations and introduce some efficiencies.
- The day to day support and service delivery from ITS to the business units is quick for non-complex issues.

Weaknesses

- Internal communication across the various areas and teams within ITS is a weakness. Staff feel disconnected from keeping up to date on information and on any ongoing projects.
- There is little documentation and formality regarding IT processes, thus relying on inherent knowledge and individuals.
- There is greater project demand than ITS can deliver causing a backlog.
- Project prioritization and adherence to a project management methodology is inconsistent.
- Limitations exist regarding MCK's ability to access, share and report on information.

Opportunities

- Utilizing technology to digitize and automate processes to achieve efficiencies internally and to deliver better customer service. This will also pave the way for digital service offerings to residents.
- Integrating systems and implementing tools for greater data sharing and reporting.
- Developing a partnership type relationship with the business units and departments to foster greater collaboration and innovation.
- Improvements to the project management process between ITS and business units. Introducing greater transparency on the process and involvement from the business units regarding prioritization and solutioning.

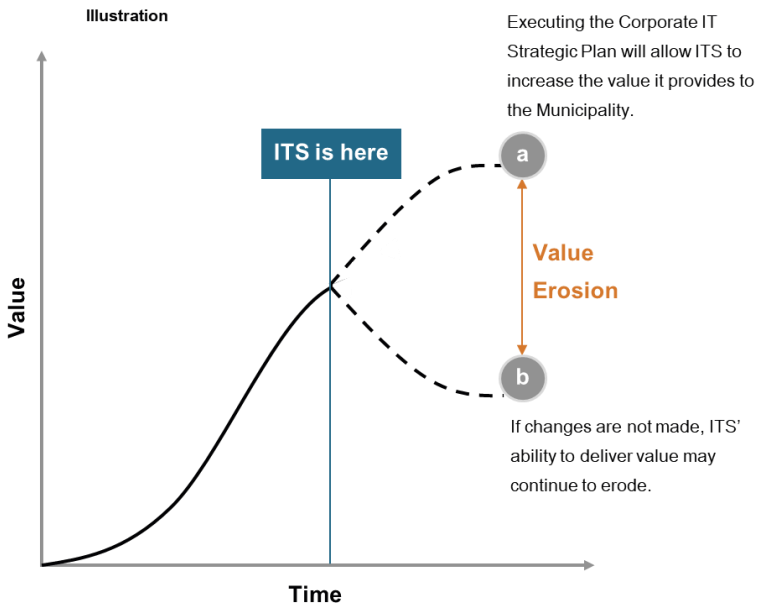
Threats

- Constraining budgets and cost pressures will put pressure on ITS to deliver current - and more - services with equal or less resourcing.
- Cybersecurity incidents are on the rise and security is becoming a greater concern as digitization continues. Addressing security vulnerabilities is an ongoing threat.

ITS Current State

ITS has made some significant gains in providing value and has achieved a great amount of success from a strategic and operational perspective. Some of the value that ITS has created for MCK includes:

- Creating an expansive network that can scale over time
- Assembling a team of skilled professionals with access to training
- Managing a large project portfolio with one Project Manager
- Implementing a highly virtual server environment
- Providing a highly available and stable environment (server, storage)
- Implementing security practices to improve MCK's security posture
- Integrating corporate systems
- Developing applications to address niche business unit needs
- Standardizing IT assets
- Implementing robust monitoring and configuration management software
- Delivering high customer satisfaction service desk



All that said, ITS is at risk of value erosion. It is at a tipping point, where the role of IT and the appropriate operating model will be key to help ensure ITS continues to provide value. The diagram to the left is an illustration of that.

There are four major factors that are causing value to erode. Only some of which ITS can influence, such as:

- The governing body (IT Strategic Steering Committee) that prioritizes projects is ineffective, requiring ITS to prioritize initiatives
- Robust practices for project resource management (ITS and business unit) need greater control
- IT Processes are ad-hoc with few controls to ensure compliance / adherence
- ITS organizational structure is not set up to deliver the scope of service and number of projects the MCK desires creating bottlenecks and delays. Additionally, some capability gaps make it difficult to deliver a growing portfolio of services

The compounding effect of these will continue to make it difficult for ITS to provide the MCK with better value, especially delivering projects / changes to the business.

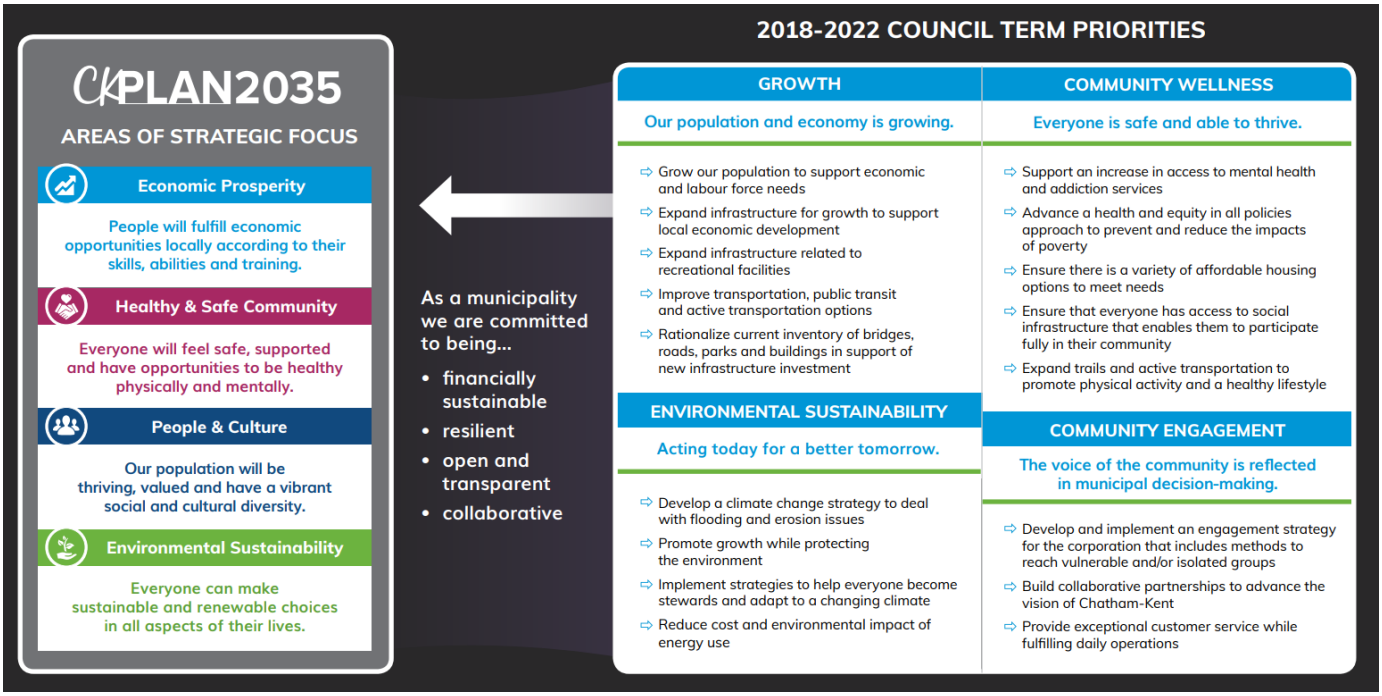
ITS Vision

An innovation partner providing strategic services and solutions

CKPlan2035

The vision of MCK is “A welcoming, healthy, prosperous community that is culturally rich and naturally innovative”. In line with this vision, CKPlan2035 is the Corporate Strategic Plan of the MCK.

The strategic plan has four strategic focus areas:

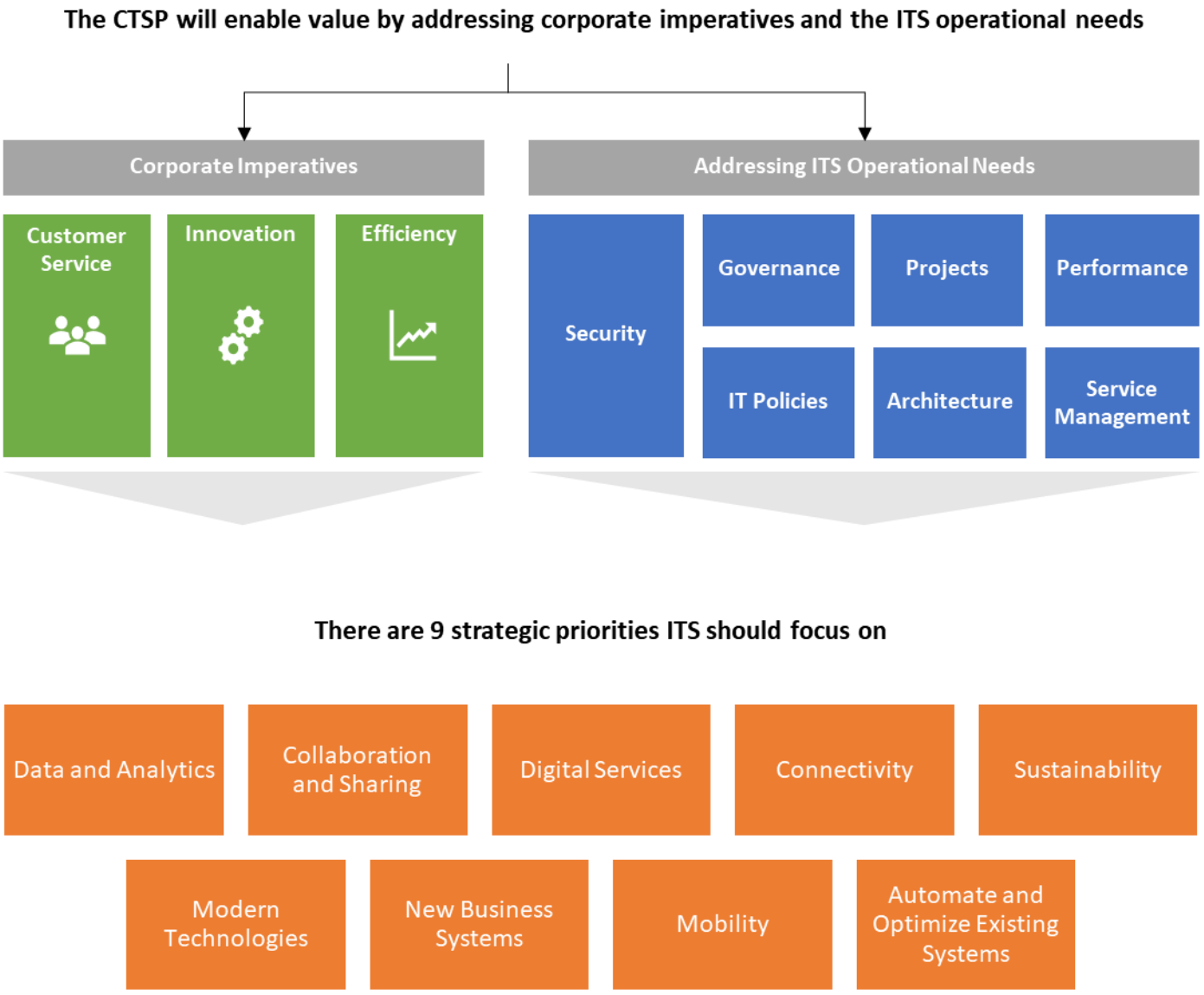


The vision of ITS is one that aligns with the overall vision of MCK. The ITS vision drives the Corporate Technology Strategic Plan and the strategic priorities, and therefore directs where ITS focuses its resources.

The following pages describe the alignment between the vision of ITS, strategic priorities and initiatives.

Strategic Priorities

The diagram below summarizes the strategic priorities of the Corporate Technology Strategic Plan.



The subsequent pages provide greater context and information on the above illustration.

Overview

The Corporate Technology Strategic Plan brings together the current and future needs of MCK, as well as optimizing the ITS department. Together, these form the strategic priorities that ITS should focus on over the next five years.

The need for technology to accomplish the corporate strategic plan (CKPlan2035) dictates the degree of importance of technology. CKPlan2035 focuses on five key pillars, and technology and ITS is a supporter and enabler to accomplishing the plan.

The **Corporate Imperatives** are the pillars that are priority to MCK and business units. Summarized as the following:

- delivering services with high levels of customer satisfaction
- being innovative in the ways MCK operates and delivers services, and
- doing so in an efficient way

Addressing ITS Operational Needs are the key areas that are necessary to operate the ITS department in a more resilient, efficient way. It is a foundation to improve MCK's value to residents. It includes:

- Security – ensuring that ITS has security measures in place from a technology and staff training perspective, while not stifling MKC's ability to innovative.
- Governance – refining current IT governance practices to be more effective, and business wide representation and engagement.
- Projects – delivering ITS projects with greater documentation and rigour.
- Performance – addressing several opportunities aimed at improving the operations within the ITS department internally to be more in line with industry practices.
- IT Policies – formalizing, documenting and tailoring ITS policies for the appropriate audiences (corporate wide and internal) is crucial to safeguarding knowledge as turnovers occur.
- Architecture – upkeep of the existing architecture, including data, applications and network. As well as designing a future state architecture.
- Service Management – continuous delivery of ITS services to MCK with high levels of customer satisfaction, including projects, advice and day to day support.

Strategic Priorities

There are nine strategic priorities, as demonstrated in the graphic in the previous page and in the table below.

Strategic Priority	Description
Automate and Optimize Existing Systems	Optimization of current system functionality to align with current process, as well as expanding it to include new business functionality. Automating business processes to introduce efficiencies and enhanced workflows.
Collaboration and Sharing	At the core of this is a document management solution that allows for digital file storage and management. As well as the ability to collaborate and share files internally and externally.
Connectivity	Connectivity is about the physical infrastructure, it includes providing new, and extending current network connectivity across facilities. As well as acting as a technology liaison with third parties to deliver infrastructure to the public.
Data and Analytics	Reporting and business intelligence tools to gather and report data, and drive evidence-based decision making and provide valuable insights. A prerequisite to this is robust foundations of data governance and data infrastructure.
Digital Services	Providing municipal services and access to information in digital and electronic means to the public. System integrations and end to end automation should be part of the MCK website's infrastructure to enable digital services.
Mobility	Tools that allow mobile roles to conduct their duties remotely when in the field. Mobile technologies increase staff efficiency and reduces multiple data entry. However, mobile technologies should meet business requirements.
Modern Technologies	Technologies that are forward thinking, innovative and not widely adopted yet, these include smart city type initiatives, intelligent sensors and Internet of Things type solutions.
New Business Systems	New systems and solutions that various business areas seek to improve operations or be more efficient from a process and back office perspective. These may be corporate wide or business specific solutions.
Sustainability	Enhancing ITS to ensure a sustainable service delivery to MCK. This includes operational enhancements to ITS to ensure effective service delivery, as well as addressing process, project and governance elements of ITS.

There are 16 initiatives in the "Initiative Details" section of the document that align to one or more of the strategic priorities.

Role of ITS

As the needs of MCK continue to evolve, so does the role of ITS. ITS will:

	**Promote Innovation** ITS should lead and support the promotion of innovation across the business via trade shows, industry events, research, and consultation with industry peers. Caveat: all business units have a responsibility to evolve their business.
	**Data Management** ITS will be a steward of data across MCK; including where information resides (information architecture). Business units are accountable for data management (acquisition and authoring, data quality, completeness etc.).
	**Evaluating and Selection Solution** ITS will assist business units to evaluate and select technology solutions. Exceptions to meeting technical requirements / Threat Risk Assessments (TRA) need approval from the appropriate authority. Furthermore, in areas where appropriate, ITS will determine the adopting of cloud services to reduce hardware needs.
	**Implementing, Managing and Supporting Solutions/System** ITS will provide the resources (or work with 3rd parties), methodology and leadership for end-to-end implementation. The business will support by providing time and resources. Furthermore, ITS will also lead the management of systems. As such, ITS will decide when and how to schedule updates/upgrades/replacements and collaborate with all stakeholders (e.g. departments, 3rd parties).
	**Managing and Supporting Infrastructures** ITS will lead the management of infrastructure technologies such as servers, desktops, networks, telephone and mobile computing to name a few. It will lead the modernization of technology within MCK by upgrading the dated hardware (past lifespan) and unsupported operating systems. The department will also be responsible for creating and maintaining a technology refresh IT policy and procedure. This procedure should include a technology refresh plan for both hardware and software based on common practices.
	**Managing Relationships with IT Vendors** ITS will be the single point of contact and relationship manager for all IT vendors. As such, ITS will engage the business unit(s) as required. This role will become increasingly more important as organizations continue to move to cloud services.
	**Secure and Protect** ITS will continue to be accountable for protecting MCK from internal and external security threats.

Governance

ITS should continue to use its current governance for managing changes and team meetings. However, the ultimate authority on IT decision making within the organization is the Executive Management Team, this is particularly in relation to corporate policy exceptions and project prioritization.

Project Prioritization

In the future, project prioritization process will be managed according to the following:

1. Idea Generation

Objective		
• The purpose of this stage is to ensure that the ideas for new projects align to the business units* or corporate objectives		
Inputs	*Activities*	*Outputs*
• Business unit budget • Current project list • Council priorities / business plans	• Collate Ideas • Rank ideas and create shortlist • Develop ideas into projects • Size projects – cost / resources / effort • Consult with ITS on sizing • Determine ITS level of involvement (project delivery team or advisor) and readiness • Perform an initial risk triage	• Business unit draft project charters

*It is up to each business unit to determine the best approach for aggregating ideas, and draft project charters (e.g. some may choose to do it at a division level first)

2. Business Units Project Prioritization

Objective		
• The purpose of this stage is to create a business unit project priority list		
Inputs	*Activities*	*Outputs*
• Business unit budget • Business unit project charters	• Score business unit projects • Business unit Team meeting to ratify project ranking • Refine business unit project charters • Approve list of business unit project priorities and send to ITS • Confirm business unit readiness (e.g. resources), potential barriers and contingencies	• Approved business unit project list

3. Synergy and Capacity Analysis

Objective		
• The purpose of this stage is to identify corporate initiatives and any capacity constraints		
Inputs	*Activities*	*Outputs*
• Approved business unit project list • Business unit project charters	• Create a consolidated project prioritization (across all business units) • Confirm project sizing • Assess costs (such as Total Cost of Ownership) • Identify potential corporate initiatives • Hold working sessions on potential corporate initiatives (merge or not) • Assess ITS capacity to deliver	• Consolidated project priority list • ITS capacity / options analysis

4. Project Prioritization

Objective		
• The purpose of this stage is to assess the consolidated project list and approved project priorities Note: Project prioritization can take place during any of the following periods: annual budgeting cycle; quarterly through the budget year; urgent period.		
Inputs • Current project list • Consolidated project priority list • ITS capacity / options analysis	*Activities* • Review priority list • Assess ITS option analysis • Approve project funding or request additional information / refinement from business unit or ITS	*Outputs* • Approved MCK projects

Project Prioritization Criteria

Below is a project prioritization framework the organization could use in ranking potential projects. The framework considers the value a project brings to the organization along with its degree of achievability.

When considering the value of a project the Executive Management Team will consider:

- Total cost of the project to the organization. This includes both one-time cost and ongoing cost
- Potential benefits on initiating project such as revenue generation, risk mitigation, cost reduction etc.
- If the project is legislated. E.g. provincial asset management plan

When considering the achievability of a project, the Executive Management Team will consider:

- Both the business unit and ITS capacity to embark on a new project at the time
- The complexity of the project. This considers the organization's experience conducting similar projects
- The degree of support from the business units
- The urgency of the project
- The capability to do the project and the capability to sustain the project after implementation
- The degree of change

The following is an example of project prioritization criterion

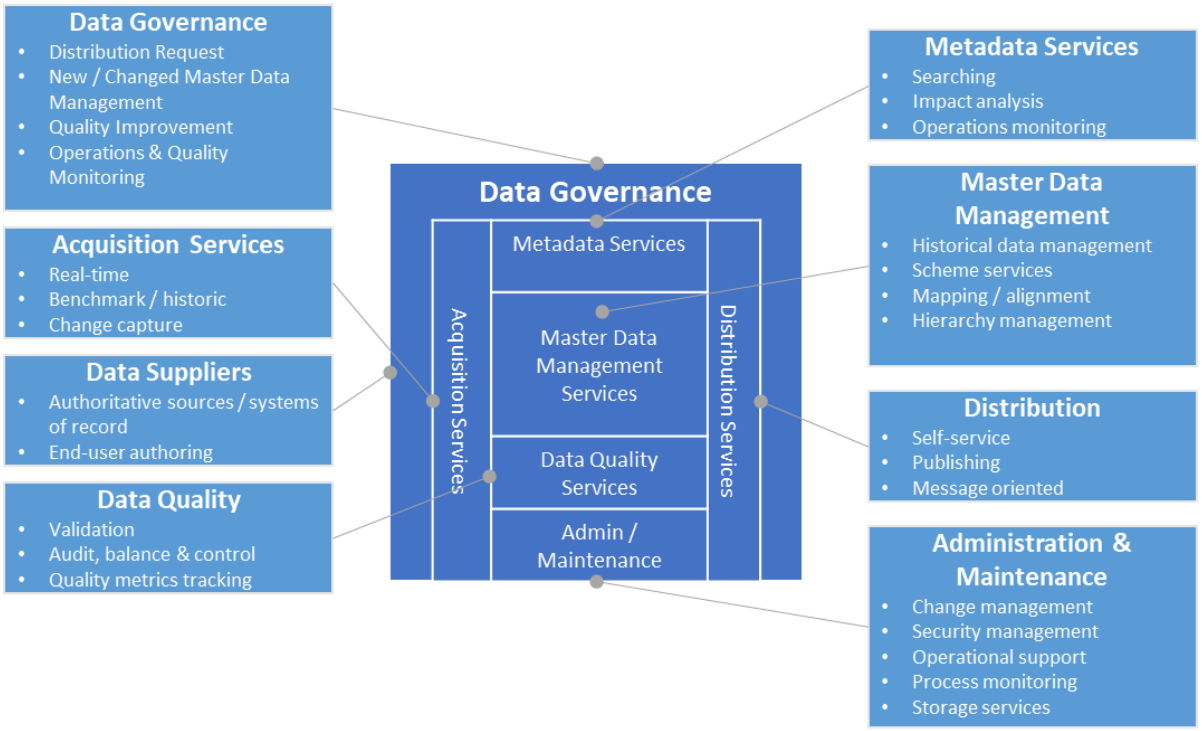
Priorities	**Value**	1. Cost x%	1a. One-time x%
			1a. Ongoing x%
		2. Benefit x%	2a. Risk Mitigation x%
			2b. Cost Reduction x%
			2c. Revenue Generation x%
			2d. Beneficiaries x%
			2e. Alignment to CKPlan2035 x%

		3. Legislative x%	
	Achievability	4. Capacity x%	4a. Business Unit Capacity x%
			4b. IT Capacity x%
		5. Complexity x%	
		6. Degree of business unit support x%	
		7. Urgency x%	
		8. Capability x%	8a. Capability to do the project x%
			8b. Capability to sustain the project x%
		9. Degree of Change x%	

Data Management / Governance

Data management is an overarching term that refers to all aspects of creating, housing, delivering, maintaining and retiring data. The need for data management is becoming more important as the demand for data (both internally and by customers) increase. By establishing data management organizations and turn data into a valuable corporate asset.

There are eight aspects to data management (see illustration below). Depending on the organization, size, use of data and industry these roles can vary in terms of ownership. However, in most cases Administration and Maintenance fall under ITS. The others are either split across multiple departments or designated to one.



Roadmap

Below is a suggested roadmap for the sequencing of initiatives.

#	Initiative	Year*					
		2020	2021	2022	2023	2024	2025
1	Optimize and Automate Accounting Services	■	■				
2	Digitize HROD Services		■	■			
3	Investigate Continued Use of CityView		■	■			
4	Implement a BI and Data Warehouse Solution				■	■	
5	Pilot Business Innovation					■	
6	Enhance Information Sharing Capabilities and Electronic Records			■			
7	Expand Web and Online Services		■	■			
8	Continue to Mobilize Field Staff						■
9	Expand Business Unit Process Automation			■			
10	Continue Network Connectivity	■	■	■	■	■	■
11	Revise IT Project Governance	■					
12	Create an Enterprise Risk Framework	■	■				
13	Create a Business Continuity Plan	■	■				
14	Develop a Target Architecture	■	■				
15	Create Guidelines for Software Development		■				
16	Improve ITS Service Management		■				

* All initiatives after 2020 are dependent on the project prioritization results.

Initiative Details

The following section details the initiatives as part of this Corporate Technology Strategic Plan over the next five years.

Initiative 1 – Optimize and Automate Accounting Services

Current Situation

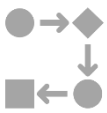
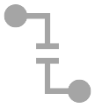
MCK uses JD Edwards (JDE) as its main finance and accounting system. MCK implemented JDE in 2013 as part of Project Delta.

- Some areas within Infrastructure and Engineering Services (IES) use JDE to process work orders. However, users indicate the JDE setup and use of work orders is sub-optimal and exhibits performance issues. In addition, staff indicate issues with inaccurate data and reports, causing lengthy processing times for work orders (taking up to five minutes, at which point IES relies on manual workarounds). This becomes inefficient when facing an operational crisis, e.g. flooding.
- MCK has a functional gap relating to JDE. Typically, organizations using large corporate systems have expert users (super-users or JDE Business Analysts) that have in-depth functional knowledge to help optimize processes, troubleshoot issues and ensure changes meet expectations.
- There is little integration between JDE and other corporate or business systems causing manual work or data re-entry.

JDE has a large user base and is a core system to MCK, thus optimizing and automating accounting services will add great value to the end users. These activities also relate to other initiatives involving data and analytics.

Description of the Initiative

This initiative aims to achieve three objectives: automate and redesign more processes using JDE, conducting a work order functionality gap analysis, and integrate JDE with other systems.

Process Review and Redesign 	• Conduct a process review using LEAN principles[4]. Engage the finance and accounting teams, and other business units that use JDE such as IES. • Using LEAN, determine whether the process activities provide value. Redesign the process in close consultation and engagement with the business units to develop the future streamlined processes. • Engage business units to identify any manual processes for automation in the future, such as processing supplier invoices, automating bank reconciliations, and approvals and workflows.
Gap Analysis 	• Conduct a gap analysis by identifying the functionality JDE can support (existing or new modules) to meet identified process needs. • Gather the requirements for the work orders process. Using the requirements, assess whether JDE is the best fit for performing the business processes. If JDE is not a good fit, then conduct market research to identify other potential solutions.

[4] A quality improvement methodology for making substantial, lasting changes in performance

Integrate JDE 	• Consult with business units to identify which business unit systems add value when integrated with JDE. Adding value includes increasing automation and providing valuable insights to business units. • Note that JDE integrations may occur as part of Initiative 4 – Implement a BI and Data Warehouse.

Strategic Priority Fulfilment

- Automate and Optimize Existing Systems
- Data and Analytics

Benefits and Values

- Staff will be more efficient with automated processes and expanded JDE functionality.
- Improved work order functionality increases system reliability and staff efficiency.
- Better data to improve decision-making processes and business insights which use JDE integrations.

Key Assumptions

#	Description
A1	MCK will continue to use JDE as a core system for the foreseeable future.
A2	Business units will dedicate staff to review and optimize current processes, and to test new functionality.
A3	MCK may require external assistance in performing the process review and redesign.

Risks

#	Description
R1	MCK may not have the capability to critically assess process steps and consequently may not streamline or improve processes.
R2	JDE may no longer fit for MKC's future work order processes and other functions.
R3	Insufficient training may result in low adoption, and staff continue to use manual processes.

Timeline

We recommend starting this initiative in **2020**.

Dependencies

This initiative is not dependent on any other initiative in this strategy, however MCK may consider:

- Conducting the process improvement elements of this initiative as a group with process improvement of other initiatives; and
- Conducting the system integrations as part of the data warehouse and business intelligence solution initiative.

Initiative 2 – Digitize HROD Services

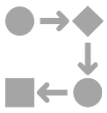
Current Situation

MCK's Human Resources and Organizational Development (HROD) department uses little technology (office productivity tools and JDE for payroll) to deliver services.

- Many HR processes are manual, paper-based such as vacation tracking, sick time tracking, and time and attendance. The impact extends beyond the HROD department, because all departments rely on HR services and processes. For example: recruitment, or time and attendance. Therefore, increasing automation can have broader impact on MCK.
- HROD is currently seeking to modernize by using technology for applicant tracking, performance management and provide staff with online services. It will be beneficial to bundle process reviews and a comprehensive HR-related functionality review to identify any additional technology needed. Some technology that may be useful includes position management, applicant tracking and performance management, and self-service capabilities. HROD is currently conducting a process review.
- The limited use of technology and heavy reliance on paper processes currently hinders HROD from producing reports quickly and efficiently. Other departments often request reports, but the current reporting process requires using multiple data sources and manually compiling information. It is time consuming and prone to error. Physical files also add complexities to producing reports and pose a risk to business continuity in the event of a physical incident or disaster such as fire or flooding.

Description of the Initiative

This initiative involves conducting a comprehensive review of HR processes, identifying HROD's needs for data and reporting, and redesigning them along industry standard practices. To procure the appropriate solution, HROD should document all relevant business requirements.

Process Review and Redesign 	• Continue reviewing HR processes. Expand the scope of the process review to include all HR processes. Map current processes and identify improvements using LEAN principles. • Expand the scope of the process review to include processes currently using technology such as payroll (uses JDE). • Redesign processes with engagement from HROD and HROD customers (other business units) especially for processes that impact customers (e.g. recruitment) to develop future streamlined processes.
Document Requirements 	• Document business and technical requirements based on the redesigned processes. • Identify any integrations required with existing systems (e.g. payroll integration with JDE). • Document HROD's needs for reporting and data analytics. Use their needs to generate reporting requirements.

Options Analysis 	• Assess whether MCK should have individual software solutions (e.g. learning management system, applicant tracking) or extend the functionality to a more holistic solution such as a Human Resource Information System (HRIS). • If not, assess other system solutions that meet additional functionality needs and identify whether integrations are possible. • Conduct a cost-benefit analysis of having multiple HR systems or one Human Resource Information System that addresses all (or part of) HROD's technical and business requirements.
Select Vendor 	• Use the requirements to procure an appropriate solution and follow MCK procurement procedures with objective criteria-based vendor selection. As part of the procurement package include items such as a request for proposal, requirements, vendor demos, price normalization (internal), scoring template (internal), diverse evaluation team (internal).
Implement and Train 	• Outline a comprehensive plan for the implementation that includes key information such as sequencing, key activities, and milestones. It will be the responsibility of HROD and ITS to conduct user acceptance testing and undergo training. • Management should communicate the importance of HR modernization and prioritize using technology to gain efficiencies.

Strategic Priority Fulfilment

- New Business Systems
- Data and Analytics

Benefits and Values

- Increase staff efficiency in HROD and throughout MCK through process automation.
- Improve data driven decision-making and reliability and efficiency of generating business insights.
- Reduce HROD staff workload by adding self-service capabilities for MCK staff and managers.

Key Assumptions

#	Description
A1	HROD will dedicate staff to review and optimize current processes, and to test new functionality.
A2	MCK will require external assistance to: • perform the process review and redesign • conduct vendor selection • oversee the implementation

Risks

#	Description
R1	MCK may not have the resourcing capacity to critically assess their process steps and consequently may not streamline or improve their processes.
R2	Ineffective vendor selection and implementation results in MCK selecting (or configuring) a sub-optimal solution.
R3	Insufficient training / change management may result in low adoption and processes remain manual.

Timeline

We recommend starting this initiative in **2021.**

Dependencies

This initiative is not dependent on any other initiative in this strategy. MCK may consider conducting the process improvement elements of this initiative together with the process improvements in other initiatives:

- Initiative 1 – Optimize and Automate Accounting Services
- Initiative 3 - Investigate Continued Use of CityView
- Initiative 9 – Expand Business Unit Process Automation

Initiative 3 – Investigate Continued Use of CityView

Current Situation

CityView is a corporate system used by multiple business units: Planning and Building services, Bylaw services, and Engineering and Infrastructure services. Consequently, staff rely heavily on this system to perform their daily routines and without it can cause business disruption, inefficiencies and impact customer services. Some challenges currently exist with the system:

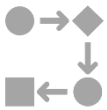
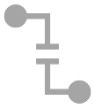
- The system was setup using existing manual processes rather than changing processes and taking advantage of system functionality.
- The system performance is degrading and causing delays. For instance, some users wait up to three minutes for the system to start or for the process to proceed to the next step.
- Whether the system, future product roadmap aligns with the needs of MCK.

Therefore, opportunities exist to investigate whether CityView is fit for MCK's future needs.

Description of the Initiative

This initiative investigates whether MCK should continue using CityView and that it is able to meet future needs of greater automation, integration with other systems and ability to provide online services. The steps are as follows:

Process Review and Redesign	• Conduct a comprehensive process review of all the business units that use CityView. Ideally this review will use LEAN principles as a basis for documenting the process activities and determine if the activity provides value or not. Following the process mapping develop future streamlined processes.

	Note: It is fundamental that there is representation from all business units that use CityView.
CityView Gap Analysis 	• Using the process maps, for each activity indicate whether the system supports the activity or not. • Contact CityView to confirm the results of the activity assessment and — whether it is existing functionality (current version) or upcoming — whether it requires customization versus out of the box • ITS should assist the business units to understand the current system functionality (and any future releases). • Summarize the results and determine the extent to which CityView is able to meet the current and future needs of MCK.
Conduct Market Research 	• Using the future processes create business requirements and document the technical requirements. • Create and tender a request for information that includes the requirements and questions regarding cost, product roadmap and experience. • Following the results of the market research compare it against the results of CityView and determine if MCK should consider using a different solution(s).
Conduct an Options Analysis 	At this point, MCK will have a clear view of needs and options. Regardless of the number of responses (assuming greater than one) MCK will have two options: — continue using CityView, or — implement a new system • Compare the options that are available to MCK by taking into account the degree of system fit currently and, in the future, costs (including transition and ongoing), and degree of business disruption. • Identify the resource (business unit and ITS) requirements and vendor involvement. • Provide guidance and support to business units to make a decision.
Implement and Train 	• At this point MCK can begin proceeding with the chosen option and implementing changes. • A robust plan should be in place to outline the best approach for the implementation (e.g. determining what changes will occur, which business unit, etc.) as part of the plan the business units will need to perform user acceptance testing and undergo training. • To help ensure adoption, management will need to communicate the importance of the initiative and incentivise staff.

Strategic Priority Fulfilment

- Automate and Optimize Existing Systems
- Data and Analytics

Benefits and Value

- Ensuring business units have a system that best meets their current and future needs.
- Process automation and expanding system functionality will make staff more efficient.
- Having the evidence to make an informed decision (to continue using CityView or an alternative).
- Reducing the reliance on paper.

Key Assumptions

#	Description
A1	Business units will dedicate staff to review and optimize current processes, and evaluation of other systems.
A2	CityView performance issues relate to either configuration changes or the underlying infrastructure.
A3	MCK may require external assistance in performing the process review and redesign and marketplace analysis.

Risks

#	Description
R1	MCK does not have the capability to critically assess the process steps and consequently does not streamline their processes.
R2	CityView no longer is a fit for MCK's future processes.
R3	Insufficient training results in low adoption, and staff continue to use manual processes.

Timeline

CityView has a large user base and we therefore recommend starting this initiative in **2021**.

Dependencies

This initiative is not dependent on any other initiative in this strategy. MCK may consider conducting the process improvement elements of this initiative together with the process improvements in other initiatives:

- Initiative 1 – Optimize and Automate Accounting Services
- Initiative 2 – Digitize HROD Services
- Initiative 9 – Expand Business Unit Process Automation

Initiative 4 – Implement a BI and Data Warehouse Solution

Current Situation

MCK has limited data analytics capabilities due to the fact that the foundation elements to perform data analytics do not exist such as a data warehouse, a method for distributing data (e.g. middleware) and visualization software – Business Intelligence (BI) suite. In addition:

- ITS initiated a middleware solution project as recommended in the previous strategic plan. A middleware solution supports managing integrations, as well as plugs into a business intelligence tool to allow for reporting capabilities.
- MCK does not have a formal data governance. While ITS implicitly stores and protects the data on behalf of business units, they are not responsible for ensuring the integrity of the data. There is no framework in place that identifies data responsibilities.
- MCK currently publishes little data to the public for self-service. Many municipalities across Ontario and Canada continuously publish data as part of the Open Data directive. Improving MCK's Open Data initiative can improve the positioning of departments such as Economic Development to compete with other municipalities in attracting businesses.

Making evidence-based decisions on municipal operations is likely to make MCK more efficient in the long run from an operational and financial perspective. Municipalities across Ontario are introducing new skills into new departments – such as Data Scientists in a Data and Analytics department – to service MCK as a whole and improve processes and decision-making.

Description of the Initiative

The objective of this initiative is to provide business units with the ability to conduct self-service reporting by accessing operational data and information as well as providing information to the public in a more limited capacity.

Procure Middleware 	• ITS should continue with the middleware project initiated previously. • Firstly, ITS should integrate existing system integration opportunities (e.g. core systems). Then, ITS should engage business units to identify their needs regarding additional system integrations.
Data Governance 	• MCK should establish a Data Management/Governance framework – see the Governance section of this report for more details. The framework should clearly distinguish between the responsibilities of business units and ITS regarding data. • Business units will be responsible for the integrity of their data, while ITS will be responsible for building the infrastructure for the business to use and report. • Upon establishing a Data Governance framework, a target architecture should identify the future state of applications and data at MCK. See Initiative 14 (Target Architecture) for more details. This will inform the set-up and characteristics of the data warehouse and business intelligence requirements.

Build Data Warehouse 	• Storing and managing data and information requires a data warehouse. ITS should set up guidelines (driven by business needs) regarding the data, such as frequency of data transfer and format of data. • ITS should meet with the business units to identify the business needs regarding reporting and data visualization.
Implement and Train 	• Implement a business intelligence solution that meets the business units' reporting needs. The business intelligence solutions should include self-service reporting capabilities and allow business units to create dashboards and develop Key Performance Indicators (KPIs). • To ensure adoption, management will need to communicate the importance of the business intelligence self-service tool.

Strategic Priority Fulfilment

- Data and Analytics
- Digital Services

Benefits and Values

- Increase staff efficiency through self-service reporting capabilities.
- Better evidence-based decision-making through reliable and timely insights from corporate data and improved information sharing across business units.
- Improve accountability and transparency by implementing self-service data capabilities for the public.

Key Assumptions

#	Description
A1	MCK will require external assistance to implement a data warehouse and business intelligence tool.
A2	The scope of the current middleware project will remain relevant.

Risks

#	Description
R1	Data integrity questions arise if weak adoption of data governance framework prevails.
R2	Insufficient training resulting in low adoption of self-service reporting.

Timeline

We recommend starting this initiative in **2023**.

Dependencies

This initiative is dependent on two initiatives:

- Initiative 14 – Develop a Target Architecture. Develop a target architecture prior to implementing this initiative.
- Initiative 7 – Expand Web and Online services. Resident self-service capabilities, and access to data and information requires this initiative to be in place.

Initiative 5 – Pilot Business Innovation

Current Situation

As with many organizations, innovation is unstructured and a shared responsibility within the business units. However, as technology trends indicate, organizations will need a better method for testing innovation in a secure and controlled fashion. Currently within MCK innovation occurs organically and not by design.

Description of the Initiative

This initiative aims to create some structure for MCK to pilot new innovations quickly, efficiently and at a low cost while keeping within a security posture that aligns with MCK's risk appetite. The following describes the steps ITS should take:

Develop a Design Lab 	• Assign ownership and responsibility to oversee the design lab and innovation within MCK. • Investigate setup of a design lab or partnering with a third party to create a separate lab for testing new innovations. This would include (but not limited to), physical working space, access to the internet, end-user devices (laptops, desktops, tablets), access to non-sensitive test data.
Create Structure for Innovation 	• Create guidelines (procurement, legal, technology and security) for working with third parties e.g. cloud and software vendors. • Communicate and market within MCK the objective of the design lab and create a mechanism for business units to submit a request to use the lab. • Investigate the use of design thinking tutorials to train staff on how to develop ideas and convert them into potential solutions. • Create a design thinking approach for business units to develop business cases for the value of adopting new innovations (See Initiative 9 – Business Unit Process Automation).
Prioritize Innovation 	• Collate business cases as part of the new project prioritization for innovations that have a positive business case.

Strategic Priority Fulfilment

- Modern Technologies

- Data and Analytics

Benefits and Values

- Piloting and implementing new innovations can improve staff productivity.
- Low cost and efficient way to test future opportunities.

Key Assumptions

#	Description
A1	MCK will need to invest funds and / or partner to create a design lab.
A2	MCK business units and ITS have new innovations they would like to test.

Risks

#	Description
R1	MCK is not able to find a partner for the design lab.
R2	MCK is not able to find funding for the design lab.

Timeline

We recommend starting this initiative in **2024**.

Dependencies

This initiative is dependent on Initiative 12 – Create an Enterprise Risk Framework as it requires MCK to define risk appetites for piloting new innovations.

Initiative 6 – Enhance Information Sharing Capabilities and Electronic Records

Current Situation

MCK heavily relies on paper for their records and document management. Storing physical documents and records also pose a business continuity risk should there be a natural disaster (e.g. fire or flood). Additionally, many municipalities are experiencing an increase in FOI requests that can be time consuming if the municipality is not able to quickly find the documentation. There are little tools that MCK staff currently use to collaborate, share documents and manage documents using version control.

- A staff survey conducted in late 2019 identified that MCK staff desire to engage in greater collaboration and desire an Electronic Record and Document Management System (ERDMS).
- ITS has initiated a project to (among other things) review MCK's use of data and evaluate implementing an electronic record and document management system.
- ITS also has a project underway to migrate to Office 365 and evaluate opportunities to exploit more of its functionality, specifically for collaboration and document sharing.

The absence of these tools creates inefficiencies when staff seek documents or records. This becomes especially crucial for cross functional collaboration and with external sources (government agencies and 3rd parties).

Description of the Initiative

The objective of this initiative is to implement an electronic document management system and allow for cross-functional collaboration.

Continue with Project 	• Continue with the project to select and implement an electronic record and document management system. • Assess business processes and the file storage systems in use and migrate to a common platform. • Identify the functionality required by business units regarding collaboration and document management. • Ensure to cover the following areas: storage and disposal of documents, seamless work, version control, access control, audit trail, redaction and legalities, mobile device access, and security.
Office365 	• Continue with the project to update to Office 365. • Conduct a gap analysis comparing functionality of Office365 to requirements of MCK. Assess the extent to which Office365 supports requirements. • Leverage Office 365 collaborating tools for sharing files and tools to enable remote work for staff. • Identify recommendations for alternative solutions that will align to ITS environment where there is a functionality gap.
Select Vendor 	• Use the requirements to procure an electronic record and document management system and follow formal procurement procedures with objective criteria-based vendor selection. • As part of the procurement package include items such as a request for proposal, requirements, vendor demos, price normalization (internal), scoring template (internal), diverse evaluation team (internal).
Implement and Train 	• Outline a comprehensive plan for the electronic record and document management system implementation that includes key information: — Implementation should include recommendations that are efficient and timely — Key information may include sequencing, key activities, and milestones. It will be the responsibility of MCK and ITS to conduct user acceptance testing and undergo training • Management should communicate the importance of electronic record and document management system adoption and prioritize using technology to gain efficiencies.

Strategic Priority Fulfilment

- Collaboration and Sharing
- New Business Systems
- Data and Analytics

Benefits and Values

- Give capabilities to MCK staff to engage in internal and external collaboration.
- Reduce the effort required to find relevant internal information by using electronic functions such as search.
- Reduce the physical file storage required for physical documents and paper.
- Improves MCK's business continuity capabilities in the event of a natural disaster such as fire or flood.

Key Assumptions

#	Description
A1	MCK will require external assistance to gather requirements, conduct vendor selection and aid with implementation.
A2	MCK will require external assistance to perform the process review and redesign.

Risks

#	Description
R1	MCK may not have the resourcing capacity to critically assess requirements.
R2	Ineffective vendor selection and implementation results in MCK selecting (or configuring) a sub-optimal electronic record and document management system.
R3	Insufficient training / change management may result in low adoption and physical papers and records remain in use.
R4	Lack of project governance could hinder the success of the implementation.

Timeline

We recommend starting this initiative in **2022**.

Dependencies

This initiative is dependent upon Initiative 4 – Implement a BI and Data Warehouse.

Initiative 7 – Expand Web and Online Services

Current Situation

MCK's website is predominantly for information not for performing transactions. In most cases, the website provides information to the public and does not support any service delivery.

- The website provides forms online (in PDF format) to the public that residents must print, fill, and either mail it in or drop it off in person. There is are no online submissions currently.
- ITS' role for the MCK website is to provide a secure, resilient hosting facility and a platform (SharePoint) for content management; business units' role is to create and manage content. This is a common model that municipalities follow regarding their websites.

- A staff survey conducted in late 2019 suggested that an online presence with digital service offerings is becoming increasingly important.
- Until recently, MCK did not have in-house graphic designer capabilities for developing the corporate website from a visual design perspective.

Recreation Registrations, bookings, reporting damage	**Property Standards** Report issues	**Roads** Report damage, potholes, snow issues etc.
Animal Services Reporting dead animals	**Parking** Complaints, permits, pay municipal tickets / fines	**Transit** Interactive transit routes and maps
Taxes Property tax look up (e.g. account information)		
Search - Detailed search with filtering capabilities		
Live Chat - Ability to chat with agents in real time		
General Services - Applications for permits / licenses		

Municipalities are increasingly offering services online and on mobile apps via self-service.

The table on the left summarizes MCK's website functionality compared to a larger municipality that offers online services. The grey shaded boxes demonstrate gaps (i.e. functionality MCK does not offer on its website).

All that said, MCK has initiated a project to revamp its website and bring it more in line with common practice of better information online and improved visual design.

Description of the Initiative

The objective of the initiative is to revamp the website to be more modern and in line with common practice, as well as offer services digitally and online.

Gather business unit Needs 	• In partnership with Corporate Communications, ITS should consult business units to identify their needs regarding website redesign and the visual design elements they require to be part of the website. • Create wireframe designs of website and validate with business units. • Carry out the changes to visual design and flow of website as per input from business units. • Instruct business units to update the content on the website based on wireframe model of website. • Collate the updated content from business units and make changes to the content on the website.
Establish Digital / Online Services Action Plan 	• Identify the services that business units wish to provide digitally and online. Consult all business units to identify their needs. • Based on the digital services wish list, identify the steps required, these may include: — Considerations to architecture — Required system integrations — Automation of processes — Changes in business workflows and rules • Estimate the cost associated with making changes. • Prioritize wish list based on criteria developed with ITS and business units.

	• Make changes to MCK website as per input from business units by adding functionality for digital services. This will likely include investigating functionality of existing systems, including: — JDE for finance related functionality — CityView for functionality related to building, planning and permitting — Other business unit systems for other digital / online services
Open Data Directive 	• Identify the data that business units and MCK are willing to make publicly available. Conduct in close consultation with the business units. • Make the necessary changes to the website to introduce functionality of making data and information available online. • Ensure controls are in place and data is read-only.
Implement and Train 	• Test and ensure that digital and online services are functioning. • Train business units and staff on process and workflow automation. • Educate business units that content management is their responsibility.

Strategic Priority Fulfilment

- Digital Services
- Sustainability

Benefits and Values

- Digital services offered to residents 24/7/365 as part of good customer service.
- Improves staff efficiency if services are digital / online and therefore processes are automated end to end.

Key Assumptions

#	Description
A1	Business units support digital / online service functionality.
A2	MCK residents desire more online services.
A3	Business units can achieve productivity gains via self-service digital / online services.

Risks

#	Description
R1	Redesigned process cannot support automation.

R2	Skills and capabilities are limited internally to conduct website functionality and visual redesign.

Timeline

We recommend starting this initiative in **2021**.

Dependencies

This initiative is dependent on several initiatives:

- Initiative 1 – Optimize and Automate Accounting Services
- Initiative 3 - Investigate Continued Use of CityView
- Initiative 4 – Implement a BI and Data Warehouse
- Initiative 9 – Expand Business Unit Process Automation
- Initiative 14 – Develop a Target Architecture
- CRM Replacement Project

Initiative 8 – Continue to Mobilize Field Staff

Current Situation

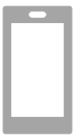
Several departments at MCK have mobile staff. These are typically staff in Community Human Services, Engineering and Infrastructure Services, Community Development and Emergency Services. They are often on-site conducting inspections, investigating emergency matters, issuing tickets, collecting data and information, and investigating compliance with codes, etc. Over the past six years ITS has been working with business units to provide greater mobility using both standard and non-standard equipment (smartphones, tablets).

- Currently, some of the staff utilize mobile equipment such as smartphones and tablets in the field. Equipment is either attached to vehicles or can be portable. That said, opportunities exist to optimize the use of the mobile devices. However, in the past, security has been a constraint reducing the benefit of using the mobile devices.
- A staff survey conducted in late 2019 revealed that demand for mobile technologies with internet access is desirable by MCK staff as the municipal service delivery landscape is changing.

Description of the Initiative

The objective of the initiative is to assess the current mobile technologies and identify their suitability. Also, to identify additional mobile technology needs for staff who are mobile and currently do not have mobile technologies.

Gather Mobile Requirements 	• Meet with the business units to identify their needs regarding mobile technologies. For business units that currently have mobile technologies, identify opportunities to optimize the functionality of the devices • Gather the requirements regarding functionality, such as internet access, issuing tickets, taking photos and videos, attaching scans. • Identify whether any existing business systems offer mobile functionalities and whether it meets the requirements of the business units.

	• All technology procurement includes a mobile first approach.
Assess and Procure 	• Conduct a cost-benefit assessment of providing the business units with the required solutions in line with their needs. Assess the cost of implementation and roll out – including hardware, software and ongoing maintenance. • Validate the requirements and costs with the business units to ensure it is meeting their expectations. • Where necessary, conduct procurement for new equipment. For existing equipment, identify a roadmap of activities to enhance equipment that is not fit for purpose – ideally this is conducted with the business units to ensure it meets their expectations.
Implement and Train 	• Following procurement, set up the equipment as needed and ensure it meets all business unit requirements. • Conduct training session to ensure staff are clear on how to use equipment, along with outlined user permissions.

Strategic Priority Fulfilment

- Mobility
- Connectivity

Benefits and Values

- Increase staff efficiency by enabling them to do work when on-site and mobile.
- Reduce data entry by eliminating the need for transcribing information into system when returning to workstations.

Key Assumptions

#	Description
A1	Mobile technology currently does not meet all business units' requirements.
A2	Mobility will continue to be widespread in the municipal service space.

Risks

#	Description
R1	Solutions don't exist in line with business unit needs.

Timeline

We recommend starting this initiative in **2025**.

Dependencies

This initiative is not dependent on any other initiative in this strategy.

Initiative 9 – Expand Business Unit Process Automation

Current Situation

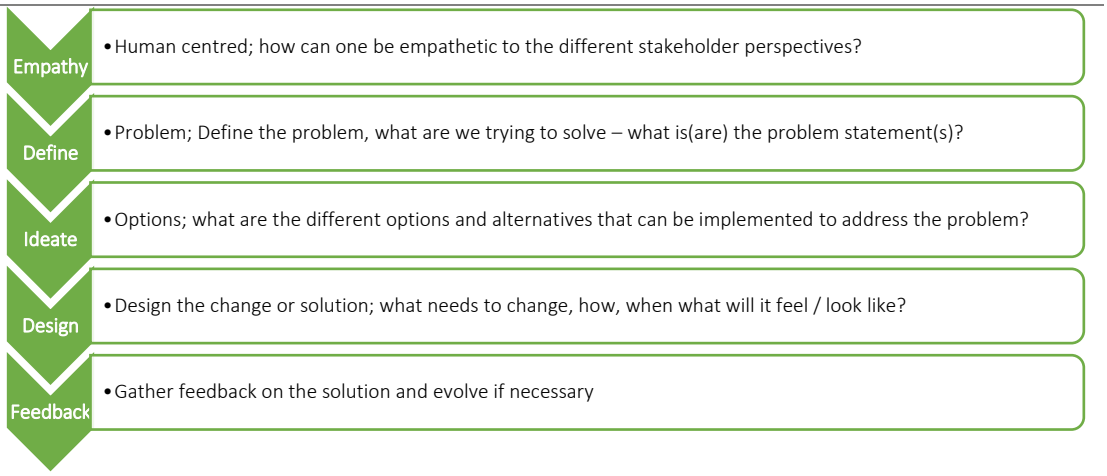
Many of the business unit specific processes at MCK are manual and paper heavy. Continuous improvement practices are not consistent within MCK. That said, in limited instances MCK has engaged in process improvement when procuring systems and applications.

- MCK does not utilize a user experience-based process redesign framework to conduct process improvements currently.
- Technology solutions do not require a business case for assessing investment worthiness.
- Some examples may include:
    - Preventative maintenance system
    - Asset management system and asset planner software
    - System to collect more data on municipal assets
    - Tempest property tax software
    - Cemetery management software
    - Egenda for Council

Description of the Initiative

MCK should apply the Design Thinking framework to collaborate with business units on redesigning processes – overarched by the LEAN principles – to be more streamlined with a focus on the user experience.

Create a Schedule 	• Identify a schedule with business units to sequence for process automation. Set an objective criterion to rank business units in order to identify priority of sequencing (e.g. by number of manual processes currently). • Identify a long-term schedule (e.g. five years) of reoccurring process improvement sessions with business units to conduct ongoing improvement.
Implement Framework 	• Implement Design Thinking framework to process improvement and redesign exercise. This puts the user experience and stakeholders at the centre of the process design.



- Base the Design Thinking framework on LEAN principles – focusing on optimizing processes by removing "waste" to deliver on the best possible experience for the end user.
- Extract requirements from redesigned process and use as input to seek technology solutions to support the end to end business process automation.

Make Business Case

- Identify the cost savings and efficiency gains from improving process through automation and implementation of a solution.
- Identify full cost of a solution by engaging potential vendors and sharing requirements based on processes.
- Identify the costs required to implement project, including internal resource requirements.
- Allow business to make a go, no-go decision on solution.

Strategic Priority Fulfilment

- New Business Systems
- Data and Analytics

Benefits and Values

- Automation of processes improves staff efficiency by reducing manual work.
- Lays the foundation for offering digital services in the longer term.
- Design Thinking framework is collaborative and puts user experience at the centre of processes.

Key Assumptions

#	Description
A1	MCK can conduct process improvement using internal resources.
A2	Business units can allocate resources (staff time) to participate in continuous improvement.

Risks

#	Description

R1	ITS does not have sufficient resources to implement changes in a timely manner.
R2	MCK does not have the training and education to implement and apply the LEAN / Design Thinking framework appropriately.
R3	Business units do not have sufficient resources to document, review or update processes in a timely manner.

Timeline

We recommend starting this initiative in **2022**.

Dependencies

This initiative is not strictly dependent on any other initiative in this strategy. However, there may be some synergies if combined with process improvement elements for the following initiatives:

- Initiative 1 – Optimize and Automate Accounting Services
- Initiative 2 – Digitize HROD Services
- Initiative 3 – Investigate Continued Use of CityView
- Initiative 5 – Enhance Information Sharing Capabilities and Electronic Records

Initiative 10 – Continue Network Connectivity

Current Situation

Over the past 5 years ITS has invested in the network infrastructure across MCK. ITS looks after several hundred network devices spanning a large area of land. A challenge MCK has is its sheer size. Thus, the MCK must use a mix of fibre and wireless. This can constrain the bandwidth / speed options available. MCK has an expansive network and plans to evolve it.

Description of the Initiative

ITS should continue its plans to expand network connectivity services to provide greater coverage and more robust speed / bandwidth for the next five years. Due to the sensitive nature of this initiative, details of ITS' approach and plan will not be shared as part of this strategic plan. However, as a principle, the future expansion plans should aim to achieve the following:

- Expand coverage to priority areas (priority should consider resident needs and access to municipal services)
- Leveraging the use of third parties where appropriate
- Improve bandwidth as it becomes more cost effective or service delivery necessitates

Strategic Priority Fulfilment

- Connectivity

Benefits and Values

- Network connectivity is a core foundation to enabling future digital services and mobility.
- Having a more expansive network with optimal speeds can improve MCK's business continuity capabilities.

Key Assumptions

#	Description
A1	ITS has the skills and capability to deliver the network expansion / upgrades.

Risks

#	Description
R1	ITS does not have sufficient resources and tools to sustain (ongoing management) of a more expansive network.
R2	ITS is unable to fund the network expansion and upgrade.

Timeline

Ongoing.

Dependencies

This initiative is not dependent on any other initiative in this strategy.

Initiative 11 – Revise IT Project Governance

Current Situation

A key component to IT governance is managing project demand, from an idea to a project delivery. Setup as part of the last IT strategic plan in 2008, the IT Strategic Steering Committee (ITSSC) has the mandate to prioritize projects for ITS to deliver. While the IT Strategic Steering Committee has all the characteristics to be an effective forum for prioritizing projects, in recent years it has been less effective in setting priorities. Consequently, ITS and its customers have a mismatch in expectations as, projects are not following set criteria for prioritization and a project backlog is occurring.

In addition, while ITS has a defined project management methodology, opportunities exist to improve adherence and expand it to include more portfolio management activities.

Description of the Initiative

This initiative aims to change the way MCK prioritizes projects and enhance ITS' project management methodology. The following describes the steps ITS should take:

Create Prioritization Tools 	• Given the breadth of projects MCK has, the current project prioritization criteria may not be suitable for MCK. As such, ITS working with the Executive Management Team should revise project prioritization criteria. They should consider criterion including: — Business value (tangibility, the project beneficiaries) — Costs (one-time, ongoing) — Legislative need — Achievability (capacity in both ITS and Business Units, capability) — Complexity of the project — Urgency of the project • MCK should apply weights to each criterion as not all have equal importance. To validate the criterion and weighting scheme MCK should perform a sensitivity analysis to understand the range and refine as required. • Using the above, ITS should create an easy to use tool for scoring projects. • The above addresses the "demand-side" of project prioritization. To address the "supply-side" ITS will need to create a process to capture its resource capacity and capability. Typically, this will leverage time entry and a skill matrix. As per the project prioritization activities (see governance section), ITS will need to create a resource plan to estimate the effort and resources required to deliver projects. • To support Executive Management Team's prioritization discussions, ITS should create a dashboard that captures the project priorities from the various MCK business units. Executive Management Team will use this dashboard to compare priorities and the consequences of reprioritizing projects. Key inputs to this dashboard will be ITS' resources capacity (resource plan) and the project priorities. • Finally, Executive Management Team should replace the IT Strategic Steering Committee. MCK should revise the Executive Management Team terms of reference to add details for prioritizing initiatives.
Pilot Prioritization Process 	• ITS in conjunction with Executive Management Team should consider piloting the new tools and process activities (e.g. "what if we did 2019 over again"). • Following the pilot, ITS should gather feedback on the efficacy of the pilot, identify refinement opportunities and discuss it with Executive Management Team for approval to make changes. • Using the information from the pilot and feedback, ITS should make the necessary changes to the project prioritization tools and process activities. • Once complete, the final project prioritization collateral should obtain Executive Management Team approval.
Implement and Train 	• ITS should create training material for MCK's various stakeholders to understand the new process. This should include communicating changes to MCK management and staff (including ITS) so that there is a clear understanding of the prioritization process. • MCK may also want to consider providing an annual refresh course of the prioritization process ahead of budgeting season.

Revise Project Management Methodology 	• In conjunction with the changes to project prioritization and resource management ITS should revise its project framework and insert controls to help ensure adoption / adherence. The changes include: — Developing a minimum list of project artefacts (schedule, charter, progress report, project closeout report) — Implement a program structure for ITS to manage projects and programs more effectively (once the project priorities are set for the year, ITS should assess the portfolio and create logical programs and assign oversight) — Create a program / project dashboard for reporting to Executive Management Team on a regular basis — Implement more robust resource management practices to track time, resource plans, impact of changes to project schedules. — Create project management standards templates to ensure not only MCK project managers adhere to the standards but also third parties — Review project resource plans on a regular basis and take corrective action as necessary. • MCK should also clearly define and communicate the role of a Project Manager within the organization and who has overall accountability for project delivery (see governance – Role of ITS).

Strategic Priority Fulfilment

- Sustainability

Benefits and Values

- Revising the project prioritization will help improve MCK's ability to match demand (i.e. requested projects from MCK business units) and supply (i.e. ITS' resources to deliver). Consequently, business unit expectations will be more aligned.
- MCK will have a value-based process to prioritize projects.
- Reduce project delays.
- More efficient use of staff resources.

Key Assumptions

#	Description
A1	ITS has the capability and internal capacity to perform this initiative.
A2	Improving the project prioritization will help address ITS project backlog.
A3	ITS will be able to use existing tools to support the new project prioritization process.
A4	It is Executive Management Team's responsibility to set project priorities, the role of ITS is to guide Executive Management Team.

Risks

#	Description
R1	Adoption and adherence to the new project prioritization process does not occur and ITS continues to have challenges meeting business units' expectations.
R2	That the new process steps may require more effort than MCK currently uses to prioritize, causing work delays in other areas.

Timeline

We recommend starting this initiative in **2020**.

Dependencies

This initiative is not dependent on any other initiative in this strategy.

Initiative 12 – Create an Enterprise Risk Framework

Current Situation

MCK does not have an Enterprise Risk Management (ERM) framework for ITS to help align its policies, IT controls and security services. The absence of an enterprise risk management framework can cause the following challenges:

- Information security is operating without a means to align risk tolerance and risk management strategies, which can cause an imbalance between security and productivity
- ITS may not be focusing effort on material IT controls
- The risks and consequences relating to lack of adherence to corporate policies may not be sufficient.

Description of the Initiative

Create an enterprise risk management framework, set risk appetite levels and align them with corporate policies, information security and IT controls. The following describes the steps MCK should take:

Conduct Market Research 	• Assemble a working group that represents the various business units to undertake the initiative. • Gather research from industry practices on enterprise risk management. Consider the following potential sources: — ISO 3100 — NIST (National Institute of Standards and Technology) — The Institute of Risk Management — Control Objectives for Information and Related Technologies (COBIT) — And any other standard practices • Using the above sources collate information that is useful for developing an enterprise risk management framework including, but not limited to:

	— enterprise risk management phases — Activities — Roles and responsibilities — Risk categories — Governance and decision-making — Tools and templates
Develop Draft Framework 	• Begin developing the enterprise risk management framework. At a minimum, the enterprise risk management framework should include the following: — Purpose — Scope — Governance — Reporting — Risk management processes, activities and responsibilities — Risk categories and criteria — Risk treatment criteria • Using the research, document supporting details e.g. process maps / procedural documentation of the phases, activities, roles and responsibilities. As well as any corresponding tools and templates e.g. risk register. • Create a draft enterprise risk management framework and review internally by the working group.
Pilot and Refine the Framework 	• Using the draft enterprise risk management framework, test by performing an initial risk assessment on a department. • Hold working sessions with the department to identify risks. Capture the risks in a risk register including key information such as: — Risk description — Category of risk (financial, operational, reputational, legislative) — Assess and score each risk's - likelihood and impact — Assign a risk treatment (accept, avoid / resolve, mitigate, transfer) — Create a risk dashboard of the results including an action plan for mitigation treatment plans. • Review the results of the pilot to identify opportunities for improvement and refine the framework accordingly. • Once complete, the final enterprise risk management framework should go to Executive Management Team for approval to implement.
Implement and Train 	• The working group should create training material for MCK's various stakeholders to understand the enterprise risk management framework. This should include communicating changes to MCK management and staff (including ITS) so that there is a clear understanding of the process steps.

Strategic Priority Fulfilment

- Sustainability

Benefits and Values

- MCK will be more informed when making decisions.
- Improve risk mitigation by having a consistent structure for identifying and managing risks.
- Better alignment between risks and security services - understand the trade-offs between security and productivity.

Key Assumptions

#	Description
A1	MCK has the capability and internal capacity to perform this initiative.
A2	An MCK business unit, working group or steering committee will lead this initiative as it is not a technology initiative and requires an operational focus.

Risks

#	Description
R1	There isn't a clear owner for enterprise risk management within MCK.

Timeline

We recommend starting this initiative in **2020**.

Dependencies

This initiative is not dependent on any other initiative in this strategy. Synergies may exist with Initiative 11 – Revise Project Governance.

Initiative 13 – Create a Business Continuity Plan

Current Situation

ITS relies on ad hoc processes and key individuals to deliver technology services. This causes an inconsistent user experience and an inherent operational risk should there be personnel absences or a major incident that causes a widespread failure in technology services.

MCK does not have a Business Continuity Plan (BCP). Organizations create a business continuity plan to minimize the impact of an incident or outage on its individuals, assets and technology. Business Impact Assessments (BIAs) identify critical systems and recovery time objectives and are an input to business continuity plans.

- Related to a business continuity plan is a Disaster Recovery Plan (DRP). This is typically the responsibility of IT. A disaster recovery plan is a plan to recover technology services in the event of a major disruption. It uses

inputs from the business units through the business impact assessments regarding their technology needs – such as maximum business unit system downtime.

- In the absence of a business continuity plan, ITS has a disaster recovery plan that focuses on core network and connectivity and base IT infrastructure. The disaster recovery plan does not include Recovery Time Objectives (RTO) and Recovery Point Objectives (RPO) and does not include recovery of all ITS supported systems. Testing for effectiveness does not occur frequently.

Description of the Initiative

The objective of the initiative is to develop a corporate wide business continuity plan with input from all business units, and a fulsome disaster recovery plan with defined recovery time objectives and recovery point objectives for systems and infrastructure.

Create BIAs with Business Units 	• Create a business impact assessment template for business units that includes key elements that are of priority to MCK. This may include business processes, technology, personnel, absenteeism, system downtime, impact of risk, dependencies and critical periods. • Develop business impact assessments in close collaboration with business units as they are the accountable for the content (and its upkeep) in the business impact assessments. Reflect any legislative or regulatory requirements in the business impact assessments.
Update DR Plan 	• Update disaster recovery plan based on the technology and recovery times as guided by business units in the business impact assessments. • This requires ITS to conduct an analysis on the current disaster recovery plan vs. future state disaster recovery plan driven by the business requirements. This may require ITS to procure additional hardware or re-architect infrastructure to meet the business impact assessment requirements. • The disaster recovery plan should include measures for both infrastructure, and systems and applications. — Consider hardware and software access requirements for remote working in the event of a disruption • Update the disaster recovery plan with necessary changes to achieve business impact assessments requirements and includes recovery time objectives and recovery point objectives.
Create BCP Documents 	• Create business continuity plan policy that includes policy statement and requirements, context, accountability and reporting. • Create a business continuity plan. It should include business continuity plan event triggers and scenarios; recovery plans for office, personnel and technology; governance; and testing and maintenance of plan. • Ensure that MCK leadership has input into the business continuity plan, particularly regarding governance and recovery plans.
Implement and Test	• Conduct a fulsome test of the business continuity plan and all its elements to ensure it is functional. Log and document all activities.

	• Implement and communicate the business continuity plan to the different levels of staff at MCK. Incorporate the business continuity plan as part of the onboarding package for new hires. • Train staff on business continuity plan and their role in the event of a disruption or major incident. Schedule set frequency (e.g. annual) training.

Strategic Priority Fulfilment

- Sustainability

Benefits and Values

- Improves MCK's ability to rapidly recover operations following a disruption or major incident.
- Improved resiliency is likely to minimize operational disruption and financial impact.
- Provides MCK with a plan to mitigate and respond against risks.

Key Assumptions

#	Description
A1	MCK has the internal capacity to conduct a comprehensive and fulsome business continuity plan.
A2	MCK will adopt and follow instructions in business continuity plan.

Risks

#	Description
R1	Business units accurately identify their critical systems and recovery time objectives.
R2	Maintenance of documents (business continuity plan, business impact assessments, and disaster recovery plan) is not updated regularly.

Timeline

We recommend starting this initiative in **2022**.

Dependencies

This initiative is not dependent on any other initiative in this strategy. However, they may be some synergies between this initiatives and Initiative 16 – Improve ITS Service Management.

Initiative 14 – Develop a Target Architecture

Current Situation

ITS has some architecture documentation. However, a target architecture illustrating the future for the various architecture layers (network, infrastructure, application and data) does not exist. The absence of a target architecture can create overlap, duplication, and overall a more costly environment to manage and maintain.

69% of the application estate are business unit applications suggesting that the MCK is building a "best of breed" architecture; selecting the best solution for a business need rather than considering the enterprise as a whole. Since MCK does not have a target architecture it is likely that the architecture is evolving organically rather than by design. Without a functionality map (which would be part of a target architecture) it is difficult to determine any potential functionality duplications.

Description of the Initiative

This initiative aims at creating a target architecture and putting in place the activities to maintain it. There are several key steps that ITS should take to complete this initiative, including documenting the current system, identifying changes, developing the target architecture, and maintaining artefacts.

Document the Current Architecture 	• Document the current architecture with a focus on the network, infrastructure and application (with data flow). • Create standards for architecture diagrams and a consistent tool for documenting it (e.g. Microsoft Visio). • Assign ownership of capturing the current architecture to appropriate ITS individuals. • Once drafted, review and approve. Ensure the artefacts include version and approval dates and store in an appropriate location for ITS staff members to access.
Collate Future Changes 	• For each architecture layer identify; known future plans/changes and potential but unconfirmed changes. • Create an index of changes and the implication to the current architecture artefacts. • Work with the appropriate ITS staff to decide how best to represent the implications of changes on the target architecture.
Document Target Architecture 	• Using this information, document the target architecture and highlight the areas of change. Provide a legend for users to understand the changes and where possible a description of the changes. • Once drafted, review and approve. Ensure the artefacts include version and approval dates and store in an appropriate location for ITS staff members to access.

Maintain Architecture Artefacts 	• Assign ownership to maintain the architecture artefacts (current and target). • Periodically review the artefacts (at a minimum annually) to ensure they are correct and accurate. • Integrate the use of the architecture artefacts into decision-making (e.g. new systems, technologies and projects).

Strategic Priority Fulfilment

- Sustainability

Benefits and Values

- Creating a target architecture can help avoid operational risks such as single points of failure in infrastructure or network topology.
- It can also optimize the architecture to help MCK achieve greater staff efficiency from using technology.
- The target architecture can also help ITS manage workload and future planning decisions.

Key Assumptions

#	Description
A1	ITS has the capability and internal capacity to perform this initiative.

Risks

#	Description
R1	Due to resource constraints ITS is not able to maintain the artefacts and they become outdated.
R2	ITS does not put in place the controls to review the architecture on a regular basis and MCK's architecture becomes fragmented.

Timeline

We recommend starting this initiative in **2020**.

Dependencies

This initiative can begin immediately, it is not dependent on any other initiatives, however some will provide inputs into this activity. For example, the following initiatives will help bring clarity to the target architecture from an application and data perspective:

- Initiative 1 – Optimize and Automate Accounting Services
- Initiative 2 – Digitize HROD Services
- Initiative 3 - Investigate Continued Use of CityView

- Initiative 4 – Implement a BI and Data-warehouse Solution
- Initiative 6 – Enhance Information Sharing Capabilities and Electronic Records
- Initiative 7 – Expand Web and Online services
- Initiative 9 – Expand Business Unit Process Automation

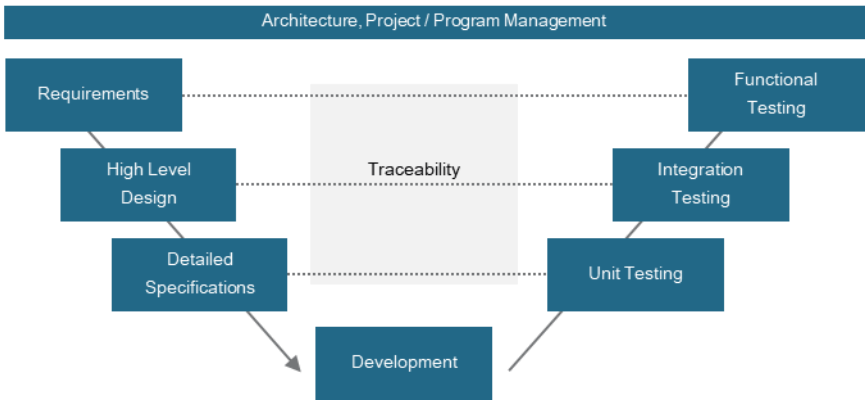
Initiative 15 – Create Guidelines for Software Development

Current Situation

With a third of the MCK's application portfolio custom, a more formal approach to custom development should exist. ITS supports 17 custom applications (29% of total business / corporate systems), offers web development and integration services.

The illustration to the right is a common Software Development Life Cycle (SDLC). It outlines the key functions for application development. For each item there is typically a set of outputs and controls to ensure quality control. While all may not be appropriate for every development project (e.g. small enhancements may not have both High-Level Design (HDL) and detailed specifications) some practices are missing, specifically:

SDLC "V" Model



- Standard documentation
- Code reviews
- Testing and scripts
- Tracking defects
- Appropriate controls in place e.g. segregating access to the different environments (development, test, and production).

None of these practices are in place today and while the risk impact is low because most of the systems are business unit and isolated, it can expose the MCK to undue operational risks.

Description of the Initiative

This initiative aims to create guidelines for improving the level of control over custom development activities and help reduce operational risks. It also aims to achieve greater knowledge transfer of custom applications MCK relies on.

Create a Baseline	• Using industry standards (CMMI, ITIL, COBIT), capture the key phases, activities, outputs of them. • Compare the industry standards to the steps ITS currently undergoes for development and identify gaps.

	• Considering the industry practices and gap analysis, create a baseline of phases, steps and outputs that ITS should use to follow for software development.
Create Criteria to Guide Development 	• Guidelines for software development should at a minimum consider two aspects, complexity and criticality. • ITS should create criteria to help determine the activities and outputs required for development projects or system enhancements. • Complexity may include: — customer (department and whether it will be for internal use or publicly available), — technology (new, existing, legacy) and — project (scope, effort, number of resources). • This will enable the assessment to take various vantage points in assessing complexities of a project. For example, some projects may have complex technical requirements, whereas other requests may be complex due to the client relationship. • Criticality may include: — sensitivity (confidentiality, integrity, availability) of data, — system functions that are in scope for enhancement or development, — impact to business, — level of integration and — overall risk of an adverse effect. • For each criterion, there should be at least two or more ratings. Each rating has a value that will have an impact on the development activities and outputs required.
Document Guidelines 	• Once ITS has a list of activities and outputs by phase for software development, it now needs to apply the criteria to create guidelines. The guidelines should indicate the activities and outputs depending on the result of applying the criterion. For example, if the complexity and criticality is high then all development activities and outputs are mandatory. If it is the opposite, then the project requires a subset of development activities and outputs.
Pilot, Refine and Review Adherence 	• To help ensure the guidelines are appropriate, ITS should apply it to several projects as a pilot prior to implementation. This will improve the accuracy and effectiveness of the guidelines. • ITS should review adherence of the guidelines on an annual basis by performing a spot check (random sampling).

Strategic Priority Fulfilment

- Sustainability

Benefits and Values

- Reduce risks relating to security exposures, poor performance, mismatch in customer expectations, and faulty code causing data errors.
- Ensure future development time is efficient (being able to refer to system documentation, change logs, etc.).
- Provide efficient knowledge transfer between team members or third parties.
- Provide stable, reliable custom systems.
- Improve effort estimation for future changes or enhancements.

Key Assumptions

#	Description
A1	ITS will continue to perform some level of customization.
A2	ITS can implement these guidelines by using existing ITS resources.
A3	Given the current projects this is a lower priority for MCK and ITS.

Risks

#	Description
R1	The controls to monitor adherence are manual, time consuming and therefore a lack of adherence occurs.
R2	That the guidelines increase ITS' workload.

Timeline

We recommend starting this initiative in **2021**.

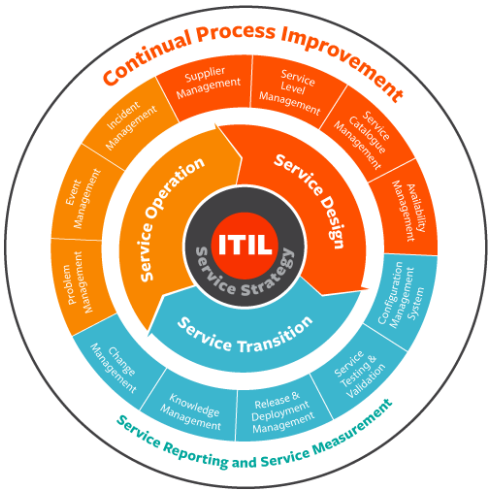
Dependencies

This initiative is not dependent on any other initiative in this strategy. However, they may be some synergies between this initiatives and Initiative 16 – Improve ITS Service Management.

Initiative 16 – Improve ITS Service Management

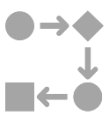
Current Situation

Most ITS staff are either certified under ITIL (see right) or have done the training. However, evidence of adopting ITIL practices into ITS' day to day activities is low. ITS relies heavily on individuals and ad-hoc processes to deliver services. While not uncommon, as MCK continues to adopt new technology and the pace of change increases, ITS may need to find more efficient and consistent ways to deliver service. In addition, reporting and using service levels for decision-making is inconsistent. ITS has several software monitoring tools available to help address some of these challenges but further work is necessary on the process side to realize greater value of ITS and manage service expectations.



Description of the Initiative

This initiative aims to enhance ITS' processes and controls, in the areas of service design, service transition and service operations. The following describes the steps ITS should take:

Document Current Processes	• The scope of the initiative should cover at a minimum the following ITIL processes: — Service request — Incident management — Change management — IT financial management — Service level management — Service catalogue — Problem management — Event management • For each process job shadow the staff that perform the activities. The shadowing should document the current process steps, the systems staff use, the length of time it takes and any hand-offs between staff. • Then perform a gap analysis comparing the activities to ITIL and COBIT. The gap analysis should also identify process steps which do not have system support (or highly manual). — ITS should confirm its intentions on using a chargeback model. And as part of the gap analysis compare not only the practices but also the price in comparison to a commercial service.
Design Future Processes 	• ITS should then synthesize the results of job shadowing and gap analysis and identify improvement opportunities. • For each of the above processes develop the future processes. ITS should consider creating an ITS Service Management Process Framework that includes: — A description of each process and any applicable service levels — An owner — The inputs and outputs

	— Process maps — And any other support templates • ITS should continue to develop its service catalogue and make it available on MCK's intranet for management and staff to use. In conjunction with the service catalogue, ITS should finalize the chargeback model and roll it out across the organization. Consider streamlining the administration portion of the process e.g. self-service ordering, automatic billing, etc. • ITS should also develop a standard service level template that includes, at a minimum: — Definition of the service level (including scope) — The calculation of the service level — Term of the service level (start / expiration) — Any additional considerations
Pilot and Refine the Framework 	• Use the draft ITS Service Management Process Framework to pilot the processes, tools and templates. ITS should determine which processes to pilot first. During the pilot evaluate the new changes and efficacy of the new changes and check to see if the changes address the gaps or initial observations. • Review the results of the pilot to identify opportunities for improvement and refine the framework accordingly. • Once complete, the final ITS Service Management Process Framework should go to ITS management for approval to fully implement.
Implement and Train 	• ITS should create training material and training sessions for ITS staff. In addition, they should create communication collateral focusing on the customer perspective and the impact of the changes. Then distribute it to MCK management and staff so that there is a clear understanding of the impact of the changes. • ITS should perform an annual continuous improvement review (self-assessment) or have an independent third party review the processes to identify enhancements.

- Introducing a more rigid change management procedure and ensure adherence.
- Create a common structure and terms for service level agreements and apply them during the service level agreement renewal.

Strategic Priority Fulfilment

- Sustainability

Benefits and Values

- Implementing these process changes and controls will help improve expectation management (between ITS and staff).
- ITS will be able to improve their ability to manage resources and forecast workload.
- Improve knowledge transfer between ITS staff and third parties, reducing risks of key person dependency.

Key Assumptions

#	Description
A1	ITS will require a third party to assist in developing the process changes.

Risks

#	Description
R1	The controls to monitor adherence are manual, time consuming and therefore a lack of adherence occurs.
R2	That the new changes without proper evaluation or supporting tools increase ITS' workload.

Timeline

We recommend starting this initiative in **2021**.

Dependencies

This initiative is not dependent on any other initiative in this strategy. Synergies may exist with Initiative 11 – Revise Project Governance.

Key Performance Indicators

Below are a set of Key Performance Indicators (KPIs) that are common for IT departments to adopt.

Category	Sub-category	Measures
People	Staffing	• Ratio of full-time IT employees vs. contractors • % of IT full-time equivalents to municipal staff • % of person-hours dedicated to projects vs. support services • % of labour spend allocated to external resourcing • Time sheet accuracy to forecast • % of overtime hours
	Training	• Average training hours per IT employee • % of IT employees receiving training
	Performance Management	• # of quality surveys meeting or exceeding goals • % complete on time • # of qualitative vs. quantitative goals set
Financials	No Sub-category	• Year over year IT spend • Year to date spend v. budget

Category	Sub-category	Measures
		• Total cost of ownership as a % of revenue • IT Spend / Employee • Split of IT spend - Project vs. Support
Project and Benefits Realization	General	• % of project milestones delivered on time • # and % of projects in green status • # of project changes to budget, scope and timeline
	Benefits Tracking	• % of total projects on portfolio that are on budget (actual vs. project forecast) • Measures the savings delivered as a percentage of total cost of ownership • % of Tasks that is automated vs manual
	Quality Assurance	• Index of # of projects with project milestone / budget reviews • # of times original budgets are exceeded • # of changes to original budget • # of defects in production
Production and Support Services	Service Desk	• Average wait time (phone) • Average (duration) open ticket • Longest (duration) open ticket • Tickets / Service Desk staff
	Production Availability	• Percentage availability of servers / systems • Network availability • # of unplanned outages • Length (duration) of unplanned outages
	Production Stability	• # of Severity 1 / Severity 2, average recovery time (hours) • # of emergency changes • Correlation between the # changes and # incidents

Organizational Impact

Based on IT trends, the future IT organization will look different, as a result we have made the following assertions:

- Technological changes continue to ramp up
- Organizations are forced to use cloud therefore reducing their on-premise infrastructure and increasing the need to manage 3rd parties
- Security will continue to be a concern
- Data will become the lifeline of an organization
- Commoditization of infrastructure will increase the use of 3rd parties for managed services
- Systems will become easier to customize (via configuration)
- There will be more specialized systems available for use

Given this, listed below are the functions your future state IT organization will require.

Strategy, Innovation and Architecture

IT strategy, innovation and architecture function will focus on promoting transformation and developing and maintaining the IT strategy. This function will advise the ITS Director in developing and executing technology strategies that drive business value and develop technology roadmaps while supporting MCK in developing other strategies (cloud, digital, data, etc.). It will also be responsible for researching, testing, and supporting MCK to test new innovations.

In this capacity, the function will lead initiatives such as setting up design labs as drivers for innovation and strategy in their organizations. These design labs actively interact with the business units to discuss new ways technology can drive the business forward and foster innovation.

Data Management and Analytics

As seen in other data rich industries (financial services, information, communication and technologies), organizations have more data and need to convert it into information and insights. Municipalities already have a vast amount of data however is not able to convert it effectively into information or insights. Partly due to how the data is stored (physical copies) and partly because of technology adoption / integration. Data management and data analytics will become increasingly important as Municipalities overcome some of these barriers. This is evident with large municipalities that are creating a function to focus on data management and analytics. In other industries the function will include:

- Collect and analyze data to answer key business questions
- Analyze trends to help predict events and make the organization more efficient
- Relate information from many different sources
- Help identify data quality issues
- Distribute information and insights to decision-makers

This function continues to evolve and will for the foreseeable future.

DevSecOps and Integration

A variety of IT departments are redesigning their programming cultures around DevOps and design thinking. DevOps combines and aims to bridge the gap between software development and IT operations.

DevOps is a set of practices aimed at reducing the time between committing a change to a system and the change placed into production, while ensuring high quality. The IT organization will rely on DevOps to increase their pace of software development and realize the business agility that stems from accelerating and streamlining the communications between operations and development.

An extension of DevOps is DevSecOps. The intent behind DevSecOps is to inject security practices early on into developing system changes and production. This helps to improve the organizations security posture by:

- Building a culture of security (all IT staff should have a security mindset not an afterthought)
- Taking a more proactive approach to security
- Leveraging security expertise
- Ensuring security practices occur at each stage of development to production

Broker Services

With the advent and adoption of cloud technology, the IT service broker is becoming an increasingly common role in IT organizations. The function includes:

- Being the "middleperson" between IT customers and 3rd parties (e.g. cloud providers)
- Managing service delivery and service level agreements (service level agreements)
- Ensuring security and protection
- Monitor and managing IT service performance

A core competence for part of this function is cloud computing, service management, performance management and vendor management. This function transitions previous roles that were part of IT service management. A key component for broker services is having a clear list of services also known as a service catalog to "broker" services between the customer and 3rd parties.

Project Management Office (PMO)

While not a new concept, managing change (big and small) will continue to be a trend that organizations need to manage. Particularly because the pace of technology is changing, project delivery is becoming more agile and important to deliver value.

The purpose is to ensure efficiency and tighter monitoring of IT projects. It is an internal (in some cases external) group that sets, maintains and ensures standards for project management within an organization. They ensure best practices, monitor project status and maintain project direction. Overall, their role is to ensure successful implementation of projects from start to finish. Below are some of the roles and responsibilities of a Project Management Office:

- Identifies and develops project management methodology, practices and standards
- Ensure adherence to practices and standards
- Provides project resources to manage and control project delivery

Relationship Management

The relationship management function operates as a business partner that owns a client portfolio. The intent of the role is to have a single person for the client to discuss issues, projects and how IT can help best support them achieve their business goals. It also allows the relationship managers to build expertise / understanding of their client's business so that they can help advise on how best to provide IT services and adoption of new technology.

This function is common in larger multi-nationals where communication can be challenging. It also helps to create an aggregation point with an appropriate span. Below are some of the roles and responsibilities of relationship management:

- Understand client needs and develop plans to address them
- Support business planning (project prioritization)
- Identify key staff in business units to cultivate relationships
- Promote high-quality customer service

Security and Risk

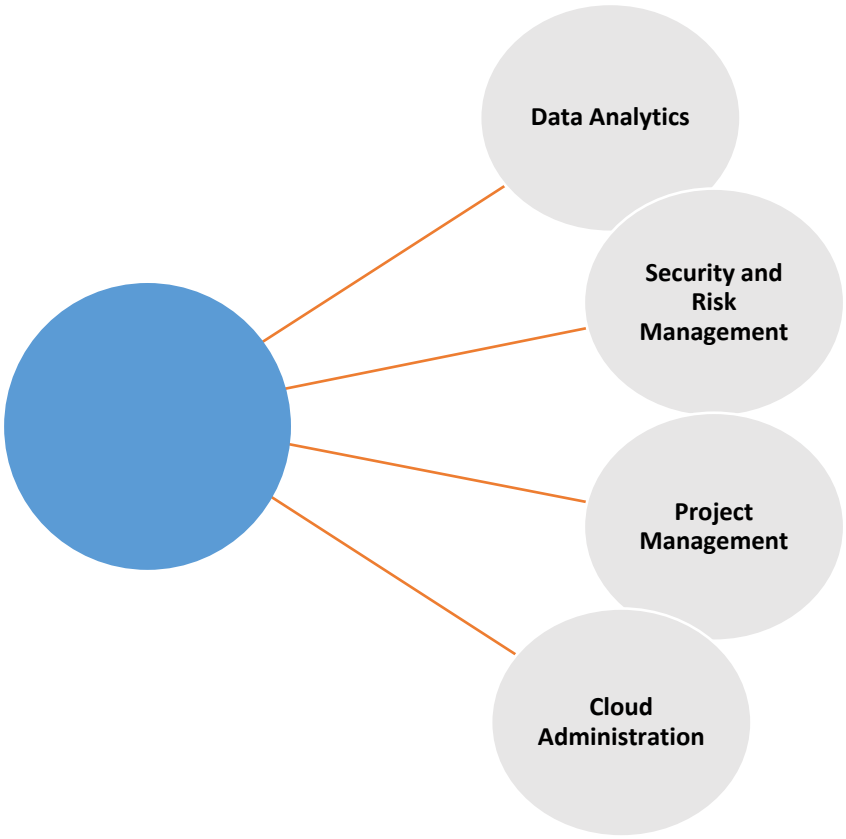
The advent of digital technology, organizations, both private and public are beginning to recognize the importance and IT security and the increasing demand for IT professionals. At a high level, IT security professionals are responsible for protecting IT infrastructure, edge devices, networks, and data. More granularly, they are responsible for preventing data breaches and monitoring and reacting to attacks. Many have backgrounds as programmers, and systems or network administrators, and in math and statistics. In the Canadian municipal space, recent cyber-attacks and ransomware have further reiterated the importance of adequate security and risk management.

However, it is important to note while security is a pivotal component of an IT organization it should not act as a hindrance to business growth. The key responsibility lies in protecting and ensuring that confidentiality, integrity, and availability is maintained in the organization. This function will also participate in architecture meetings (e.g. design authority) to maintain the security posture of an organization. Below are some of the roles and responsibilities of a security and risk function:

- Set security standards
- Ensuring policy and regulatory compliance
- Performing risk assessments
- Administering security programs, security awareness and training staff
- Security incident handling, security solutions and testing
- Work with IT operations to set up a shared disaster recovery/business continuity plan
- Set and implement user access controls and identity and access management systems
- Monitor network and application performance to identify irregular activity

Key Future Capabilities

MCK currently has a siloed structure with too many staff reporting to the two IT managers. This makes it difficult to scale in the future if the department were to grow. Structural changes to the IT department will help better manage growth and changes in the role of IT. Represented in the diagram below are key functions MCK should adopt / refine to meet future capacity and capability requirements.



- **Data** will become the lifeline of any future organization. In order to leverage the vast amount of data municipalities possess. The organization should create a data function with the purpose of translating this information to insights that will improve efficiency within municipalities.
- The IT department currently, has only one staff dedicated to **security and risk management**. As concerns continue to increase, the department will need to expand its security and risk function to catch up to rising threats.
- A backlog of projects exists, requiring an effective **project management** team to eradicate it. Furthermore, unlike its peers the IT Department uses very few third parties or contract services to help deliver IT services. MCK should consider making strategic partnerships with 3rd parties to augment capability and capacity.
- Reducing their on-premise infrastructure as organizations move towards using **cloud**. In addition to this, systems will become easier to customize which will bring about more specialized systems for use. These changes will necessitate cloud vendor management.

Investment Requirements

Over and above the current level of IT expenditures, we estimate the Corporate Technology Strategic Plan will require additional investments over the next five years. The figures are indicative, based on estimates and key assumptions. It excludes any potential cost savings.

It is our recommendation that following the acceptance of this document, ITS leadership further validate the timeframes and develop budget requests as per standard operating procedures.

In addition, several of the initiatives should deliver ongoing savings via a LEAN assessment. Initiatives that are not able to prove savings or efficiency gains may not proceed. We assume that each of the below initiatives will follow the new project prioritization framework for approval.

Initiative	2020	2021	2022	2023	2024	2025	Total
1. Optimize and Automate Accounting Services	$ 27,500	$ 47,500	$ -	$ -	$ -	$ -	$ 75,000
2. Digitize HROD Services	$ 15,000	$1,534,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 1,949,000
3. Investigate Continued Use of CityView	$ -	$ 39,000	$ 9,000	$ -	$ -	$ -	$ 48,000
4. Implement a BI and Data Warehouse Solution	$ -	$ -	$ -	$ 522,000	$ 725,000	$ 725,000	$ 1,972,000
5. Pilot Business Innovation	$ -	$ -	$ -	$ -	$ 50,000	$ 10,000	$ 60,000
6. Enhance Information Sharing Capabilities and Electronic Records	$ -	$ -	$1,225,000	$ 100,000	$ 100,000	$ 100,000	$ 1,525,000
7. Expand Web and Online Services	$ -	$ -	$ -	$ -	$ -	$ -	$ -
8. Continue to Mobilize Field Staff	$ -	$ -	$ -	$ -	$ -	$ 550,000	$ 550,000
9. Expand BU Process Automation	$ -	$ -	$ -	$ -	$ -	$ -	$ -
10. Continue Network Connectivity	$ -	$4,200,000	$1,040,000	$1,040,000	$1,040,000	$1,040,000	$ 8,360,000
11. Revise Project Governance	$ -	$ -	$ -	$ -	$ -	$ -	$ -
12. Create an Enterprise Risk Framework	$ 5,000	$ 140,000	$ -	$ -	$ -	$ -	$ 145,000
13. Create a Business Continuity Plan	$ 55,000	$ 75,000	$ -	$ -	$ -	$ -	$ 130,000
14. Develop a Target Architecture	$ -	$ -	$ -	$ -	$ -	$ -	$ -
15. Create Guidelines for Software Development	$ -	$ -	$ -	$ -	$ -	$ -	$ -
16. Improve ITS Service Management	$ -	$ 75,700	$ -	$ -	$ -	$ -	$ 75,700
Totals (w/o inflation)	**$102,500**	**$6,111,200**	**$2,374,000**	**$1,762,000**	**$2,015,000**	**$2,525,000**	**$14,889,700**
Totals (w/ inflation)	**$104,550**	**$6,233,424**	**$2,421,480**	**$1,797,240**	**$2,055,300**	**$2,575,500**	**$15,187,494**

Note: Several initiatives will leverage internal resources and do not have an investment requirement.

Appendix

Technology Trends

Details of the Technology Trends in the External Factors of the Current Situation section are below:

5G Technology

5G stands for fifth generation of wireless communication. We have come a long way; first generation wireless technology did not allow for the transmission of data through wireless means. Innovation has allowed for 4G and now 5G, wirelessly transmitting large amounts of data. 5G runs on a technology called small cells, progressing from macro cells, used in 4G networks. The 5G network allows for more capacity to connect and transmit large amounts of data quickly and simultaneously. It will play a crucial role in the success of Internet of Things and Smart Cities, as they depend on the ability to transmit large quantities of data in real time rapidly and securely. 5G connectivity will transform the way devices will connect and transmit data, it will continue to require the physical connection to a network.

The difference between fibre-cables and 5G is that the latter allows for mobility, i.e. devices connected to may be moving. Fibre networks pose limitation due to the technology used to transmit and receive signal, therefore creating a connection called a fibre-to-the-premise (FTTP) configuration to avoid losing signal strength. 5G and fibre connectivity go hand in hand; the level and speed of data transmissions under 5G networks requires a strong backbone. Often there is a misconception that 5G can replace fibre connectivity, however that is not entirely true. 5G is based on deploying small cells that but they remain connected to a physical network (i.e. backhauled). The most common form of backhauling traffic is fibre connectivity.

However, the technology is not available to consumers in Canada today. Telecom carriers in Canada underwent heavy investment in upgrading towers to enable 5G connectivity and make it more widespread. They are currently testing it in major cities across the country – in fact, in January 2020 Rogers announced the launch of 5G networks across Canada's metropolitan cities, including Toronto.[5]

Despite 5G's enormous potential, it will also have its challenges particularly with regards to rural connectivity. The Canadian federal government set an objective of 95 percent broadband coverage for homes across the country by 2026 and is formulating coordinated plans to provide $5B to $6B in public and private sector investment to connect underserved communities over the next 10 years.[6] Although it is expected that rural communities will receive 5G connectivity in the coming years, it is likely that this will occur with less capacity than urban areas because of the technology's reliance on density. 5G connectivity in rural areas could mean substantial advances in technology in Canada agricultural sector. These innovations in industrial applications such as mining and agriculture will serve as the greatest 5G opportunities in rural/underserved areas as connecting smart devices can reduce labour requirements and increase returns[7]. This is particularly pertinent in Saskatchewan where a projected 95% increase in the availability of broadband service will potentially increase its GDP by $1.2bn[8].

5G is currently being prototyped in rural areas across Canada, it is not widespread, and the implementation has been slow. The success of 5G in rural areas will depend on the level of investment from stakeholders – government and private sector. Further, 5G adoption has slowed due to geopolitical hurdles (re Huawei) which produces much of the hardware related to 5G.

[5] https://about.rogers.com/2020/01/15/rogers-starts-rollout-canadas-first-5g-network-joins-global-5g-forum-2/
[6] http://www.accenture.com/ca-en/insights/strategy/5g-canada-benefits
[7] https://www.schoolofpublicpolicy.sk.ca/research/publications/policy-brief/5G-raises-tough-policy-choices-for-Canada.php
[8] http://www.accenture.com/ca-en/insights/strategy/5g-canada-benefits

Cloud

Cloud computing (Cloud) in its simplest definition is the availability of computer services and applications on demand via the internet rather than physical on-premise. It provides organizations with a "utility" style service – pay as you go / use and in many cases software vendors will force their customers to use Cloud and do away with on-premise as an option.[9]

Cloud has revolutionized the way information services can be delivered and has forced governments globally to embrace and, in some instances, encourage cloud adoption. Some examples of these are the FedRAMP program in the United States where the main mission is to promote the adoption of secure cloud services across the Federal Government. The objective of the program is to provide a standardized approach to security and risk assessment when choosing to use the Cloud. Their approach has been one that does not stifle innovation (i.e. cloud adoption) but sets guidelines in place to ensure that when public sector organizations embrace cloud, they do so securely. This is because often times some public sector organizations, particularly smaller ones, do not have the in-house resources to identify secure cloud solutions. In addition, it allows the US federal government to set guidelines in line with its expectations and agreed-upon risk appetite. The FedRAMP has a set of criteria it uses for assessing whether cloud service providers are secure for adoption, some of these include meeting security assessments plan, system security plan, and continuous monitoring programs.

Another example is the G-cloud in the UK. This is an initiative aimed at easing procurement of commodity IT services that utilize cloud by public sector organizations in the UK.[10] These initiatives have vastly reduced the amount of time it takes to authorize a Cloud service provider. [11] [12] This allows organizations to choose from a preexisting list of providers who have been vetted and identified as secure to procure from.

In Canada, the case differs from the UK and US. The federal government does not have a program currently in place that approves cloud service providers. That said, below are a variety of reasons organizations may choose to embrace cloud:[13]

- Canada is the third most exposed country to possible cyber-attacks. Cloud can help mitigate this as major cloud service providers are likely to have better security and privacy than most municipalities and businesses that use on-premise infrastructure
- Cloud is scalable and thus, supports growth/contractions in an efficient way
- Easier integration with cloud-based business platforms and systems
- Cloud service providers can help improve an organization's disaster recovery capabilities
- Cloud permits greater accessibility which in turn supports the business by enabling staff to work remotely

Although the federal government in Canada has not formally established an initiative for cloud adoption, the global direction of cloud computing is clear.

[9] https://www.sirkit.ca/blog/why-canadian-companies-need-migrate-cloud-hosting-more-ever/
[10] https://www.fedramp.gov/
[11] https://www.whitehouse.gov/wp-content/uploads/2019/06/Cloud-Strategy.pdf
[12] https://www.digitalmarketplace.service.gov.uk/buyers/direct-award/g-cloud/choose-lot
[13] https://www.sirkit.ca/blog/why-canadian-companies-need-migrate-cloud-hosting-more-ever/

Data Analytics and Big Data

Data is the new economy and municipalities have an abundance of it. As a result, data analytics has become mainstream and widely adopted in organizations of all types and sizes. Effectively, municipalities should have at the minimum middleware, business intelligence tools and data warehousing to support their large amounts of data. These tools can increase collaboration across departments, drawing insights from information located across various services and functions. Although municipalities collect a lot of data, this can often feel like a burden for their staff because data is difficult to manipulate and requires certain expertise, therefore it is often underutilized by government agencies. However, if harnessed properly it can improve delivery of services and raise quality of life for residents. Municipalities are moving in the right direction by adopting data analytics, however, the next frontier for municipalities is big data. Big Data is:

- datasets available at massive scale, millions, or billions of data points
- accessible in real time or close to
- have high dimensionality, i.e. many variables,
- much less structured than conventional datasets
- datasets are often too large and complex to manipulate with traditional data-processing software[14]

Big data offers a great amount of value to the public sector as it presents the potential to reduce costs and generate transformative insights.[15] A simple example of harnessing big data is vehicle maintenance. Municipalities do not usually track maintenance digitally and in most Public Works departments, where raising funds to buy new equipment and vehicles is usually a challenge, there's typically old equipment that costs more to repair yearly than it costs to purchase a new and more efficient one.[16] Having access to data on vehicle status will make maintenance more efficient and cost effective.

Data is one of the most reliable ways of showing such efficiencies and savings. Furthermore, Big Data has a role to play within government agencies. Departments can be siloed and often do not share their data – unintentionally due to inappropriate infrastructure to do so. Connecting these would present a whole new frontier in government efficiency. Listed below are a few areas utilizing Big Data to address challenges within municipalities.

- **Food Inspections in Chicago.** Faced with the challenge of limited food inspector per food establishment (ratio of 35 inspectors to 15,000 food establishments), the City of Chicago decided to improve its inspection performance with the aid of analytics. The City was able to develop a model to forecast the risk of a restaurant failing and was able to identify violations 7 days faster than the manual process.[17]
- **Traffic Fatalities in New York City.** The City was able to develop a model that judges effectiveness of street designs. The model assists the City's Department of Transportation in forecasting the active car counts in specific areas at given times to help optimize traffic patterns and improve road safety.[18]

Big Data and data analytics are becoming a transformative force, the abundance of data gives the public sector new avenues to learn, organize and innovate[19]. The opportunity is real, as smarter and more personal public service will give residents the same quality of experience, they are accustomed to receiving in the private sector. Before governments can reap the rewards of Big Data, they need to be an intelligent consumer of data.[20]

[14] https://munkschool.utoronto.ca/imfg/uploads/338/imfgpaper_no24_citiesdatadigitalinnovation_markkleinman_feb_10_2016.pdf
[15] http://avianaglobal.com/the-value-of-big-data-for-local-government/
[16] https://expectexceptional.economist.com/impact-data-analytics-local-government.html
[17] https://towardsdatascience.com/stories-from-the-world-of-municipal-analytics-d3dc97077682
[18] https://towardsdatascience.com/stories-from-the-world-of-municipal-analytics-d3dc97077682
[19] https://munkschool.utoronto.ca/imfg/uploads/338/imfgpaper_no24_citiesdatadigitalinnovation_markkleinman_feb_10_2016.pdf
[20] https://munkschool.utoronto.ca/imfg/uploads/338/imfgpaper_no24_citiesdatadigitalinnovation_markkleinman_feb_10_2016.pdf

Future IT Organization

There is a growing trend towards outsourcing IT and technology services (refer to IT Outsourcing section). There is also growth in cloud services and Software as a Service (SaaS) in the industry as well as growing demand by business units for more applications related to their operations. These changes occurring externally are impacting the IT department and the skills required. As the move is away from developing applications in-house and providing infrastructure in-house, the skills required to manage the future IT department will change too.

IT is increasingly becoming more important in organizations, elevating its role to the executive level in many organizations. Technology strategies are no longer IT strategies, but rather inherent with the business strategy because IT is an enabler of the business as a whole - below are more examples of how IT is changing:

- Growing interest by business units to automate business processes and back office functions means that IT departments must understand the business more intimately
- Moving to cloud service providers and Software as a Service (SaaS) requires vendor management skills
- Democratization of applications and SaaS requires robust IT governance and guidelines to ensure upholding minimum standards
- Utilizing data requires data specific skills such as data mining, data science and integration skills
- Almost all employees in organizations use technology and given that cybersecurity incidents are on the rise, it is no longer an IT issue but a corporate issue, thus access to security related skills will continue to prevail.

Organizational structures are becoming increasingly flat, moving away from the traditional hierarchical structure. This is predominantly due to the increased recognition in the benefits of collaboration and cross-functional teams. This is not to suggest that there are no managers or direct reporting structures, but rather that collaboration of individuals of various skills is more widely encouraged.[21] This is also true of IT departments, as seen in the increased use of Agile Methodology where teams are created based on a mix of expertise and cross functions for greater diversity and iterate on a continuous basis – over traditional linear methodologies such as Waterfall.

From a skills perspective, digital, data and software related skills are increasingly in demand. Every year, LinkedIn publishes research identifying the top skills that organizations are seeking from candidates in the year ahead. [22] In the last three years, there are several skills that have reappeared and ranked in the top ten. Increasingly, these skills are related to IT and technology, as recognition, adoption and the rising importance of digital and IT across organizations in all sectors. Below are technology skills that are in high demand according to published research.

The combination of the increased availability in systems and applications, the diminishing reliance on on-premise technology infrastructure and rise in Cloud and increased cybersecurity threats, the need and importance of new

[21] https://thescalers.com/future-proofing-your-organisational-structure/
[22] https://business.linkedin.com/talent-solutions/blog/trends-and-research/2020/most-in-demand-hard-and-soft-skills

skills is increasing. The role of integrators, cloud computing specialists, data scientists and security type expertise are fundamental in ensuring a solid foundation of IT.

Internet of Things (IoT)

As municipalities strive to provide quality services in today's complex environments, there are technological advancements in the form of devices that have begun to make this easier and more efficient, while helping to generate greater public value.[23]

The Internet of Things is one of these technological advances. It is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.[24] It refers to the billions of physical devices around the world that are now connected to the internet, collecting and sharing data. It is a concept that has the potential to impact how municipalities deliver services. A simple example of an IoT device is sensors on garbage bins that detect the garbage volume in real time.

Despite this great potential value add, the public sector is lagging when it comes to adopting IoT that may impede their ability to efficiently delivery quality services by taking advantage of the efficiencies IoT offers. This is likely because of access to expertise and investment as failures can prove to be very costly. Thus, conventional thinking expects municipalities to wait for the IoT market to mature. However, some municipalities in Canada and around the world are already deploying IoT networks in low risk areas, for instance:

- **Calgary, Canada.** The City built a low-power wide-area network technology (LoRaWAN) leveraging a City owned fiber-connected tower. The purpose of the LoRaWAN based networks is to bring the City low power and long-range connectivity. Case studies include Devonian Gardens, where the city deployed sensors to measure and monitor light, humidity, temperature, and water to conserve water and park resources at a low cost. Historically, the City found it costly to determine the level of water and maintenance required to keep the ecosystem in the garden healthy. Staff received a better perspective on the level of water and maintenance required using sensor data from IoT.
- **Copenhagen, Denmark.** In a City like Copenhagen, biking is essential to the daily life of most of its residents – more than 40% of the city's residents commute by bike daily.[25] The City uses sensors to monitor the City's bike traffic in real time, which provides key data which is used to improve the bike route in the city promoting road safety.
- **City of Stratford, Canada.** The City announced that it would embark on a smart parking project (pilot) aimed at reducing urban congestion. Every summer when the City hosts the Stratford festival, parking causes issues. With the help of small "pucks", the City is now able to track whether a parking spot is available or not. Users are able to access this data via their smart phone or computer[26]. The project would allow drivers to quickly locate parking spaces and eliminate the need for lengthy searches for vacant parking spaces.[27.]

There are many examples of deploying IoT to increase efficiency and improve quality of service delivery. However, it is important to lay a solid foundation and perform proper due diligence before embarking on any transformative technology as failure can also be costly.

[23] https://www2.deloitte.com/us/en/insights/focus/internet-of-things/iot-in-government.html
[24] https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT
[25] https://www.businessinsider.com/iot-smart-city-technology
[26] https://news.communitech.ca/stratford-rolls-out-smart-parking-program/
[27] https://www.businessinsider.com/iot-smart-city-technology

IT Outsourcing

Municipalities are often experiencing increased growth coupled with decreasing budgets. This has given rise to innovative and creative strategies in delivering services and protecting residents. One of the methods revolutionizing service delivery for many government entities is IT outsourcing. Outsourcing typically refers to transferring an in-house service to an external third party, typically a private company.[28]

The rationale behind outsourcing is often for expertise, allowing the organization to focus on its core business. In 2019, the most outsourced IT functions were IT security and application hosting. IT security has also seen large growth in terms of percentage outsourced while network operations had the largest growth in terms of absolute numbers. IT security and web operations had the greatest potential for improving service through outsourcing.[29]

Business Function	Currently Outsourced	Increase in Outsourcing
IT	72%	31%
Legal	63%	14%
Real Estate and Facility Mgmt.	60%	30%
Tax	53%	17%
HR	57%	32%
Finance	42%	36%
Procurement	41%	29%

In a survey completed in 2016, Deloitte compiled 70 questions covering the outsourcing lifecycle and market trends. As seen in the table to the left, IT has the highest level of outsourcing at 72%. The article further states that this figure will increase by 31% in the coming years.[30]

In the same article, IT outsourcing as a cost cutting tool is the most mentioned reason organizations choose to outsource IT. Other common reasons cited are ability to solve capacity issues and enabling organizations to focus on core business.

On the other hand, the most common challenge organizations experience with outsourcing are change management and job reassignment.[31] Furthermore, most respondents mention data privacy as the primary regulatory risk associated with outsourcing.

Delivering IT services in-house is becoming increasingly challenging for municipalities given the increasingly complex environment as cloud services become more pervasive. Technology services are contenders for outsourcing as organizations struggle with performance issues and lack of clarity around owners of technology.[32]

IT outsourcing can be a strong avenue for transformative growth and value creation for municipalities and organizations in general.[33] However, these are usually large investments and execution is key to mitigate the potential risks that come along with it. For instance, one of the reasons outsourcing arrangements fail is because government entities tend to rely on contracts to manage their complexity.[34] It is important to invest effort during the initial stages of the outsourcing relationship to ensure maximum benefits – some steps listed below.

- Guard against outsourcing arrangements that prevent organization from adopting new technology
- Keep contracts flexible
- Emphasize long term vision and develop shared understanding of business outcomes
- Maximize competitive tension

[28] https://careersingovernment.com/tools/gov-talk/about-gov/public-sector-trends/outsourcing-can-lead-increased-government-efficiencies/
[29] https://www.computereconomics.com/temp/outsourcingstatssamplepages.pdf
[30] https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/operations/deloitte-nl-s&o-global-outsourcing-survey.pdf
[31] Ibid.
[32] https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/its-future-value-proposition
[33] https://www.mckinsey.com/business-functions/mckinsey-digital/how-we-help-clients/it-sourcing-service-providers
[34] https://www.bcg.com/en-ca/publications/2013/procurement-smarter-outsourcing-public-sector.aspx

Security

Technology has become widespread and is part of our everyday lives; it is only becoming more pervasive as cities move towards becoming 'smarter'. Data collection and transmission continue to grow and consequently the role of cybersecurity continues to be important. Organizations will fall for ransomware attacks every 14 seconds and the global cost of cybercrime is estimated to cost $6 trillion annually by 2021 – double that of 2015.[35] This affects organizations in all sectors and industries, including companies like Yahoo, Marriot, Hewlett Packard, British Airways, Simplii Financial and Equifax; and government is no exception. Many cybercrimes are not reported, and often victims are unaware that cybercrimes can be reported. Cybercriminals are becoming more sophisticated, and organizations require resources to keep up with the changes, therefore making it costly.

Canadian municipalities are increasingly becoming targets for cybercrime. In 2018, Wasaga Beach and Midland, both in Ontario, became targets with ransom demands; the full cost of recovery was estimated to be $250,000.[36] The Mayor of Stratford described Canadian municipalities as 'sitting ducks' for cyber terrorists after they suffered a ransomware attack.[37] For criminals, it is an easy opportunity to make money as they are aware that municipalities may not have the most sophisticated security measures. Often it may be cheaper to pay the ransom than put safeguards in place, thus local governments remain targets.

The Canadian Internet Registration Authority (CIRA) found that IT departments dedicate 25% to 50% of their IT staff to cybersecurity; and 51% outsource cybersecurity to contractors. Moreover, staff training, and awareness is a key factor in ensuring security. Phishing and social engineering attacks occur commonly, and lack of training can leave an organization vulnerable – CIRA found in a survey that 53% of organizations offered some sort of training to employees.

In 2019 several Ontario municipalities appeared in the news: Stratford, Woodstock and The Nation Municipality. Industry experts argue that the lack of information collected on these events and the weak reporting mechanisms is what makes the real threats unclear. That said, recently the Federal government expanded the Personal Information Protection and Electronic Documents Act (PIPEDA) to make both data breach notification and reporting mandatory. The Association of Municipalities of Ontario (AMO) and the Federation of Canadian Municipalities (FCM) have begun educating their members on cybersecurity and collecting and sharing more information.[38]

The Harmonized Threat and Risk Assessment (HTRA) Methodology[39] is an unclassified publication created by the Government of Canada. It is a methodology based on project management methodologies and system development life cycles. It examines existing threats against security control measures and creates a probability of compromise along with the severity. This is a framework available for adoption by different levels of government to create a harmonized cybersecurity methodology.

All that said, evidence suggests that the pace of cyber threats will continue to increase. Therefore, organizations require the appropriate infrastructure, and access to expertise and resources to guard against such threats and be able to respond to cyber incidents. They also require the appropriate training for staff to raise awareness and establish response guidelines.

[35] https://www.herjavecgroup.com/wp-content/uploads/2018/12/CV-HG-2019-Official-Annual-Cybercrime-Report.pdf
[36] https://www.cira.ca/resources/cybersecurity/report/2018-cybersecurity-survey-report#main-content
[37] https://www.cbc.ca/news/politics/stratford-cyberattack-ransomware-hack-1.5170951
[38] https://www.itworldcanada.com/article/canadian-municipalities-are-on-an-island-fighting-ransomware-and-hackers-are-barely-trying/423387
[39] https://cyber.gc.ca/en/guidance/harmonized-tra-methodology-tra-1

SWIFT

The Southwestern Integrated Fibre Technology (SWIFT) is a non-profit regional broadband project. The Western Ontario Wardens' Caucus Inc. (WOWC) initiated the project in 2011. WOWC is a non-profit organization that represents 15 upper and single tier municipalities in southwestern Ontario – combined they have a population of 3 million.

At the outset, WOWC's mandate is to enhance the wellbeing of rural and small urban communities across southwestern Ontario. The organization's members are:

County of Brant	**Bruce County**	**Chatham-Kent**	**Dufferin County**
Elgin County	**County of Essex**	**Grey County**	**Huron County**
County of Lambton	**Middlesex County**	**Norfolk County**	**Oxford County**
Perth County	**Simcoe County**	**Wellington County**	

One of WOWC's key objectives is broadband connectivity in communities across Ontario. Today, many households across Ontario are not meeting the minimum targets set by the Canadian Radio-television and Telecommunications Commission's (CRTC). CRTC has establish minimum targets for broadband connectivity across Canada to provide basic broadband to households, which are speeds of 50/10 Mbps download and upload respectively.

The infrastructure itself is neither robust nor widespread in rural parts of the Province, due to the costs involved in setting up the infrastructure. The capital-intensive costs disincentivize private sector organizations, such as Telcom companies to invest, as the return on investment is low.

In January 2020, SWIFT announced a $19 million award from the provincial and federal government to increase broadband services across the counties of Wellington, Norfolk, Lambton and in Kettle and Stony Point First Nation. The total investment value is now roughly $35 million, including government funding and contributions from service providers. SWIFT released three Request for Proposals (RFPs) in the first quarter of 2020. The RFPs are open for several months and are for the construction of critical broadband infrastructure. These RFPs were released for the Cities of Windsor[40] , Chatham-Kent[41] and Oxford County[42], combined for a total of approximately $20 million in value. These projects are funded via a combination of investments from the municipality itself, service providers and SWIFT funding (obtained through provincial and federal government grants). Over the next several years, SWIFT will continue to provide and expand broadband connectivity across Ontario by partnering with a diverse range of stakeholders (i.e. service providers, different levels of government) for technical and financial support to achieve its objective.

[40] https://swiftruralbroadband.ca/swift-launches-rfp-to-enhance-high-speed-internet-in-windsor/
[41] https://swiftruralbroadband.ca/swift-issues-rfp-to-improve-access-to-high-speed-internet-in-chatham-kent/
[42] https://swiftruralbroadband.ca/swift-issues-rfp-to-expand-high-speed-internet-in-oxford-county/

End of document