

Université du Québec en Outaouais

**Business Technology Management (BTM) Executives,
Digital Transformation, and Project Governance in Public Sector**

**Cadres en gestion des technologies d'affaires (GTA),
Transformation numérique, et Gouvernance de projet dans le secteur public**

By

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FOREWORD

Business Technology Management (BTM) is an emerging profession dedicated to leading the Digital Transformation of organizations and industries. Given their evolving roles and competency profile, we focus on executives in the challenging task of mobilizing peers, employees, resources, technologies, and partners in leveraging IT for innovative projects.

As a Project Management (PM) student, and as a professional, I found interest in this topic for several years now. My interest is mainly due to my experience with executive management in public sector, and my personal observations of this role, its duties, authorities, interactions, competencies, and importance to any organization. These observations have been made over several years, throughout my professional experience, while being involved in strategic projects and initiatives in the public sector.

This leadership role is an ever evolving one, with various, changing, and different responsibilities across public and private sector that have impact across the organizations, with comprehensive skill sets and competencies, levels of authority that have expanded in the past 2 decades, with relationships with internal and external stakeholders that is perceived and have impact at the organizational level.

The variations of this undefined leadership role mainly in public sector, that presents strong influences from private sector, with evolving and revolving governance models and relationships with other leaders in the organization, and a level of authority not always clearly defined, recognized, or acknowledged are felt across public sector.

I find intriguing the facets that this leadership role takes, its new valences, when the context is public sector with its own unique constraints and opportunities. Aiming to better understand and define this role, I found interesting and worth exploring the “voice” that the person in this role would have at the senior management table, the aspects of the continue evolving role, the competencies required, the relationship with the CXO group, among other issues, and the influence this role can have over the other CXOs and the entire organization.

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I would like to acknowledge here all CIOs across Government of Canada who contributed to my thesis, expressed interest in my thesis research, who believed that the role of the CIO needs to be defined, discussed about and promoted given its evolution value and importance, I thank personally to each and every single one of the CIOs who so generously took time from their hectic days to share with me so generously their experience, their successes, and discuss about this important role in any organization, role that is continuously examined, analyzed throughout its evergreen and epic transformation.

SOMMAIRE

La Gestion des technologies d'affaire (GTA) est une profession émergente dédiée à la direction de la transformation numérique des organisations et des industries. Compte tenu de leur évolution des rôles et de leur profil de compétences, nous étudions comment les cadres supérieurs abordent les tâches de mobiliser leurs pairs, leurs employés, leurs ressources, leurs technologies et leurs partenaires dans l'exploitation des TI pour des projets novateurs. Nous nous concentrons sur le secteur public compte tenu de son ensemble distinct de contraintes et de l'urgence d'améliorer la performance et la gouvernance des projets numériques. La transformation numérique et l'innovation sont des priorités importantes alors que les gouvernements tentent d'améliorer la qualité des services tout en réduisant les budgets, y compris les immobilisations en matière de technologies de l'information et les dépenses. Dans ce contexte, les Dirigeants principaux de l'information (DPI) et leurs nouveaux sous-homologues et Dirigeants principaux numériques (DPN) sont mis au défi de trouver des solutions moins coûteuses et plus efficaces pour aider leur organisation à devenir minces et agiles, tout en s'appuyant sur des projets informatiques antérieurs à l'échelle de l'entreprise. Notre modèle théorique s'appuie sur la recherche en Gestion de projet organisationnelle (GPO) pour enrichir la GTA d'un nouveau modèle de compétence exécutive. À l'aide d'une méthodologie d'étude de cas comparatifs, nous analysons l'évolution des approches de leadership de projet de transformation numérique des grandes organisations du secteur public. L'échantillonnage opportuniste au sein d'un même gouvernement rend notre étude plus comparable compte tenu du même contexte de politique numérique. Nous effectuons des entretiens avec les DPI et DPN à deux périodes (2016 et 2021) et identifions la lignée des compétences plus stables liées au succès des projets numériques au niveau de la haute direction. Un modèle des compétences émerge de l'étude terrain et nous permet de clarifier le nouveau rôle des exécutifs de la GTA tout au long des processus de gouvernance des TI dans le secteur public.

ABSTRACT

Business Technology Management (BTM) is an emerging profession dedicated to leading the Digital Transformation of organizations and industries. Given their evolving roles and competency profile, we study how executives address the tasks of mobilizing peers, employees, resources, technologies, and partners in leveraging IT for innovative projects. We focus on the public sector given its distinct set of constraints and the urgency of improving digital project performance and governance. Digital transformation and innovation are high priorities as governments try to improve service quality while reducing budgets, including information technology (IT) capital and operating expenditures. In this context, Chief Information Officers (CIOs), and their new counterpart/superior Chief Digital Officers (CDOs), are challenged to find cheaper and yet more effective solutions to help their organization become lean and agile, while building upon prior enterprise-scale IT projects. Our theoretical model builds upon Organizational Project Management (OPM) research to enrich BTM with a new executive competency model. Using a comparative case study methodology, we analyze the evolving digital transformation project leadership approaches of 10 large public sector organizations. Sampling opportunistically within the same government makes our study more comparable within the digital policy context. We carry interviews with CIOs in two periods (2016 and 2021) and identify the lineage of the more stable competencies linked to digital project success at the senior executive level. The information was collected from the interviews conducted and the observations made during the interviews. A model emerges from the field study of the new roles of BTM executives along IT governance processes in the public sector.

SYNOPSIS

Énoncé du problème

Le développement de la technologie au cours des quatre dernières décennies a transformé la société, ses citoyens, avec un impact direct sur le secteur public et privé. La technologie nouvelle et améliorée a transformé la façon dont les gens vivent leur vie, leur façon de travailler, créant de nouveaux environnements de travail, créant de nouveaux secteurs d'activité. Cela a créé un besoin continu, presque perpétuel d'attentes différentes en matière de prestation de services, avec un besoin pour les secteurs public et privé d'améliorer la prestation de services et de créer de nouveaux services transformés et différents qui n'existaient pas auparavant. Le secteur public est appelé à répondre à cette nouvelle réalité et à se transformer de l'intérieur tout en continuant à remplir son propre mandat unique, pour soutenir ses citoyens.

La fonction publique est appelée à se transformer de l'intérieur vers l'extérieur pour rester pertinente, à adopter des technologies nouvelles et améliorées pour fournir les services actuels et être en mesure de créer de nouveaux services nécessaires à ses citoyens. Cela a nécessité des initiatives et des projets de transformation au niveau départemental ainsi qu'au niveau horizontal, dans quelques départements ou dans l'ensemble du secteur public. Ces projets étaient des projets technologiques, des projets de technologie numérique ou des projets de transformation de leaders technologiques d'entreprise. Le CIO joue un rôle majeur en tant que chef de file de bon nombre, sinon de toutes ces initiatives ou projets majeurs, soit dans un rôle de chef de file, soit parfois en tant que co-chef de file avec des entreprises, des chefs d'entreprise de ses propres services ou avec des pairs CIO du secteur public. Cette recherche vise à explorer le rôle transformateur des DSI dans le secteur public, à se concentrer sur le secteur public canadien et les facteurs clés qui mènent au succès de ces projets de transformation numérique.

La transformation et l'innovation du secteur public restent des priorités élevées, même à une époque où les gouvernements sont partout aux prises avec des réductions

budgétaires, y compris les dépenses d'investissement et de fonctionnement en technologie de l'information (TI). Les Dirigeants principaux de l'information (DPI) et Dirigeants principaux numériques (DPN) sont mis au défi de trouver des solutions moins chères et pourtant plus efficaces pour aider leur organisation à devenir légère et agile.

Pour les gouvernements, l'innovation organisationnelle est un impératif croissant, impliquant le développement de nouvelles politiques et stratégies, de nouveaux modèles de services, de nouveaux processus opérationnels, de nouvelles façons de gérer les personnes et de nouvelles architectures technologiques. Ces initiatives dépendent de plus en plus d'approches de leadership dynamiques pour orienter la transformation numérique vers des résultats plus immédiats. Alors que l'adoption des méthodes existantes est le plus souvent recommandée, le secteur public évolue rapidement et oblige les agences à développer des capacités d'innovation natives de l'intérieur.

À mesure que les outils deviennent plus flexibles et adaptables (par exemple, Cloud, Big Data, Blockchain, applications mobiles, Web sémantique, technologies numériques, etc.), les fonctionnaires à tous les niveaux sont appelés à s'impliquer dans des projets informatiques et à aider à développer des processus commerciaux innovants. et les capacités de renseignement.

Les rôles actuels des cadres supérieurs et des cadres, en particulier dans les organisations du secteur public, nécessitent une redéfinition et une adaptation aux besoins de leur environnement en constante évolution. Ce sont des entités qui traversent une transformation au niveau stratégique tout en adoptant l'innovation et la transformation facilitée par l'informatique.

Cadre conceptuel

Nous proposons un modèle de compétences pour les DPI et DPN de la prochaine génération, construit autour du rôle stratégique du leadership de la transformation numérique. Elle sera formulée au carrefour des dyades clés de la littérature sur la Gestion de projet organisationnelle (GPO), et sur l'alignement entre les activités et la technologie, et alignement entre la stratégie et les projets. Notre modèle va au-delà des rôles du

secteur privé et met en évidence la différence entre les services publics et les entreprises traditionnelles à but lucratif.

Au-delà du leadership de projet informatique traditionnel, l'une de nos hypothèses clés est que l'innovation pilotée par l'utilisateur peut compenser les réductions de budget dans la branche DPI. Cela permettrait aux utilisateurs finaux de prendre en charge ou de piloter une activité en plusieurs étapes, voire un projet innovant complet. Notre modèle suppose que les relations DPI et autres cadres supérieurs durant la gouvernance peuvent évoluer vers une responsabilité conjointe et un partenariat, l'informatique devenant des consultants internes, champion de la transformation. Notre modèle implique une évolution de la simple gestion des opérations informatiques vers une transformation stratégique des services à l'échelle de l'organisation.

Nous intégrons la littérature sur le leadership informatique aux concepts de la GPO et de la gouvernance. Nous nous concentrons sur l'interface floue du cycle de vie des projets innovants, où les DPI peuvent jouer un rôle majeur en défendant la transformation des services. Alors que la technologie et son acquisition deviennent plus flexibles, impliquant de plus en plus de partenaires externes dans le processus de développement, nous soulignons comment les fonctionnaires à tous les niveaux peuvent apprendre au-delà des frontières et s'appropriier les projets informatiques et leurs résultats.

Méthodologie de la recherche

Notre thèse s'appuie sur une étude qualitative en cours pour aider à identifier les meilleures pratiques et le profil probable des cadres les plus performants. À l'aide d'entretiens semi-structurés, les DPI et DPN sont invités à partager leurs leçons, comme conseillé dans les premières étapes des études anthropologiques et théoriques. En tant qu'analyse exploratoire au niveau stratégique, cette recherche utilise une approche de pensée conceptuelle, basée sur la méthodologie de la théorie ancrée comme méthode qualitative.

Nos recherches portent sur des projets d'innovation dans le secteur public ou sur la transformation des modèles de services et des processus par l'informatique. Nous

posons 2 questions de recherche visant à améliorer le succès, la rapidité et la rentabilité des projets :

- Leadership: dans leur rôle de leadership, que peuvent faire les DPI pour aider à défendre et guider les projets d'innovation, ainsi que pour réduire les lacunes en matière de connaissances et de talents tout au long du cycle de vie, à tous les niveaux de gestion, au sein et à l'extérieur de leur agence ?
- Gouvernance : en adoptant une vue d'ensemble de l'ensemble du gouvernement du Canada, ainsi que des entités externes et des partenaires de l'industrie des TI, quelle pourrait être l'architecture (éventuellement une organisation de « plateforme » comme Gartner le dit) pour un cadre de gouvernance des TI plus flexible afin d'améliorer la performance des projets d'innovation, de leur conception à leur aboutissement ?

La méthodologie de recherche est basée sur la Théorie ancrée, mieux connue sous l'appellation anglaise Grounded Theory (GT), utilisant une approche inductive. Construire une théorie par la collecte itérative de données et l'observation systématique. Cette recherche est une étude qualitative, qui vise à :

- Identifier les meilleures pratiques et le profil probable des cadres GTA les plus performants;
- Élaborer des études de cas individuelles pour les DPI interrogés en étude exploratoire;
- Échantillonnage raisonné et auto-sélectionné.

Deux séries d'entretiens ont été menées et des données ont été recueillies au cours de ces engagements avec les DPI.

Cycle I : Tout au long de 2016, nous avons réalisé 14 études de cas détaillées de projets de transformation basés sur les technologies de l'information achevés dans des agences de tailles et de mandats variés.

Cycle II : Tout au long de 2021, nous avons réalisé 9 études de cas détaillées de projets de transformation basés sur l'informatique achevés dans des agences de tailles et de mandats variés.

Enfin, une analyse et examen des cas : rédaction d'un résumé de cas, identifiant comment le rôle de leadership numérique et le cadre de gouvernance évoluent.

Aperçu de la thèse

Le chapitre 1 est la présente "Introduction".

Il se concentre sur la transformation et l'innovation du secteur public grâce à l'informatique et identifie la pertinence de ces fondements théoriques pour notre problème. Nous introduisons le contexte théorique dans lequel cette recherche est menée, la transformation numérique du secteur public, avec ses opportunités et ses défis. Nous présentons le rôle de leadership du DPI, ses fonctions transformatrices en évolution au sein de l'organisation, son rôle à l'avant-plan flou du cycle de vie du projet innovant. Dans cette section est présenté le modèle proposé pour les directions TI, ses fonctions de gestion de la technologie d'entreprise et les hypothèses du modèle proposé selon lesquelles les relations avec les autres cadres durant la gouvernance peuvent évoluer vers une responsabilité conjointe et un partenariat.

Le chapitre 2 est une revue de la littérature sur les "Compétences des DPI".

Il fournit une discussion de la littérature récente dans nos domaines de recherche disciplinaires, GTA et GPO, introduisant la transformation apportée par les technologies numériques aux organisations, les spécificités du rôle de leadership du DPI dans le contexte du secteur public et l'analyse exploratoire engagée dans le cadre de cette proposition, menées dans l'ensemble du secteur public.

Dans cette section, nous identifions la littérature clé à l'appui de notre modèle de compétences de DPI proposé, car il se rapporterait à la gestion de projet de transformation numérique, en tant que pratique émergente. Nous examinons également de plus près comment les DPI peuvent influencer l'innovation grâce à des partenariats

étroits avec d'autres exécutifs, et leurs rôles plus traditionnels dans la gestion des dyades d'alignement.

Le chapitre 3 est une revue de littérature sur la "Gouvernance des projets de transformation numérique".

Il présente la gouvernance de projet engagée dans divers projets de transformation numérique telle que présentée dans la littérature commerciale, technologique et de gestion de projet.

Le chapitre 4 présente la "Méthodologie".

Cette recherche vise à aider à définir un profil de compétences émergent pour les DPI de la prochaine génération, centré sur la conduite de projets innovants. Conformément à l'objectif de la recherche, pour développer un modèle qui appuie l'accent mis sur le leadership et la gouvernance de la recherche, des méthodes qualitatives et quantitatives doivent être utilisées à différentes étapes de la recherche.

Cette approche de recherche mixte s'étendra à l'ensemble du calendrier de recherche. La section des sources de données présente le pool disponible de sujets de recherche considérés pour cette recherche et les spécificités des indicateurs de cette source de données sélectionnée. Les méthodes de collecte de données utilisées jusqu'à présent sont décrites ici, telles qu'elles ont été engagées à ce stade de la recherche ; les futures méthodes de collecte de données sont en cours de constructions, les dernières spécificités seront décrites dans le cadre de la thèse. Le processus d'analyse des données est introduit, en référence aux constructions d'interprétation des données et aux outils d'analyse des données à considérer. Cette section se termine par le calendrier de recherche.

Le chapitre 5 est le "Leadership"

Dans cette section, nous présentons le rôle du DPI, et nous présentons les conclusions sur l'avenir du rôle de ces exécutifs de la GTA. Dans cette section, nous présentons les compétences techniques, ainsi que le mandat du DPI. Nous abordons également dans

cette section le parcours professionnel des DPI, leur parcours professionnel et personnel de ces dirigeants. La relation des DPI avec leurs homologues DPN est présentée dans cette section, ainsi que l'alignement des technologies d'entreprise dans le rôle numérique exécutif des DPI. Dans cette section, nous présentons des informations sur la gestion des talents et l'équipe de transformation, ainsi que la collaboration entre le bureau du DPI et les unités commerciales du secteur public.

Le chapitre 6 est la "Gouvernance"

Dans cette section, nous présentons des informations sur la gouvernance de l'ensemble des organisations du secteur public. Nous présentons des modèles de gouvernance utilisés dans divers types de transformation de projets et des modèles de gouvernance utilisés dans des projets numériques. Dans cette section, nous présentons les principales observations, les meilleures pratiques, les facteurs de succès ainsi que les points communs et les domaines de différences entre les pratiques de gouvernance en 2016 et en 2021.

Le chapitre 7 porte sur le "Contexte"

Dans cette section, nous présentons des informations sur le contexte du secteur public, en mettant l'accent sur le secteur public canadien. Nous discutons ici de la volonté du secteur public d'adopter et d'utiliser de nouvelles technologies, et de la transformation de l'intérieur de ce secteur public depuis une décennie. Nous présentons ici des informations relatives au contrôle budgétaire, à la responsabilité et au contexte stratégique, à l'accès aux ressources externes (c'est-à-dire à l'approvisionnement) par rapport à l'utilisation des ressources internes du secteur public nécessaires à la transformation et aux projets numériques.

Le chapitre 8 aborde les "Facteurs de réussite et défis".

Dans cette section, nous présentons un résumé des facteurs de succès identifiés par les DPI dans leur rôle, ainsi que des facteurs de succès constatés dans divers projets de transformation et numériques. Dans cette section, nous avons rassemblé les domaines

de défis notés par les exécutifs en GTA dans leur travail quotidien, dans leurs relations avec leurs pairs à l'intérieur et à l'extérieur de l'organisation, ainsi que les défis notés dans chacun des projets qu'ils dirigent ou co-dirigent.

Le chapitre 9 est une "Analyse des résultats".

Dans cette section, nous présentons les résultats, basés sur l'analyse des données recueillies lors des deux séries d'entretiens. Nous effectuons également ici une comparaison des observations faites lors des deux séries d'entretiens menés en 2016 et en 2021. Dans le cadre de l'analyse, nous recherchons des points communs sur divers domaines liés à nos questions de recherche, ainsi que des divergences dans les données recueillies, des observations pertinentes pour les modèles existants tels que le manuel GTA sur la gouvernance, les domaines de réussite, ainsi que les rôles et les principaux traits de leadership. Les éléments de base de la thèse, la gouvernance, le rôle du DPI, les traits de leadership, les compétences seront abordées, à savoir une introduction où nous analysons les résultats, une section médiane qui présente l'argument analytique de notre analyse et une conclusion de la section d'analyse.

Le chapitre 10 est la "Discussion".

Dans cette section, nous discuterons de notre analyse, des principales conclusions tirées, discuterons de l'examen de la littérature menée en rapport avec les principaux sujets de la recherche, en procédant à un examen des résultats pertinents pour le secteur public. Les observations clés seront discutées ici vis-à-vis des théories existantes, ainsi que les modèles de gouvernance et de leadership, et les modèles, thèmes, tendances seront présentés dans cette section.

Le chapitre 11 est la "Conclusion".

Dans cette section, nous identifierons plusieurs questions ouvertes pour un programme de recherche et expliquerons comment nos contributions attendues et leurs limites inhérentes peuvent servir à faire progresser la GTA en tant que domaine. Nous présentons ici les apports attendus de cette recherche du point de vue académique et

pratique. Dans la section contribution est présentée l'opportunité immédiate que cette recherche apporte, liée aux relations entre les DPI et DPN au sein de l'équipe dirigeante, dans les processus de gouvernance, le leadership des DPI au cœur des dyades d'alignement clés et le rôle de champion dans le cycle de vie de l'innovation organisationnelle.

Cette section présente les limites de la recherche identifiées, principalement liées à l'échantillon de données (taille de l'échantillon, niveau organisationnel, localisation géographique). Ici sont présentés les aspects d'applicabilité de la recherche, l'implication dans les domaines de la gestion de projet, des ressources humaines et de la gestion des technologies d'entreprise ainsi que les implications de la pratique exécutive GTA dans son ensemble.

Annexes

Cette thèse se conclut par la présentation des annexes faisant partie de cette recherche : la lettre d'invitation des sujets de recherche lors du processus de collecte des données ; le formulaire de consentement ; présentation du questionnaire d'entretien semi-directif utilisé lors du processus initial de collecte de données réalisé en 2016-2017 ; présentation du questionnaire d'entretien semi-structuré pour le processus de collecte de données à mener en 2021. La dernière section de la proposition énumère les sources d'informations référencées dans cette proposition de recherche.

Contributions de la recherche

L'objectif de cette recherche est d'examiner les projets d'innovation du secteur public ou la transformation des modèles de service et des processus par l'informatique, et d'explorer le leadership des DSI et le modèle de gouvernance. Le leadership du DPI fait référence aux rôles, à leur évolution et leur statut actuel, à la contribution du DPI et à la manière dont ils peuvent aider à défendre et guider les projets d'innovation, ainsi qu'à réduire les lacunes en matière de connaissances et de talents tout au long du cycle de vie, à tous les niveaux de gestion, au sein de et en dehors de leur agence.

Le cadre de gouvernance exploré dans le cadre de cette recherche fait référence aux modèles de gouvernance existants utilisés dans le secteur public pour un cadre de gouvernance informatique plus flexible nécessaire pour améliorer la performance des projets d'innovation, du début à la fin.

Le rôle et les compétences du DPI ont évolué et changé au cours de la dernière décennie, parallèlement aux changements technologiques, aux progrès et à l'innovation. L'informatique est devenue un pilier central de la gouvernance organisationnelle dans le secteur public. Les DPI ont été appelés à devenir des champions de l'innovation et à aider les agences à devenir Lean et agiles grâce à des programmes de transformation basés sur l'informatique.

Notre thèse a exploré comment cette tendance majeure va changer la fonction DPI dans les années à venir. Après une brève définition de l'innovation organisationnelle, de la gouvernance et de l'informatique dans le secteur public, nous avons passé en revue la littérature académique sur les compétences des DPI, exploré leur évolution dans ce contexte émergent et présenté les spécificités du secteur public.

Cela nous a amenés à considérer trois questions clés : les relations entre DPI et exécutifs dans les processus de gouvernance, le leadership du DPI au cœur des dyades d'alignement clés et le rôle de champion du DPI dans le cycle de vie de l'innovation organisationnelle.

Nous avons ensuite proposé un modèle de compétences pour les DPI de prochaine génération, plaçant cette position de leader au centre des dyades d'alignement des TI avec les affaires et la stratégie des projets numériques. Le DPI, grâce à des relations renouvelées avec les équipes de direction, se concentrerait alors sur la gestion d'un programme de projets innovants avec l'informatique comme pilier central.

Le besoin de preuves plus claires à l'appui du modèle est en fait révélateur du potentiel d'une étude plus approfondie. Un rôle plus intégré pour le DPI a été suggéré depuis longtemps dans la littérature, et notre modèle fournit un cadre riche et cohérent pour garantir que ce rôle complète les capacités d'innovation globales de l'organisation.

Compte tenu de la nature pratique de l'expertise en gestion informatique, au sein de la GTA dans son cadre plus large, ce programme de recherche nécessite un partenariat solide entre les principales communautés de DPI au sein du gouvernement, les réseaux de DPI et un riche réseau de partage des connaissances impliquant le milieu universitaire. Cela peut amener les directions générales du DPI de diverses juridictions à développer une capacité conjointe de "recherche clinique", permettant à des équipes conjointes de chercheurs publics-privés-universitaires de tester et de développer le modèle proposé, ainsi que des explications dérivées et alternatives.

L'expertise hybride nécessite une approche véritablement transdisciplinaire si nous voulons aider les DPI de la prochaine génération à relever les défis croissants de l'innovation organisationnelle dans le secteur public.

Il s'agit donc d'un appel à réunir l'expertise de plusieurs disciplines des sciences administratives, à savoir l'administration publique, la gestion stratégique, la gestion de projet et la gestion des technologies d'entreprise.

Au cours de cette recherche, une série de limites ont été identifiées : l'échantillon des dirigeants du secteur public n'a pas été stratifié selon l'âge, le sexe, l'expérience professionnelle, l'éducation ou d'autres critères.

L'échantillon de sujets de recherche n'inclut pas les dirigeants en dehors du secteur public et du domaine de la gestion des technologies d'entreprise GTA ; l'échantillon pour les dirigeants du secteur public au niveau provincial et municipal n'a pas encore été initié ; discontinuité des informations recueillies en raison de changements dans le rôle du DPI en raison de l'attrition ou des congés organiques des DPI.

Les données aussi sont limitées, recueillies à partir de la fin de 2016 et complétées en 2021, donc deux périodes non-continues. Les indicateurs des principaux concepts et sous-concepts des deux domaines, leadership et gouvernance, ont été élaborés a priori à la date de début des entretiens initiaux. Afin d'assurer la validité des données recueillies, le chercheur a dû étendre le modèle pour ce que tous les sujets de la recherche en cours soient intégrés.

Ce chercheur considère le spectre des ontologies personnelles et reconnaît que les populations considérées comme vulnérables n'ont pas été considérées comme des sujets de recherche.

La position déontologique du chercheur comprend l'éthique professionnelle, l'ensemble des valeurs, le comportement professionnel et les pratiques professionnelles. Dans le cas de ce chercheur, on tient compte des codes d'éthique applicables prescrits : celui du secteur public - en tant qu'employeur de mon choix, celui en gestion de projet selon le domaine de mon étude et celui de mes professions en tant qu'un ingénieur.

Il est tenu compte de la confidentialité des informations recueillies au cours du processus d'entretien, comme indiqué dans l'accord de consentement éclairé avec les participants à la recherche, et de l'éthique professionnelle manifestée par ce chercheur tout au long du cycle de vie de cette recherche. Pour les sujets de recherche impliqués jusqu'à présent et ceux qui seront impliqués à tout moment au cours de cette recherche, nous considérons leur droit à la confidentialité, sauf dérogation expresse, en tenant pleinement compte de leur sécurité et de leur protection, dans le but de créer un climat positif d'expérience de recherche.

Pour chacune des organisations impliquées dans cette recherche, la confidentialité de leurs données sera ainsi respectée et assurée. Enfin, la documentation éthique nécessaire a été préparée, soumise et approuvée par le Comité d'éthique de la recherche (CER) de l'Université du Québec en Outaouais (UQO).

La recherche améliorera les normes de capacité organisationnelle reconnues par l'industrie soutenues par le cadre de connaissance (Body of Knowledge, BOK) et les autres dans d'autres domaines; contribuer aux certifications de compétences professionnelles existantes telles que le consultant certifié en gestion (CMC); les objectifs de contrôle des technologies de l'information et des technologies connexes (COBIT); les normes de compétence telles que le cadre de compétences pour l'ère de l'information (Skills for the Information Age, SFIA) du Royaume uni.

Au niveau pratique, les résultats de cette recherche soutiendront l'avenir du travail dans les organisations, garantissant la préparation du personnel au niveau d'innovation et de transformation numérique dans les organisations où l'apprentissage et le développement du personnel sont déclenchés par les portefeuilles des DPI.

Le rôle des DPI, dans le cadre des équipes dirigeantes du secteur public, continuera d'évoluer et de devenir plus pertinent pour les organisations dans les années à venir. La dernière décennie a vu le changement d'un rôle classique avec des compétences de base dans les affaires et l'informatique, avec une transition vers l'innovation et des organisations numériques de premier plan et des fusions avec d'autres rôles nouvellement formés tels que celui de DPN formant le nouveau Dirigeant principale de l'information et du numérique (DPIN). Ces transformations nécessitent de nouvelles formes de leadership et de nouvelles compétences évoluées.

Les résultats de cette recherche doteront les DPI et les praticiens des ressources humaines des connaissances nécessaires pour soutenir la progression de carrière et le développement professionnel, le processus de recrutement dans les secteurs public et privé et la rétention des candidats DPI pour le groupe de gestion des talents.

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LIST OF ABBREVIATIONS

ADM	Assistant Deputy Minister
BTM	Business Technology Management
CA	Chief Architect
CXO	Chief (X = various executive) Officers
CEO	Chief Executive Officer
CFO	Chief Financial Officer
DG	Director General
CFO	Chief Financial Officer
CIO	Chief Information Office
CDO	Chief Digital Officer
CDIO	Chief Digital Information Officer
CTO	Chief Technology Officer
CPO	Chief Procurement Officer
DM	Deputy Minister
Director	PMO Director Project Management Office
PMO	Project Management Office
BTM	Business Technology Management
PM	Project Management
TIM	Technology and Innovation Management
EA	Enterprise Architecture
TMT	Top Management Team
VP	Vice President

1 INTRODUCTION

1.1 Introduction

The development of the technology in the past four decades transformed society and its citizens, with a direct impact on public and private sector. New and enhanced technology transformed the way people live their lives, how they work, creating new work environments, creating new business lines. It created a continued, almost perpetual need for different expectations for service delivery, with a need for public and private sector to improve the service delivery and create new, different, transformed services that didn't exist before. Public sector is called to respond to this new reality, and to transform from inside out while maintaining to deliver on its own unique mandate, to support its citizens.

1.2 Problem Statement

Public service is called to transform from within out to remain relevant, to adopt new and enhanced technologies to deliver current services and be able to create new services necessary for its citizens. This called for transformation initiatives and projects at departmental level as well as at horizontal level, across a few departments or across the entire public sector. These projects were technology projects, digital technology projects, or business technology lead transformation projects.

The Chief Information Officer (CIO) and Chief Digital Officer (CDO) play a major role as leads of many if not all these major initiatives, projects, either in a lead role, or sometime co-leading along with business, corporate leads from own departments, or with peers CIOs across public sector. Their roles are varying greatly as per the needs of the organization and its context (Moker, 2020). However, literature shows there is convergence toward a core competency framework (Ulrich & Lehmann, 2023).

Considering a specific context as a homogeneous environment for theory building, this research aims to explore the transformative role of the CIOs and CDOs across public sector, focus on Canada public sector, and the key factors that lead to success of these digital transformation projects. Roles are distinct but linked closely, and therefore will be studied interchangeably depending on case contexts (Lorenz & Buchwald, 2023).

While CIOs play a crucial role in digital transformation, their level of authority is not always very high, and their scope of responsibility often varies greatly across organizations. A recent 2020 survey, with “responses from 1,005 IT executives, including 345 CIOs and 624 unique organizations”, reveals the following findings (Kappelman et al., 2021):

“The most common criteria for assessing CIO performance were User Satisfaction (Internal), Value of IT to the Business, Contribution of IT to Strategy, IT Cost Control and Cybersecurity.

The average tenure of CIOs remains a little over six years, with almost 47% reporting to the CEO and over 26% to the CFO, the former down and the latter up since 2019.

Continuing trends are for CIOs to come from outside the organization (now over 80%) and from non-IT positions (now nearly a quarter). successfully.” (Kappelman et al., 2021)

Given this wide diversity of CIO roles, it is useful to ask how contextual factors can influence its emergence. We chose to perform this study in the public sector as a unique environment where a greater homogeneity could be expected, and therefore give rise to an emerging model of IT executive competencies.

1.3 Public Sector Digital Transformation

Public sector transformation and innovation remain high priorities, even at a time when governments struggle everywhere with budget reductions, including information technology (IT) capital and operating expenditures, CIOs are challenged to find cheaper and yet more effective solutions to help their organization become lean and agile.

For governments, organizational innovation is a growing imperative, involving the development of new policies and strategies, new service models, new business processes, new ways of managing people, and new technological architectures. These initiatives increasingly depend on dynamic leadership approaches to steer digital transformation toward more immediate results. While the adoption of existing methods is

most frequently recommended, the public sector is changing rapidly and requires agencies to develop native innovation capabilities from within.

As tools become more flexible and adaptable (e.g., Cloud, Big Data, Blockchain, Mobile Apps, Semantic Web, Digital technologies, etc.), public servants at all levels are called upon to get involved in IT projects and help develop innovative business processes and intelligence capabilities.

1.4 CIO Roles in the Public Sector

The current roles of senior and executives, especially in public sector organizations, requires redefining and adapting to the needs of their ever-evolving environment. These are entities that are going through transformation at strategic level while embracing innovation and IT – enabled transformation (Al-Taie et al., 2014).

This study aims to explore the development of a framework for CIOs given the lack of studies and models for CIOs and their role mainly in public sector. The problem addressed by this current research is seeking the relationship between the transformation of the CIO leadership role, the success of IT innovation projects, and the governance of these IT – enabled projects in public sector, to identify causality and effect for success of IM/IT innovation projects.

1.5 Executive Competency Model

We propose a grounded theory approach to develop a competency model for next generation CIOs and CDOs, built around the strategic role of digital transformation leadership. We find inspiration from recent literature reviews, but chose to rely on solely on field data to formulate our model (Kratzer et al., 2023).

Our model will be formulated at the nexus of key dyads of the Organizational Project Management (OPM) and governance literature: alignment between business and technology, and alignment between strategy and projects. Our model goes beyond private sector roles, and pinpoints how public services differ from profit-seeking business.

Moving beyond traditional IT project leadership, one of our key hypotheses is that User-Driven Innovation may compensate for budget reductions in the CIO branch (Magnusson et al., 2019). This would allow end-users to take charge or drive some activity at several stages, or even a complete innovative project. Our model assumes that CIO-CXO relations and governance frameworks can evolve into joint responsibility and partnership, with IT becoming internal consultants, championing transformation, e.g., CIO-CMO relations (Sleep & Hulland, 2019). Our model implies an evolution from merely managing IT operations toward organization-wide strategic service transformation.

Going well beyond traditional responsibilities, agency deputies are asked to provide IT leaders renewed decision-making power and demanding that other executives take joint responsibility. Consideration is given to various impact factors and their dimensions. “The dimensions include organizational aspects (Crossan & Apaydin, 2010) that enable and support innovation in companies in terms of initiatives, processes, and managerial practices”.

We integrate the IT leadership literature with concepts from OPM and governance, where the CIO role can have a major impact at senior level decision making, especially related to digital investments (Turedi, 2020). We focus on the fuzzy frontend of the innovative project lifecycle, where CIOs can play a major role championing service transformation. As technology and its acquisition is becoming more flexible, involving increasingly more external partners in the development process, we emphasize how public servants at all levels can learn across boundaries, and take ownership of IT projects and their outcomes.

Our thesis proposal builds on an ongoing qualitative study to help identify best practices, and the likely profile of the most successful executives. Using semi-structured interviews, senior CIOs leaders are invited to share their lessons, as advised in the first steps of anthropological and grounded theory studies. As an exploratory analysis at the strategic level, this research is using a conceptual thinking approach, based on the grounded theory methodology as a qualitative method.

1.6 Business Technology Management (BTM)

The purpose of the current research is to develop a competency profile for BTM Executives. There is a growing skills gap at all ranks in IT leadership, and CIO demand and supply imbalance is causing major challenges in IT governance (Barnes et al., 2021).

The knowledge gap and need for a new BTM Body of Knowledge (BOK) for executives creates ambiguity as to how to identify the most likely candidates to promote through the ranks, how to prepare in their career development for these roles, and in how to consider candidates for Talent Management Programs and succession planning. This also creates a vacuum in strategic project governance, with a lack of clarity as to how to share leadership among business and technology executives. Some frameworks are emerging for a greater integration of CIO competencies, but more research is required to contextualize and ground frameworks in real practice (George & Howard, 2020).

This competency profile is a model for next generation CIOs, built around this strategic role (van Toorn et al., 2019). It is integrated with the existing IT functions, at the nexus of key dyads: alignment between business and technology, and alignment between strategy and projects. This model is a framework for digital organization leadership, a model for the strategic transformation project leadership and governance mechanism.

Our main questions are focused on:

- (1) the leadership roles and competencies required to build a profile around the best practices shared by these senior leaders and their projects; and,
- (2) the governance framework for digital projects and how to build appropriate models for IT-enabled transformation.

The leadership model and governance framework will have academic and practical applicability; it shall help to make BTM job knowledge easily accessible, customizable, and reusable for decision-making by professionals, employers, higher education, private and public entities, other associations involved with IT- related standards, certification, and accreditation.

This research will build upon, and help contribute to advance the implementation, of the latest advances in 3 disciplines:

- in Project Management (PM), by studying BTM senior executive roles in leading digital organizations, and career management models, within the scope of the PM discipline.
- in Business Technology Management (BTM) by integrating in a framework the latest IT management best practices and standards; and,
- in Software Engineering, especially for a peer-to-peer approach, to reusing BTM standards.

1.7 Research Objectives and Research Questions

Our research deals with public sector innovation projects, or IT-enabled transformation of service models and processes. We ask 2 research questions seeking to improve project success, speed, and cost-effectiveness:

- CIO Leadership: In their leadership role, what can CIO's do to help champion and guide innovation projects, as well as reduce knowledge and talent gaps throughout the lifecycle, at all levels of management, within and outside their agency?
- Governance Framework: Taking a broad view of the whole Government of Canada, along with external entities and IT industry partners, what could be the architecture (possibly a "platform" organization as Gartner puts it) for a more flexible IT governance framework to improve the performance of innovation projects, from inception to completion?

1.8 Research Design

The research methodology is based on the Grounded Theory (GT), using an Inductive Approach. Building theory through iterative data gathering and systematic observation. "In conceptual analysis, for example, a concept is chosen for examination, and the analysis quantifies its presence and occurrence" (Drench & Croson, 2013).

This research is a qualitative study, that aims to:

- Identify best practices, and the likely profile of the most successful BTM executives.
- Develop individual case studies for the CIOs interviewed Exploratory Study
- Purposive, self-selection sampling

We follow the principles set by Miles and Huberman: “Qualitative studies take place in a real social world and can have real consequences in people’s lives; that there is a reasonable view of “what happened” in any situation.” (Miles, Huberman, 2003).

Two rounds of interviews were conducted, and data gathered during these engagements with CIOs.

Round I: Throughout 2016, we have carried out 14 detailed case studies of completed IT-enabled transformation projects in agencies of various sizes and mandates. Our research process involved the following steps with each agency:

1. CIO Interview: Hold a 1-hour interview with the CIO to identify a relevant innovation project, discuss their leadership role throughout its lifecycle, and identify relevant contacts and documentation.
2. Interviews with PM and Others: Hold a series of 1-hour interviews, as well as small focus groups, with the Project Manager (PM) and other direct reports of the CIO, to identify the key “pain points” impacting project performance.

Round II: Throughout 2021, we have carried out 9 detailed case studies of completed IT-enabled transformation projects in agencies of various sizes and mandates.

3. Case Study Analysis and Review: Draft a case summary for the strategic project, a “story board” or timeline of key events, an “influence network” of facilitating/impeding factors, and a “competency profile” for CIO leadership.

As per (Dubé & Paré, 2003) “The Qualitative researchers face the challenges of designing a study in a systematic and manageable yet flexible manner and of integrating the results into a coherent document “

1.9 Thesis Outline

In this section of the thesis, we present the layout of this proposal and introduce the reader to the sections and structure of this document.

Chapter 1 is the present “Introduction”: It is focused on the IT-enabled public sector transformation and innovation and pinpoint the relevance of these theoretical foundations to our problem. We introduce the theoretical context in which this research is conducted, the Public Sector Digital Transformation, with its opportunities and challenges. We introduce the CIO leadership role, its evolving transformative BTM functions within the organization, its role at the fuzzy frontend of the innovative project lifecycle. In this section is introduced the proposed model for the CIO leaderships, its Business Technology Management functions, and the assumptions of the proposed model that CIO-CXO relations and governance frameworks can evolve into joint responsibility and partnership.

Chapter 2 is a literature review on “CIO Competencies”: It provides a discussion of the recent literature in our 3 disciplinary research areas of BTM, OPM, and TIM, introducing the transformation brought by digital technologies to organizations, the specifics of the CIO leadership role in the context of public sector and the exploratory analysis engaged as part of this proposal, conducted across public sector.

In this section we identify the key literature supporting our proposed CIO competencies model, as it would relate to digital transformation Project Management (PM), as an emerging practice. We also look more closely at how CIOs can influence innovation through close partnerships with other CXOs, and their more traditional roles in managing the alignment dyads. **Chapter 3 is a literature review on “Digital Transformation Project Governance”:** It presents the project governance engaged in various digital transformation projects as presented in the business, technology, and project management literature.

Chapter 4 is presenting the “Methodology”: This research seeks to help define an emerging competency profile for next generation CIOs, centered on leading innovative projects. As per the aim of the research, to develop a model that supports the leadership and governance focus of the research, qualitative and quantitative methods are to be

used at various stages of the research. This mix research approach will be spanned throughout the entire research calendar. The data sources section presents the available pool of research subjects considered for this research and the indicators specifics of this data source selected. Data collection methods used so far are here described, as they have been engaged to this point of the research; the future data collection methods are under constructions, final specifics to be described as part of the thesis. The data analysis process is introduced, with reference to the data interpretation constructs and the data analysis tools to be considered. This section ends with the research calendar.

Chapter 5 is about “Leadership”: In this section, we present the role of the CIO, and we present findings on the future of the CIO role. In this section we present the hard skills of the CIO, as information on the CIO tenure. We also touch in this section about the career path of CIOs, their professional and personal path of this leaders. The relationship of CIOs with CXOs peers is presented in this section along with the business technology alignment in CIOs executive digital role. In this section we present information on talent management and transformation team, as well as the collaboration between the CIO office and Business units in public sector.

Chapter 6 is about “Governance”: In this section we present information on governance from across public sector organizations. We present models on governance used in various types of project transformation, and governance models used in digital projects. In this section we present main observations, best practices, success factors as well as commonalities and areas of differences among the governance practices in 2016 and in 2021.

Chapter 7 is about “Context”: In this section we present information about the public sector context, with a focus on Canadian public sector. We discuss here about the readiness of public sector to adopt and use new technologies, and the transformation from within that public sector has been working one for the past decade. We present here information related to budget control, accountability and strategy context, access to external resources (i.e., procurement) versus using internal resources in public sector required for the transformation and digital projects.

Chapter 8 is about “Success Factors and Challenges”: In this section we present a summary of factors of success identified by CIOs in their role, as well as factors of success noted in various transformation and digital projects. In this section we gathered areas of challenges noted by CIOs in their day-to-day work, in their relationship with peers within and outside the organization, as well as challenges noted in each of the project they lead or co-lead.

Chapter 9 is the “Analysis”: In this section, we present the findings, based on the analysis of the data gathered from the two rounds of interviews. We also conduct here a comparison of the observations made during the two round of interviews oconducted in 2016, and in 2021. As part of the analysis we are seeking commonalities on various areas related to our research questions, as well as divergencies in the data gathered, observations relevant to existing models such as BTM handbook on governance, areas of success, as well as roles and key leadership traits. The core elements of the thesis, governance, role of CIO, leadership traits, competencies will be addressed here, namely an introduction where we analyze the findings, a middle section that presents the analytical argument of our analysis, and a conclusion of the analysis section.

Chapter 10 is the “Discussion”: In this section we will discuss our analysis, main conclusions drawn, discuss the review the literature conducted relevant to the main topics of the research, conducting a review of findings relevant to the public sector. Key observations will be discussed here vis-à-vis the existing theories, as well as the governance and leadership models, and patterns, themes, trends will be presented in this section.

Chapter 11 is the “Conclusion”: In this section we will draw conclusion of this research, present findings, areas of novelty as well as area of confirmation to the existing research, theories, and models in place, as well as conclusion related to how the current research support the adoption of BTM. In this section we will identify several open issues for a research agenda, and explain how our expected contributions, and their inherent limitations, may serve to advance BTM as a field. Here we present the expected contributions of this research from the academic and practical point of view. In the contribution section is presented the immediate opportunity that this research brings,

related to the CIO-CXO relationships in governance processes, CIO leadership at the core of key alignment dyads, and CIO championing role in the fuzzy front-end of the organizational innovation lifecycle. This section presents the limitations of the research identified at the time of presenting this proposal, mainly related to the sample of data (sample size, organizational level, geographical location); additional limitations will be identified throughout the research that will be conducted, and up until the final thesis will be defended. Here are presented the applicability aspects of the research, the implication in project management, human resources, and business technology management areas as well as the implications of the BTM executive practice overall.

Appendices: This thesis concludes with presentation of the appendices part of this research: the invitation letter for the research subjects during the data collection process; the consent form; presentation of the semi-structured interviewed questionnaire used during the initial data collection process conducted in 2016-2017; presentation of the semi-structured interviewed questionnaire for data collection process to be conducted in 2021. The final section of the proposal lists the sources of information referenced in this research proposal.

2 CHIEF INFORMATION OFFICER (CIO) COMPETENCIES

2.1 Introduction

For the last decade the role of the CIO has evolved, it has transformed, and it become extremely visible, at the forefront of the major transformation initiatives, impacting organizational performance on several fronts (Liu & Preston, 2021). This is due to a variety of factors among which the release of new, improved, advanced technologies, adoption of new technologies in a variety of new areas such as public sector, enhancement of existing technologies, the new political mandates of elected governments. These changes brought a wave of transformation and modernization across public and private sector, for leveraging and harnessing technology to support better service delivery, meeting current and new business needs while leveraging digital technologies, and providing support to citizens, the end users.

The role of the CIO has expanded and has become better recognized, formalized, and supported by the development and implementation of new policies put in place mainly in public sector. The role is also evolving in terms of structural power and hence the position it holds in partnership with CXOs, especially in relation to organizational performance (Feng et al., 2021). The revised role of the CIO is supported by new and enhanced competencies that the CIO had to acquire and demonstrate in the new functions of this role. In this role the CIO is working towards meeting high demands, of digital transformation in public and private sector, a role that the society and its citizens is relying on more and more.

The new role of the Chief Digital Officer become visible and active in private and public sector organizations due to the creation and adoption of new, emergent digital technologies. Public sector public organizations created this new role that work in parallel with the CIO, driving and implementing digital transformation to staff and their business. In some public sector organizations CIOs took over a digital leadership role, developing and implementing digital strategy in parallel with their classical role.

Private sector has been eager in transforming their business environment, adopting new digital technologies for better and more competitive products and services creating the

new CDO leadership role and supporting their digital transformation, working often with the CIOs.

The operational, business, technology-oriented role of the CIO, combined with the digital, change management-oriented role of the CDO is merging towards a new role, the Chief Information Digital Officer, that combines the breadth of business, technology and digital.

CDO emerged to address joint business-technology innovation, a new role following on the path initially held by CIO and CTO who historically were associated with IT and business transformation. “The nature of the CDO’s role as ‘the art of digital transformation’, recognising the blend of business and technology knowledge with superior communication and persuasion skills.” (Davison et al., 2023).

CDO role can have several similarities to CIO in complex organizations. On one hand CIO has an operative expert role, act as a change agent of digital transformation; whereas CDO has a strategic and visionary role and is the actual change agent of digital transformation. CDO develops and implement the digital strategy across the organization, playing a cross functional role, actually leading the change management efforts to prepare the organization for the digital times. (Locoro & Ravarini, 2019).

CDO and CIO must co-lead innovative projects. “CDOs primarily focus on the strategic and communicational aspects of the digital transformation and closely collaborate with their CIOs if both positions exist in a company”. (Horlacher, 2016)

We propose to integrate both roles into one model of Organizational Program Management (OPM).

2.2 IT-Enabled Public Sector Transformation and Innovation

2.2.1 IT-Enabled Innovation

IT-Enabled organizational innovation must be understood as both an activity, and an outcome. We must emphasize two fundamental features of innovation: innovation is about new solutions, and innovation is contextual, where CIOs can act as champions (Hsu & Liu, 2019).

Table 1 summarizes these functions, where IT-enabled organizational innovation can be viewed as an opportunity for developing new sources of value within a defined strategy, justifying renewed investments in IT solutions (D. Q. Chen et al., 2021). It is to be noted that this may not mean new IT infrastructure per se, as innovation, involve reconfiguring solutions, processes, and how we leverage IT.

One example is AI where CIOs play a lead role in ensuring adoption of innovative practices. “CIOs are decision makers directly involved in ministries implementing applications, cases, and techniques based on AI. Their ideas and visions are critical during the initial stage to shape and guide the future of AI in the public sector.” (Criado et al., 2021).

CDOs are also expected to play an important part in ensuring AI stimulates creativity. Authors talk about “Digital Transformation” for current business models, about “Digital Innovation” for new business models, and “Digital Leadership” on the associated corporate management, whereas the human aspect in the form of the Chief Digital Officer meets the machine aspect in the form of the Artificial Intelligence AI.”CDO is often brought into play, who, as an acting player, is to anchor Digital transformation in the organization via Digital Leadership and shape it both strategically and operationally.” (Kollmann et al., 2023).

This is most acute in the public sector where AI has the potential to make automation more effective while CIOs most raise and address ethical issues. AI is not only present in policy documents but in real use cases and concrete solutions identified along with the examples of adoption of AI in public sector. (Ahn & Chen, 2022).

Another example is how CIOs lead organization-wide efforts for sustainable development where all stakeholders must commit and stay the course to digital efficiency. Chief information officer's (CIO's) has a dominant regulatory focus “Chief Information Officer (CIO) becomes more important and required. It should be able to cope with different challenges related to decision-making under the lack of enough time or sometimes under uncertain conditions”. (R. Y. K. Chan, 2021).

The same was observed during the COVID-19 pandemic where CIOs played a key role in accelerating digital transformation. “With the rapid development of digital technologies, digital government transformation (DGT) has been legitimated, contributing to innovative efficacy, but it also has created a set of challenges, dilemmas, paradoxes, and ambiguities (S.-J. Eom & Lee, 2022).

Table 1: Definition of Organizational Innovation

Dimension	Definition	Criteria
New	Innovation is about new concepts and solutions to various needs.	New to the world or a region, new to an industry or an organization.
Contextual	Innovation is contextual to the organization and industry within which it is adopted.	The same type of solution can take a distinct nature or shape in others, and still be classified as innovative, at least within that realm.
Where	Innovation in organizations can occur at strategic and/or operational levels, within a planned and/or emergent activity, with deliberate and/or unintended outcomes.	Innovative activities and outcomes will depend on the sector, and occur as per their respective dynamics, e.g., business, government, municipal, para-public, or non-profit.

What	Innovation can bring new solutions in one or more deliverables.	New business models, new products/services, new technology/infrastructure, new production/business processes, new management methods/practices, new ways of thinking/working, etc.
When	Innovation happens when forces converge or spontaneously organize as a new “equilibrium solution”, often viewed as a “dominant design” among competing solutions.	Dominant designs are typically rooted in a set of evolving needs, and in response to opportunities and/or constraints that form a “complex system” leading to, causing, or driving innovation.
Why	Innovation typically targets performance or a planned outcome.	Profits or Return on Investment (ROI), productivity or quality improvement, meeting end-user/stakeholder needs, serving new markets or constituents/mandates, access to new resources or knowledge, employee initiative and ideas, etc.
How	Innovation is best conceived as a project, with a beginning and ending, and unfolding as a process managed by one or more interdisciplinary team(s) throughout a lifecycle.	Innovative projects may be composed of one, more, or any of a few stages within which several iterations may occur, with varying degrees of originality among innovative needs, options, and solutions, involving: (1) development, (2) implementation, (3) diffusion, (4) adoption and adaptation, (5) abandonment or replacement.

The role of IT in organizational innovation is well described by strategic management theories focused on core competencies and flexibility (Drnevich & Croson, 2013). The theories in strategic management incorporate the causal profit, or value-extraction mechanism (Makadok, 2010), the value mechanism applicable to IT that becomes a pillar in achieving an organization's mandate, and not just a support tool.

While IT suffers successive phases of commoditization, digital adoption must be accompanied with organizational innovation of varying frequency and scale (Carr, 2003). Carr argued in a Harvard Business Review article, that in the private sector, IT and its "infrastructural technologies", initially reserved for visionary companies, it become in medium term, simply commodities. Like any invention, IT has gone through the commoditization process that brought a deflation of the initial price after a peek in value. This process brought almost immediately the progressive yet rapid organizational changes, from scale economies, brand uniqueness, recognition, to positioning advantages.

The commoditization process of IT evolves, pushes companies to become more strategic in their thinking, and consider alternative options (i.e., outsourcing, open source, crowdsourcing, etc.), "from an open innovation perspective, firms can use open source as a source of external innovations, or to spin off technologies that cannot be commercialized by the firm" (Bogers & West, 2012), an effort for cost reduction, necessary to the organization, becoming strategically competitive. In this context, rather than managing IT, organizations need to innovate themselves, and manage the costs and the risks associated with IT. This is a cycle of innovation to commoditization. This leads to a dynamic synchronization of strategy and innovation, where IT can play a driving role (Prahalad & Krishnan, 2002). Transposing this concept to the public sector, organizations seeking for new means of fulfilling their mandate while bringing value to citizens, turn to technological advantages of innovative IT solutions, revamping existing, or building new programs, services, and products (Janowski, 2015).

In the public sector, the concept of strategy may be akin to that of policy (Rose & Cray, 2010). Agencies that play a leading adopter role will investigate engaging their CIO into

the strategic exercise of the organization and empower them to exercise their exiting roles by using their competencies. They introduce technological changes and innovation to the “C” executive group, building a common agenda with the business groups. Foreseeing organizations engage the CIO to enhance the technological infrastructure, by enriching it, not only by aligning it with the business strategy of the organization rather than by enhancing their strategy and including IT within all its programs.

The internal dynamic collaboration among business, technology, strategy, projects, and innovation is key to this endeavor, as public sector case studies demonstrate (Tinjan et al., 2023; Verma & Dawar, 2019; Zygiaris & Maamari, 2023). By dynamically synchronizing strategy with IT, the CIO can play a key role in IT-enabled transformation, not only in the IT development and innovation, but in leveraging IT for innovation.

Organizational innovation is often linked to strategic IT projects, where their evolving phases can serve to stimulate renewal and learning (Arvidsson et al., 2014). Strategic projects, especially in project-based organizations, can serve as strategy-making and policy-making opportunities (Salunke et al., 2011). Organizations introduce innovation for creating value that occurs in the contextual use of the Dynamic Capability-based View (DCV) of strategy. It is DCV that attempts to explain why some firms gain competitive advantage in continually changing environments (Eisenhardt & Martin, 2000). A project-oriented organization provides the necessary setting to examine service innovation.

2.2.2 Contrasting IT Projects in Private and Public Sectors

IT management is a generic competency that CIOs apply interchangeably in both private and public sectors (Hooper & Bunker, 2013). Practices are developed primarily by industry and adapted to government. Infrastructure, standards, and methods are identical, but sectors differ sharply in terms of governance and resource endowment (Noonpakdee et al., 2020). The effectiveness of knowledge transfer may be affected, among other by CIO job tenure, shorter in government (3.53 years) than business (5 years) (Dawson et al., 2015).

Table below outlines the scope of CIO responsibilities, and the importance of application development and IT operating infrastructure as part of their portfolio. In a trend common to all jurisdictions, many large agencies appoint CIOs at the Assistant Deputy Minister (ADM) level. Usually, small agencies appoint them as Director Generals (DG); when they are appointed at the DG level, Branch units and sub-units are managed by Directors and Unit Heads (Chiefs). In this latest case, the DGs report to an Assistant Deputy Minister (ADM) that manages Human Resources, Procurement, and other corporate business functions of the agency.

Table 2: Scope of CIO Responsibilities in the Public Sector

CIO Units (At Director General level)	Sub-Units (At Director level)	Direct Costs (At CIO Portfolio level)	% of Budget (At portfolio level)
Application Development	1. Development Project Office 2. Architecture/Modeling 3. Web Sites/Applications 4. Enterprise Systems 5. Systems Integration 6. Business Req. and Analysis 7. Database Support	Business Analysts/Developers Consultants/Certification Multimedia/Production Integration Appliances Database Analysts	35-45 %
IT Operations	8. Shared Services Liaison Role 9. Internal Data Centers 10. Mainframes 11. Networking/Security	Outsourcing Services Servers/Facilities Hosting/Maintenance Networks/Telecom.	25-30 %

	12. Business Continuity 13. IT Security Operations	Backups/Recovery	
IT Support	14. End-User Equipment 15. End-User Support 16. End-User Software 17. Telephony/Conferencing 18. Identity/Security	Computers/Peripherals Printing and Supplies Software Licenses Devices/AV/Telecom. ID Cards/Access Points	20-25 %
Information Management	19. Content Management 20. Library Services 21. Files and Archives 22. Compliance/Audit	Storage Servers Consultants/Auditors Information Management Analysts	15-20 %
Branch Management	23. Policy and Planning 24. Human Resources 25. Accounting 26. Procurement 27. Legal Counsel 28. Program and Project Management 29. Enterprise Architecture 30. License Management	Strategy Consultants Temp Agencies Accountants/Consultants Vendor Analysis Firms Lawyers/Consultants Project and Program Managers Enterprise Architects All Licenses for Agency	5-10 %

To help weight CIO challenges, we contrast in Table 3 some of the key sector differences in the factors that influence digital transformation. We are focusing on the advantages enjoyed by business, and the constraints within typical public agencies, as typical cases

of government digital strategies involve complex interplay between these factors (Hafseld et al., 2021).

Most of these differences are due to the respective economics and culture of each sector (Rosacker & Rosacker, 2010).

Table 3: IT Project Context in Private and Public Sectors

Project Context	Private Sector (advantages)	Public Sector (constraints)
Strategy and Policy Making	<ul style="list-style-type: none"> • Senior executives make decisions. • Competitive intelligence is key. • Board will follow CEO guidance 	<ul style="list-style-type: none"> • Long and complex consultations • Election cycles influence decisions. • DM must follow Cabinet priorities
Value from IT Investments	<ul style="list-style-type: none"> • Use IT for efficiency and growth. • Innovate as often as possible. • Justify IT investments based on value 	<ul style="list-style-type: none"> • Use IT to implement and support programs. • Innovation at beginning of program. • IT investment dictated by policy priorities
Flexibility in IT Procurement	<ul style="list-style-type: none"> • Short-term competitive IT contracts • Vendor accountability and switching • Cloud services and integration are key 	<ul style="list-style-type: none"> • Long-term licensing and outsourcing • Vendor autonomy in IT service delivery • Law remains a challenge for cloud services
Project Management	<ul style="list-style-type: none"> • Strategic projects have mini-CEOs. • PM certification and capabilities 	<ul style="list-style-type: none"> • Close control of strategic projects • PM profession and capability emerging

	<ul style="list-style-type: none"> • PMO with special integrated systems 	<ul style="list-style-type: none"> • PMO uses mostly accounting systems
Budgeting Cycles	<ul style="list-style-type: none"> • Budgets are adjusted quarterly. • IT is protected, linked to profitability. • Performance control based on ROI 	<ul style="list-style-type: none"> • Annual budgets, difficulty to increase funds. • Policy priorities get most funds, IT second • Control based on budget conformity
Financial Stability	<ul style="list-style-type: none"> • Projects that deliver value are priority. • Funding follows business growth. • Innovate with revenue opportunities 	<ul style="list-style-type: none"> • Programs can get cut without notice. • Funding follows Cabinet priorities. • Innovate rarely and only when new IT is necessary
Access to Best Expertise	<ul style="list-style-type: none"> • Salaries based on knowledge value. • Staff changes based on performance. • Protect internal strategic IT capabilities 	<ul style="list-style-type: none"> • Union salaries are fixed and uncompetitive. • Staffing based on long term temp agencies. • Consultants provide strategic IT expertise

IT-enabled public sector transformation projects present distinctive challenges that CIOs in profit-seeking businesses do not share (Patanakul, 2014). For example, the lack of a uniform Project Management (PM) framework has been a key impediment to innovative initiatives, such as e-government projects using the web to develop innovative public services (Sarantis et al., 2011). Most projects also suffer due to the procurement processes, mainly the constraints related to the latest technologies, causing successive waves of uneven development (Gil-Garcia et al., 2014). This often leads to dysfunctional Enterprise Architecture (EA) models, where technology misalignment prevents from fully leveraging IT solutions (McNabb & Barnowe, 2009).

Probably one of the most damaging aspects of the public sector is when political manoeuvring leads to unsuccessful projects continuing, despite warning calls by public accounts auditors (Sandeep & Ravishankar, 2014). In this context, the accountability is practically ineffective when CIOs do not have the authority to manage across agencies and stakeholders' realms (Hansen & Kræmmergaard, 2013), despite the trend of using cross-functional teams in the public sector that may progressively improve this situation (Piercy et al., 2013).

For CIOs, lean and agile initiatives require more developed and stable governance, along with project management frameworks to ensure success, as opposed to the proliferation of trials and errors in shared decision making at various levels (Radnor & Osborne, 2013). Adoption of agility is directly supported by "Top management support...the continual active and enthusiastic approval of senior executives for a proposed innovation." (F. K. Y. Chan & Thong, 2009).

2.3 Evolving CIO Competency Profile

2.3.1 Complexity of CIO's Roles and Responsibilities

Since the CIO role varies greatly in level and scope, there are some difficulties in developing coherent competency frameworks that are general (Gouveia & Varajão, 2019). It is often the case that CIOs are entering an organization without a well-defined role, making it both a challenge and an opportunity, which will be leveraged according to leadership abilities of the new CIO (Golding & Facey-Shaw, 2019).

While many more modern models exist, Mintzberg's managerial roles is a model applicable to describing the CIO position, and the competency profile (Carter et al., 2011).

Reproduced in Table 4, this typology (informational, decisional, and interpersonal roles) offers a framework to account for the collaboration, communication, exchange of information, impact, as a framework for IT management.

Table 4: Managerial Roles as per Mintzberg's model

ROLE	DESCRIPTION	ACTIVITIES
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Interpersonal		
Figurehead	Symbolic head; obliged to perform several routine duties of a legal or social nature.	Ceremony, status request, solicitation
Leader	Responsible for the motivation and activation of subordinates; responsible for staffing, training, and associated duties	Virtually all managerial activities involving subordinates
Liaison	Maintains self-developed network of outside contacts and informers who provide favours and information.	Acknowledgment of mail; external board work; other activities involving outsiders
Informational		
Monitor	Seeks and receives wide variety of special information (much of it current) to develop thorough understanding of organization and environment; emerge as nerve centre of internal and external information of the organization.	Handle all mail and contacts categorized as concerned primarily with receiving information (e.g., periodical news, observational tours)
Disseminator	Transmits information received from outsiders or from other subordinates to members of the organization; some information factual, some involving interpretation and integration of diverse value positions of organizational influencers	Forwarding mail into organization for informational purpose, verbal contacts involving information flow to subordinates (e.g., review sessions, instant communication flows)
Spokesman	Transmits information to outside on organization's plans, policies, actions,	Board meetings, handling mail and contacts involving

	results, etc.; serves as expert on organization's industry	transmission of information to outsiders
Decisional		
Entrepreneur	Searches organization and its environment for opportunities and initiate "improvement projects" to bring about change, supervise design of certain projects as well	Strategy and review involving initiation or design of improvement projects
Disturbance Handler	Responsible for corrective action when organization faces important, unexpected disturbances	Strategy and review sessions involving disturbances and crises
Resource Allocator	Responsible for the allocation of organization resources of all kinds – in effect the making or approval of all significant organizational decisions	Scheduling, requests for authorization; any activity involving budgeting and the programming of subordinates' work
Negotiator	Responsible for representing the organization at major negotiations	Negotiation

Source: (Mintzberg, 1973)

In table 5, we use Mintzberg's typology to help classify CIO roles as referenced in the reviewed academic literature. This exercise has led to identify core competencies that can help shape IT governance.

Table 5: CIO Roles as per Mintzberg's Classification

Authors	Interpersonal	Informational	Decisional	New CIO Competencies
	<ul style="list-style-type: none"> • Figurehead • Leader 	<ul style="list-style-type: none"> • Monitor • Disseminator 	<ul style="list-style-type: none"> • Entrepreneur 	

	<ul style="list-style-type: none"> • Liaison 	<ul style="list-style-type: none"> • Spokesperson 	<ul style="list-style-type: none"> • Disturbance handler • Resource allocator • Negotiator 	
(Gefen, Ragowsky, Licker, & Stern, 2011)	Business Partner, Business Integrator		Establish Priorities, develop Processes, Early Adaptor	Executive, Strategic
(Chun & Mooney, 2009)	Business Strategist, Innovator, executive leader			
(Carter et al., 2011)	Innovator, Integrator, Business Process	Information, Disseminator, Communicator	Promoting strategic applications	
(Dlamini, 2013)	Strategic mind, Institutional strategist	IT Knowledge, IT savvy		Strategy role, business Savvy
(Al-Taie, Lane, & Cater-Steel, 2014)	Executive		Leader	
(Mellott, Thatcher,	Business Process			Project Manageme

Roberts, & Carter, 2012)				nt, Integrator
(Coertze & Von Solms, 2014)	Senior official, align IT /business s, business oriented.		Resource allocator	Strategic, Integrator
(Smaltz, Sambamurthy, & Agarwal, 2006)	Integrator	IT Knowledge, IT savvy		Business Savvy, Subject Matter Expert
(Hunter, 2010)	Strategic, A Liaison	IT Knowledge		

CIO competencies are aligned to the active role played in IT projects, where governance is essential to ensure strategy deployment (Saddiqa et al., 2023). They recognize a more active in the portfolio business transformation projects and as a business strategist and process innovator role (Chun & Mooney, 2009). Over the past few decades, the role has extended, from managing technologies that support business processes, to innovator, and integrator role (Carter et al., 2011). The CIO's competencies are aligned with its role, as "the most senior official of the organisation, that is responsible for aligning IT and business strategies, and is accountable for planning, resourcing, and managing the delivery of the IT services and solutions to support business objectives" (Coertze & Von Solms, 2014).

In the roles of an Integrator, CIO's competencies, are "being technology-centered toward being a bridge between the strategy needs of the organization and the technology"

(Hunter, 2010), and the classical management-technology savvy role, has been transformed into a Business Integrator business builder (Gefen et al., 2011).

CIO becomes an early adapter of innovation and change, “CIO being part of an early majority in the Diffusion of Innovation terminology who is open to new ideas, but only when they are already proven and the risks known” (Gefen et al., 2011). The expected CIO competencies have evolved through successive changes in IT, and the potential business capabilities that they enable. CIO role incorporates more and more the strategic aspect: “Current research reflects these changes, reporting a shift in the role of the CIO toward more involvement in strategic business decisions, and more acceptance in that position by the other C-suite managers” (Al-Taie et al., 2014). The role of the CIO has become strategic, omnipresent in the ROI exercises, and CIO is desired in the strategic environment, where the Risk management competency is exercised for each of the strategic projects of the organization (Al-Taie et al., 2014).

More often the business aspects of the organization are interested to “bounce off “ideas with CIO (Esdar et al., 2019). A new series of competency of CIO is introduced, the Subject Matter Expert (SME) aligned with the Project Integrator and the existing competencies of strategic and project alignment. This alignment happens through an interplay between project, programme, and portfolio levels (Valverde-Alulema & Llorens-Largo, 2021).

The CIO role includes the business planning, IT savvy competencies, build upon the existing roles as an engager, and a communicator, a change agent. The leading project competency is incorporated also: “CIOs are expected to provide leadership and direction in seeking integration opportunities, monitor how effectively their organization is leveraging IT for business process integration, and allocate resources toward critical projects” (Smaltz et al., 2006).

CIO need to be political savvy, and “... be able to recognize when conditions are ripe for effective change management and when projects are at risk due to the organizational unwillingness to commit to change” (Smaltz et al., 2006).

CIO educates their business peers about the value and risks of promising IT projects and investments “CIOs with a high degree of strategic IT knowledge will be perceived by their TMTs (i.e., Top Management Team) as being more effective because they can provide the right guidance about investing in information technologies and managing complex integration projects (Al-Taie et al., 2014). CIO skills and competencies are to be aligned with “plan, execute, and control IT projects that support business opportunities.” (Mellott et al., 2012). Despite the increased business-like profile expectations on a CIO, IT management competencies remain crucial skills, along management and leadership skills (Y.-C. Chen & Wu, 2011).

The role of the CIO has changed, has developed, it grew, and has emerged, and CIO support the business, IT, strategic, and portfolio management aspects along with their alignment (Toor, 2017). Back in the 1960-1970, the management competencies of the CIO role were fully operational and technical; the IT savvy aspect of the CIO is also well supported by the classical managerial competencies. By 1980, the two main areas of CIO competencies have been well separated: the operations competencies, aligned to repetitive, mechanical flow of tasks within a rigid environment; and the dynamic, developmental, sometime fast speed aspect of the CIO role, where competencies are aligned to an open, adaptive, and organic environment. In this environment, competencies in communication, service orientation, human resources, will add up to the already existing management competencies of the classical CIO role (Chun & Mooney, 2009). In the 1990's, the CIO role of IT manager evolved into a rather business oriented manager, with technical and business value-driven competencies, strategic technology project, portfolio planning and control competencies. IT architecture management, IT standards and development competencies are additions to the “revamped” role. By the turn of the new decade, especially since the COVID pandemic, CIOs have taken a more operational approach with more focus on cybersecurity (Karanja, 2017) and skills gap management (Nenkov et al., 2017).

The direct reporting to CEO or the Deputy Minister also changes the required competencies, where the new CIO is playing a rather active role at the strategic table (Toor, 2017). The strategic and transformational competencies of the new role emerge

and become predominant, with increasing structural power as it has been the case in private sector contexts (Shao et al., 2016). There is strong evidence of the development of additional competencies, aligned to the new CIO strategic, and transformation role, such as: wealth of knowledge (Salunke et al., 2011), performance (Carter et al., 2011), influencing executive peers to design and to implement strategic initiatives (Chun & Mooney, 2009). Additional competencies are built on the existing foundation of managerial competencies, of this role. Table 6 presents the competencies of CIO' predominant roles, as identified in the academic literature reviewed.(Richardson et al., 2018). As well, CIO performance evaluation is a challenging concept to assess, given the diversity of the role structural position, along with organizational cultures (E Costa et al., 2017).. Finally, a longitudinal study of CIO careers would have been ideal, however the sample was opportunistic and career monitoring was not possible in our research context (Amaral e Costa et al., 2017).

Table 6: CIO Competencies as per the Predominant Roles

Technology	Business	Strategic	Integrator
IT savvy	Establish Priorities	Strategic thinking	Project, Portfolio management knowledge (i.e., plan, execute, control)
Knowledge of technology	Business knowledge Develop business processes	Strategic analysis	Change management
Knowledge of systems	Build and maintain business partnership	Leadership	Strategic and project alignment

Knowledge of information technology	Project Portfolio management, planning knowledge	Business strategy	Business savvy
	Manage change	Business knowledge	Innovator
	Transform	Planner	Business integrator
	Innovate	Technology knowledge	Early adapter
	Integrate		Innovation
			SME subject matter expert

2.3.2 CIO Project Management Competencies

Managing IT project portfolio is considered a dynamic capability; it helps the organization adapt to the changing and complex conditions in its environment (Onibere et al., 2017). It is the role of the CIO to master the `competencies on sensing, seizing, and transformation of this dynamic capability, as a reflection of an IT management style, aligned with a changing environment. The identification, the evaluation of risk exposure, performance, and the management of specific risks, are need-to-have competencies, as priory in the IT projects. It is CIO role to disperse and remove the risk sources (Banjanin & Strahonja, 2018).

Managing an IT portfolio require CIO role to be fully equipped with knowledge, skills, capabilities, and competencies that support the risk complexity in IT projects. In this context, the key competencies include managing unknown risks by exploiting optional capabilities or flexibility reserves (Drnevich & Croson, 2013). This requires a clear understanding of the many interactions between projects, between business and technology requirements, and between the former and the organization's evolving and emerging strategies (Arvidsson et al., 2014). CIO is faced with the interdependencies of these contextual factors, and the uncertainties in management of unknown risks.

Enterprise architecture may serve to integrate IT project portfolio and risk management functions, while maintaining proper alignment between the many factors involved (Salunke et al., 2011). Table 7 presents the competencies of CIO in terms of the key management functions for strategic projects. The Dynamic Capabilities theoretical framework provides indications of the micro-foundations of CIO competencies in strategic project leadership (Huang et al., 2023)(M. T. Eom et al., 2020).

Table 7: Strategic Project Management and CIO Competencies

Strategic Project Management	Strategic Priority	CIO Competencies
Portfolio Management	Help the organization adapt to changing and complex conditions	<ul style="list-style-type: none"> • Sensing, • Seizing • Strategic Transformation
Risk Management	Diversify and prevent too many risks from a similar and less manageable category	<ul style="list-style-type: none"> • Business savvy • PM savvy • Transformation Management • IT knowledge
Complexity Management	Understand complex interactions between projects and the organization's evolving and emerging strategies	<ul style="list-style-type: none"> • Adaptable • Flexible • Business savvy • Open • Change management • IT savvy • PM savvy • Strategic Management • Liaison • Engager
Uncertainty Management	Manage unknown risks by exploiting optional capabilities or flexibility reserves	<ul style="list-style-type: none"> • Strategic • Visionary • Innovative • Business savvy • PM savvy

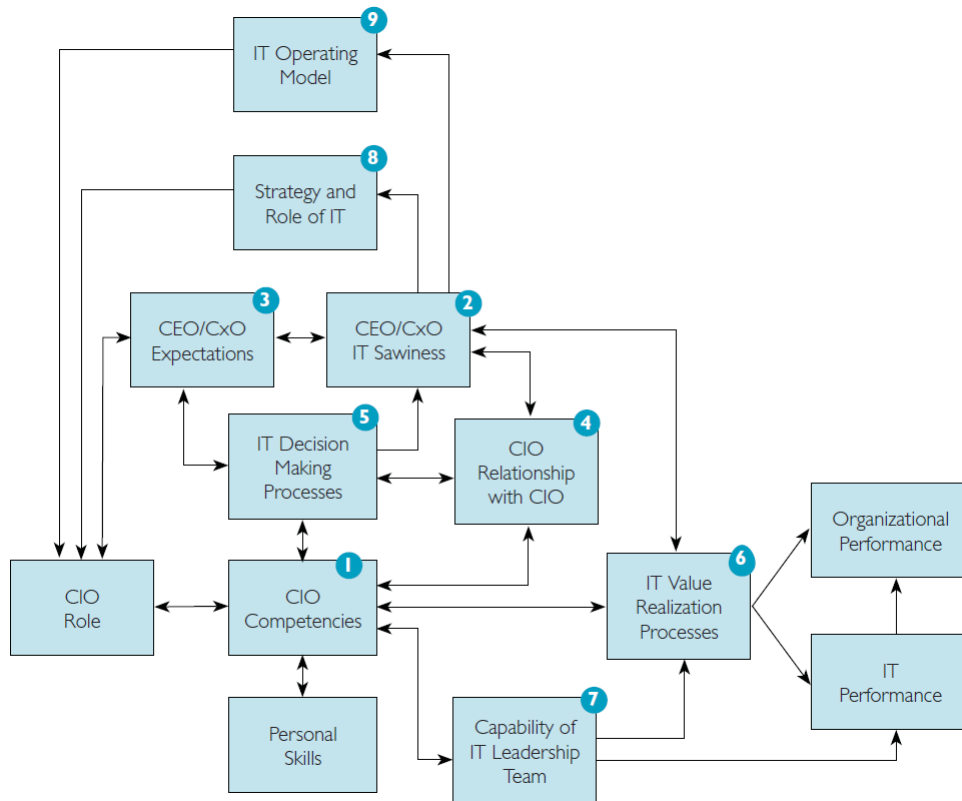
Enterprise Architecture	Integrate IT project portfolio and risk management functions	<ul style="list-style-type: none"> • IT savvy • Management • PM savvy • Business savvy • Innovative • Strategic

2.3.3 CIO Relations with Other Chief Executives (CXO)

The impact of IT on organizational performance (e.g., efficiency, effectiveness, stability, transparency, etc.) will be determined by the ability of the CIO Branch to translate the business requirements in IT solutions and help public servants at all levels innovate and create value using information and technology assets (Kristensen & Andersen, 2023). In most large public agencies, the CIO is typically part of the Top Management Team (TMT). Governance processes, involving both business and technology expertise, require CIOs to develop effective relationships with the Deputy Minister or the agency deputy head, as well as with other Chief Executives or CXOs.

As shown in Figure 1: CIO Roles and Organization Performance, like IT governance in the private sector, CIO and TMT relationships are part of a broader set of issues surrounding the strategic role of IT within government (Peppard, 2010).

Figure 1: CIO Roles and Organization Performance



Source: (Peppard, 2010)

CIO-TMT relationships are key to business-technology alignment, as presented in Table 8, (Coertze & Von Solms, 2014).

The CIO’s actions are part of a web of decision-making events, shaping the coevolution of strategy, business, technology, and projects (D. Q. Chen et al., 2010). The CIO will typically take several key roles, support TMT decision-making and CXO understanding and strategic guidance, adapted to the context of different organizations (Al-Taie et al., 2014).

CIO must excel at translating technology and business knowledge, forging effective internal and external partnerships, and leading governance and decision processes.

Table 8: CIO Influence in CXO Relations as per the Predominant Roles

	CIO PREDOMINANT ROLE
--	----------------------

Authors				
	Business	Strategic	Technology	Integrator
Teubner, 2013		Technical leadership	Technical knowledge	Build Relationship and linkages
	Building and sharing business knowledge	Building and sharing technical knowledge	Sharing technical knowledge	Build social capital. (Structural, cognitive, and relational)
Riempp & Gieffers- Ankel, 2007	Enterprise process	Stakeholder engagement Embedding strategic role within CXO peers		
	Mediator Communicator		Technology and IT strategic educator	Knowledge sharing
Enns & McDonagh, 2012	Business strategist	Leadership skills Alignment of IT Strategy and Business Strategy	IT savvy	Communicator Engager Liaison
	Alignment of roles, alignment of actions Communicator		Technology knowledge sharing	Engager Business knowledge sharing
Maniak & Midler, 2014	Alignment enabler (Business-IT) (Strategy-projects)	IT governance (strategic alignment, risk, management, resource management, and value delivery) – awareness and knowledge sharing. IT knowledge sharing		

	Business knowledge and sharing	IT governance standards-awareness	Knowledge of IT and IT strategy	Integrate IT knowledge and IT strategies among CXO peers
Newbold & Azua, 2007		PM knowledge and PMO strategic role-awareness and knowledge sharing		

2.4 Understanding the CDO Role in Digital Transformation

2.4.1 Emerging Evidence on CDO Strategic Role

The recent IT and PM literature has emphasized the distinctiveness of CDOs relative to other TMT members. About the CDO role, after more than 15 years in existence, “Practitioners stress CDOs’ critical role in recrafting digital strategies and accelerating digital transformation, while others predict their disappearance.” CDO’s are initiating, conducting, and accelerating digital transformation, or coordinators of digital initiatives; do interact cross-functionally across business units; they are change facilitators related to digital transformation; are the digital strategist in the organization vis-à-vis the IT support and strategy development role of the CIO.(Kessel & Graf-Vlachy, 2022).

Interestingly, a recent text analytics of IT executive job postings showed that expectations toward CDOs presents a unique blend of business and technology expertise. CDO, a cross organizational leadership role, a digital leader, supporting organizations to implement digital transformation. “CDOs are expected to be digital ‘triathletes’ as they simultaneously embody a versatile blend of technical, business and soft skills.” (Culasso et al., 2023).

Another study of IT executive titles and roles among S&P1500 index companies showed that the role did not appear until 2003, and has increased notably since 20 The role notably is intended to move the organizations through their digital adoption and adopt digital

initiatives, with the specifics of the role for the intended needs of their organizations. (Kunisch et al., 2022).

The term CDO did not emerge until about 2014 in academic literature. With an increase presence of the role in public and private sector, across various industries, with a role specific to individual organizations, CDO's tasks and responsibilities differ from one organization to another besides the digital transformation in its various stages- from its development to its implementation, and organization's adoption. CDO role, is a distinct role, a functional executive role in an organization and represent a major structural change with impact at all levels across all business units. (Raković et al., 2022).

The increasing strategic importance of a "digital project portfolio director" was recognized early on as a factor warranting the need for a more formal executive title as CDO. "The concept of a digital director is gaining in importance as organizations begin to recognize the full impact of a robust, dynamic flow of data, knowledge and information across business interests and through social activity streams." (Dumeresque, 2014).

In the private sector, CDO roles are more valued when they are merged with the CIO role. The CDO positions are frequently present in private companies with direct impact on their business and strategic management.

The announcement of naming a CDO role is associated with an increase of the value of the organization's stocks, and the parallel existence of both CIO and CDO sends negative signals to investors "because the relationship of both managers might be prone to power struggles and jurisdictional issues".. (Drechsler et al., 2019)

2.4.2 Organizational Structure and Governance Roles

Governance of digital projects is also expected as one of CDOs most important contributions (HosseiniNasab et al., 2021)

Among various models of IT governance, when CDOs and CIOs coexist, or are a unique role, they have been shown to cover most of COBIT5 capability areas (Ctarino et al., 2018). "An initial conceptualization of the CDO's position suggests that its primary responsibilities are the strategic and communication aspects of DT, and, if the CDO and

CIO positions coexist, the CDO should closely collaborate with the CIO. The CIO, in turn, deals with the technical aspects of DT.” (Ctarino et al., 2018)

Overall CDOs play a closer role with TMT than prior IT executive roles (Christofi, 2024)

Because of their primary responsibility for innovation and creativity, CDOs are often viewed as institutional entrepreneurs (Tumbas et al., 2018).

They are also expected to develop organizational capabilities for digital innovation, data analytics, and customer engagement as primary drivers of digital transformation (Tumbas et al., 2017)

2.4.3 Digital Vision and Leadership Roles

Dynamic Capabilities theory helps understand emergence of CDOs as mediator for organizational creativity” The significant DCs are substantive and adaptive capabilities, which are offering new solutions, seizing new opportunities, and coping with changes”. (Scuotto et al., 2022)

Leadership competencies are highly expected from CDOs (Davison et al., 2023)

Creating a culture of digital transformation is one of the primary goals of a CDO (Horlacher & Hess, 2016)

The culture must be shaped from within the organization to respond adequately to the strategic environment (Schachtner, 2023)

Forging a vision of digital transformation, or the “to-be” state of the organization, is one of the primary challenges of CDOs, where they must focus on digital adoption as well (Kossowski et al., 2020)

The challenges of an IT vision will be dependent on the relative weight of IT knowledge required in digital transformation (Danilova et al., 2022)

2.4.4 Distinctive Competencies in Response to Business Environment

A recent study of 913 EU and US firms showed that CDOs emerge in organizations with higher transformation urgency and coordination needs (Firk et al., 2021)

Yet a recent survey confirmed that successful CDOs are more evolutionary than revolutionary, with a more balanced approach to digital transformation (Berman et al., 2020)

The CDO role must be both a vertical and horizontal coordination role, but its configuration depends on digital transformation strategy (Singh et al., 2020)

Due to their leadership and coordination roles, CDOs are expected to have a broader range of competencies (Singh & Hess, 2017)

As they attempt greater integration of business and technology functions, CDOs can have a determinant impact on how IT departments are structured and run (Engesmo & Panteli, 2019)

2.5 Toward a Unified CIO-CDO or CDIO Role

2.5.1 Translating Technology and Business Knowledge

The personal and professional qualities, the abilities, and knowledge competencies define the “CIO”, as the “hero of the day”, intrinsically connected in the organization. The “right fit” for the job is a need in the recruitment and staffing process for this role. The candidate not only requires acumen of technology, also the ability to understand, practice and demonstrate the fit, the linkages within the organization, and with the executive peers. A technical leader is what a CIO is today, part of a web, in a complex context that has the potential to bring new competitive advantages to the organization.

A new model of leader is defined with the current role of the CIO. New competencies, leadership, visionary, strategic thinker, diplomacy, deliverer, and reading the market, are now attached to the current zipped package of competencies of the role.

The competency as a communicator of the CIO is called for translating the IT vocabulary, the IT terminology, to the board colleagues, engaging them all in the alignment process between the business and the IT, for the benefit of the organization: the “lack of clarity or involvement from the board or because of IT’s inability to interpret and translate what the board wants in business terms into applicable actions for the IT functions; more

specifically is it as a result of the board's lack of closeness to IT or IT not being closely involved with the business" (Keil & Montealegre, 2000).

2.5.2 Forging Effective Internal and External Partnerships

As any other functional strategy, the one in IT is dependent on dynamic and insightful working relationships between CIOs and CXOs (Riempff & Gieffers-Ankel, 2007). The social capital and the impact of the CIO relationship with CXOs has been a topic for research, with the focus on the dynamic of this relationship and the impact on the strategy of the organization. The impact on the relationship among CIO and CXO, and the social capital with its dimensions, the capital — structural, cognitive, and relational social capital, has been demonstrated to foster the knowledge exchange.

Among other CXO relationships, CIO position is one interacting with several internal and external clients and partners (Enns & McDonagh, 2012). The continue changing role of the CIO and its dynamic transformation, bring responsibilities on revenue generation, service delivery, service. and client oriented and delivering shared services, the enterprise building, development, or enhancement of business processes, along with the business operations aspects.

We are witnessing the process of digitalization of business and of the economy. In this complex environment, a classification of the roles and responsibilities of the CIO's in private and public environment, brought the following categories as unique and individualized: IT Service CIO (i.e. provide IT services for a digitalized business), External Customer CIOs, (sell/buy IT product and services, and develop the company's relationships with its customers), Embedded CIOs (part of the executive group, conducting strategic exercises), and the Enterprise Process CIOs (operating key enterprise It and business processes).

The aggressiveness, analysis, external and internal defensiveness, futurity, innovativeness, pro-reactiveness, and riskiness are included into the typology. These "strategies" designate a business/strategic/technological/project approach of the organization's IT vision. CIO's and the CEO's have a different perspective of the usage

and benefit to the organization, for these strategies. Despite differences of opinion at the individualized level, both CIO's and CEO's sustain and support the understanding, and evaluation of the strategies, and agree on the benefit of the IT strategy within an organization. However, they disagree on the strategy to be used for achieving the set of IT vision for the organization. The agreement among these two executives, and the mutual understanding of the strategies engaged, are key factor of success in the full endorsement of the strategy chosen.

2.5.3 Leading Governance and Decision Processes

Overall, CIO-CXO relation will be determined by the CIO's leadership skills (Newbold & Azua, 2007). The strategic leadership of CIO continue to be an element for analysis due to the impact on the organizational benefits. The IT strategic leadership incorporates the strategic IT leader and the business strategist IT leader, considering the business-technology-strategy alignment of the CIO role. The question posed is whether and how the IT influences the organizational benefits. The IT vision has an impact on the relationship between strategic leadership and the IT quality. The research conducted (Markham et al., 2010), reveals that CIO has two paths for each of the leadership aspects: an IT oriented business, in which case the leadership is exercised and impacted by the quality of IT, and various aspects (human, financial, investment). The other aspects of the CIO role include its strategic, business-oriented roles, in which case, CIO is involved in the organizational, strategic, planning, and decision- making processes, and where the IT directly impact the organization. The two path of CIO leadership are to be considered further.

Multi-level project governance involves synchronizing CIO and CXO actions to ensure proper alignment across all the organizational success factors (Markham et al., 2010). The project delivery is affected by the project governance. There is limited demonstration of the application of governance theories in project governance. Project objectives and organization strategy are supported by the project governance; designed ways of applying governance, as a separate function part of the project-based organization, are applicable at any level. The various governance levels where CIO and CXO' actions,

priorities, and objectives are aligned, and engaged on, provide the necessary project governance for alignment, and ensure success. Governance theories, agent theory, transaction cost economics, stakeholders and shareholders theories, stewardship theory and resource dependency, are used to demonstrate the correlation between the project owner and the project manager, the cost benefit, the trust, the authority, and the executive power to acquire the necessary sources for the project completion.

The top management team must remain aware of IT governance and the strategic impact of these projects (Ali et al., 2013). IT governance standards can help clarify and strengthen CIO-CXO relations around more effective IT decisions (Watts & Henderson, 2006). Clear definition and design of the IT governance and its standards, conducted in a continuous cycle within the “C” group, supports the engagement, commitment, and support of the CXO peers to the CIO and the IT strategy. The importance of understanding the IT governance within the organizations has been researched, and governance knowledge, IT strategic knowledge, business-IT alignment areas have been explored. Applicability of mature IT governance practices increase the maturity of business-IT alignment (De Haes et al., 2013).

The Project Management Office (PMO) serves as a vehicle for greater IT governance effectiveness (Kissi et al., 2012). The role of PMO in the life cycle of an IT/IS project explore aspects related to the type of PMO, the stage in the project life cycle when the PMO has been created and got involved in the life of the project, the IS/IT project success, the awareness of the organization, and the CIO’s role on the value of the project. PMO is involved in the implementation of IS, IM, IT projects, however, the role that PMO has on the project success, and the senior management level of satisfaction is to be further researched.

2.6 CIOs at the Nexus of Alignment Dyads

2.6.1 Alignment Dyads

Public sector organizations, much like profit-seeking businesses, must continuously evolve and anticipate change (Rose & Cray, 2010). The information management and IT

solutions supporting public servants must change at the same pace with the operational or, the service requirements.

This is the process of Business-Technology alignment, or the proper development and coevolution of an organization, along with the information and technology assets (Luftman, 2015).

On the other hand, IT solutions are primarily developed, implemented, maintained, and leveraged through projects. While short and small projects tend to be easy to control, it is typically the case that longer and larger projects will involve a significant risk of deviation from organization's strategy or policy. As such, they require a constant process of Strategy-Project alignment, or a set of project control mechanism ensuring that IT delivers the value expected from initial investments (Srivannaboon, 2006).

The CIO is at the center of these two alignment dyads, with roles and competencies that go well beyond traditional IT management, and toward BTM functions. Table 9 offers a literature review, showing certain disconnect between these two dyads, despite great similarity of required CIO competencies. These two alignment processes provide an integrated framework for CIO's role in strategic innovation projects.

2.6.2 Alignment between Business and Technology

The strategic performance of an organization depends on business units adequately supported by IT solutions, synchronized to meet their present and evolving information processing requirements (Ullah & Lai, 2013). The synchronization, used in the definition of alignment, is the key to this process:

“The process of alignment is defined as the mutual synchronization of business goals and IT services” (Ullah & Lai, 2013). IT provides services to all business areas of an organization, and mutually collaborates for their own goal and objective achievement. Easy to say hard to do as it implies a stage, coordinated approach, given the interconnectivity and the interrelation among these two areas with common, mutual interests. The IT involvement in the development of the organization's strategy may well

support the present and the future IT needs of the business units of an organization. A review of this nature will also support and fortify the relationship among these two groups. In this context there is also a wide recognition of the value of “having IT management more business savvy” (Gefen et al., 2011).

As in other alignment processes, communication and shared knowledge are key in ensuring timely adjustments in portfolio of IT applications (Charoensuk et al., 2014).

The communication is key; a constant, well engaged, good quality communication, supports the business and the IT areas, and sustains the constant need for information. Formal or informal, via various vehicles, multiple channels, via modern or more classic methods, the communication is a constant process of the groups.

Communication gaps must be avoided and addressed, to remove unavoidable consequences related to the lack of information.

Shared knowledge falls under the duties of parties involved in any aspect of the alignment.

Table 9: CIO Competencies as per Alignment Dyads

Alignment	CIO Competencies	1	2	3	4	5	6	7	8	9	10	11	12
Business-Technology	IT savvy	√	√	√									
	PM savvy	√	√	√									
	Business savvy	√	√	√	√		√	√					
	Synchronization	√	√										
	Communication	√	√	√	√	√							
	Liaison			√	√	√							

	Strategy	√	√	√	√			√	√	√			
	Leadership		√				√						
	Governance					√							
	Dynamic Capabilities								√				
Strategy-Project	PM savvy										√	√	
	Management											√	√
	Strategy											√	√
	Leadership												√
	Innovation												√
	Dynamic Capabilities								√		√		

Table 9 continued:

Authors in columns 1 to 12:

1. (Ullah & Lai, 2013)	7. (Gefen et al., 2011)
2. (Al-Taie et al., 2014)	8. (Schwarz et al., 2010)
3. (Charoensuk et al., 2014)	9. (Smaltz et al., 2006)
4. (H.-T. Wagner et al., 2014)	10.(Killen et al., 2012)
5. (Luftman & Kempaiah, 2007)	11.(Mullaly & Thomas, 2009)
6. (Salunke et al., 2011)	12. (Weiss & Thorogood, 2011)

Personnel from both business and technology backgrounds must develop dynamic social networks to share strategic knowledge helping to guide IT portfolio decisions toward timely alignment (C. Wagner, 2004). There is a need for an educational foundation on alignment among the parties involved, and the tools that promote, and support the implementation of this key process in an organization. The social capital theory and the business knowledge support the operational alignment aspect of an organization considered the heritage of the social capital of an organization: trust, knowledge, knowledge sharing that complement the communication.

There are noted issues related to business and IT alignment as they relate to the social capital perceived as a competence: IT executives may not always be privy to corporate strategy, and at the same time, business leaders are not always knowledgeable about IT, about key business, and the drivers of the industry.

From a dynamic capability perspective, this implies that business-technology alignment involves a constant planning ahead of the likely impact of IT on processes, attempting to extract strategic business value from further steps beyond implementation and adoption of IT (Schwarz et al., 2010). The Dynamics Capabilities Theory and the IT-Business Alignment have been accessed for research in alignment, to understand the strategic and operational success of an organization when impacted by the IT-enabled business processes and IT-business alignment.

The organization must grow through a series of stages toward greater maturity in practicing alignment, where requirements analysis, value analysis, communication, partnership, architecture, and governance are key dimensions (Luftman & Kempaiah, 2007). The alignment between IT and business, continues to be as a "...pervasive problem. Is it as difficult as drawing a line in the sand." (Luftman & Kempaiah, 2007). There is no "silver bullet" in addressing the business-IT alignment, and the interaction and interrelation among business and IT must consider: communications, value, governance, partnership, scope architecture, among other attributes.

A maturity model, built around these key aspects, measure the value and impact on alignment of each of the identified aspects. Alignment of business and IT has been also impacted by (1) the IT organizational structure, (2) the CIO reporting structure, and the

(3) organization 'performances. Research conducted while considering all these factors, demonstrate that a higher alignment maturity is achieved in public sector, and it is correlated to higher performances. Also, the CIO, reporting directly to a CEO (or equivalent) reaches higher level of alignments than any other CIO reporting to a business line senior executive.

A weak alignment between IT and the firm's strategy can lead to a reduction in the business value of IT, a decrease in the effectiveness of the CIOs, and a potential corruption of the relationship between the CIOs and the Chief Executive Officers (CEOs). The misalignment of the current CIO roles with the IT vision of an organisation, could threaten the survival of the CIO position in an organisation" (Al-Taie et al., 2014).

2.6.3 Alignment between Strategy and Project

Alignment between all an organization's strategies and projects derives directly from portfolio management as a dynamic capability (Killen et al., 2012). Alignment in this context may be interpreted as a dynamic fit between an organization's goals and project-based strategy deployment (Mullaly & Thomas, 2009).

The strategic management theories of Dynamic Capabilities (DC), Resource Based View (BRV), and the Absorptive Capacity (AC), are relevant to explain alignment challenges. Absorptive capacity in project management research is linked to acquiring external knowledge, assimilating, and applying it, and manage change. The existence of a "fit" between organization design and the environment, between the subsystem of an organization and its environment, is where AC has a key impact.

The concept has been translated in project management area, where PM implementation must be aligned, or fitted, with the strategic goal of the organization and its environment. The role and influence of "fit" has brought value to the project management area. The strategic management theories apply to the project and portfolio management areas, and the application of the management theories, the RBV, DC and AC to the project and portfolio management research provide value and applicability to strategic management area. Strategy-project alignment will intersect with the alignment process between

business unit requirements and their supporting information technologies (Weiss & Thorogood, 2011). An IT strategy framework will incorporate the technical resources, the business enabling aspects of the organization and the strategic IT, perceived as a “weapon” in an evolutionary analysis of internal / external IT –business integration /engagement Cartesian model. The analysis of the model and the review of the outcomes of the implementation of strategic IT / business projects brings more insight on the perspective of IT as a strategic “weapon”. Alignment of IT, when IT is the “strategic weapon”, involves behavioral, technical, and strategic competencies for business and technology executives, and for project managers.

2.7 Next Generation CIOs as Innovation Champion

2.7.1 CIO Influence in the Fuzzy Front-End of Strategic Projects

Strategic organizational innovation is typically emergent and require a lengthy front-end, or “avant-projet”, where risk and uncertainty management are key challenges (Williams & Samset, 2010). The studies of the fuzzy front-end stage in the development and success of a project are a topic of interest, and writings have been made on several of its aspects.

Defined as the stage of a project prior to the approval of the project, the fuzzy front-end involves parties interested in the concept of a project, that will actively participate further in the approval and the implementation of the project. The knowledge of the decision-makers on projects, their evolution, is a need in the pre-planning stage of the project, and poses some challenges, that sometime the organizations can’t overcome.

The business and the strategic role of the CIO, along with the Innovator role, will require CIO presence to the fuzzy front-end of projects, where extending pre-planning focus is needed. As a driver for change and innovation, CIO is caring not only the professional knowledge on the innovative aspect of the project, but also on the potential consequences that it may have on the organization. As innovation is enabled in organization, and strategic discussions include innovation, CIO and the stakeholders involved at that stage of the project, should allocate an extensive, prolonged fuzzy-front end stage in

preparation for the full conceptualization and approval of the project. In the fuzzy front-end phases, the coevolution of IT strategies and projects will depend greatly on the CIO leadership (Teubner, 2013).

The need for an extended fuzzy front-end stage requires commitment, collaboration, of all the ones involved. The relationship among the parties involved at this stage of the concept of the project, is the key dominant factor that dictate the outcomes of the project, and the impact/value for the organization. The innovative aspect of the projects brings CIO as a subject matter expert, and as a business, strategic and innovator, that engages and share expertise and knowledge by exercising leadership skills in this uncertain stage of the project.

Organizational innovation must be supported by the enterprise architecture framework, which guides IT application and project portfolio decisions (Riempp & Gieffers-Ankel, 2007). A CIO will generally have direct influence on guiding technological innovation to foster business-technology alignment (Enns & McDonagh, 2012). The business – strategic role of the CIO, along with the subject matter role that it plays as part of the technological role, places CIO in a unique and advantageous position with the group of decision makers. “There is no single profile of the ideal CIO, there are different CIO demographic and personalities for different business strategies” (Leger et al., 2019).

There is no single profile of the ideal CIO, there are different CIO demographic, along with varying personalities for different business strategies (Jones et al., 2020). Collaboration aspect of the relationship CIO-CXO, the level of credibility, authority, will play a major role in the success of this endeavour, overcoming traditional stereotypes of CIOs as solely technical leaders, toward a broader perspective (Gonzalez et al., 2019).

The alignment of business with technology will need to be ensured and be the focus of promoting the IT Innovation projects; this alignment will allow the CIO to guide the innovation within an organization, while supporting the executive group in engaging into the change process that the innovation projects bring (D. Q. Chen et al., 2021). Existing studies present practices and behaviors that CIOs can use to successfully influence and engage other executives, regarding technological innovations, and CIO will have to enhance their competencies for a successful Innovation Champion role (Carvalho et al.,

2018). One way of guiding IT-driven innovation is using dynamic program management, where business unit and technology assets form complex systems with clear lineage and enterprise architecture (Maniak & Midler, 2014).

A dynamic program management brings potential competitive advantages to the business, and the challenges associated with a constant change of the structure of the program management. The complexity of this system will have to be supported by the existence of the business - technology alignment, and by a customized enterprise architecture for the organization, to align and supports the complexity and constant change. The benefits of a dynamic program and portfolio management within an innovation's enabler organization, will have to be further researched, by looking into the program life cycle of each project, and understanding the needs and the impact on the organization (Serrano et al., 2017).

2.7.2 Champion Role in Innovation Management

As the CIO may help lead organizational innovation, and stimulate alignment among key success factors, the leadership role may take the form of Innovation Champion (Newbold & Azua, 2007). With its recognized expertise and knowledge as subject matter expert in technology, CIO is the change and strategic innovations flag bearer within the organization. This is a heavy role, with responsibilities that are not limited to an isolated business group, rather, a cross – organizational role, with impact on the business in short and long term.

The CIO is called for exercising leadership skills, knowledge, expertise, and capabilities, and embrace them in a new leadership model, a Champion model, that support this complex role. There are expectations for change of the classical CIO role, towards a more visible and strong leadership skills: "The CIO is the evangelist for the innovation process," says the CIO of an information-services firm who is in the forefront of her firm's growth strategy. As such, she needs to walk around and promote continuous discussions. The CIO is responsible for helping make the company more flexible and for preparing the company for the new business challenges" (Newbold & Azua, 2007).

Champion roles are typically seen in innovation management, where projects must undergo risky phases requiring sustained top management support for guidance and strategic focus (Markham et al., 2010). Champions make the organization aware of opportunities by conceptualizing the idea and preparing business cases. “Champions make the organization aware of opportunity by conceptualizing the idea and preparing business cases” (Markham et al., 2010). In the case of the CIO, the Champion role implies the CIO classical role, exercising authority, strategic thinking, along with technological expertise and ability to influence peers, by educating them towards the engagements, collaboration, and support of innovative projects. The champion role not only introduces the innovation, but rather aim to properly manage the strategic innovations projects with their risks and unknowns’ uncertainties.

IT projects can stimulate innovation, and further allow emergent strategies, to the extent business and technology personnel are given an adequate climate to stimulate experimentation, along with rapid solution validation and deployment (Watts & Henderson, 2006).

An open minded and visionary perspective is needed for an organization that incorporates innovation within its culture. Stimulating experience and experimentation, allowing failures to occur for the benefit of potential improvements, supports the innovative ideas within an organization to be developed. The CIO may also delegate innovation champion role to program managers who will become responsible for organizational transformation in their respective business units or operational domains (Kissi et al., 2012).

The strategic and the business role of the CIO will require collaboration and involvement in the strategic aspects of IT and innovation projects, and collaboration at the horizontal and vertical level with the IT teams. The involvement of CIO in projects with interconnectivity and interdependencies across the organization, will solicit collaboration with project, program managers, delegated, at the strategic level, to manage the innovation projects. It may be the full delegation of the CIO that will better support the management of the program, or delegation of the members of the executive group.

As strategic IT projects may also become key liabilities, the CIO champion role will also include managing or deescalating projects with decreased innovative value (Keil &

Montealegre, 2000). The evolving strategic role of the CIO incorporates tasks and responsibilities associated to the promotion of the innovation and the project associated, but also to identify the relevant moments in the development of the projects when termination, cancellation, or suspension may be necessary to better mitigate the risks and uncertainty, and the consequences on the organization.

“The role and the competencies of CIO have evolved and changed over the last decade, along with the technological changes, advancement, and innovation. IT has become a central pillar of organizational governance in the public sector. CIOs have been called upon to become innovation champions, and help agencies become lean and agile through IT-enabled transformation program” (Gagnon & Murariu, 2015).

With the intense dynamic of the innovation, market condition, or strategic decision of the organization may need to be made, and innovative projects to be deescalated. It may be the organization that did not meet the competitive advantages desired from/on the innovative projects, or, external factors that determine the reduced value of the innovation project, not a suitable fit as strategic IT project. This is one of the CIO competencies, part of the Innovator Champion role, to properly align strategic needs of the organization with the dynamic changes required for innovative IT projects.

2.7.3 Synthesis of CIO Managerial Roles

This literature review has helped outline the core challenges of public sector CIOs as strategic leadership of digital transformation projects. In Table 10, we synthesize this literature based on (Mintzberg, 1973) seminal work, remaining highly relevant today, especially in time of profound change in senior executive roles and expectations. This model leads us to develop a more systematic set of hypotheses and research models conducive to empirical, grounded theory building. We will attempt to operationalize this literature with a conceptual model seeking to map more cautiously the cause-effect network among variables, to be applied within the context of a comparative case study methodology of digital projects in several public sector agencies.

2.7.4 Next Generation CIO – CDIO Competencies

Our review of CIO competencies has led us to consider three key issues: CIO-CXO relationships in governance processes, CIO leadership at the core of key alignment dyads, and CIO championing role in the fuzzy front-end of the organizational innovation lifecycle. In, we propose to integrate these core features into a new competency profile for Next Generation CIOs. See Figure 2:CDIO as integration of CIO and CDO . Key innovation activities (diagonal corners) manage intelligence, opportunities, partnerships, and implementation, each connected to alignment domains (squares). The CIO reports to the DM, and integrates two empowered and IT savvy teams, the TMT (DM, ADM Policy, CFO, ADM Operations), and the CIO Branch (CTO, Chief Architect, Vendor Relations, and PMO).

While team members interact continuously (blue arrows), the CIO concentrates on four tasks (red numbers):

- (1) Design innovative projects,
- (2) Negotiate innovation financing,
- (3) Integrate innovation to the organization, and
- (4) Ensure innovative project success.

2.7.5 Strategic Innovation Projects

The proposed competency model for Next Generation CIOs integrates traditional IT roles into BTM as a broad function. Traditional roles can be delegated within the CIO Branch, focusing CIOs on strategic innovation projects. The position's knowledge and expertise are centered on managing the organization's Strategic Innovation Program. The four key innovation responsibilities, accomplished in partnership with their respective executive team members, allow for a strong integration of all alignment domains.

Research is needed to explore the impact of this model on accelerating the strategic innovation lifecycle. New methods are needed to help leverage richer business and technology intelligence in the design of faster and more valuable innovation projects.

Methods are also needed to simplify innovation financing through value and ROI analysis and develop new ways of conceiving risk and real option value in public sector innovation projects. Model Driven Engineering (MDE), and Enterprise Architecture (EA) tools and methods must also be more integrated to the innovation lifecycle, helping to translate requirements into solutions, and integrating innovation throughout the organization architecture. Finally, new PM methods are required to coach operations experts for User-Driven Innovation, allowing them to effectively become lead partners in managing strategic projects jointly with IT.

These various roles of the CIO, enhanced by the innovation champion role, support an organization to bring innovation and manage the associated projects while other team members can effectively act upon the decision-making value provided by the CIO. The enhancement of innovation in organizations will support both policy and operational development, exploiting latent value options that would be locked out by lack of integration between alignment domains.

Adapting the CIO competencies to a work environment is a lengthy process, a journey. It implies policy makers' recognition of the change, revision and implementation of the policy changes, changes at business and process level, changing of the emerging role that the CIO is playing, to support innovation as part of the business line and organization culture of an enterprise. More research is needed on how innovation is managed in both the private and public sectors, and what are the particularities for the strategic innovations projects.

The adaptation process will also imply the existence of the evidence base that will support the development of tools and methodologies and allow public sector to develop native innovation capabilities to help public servants embrace, customize, and engage IT within their work.

2.7.6 User Leadership Roles in IT-Enabled Public Sector Transformation

Public sector organizations are typically hierarchical, where collaboration between IT, policy, and operations branches are prone to various obstacles. Making these relationships more fluid requires changing the role of operations end-users and empowering them to lead innovation projects. Their contribution is often in the form of knowledge and intelligence, as well as champion and sponsor (Bogers & West, 2012).

Research is needed to explore how public sector organizations can reach their full potential for innovation, leveraging IT by moving beyond traditional roles, and developing new capabilities toward "User-Driven Innovation". This allows end-users to "take charge" or drive a few stages or own a complete innovative project.

In that context, a user or unit (or many users/units forming a partnership) can identify an opportunity, design, and obtain funding for a project, lead the project, and be accountable for the implementation and diffusion of its results. The CIO is therefore transferring responsibility outside the IT function, which becomes an internal consulting unit. User-driven innovation requires a hybrid project portfolio management, where they can cohabit with more classical projects, but be granted more latitude than established processes, to favor the rapid emergence of solutions.

2.7.7 CIO-CXO Relations and Governance

Due to the complex role that the CIO plays within an organization, and due to its integration function among alignment domains, CIO-CXO relationships are to evolve radically. At the operational level, the knowledge base on CIO role and its competencies, provide both TMT and CIO Branch members with governance knowledge. At the strategic level, the board, acting as a group rather than in silos, will better engage in providing support to the CIO role as it pertains to integration, collaboration, communication, comprehension, support, and authority for the implementation of the strategy of the organization and the IT vision.

Research is needed to explore the model's key assumption: that both TMT and CIO Branch Leadership Team members can become more IT savvy, share joint responsibility, function well within a highly decentralized and empowered environment, communicate effectively transversally between levels and functions, and come to share a common understanding of business, technology, strategy, and projects. Research will be needed to explore new decision-making methods and models for CIOs to provide information more effectively, foster collaboration within the TMT, eliminating knowledge gaps toward joint leadership.

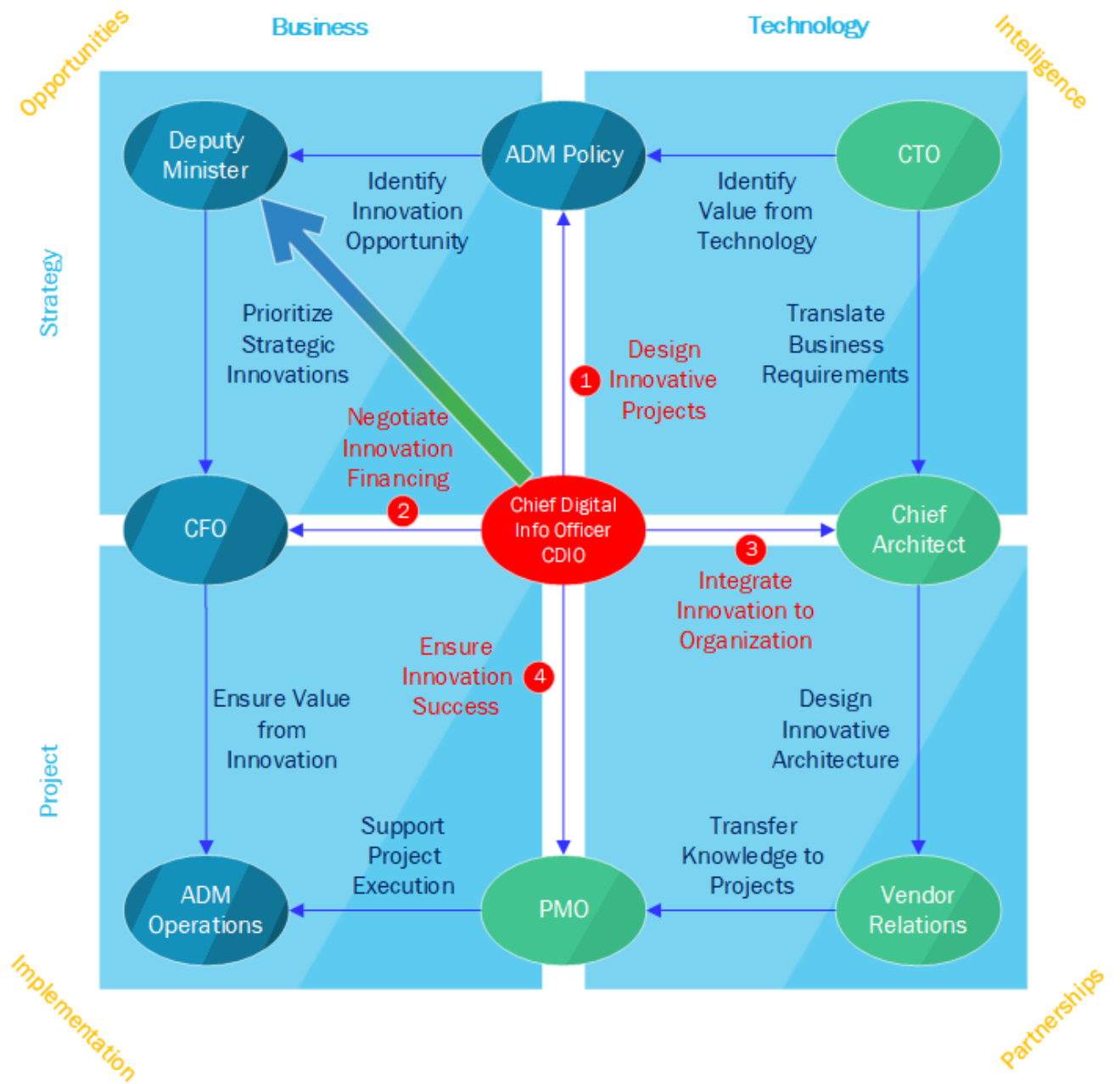
2.7.8 Hybrid Public-Private Sector Profiles

While the public sector must continue to develop native innovative project management capabilities, there must be a renewed effort to integrate BTM expertise across sectors and bring both public and private CIO practices to be integrated in a joint competency model. Research is needed to extend the proposed competency model for CIOs in both public service and business and help TMT in both sectors adequately staff this strategic executive position.

The model needs to be aligned with numerous education programs and professional certifications that help prepare IT managers for Next Generation CIO roles. This model, once tested through research, can serve as an anchor to further develop the necessary PM competency framework for the public sector. It brings additional competencies associated with the interconnectivity of the CIO role in business, technology, strategy, and projects, and defines the features of strategic innovation management as a new PM knowledge area.

CIO and CDO are often co-orchestrating digital transformation strategies, and it makes sense to integrate their functions within one role and model. Creation of the CDO role creates the potential duplication with the CIO roles, also creating opportunities for revisions of the CIO role. It also clarifies the role of the CDO into four distinct areas: (Evangelist, Coordinator, Innovator, and Advocate) (Haffke et al., 2016)

Figure 2: CDIO as integration of CIO and CDO roles.



2.8 Conclusion

The role of the CIO will continue to evolve along with the advancement of technology and implementation of digital transformation across the society. The CIO will continue to be involved in the journey of governments transforming themselves towards digital governments, transforming existing services and creating new services to support its citizens. CIOs will continue to be faced with challenges in supporting their agencies on this path, as active contributors to the creation and implementation of digital policies, enhancement of business lines due to new and improved technologies. CIOs will be the brokers among their CXOs peers and the organization, the driver of major transformation, to support and drive learning and knowledge sharing horizontally and vertically, enabling, and supporting innovation, for a smooth adoption of the carousel of changes that governments will be faced with.

CIOs role will continue to evolve and transform and be of major importance among the leaders supporting transformation. It will align to the needs of new digital technologies that will continue to be adopted and implemented across the society and in the public sector, such as continue transformation towards smart cities using information and communications technology.

		(Al-Taie et al., 2014), (Smaltz et al., 2006), (Hunter, 2010), (Carter et al., 2011), (R. S. Dlamini, 2013).	Business savvy Communication Strategy Leadership Governance Dynamic Capabilities	2013), (Salunke et al., 2011).	Enterprise process lead Alignment enabler Savvy	(Markham et al., 2010), (Ali et al., 2013).
DECISIONAL	Strategic (Innovator Decision Leader)	(Gefen et al., 2011), (Ragowsky et al., 2014), (Carter et al., 2011), (Al-Taie et al., 2014), (Coertze & Von Solms, 2014)	Strategy – Projects PM savvy Management Strategy / Leadership Innovation Dynamic capabilities	(Smaltz et al., 2006),(Killen et al., 2012) (Mullaly & Thomas, 2009), (Gefen et al., 2011), (Smaltz et al., 2006)	Strategic Technical leadership Stakeholder engagement Strategic role with CXO IT governance PM and PMO savvy	(Teubner, 2013), (Enns & McDonagh, 2012), (Kissi et al., 2012).

3 DIGITAL TRANSFORMATION

3.1 Introduction

The last two decades has seen digital technology evolving, with an increased number of new and enhanced solutions. They are offering opportunities but also risks and the need for governance. The move towards digital governments creates a wave of changes and transformation, with more rapid evolution brought recently by cloud adoption and microservices (Trček, 2022).

More recently, in the last three years, the world was faced with a global crisis, a pandemic, caused by the commencement of COVID, causing government pressure for digital transformation (Gangneux & Joss, 2022). In times of crisis and extraordinary situations with impact at global level, leadership is key to guide people and their organizations. Equally important is governance adaptable to the situations that impact organizations and landscape in which they operate, many times in situation with no precedent, especially in organizations with lower levels of resources, such as local government (Palos-Sánchez et al., 2023).

This period has seen private and public sector organizations in full process of adopting digital technologies, in transforming and enhancing their business lines, mainly given the political mandate of the current governments. This is a transformative process for organizations, proven to be lengthy and in certain cases a tedious endeavour, a journey with great impact and challenges at cultural, economic, social, and structural level. Public and private sector are equally engaged in this transformation in the last decade that has proven to be transformative and challenging. The mandates of new governments impact over the transformation that public sector is engaging, given the major directions from the new governments for drastic changes across public sector (Sanina et al., 2023).

Digital technology and the new, emergent technologies along with global transformation that many governments adhered to, aligned to the Sustainable Development Goals (<https://sdgs.un.org/goals>), have moved the conversations on the government transformation, national governments versus global governments, and the future of government towards digital government and e-government (Vărzaru et al., 2023).

3.2 Governance models in digital transformation

Governments have been challenged to become nimble, agile, and flexible, increase their readiness for major changes while ensuring business continuity. They have been called to lead, and participate in horizontal, government – wide initiatives and in the specific organizational initiatives, the horizontal transformation initiatives, to face the major transformation and modernization efforts (Schirmacher et al., 2019). Agility and innovation call for major revisions of governance models, policies, frameworks, and practices. Government policies and practices are in need for revision, mainly the governance and service policies, to respond to digital era. Mainly IT governance require flexibility, and agility among some of the main attributes, to face and support digital transformation, and innovation in organizations (Hamada & Akzambekkyzy, 2022).

The last decade has seen public sector challenged by the governance model used. The existing models were not designed to support digital initiatives, that are digitally enabled services or solution, information system, or application, or for the delivery of digital services to citizens. Public Sector organizations were in need for revisions of their policies, their structure, and their governance models to accommodate the avalanche of technological, and politically mandated modernization and transformation directions.

3.2.1 Digital Project Governance

In this context of digital transformation and digital adoption of internet and use of data, the digital governance is under development, with conversations on digital governance at project level, nationally and globally, as well as on digital governance models.

Governments need to deliver better and up to date services to their citizens, and continuously seek for the continued improvement of service delivery. There is a need to increase efficiency of operations and service delivery, along with improved trust in public organizations (Mahmood, 2016). Public Sector is faced with the need to introduce and integrate new technologies and transform from within while facing external pressures.

With more than a decade of evidence of digital efforts in finding ways to align new and existing technologies, and technological opportunities for better service delivery, better performances,

technology is an ally to enhance and support innovation in governance, public management, and public service delivery.

3.2.2 Digital Transformation Context

Defined as a journey that organizations are taking on, recognized as a key strategic initiative, the digital transformation renews, and transform organizations and their business lines while they are enhancing and leverage digital technology; digital transformation goes beyond the project level with direct impact over the entire organization. It brings new frameworks, new ways of working, and delivering services, transforming citizen's expectations to deliver high-value, real-time digital services. In the context of this research, definition digital transformation is to be revisited.

3.2.3 Drivers of Digital transformation

Digital Transformation drivers are linked mainly to internal and mainly to external drivers. They are related to the issue of new waves of technologies that created the opportunity for digital transformation aiming to meet user's needs, such as social media, mobile devices, AI, automation, cloud computing, and the internet of things (IoT) among other technologies.

Political changes and political imperatives of governments in power are known as major drivers of digital transformation. Adoption of these new technologies continue to have an impact on the society, as they have brought improvement of customer experience and optimization of processes. As the early adopters have seen the continued development and reinventing of new business lines, such as e-commerce.

3.3 Digital Transformation in Public and Private Sector

Full self online service delivery is associated with Digital Transformation (Ioannou et al., 2022). The term of "e-government" is tied to Digital Transformation in Public Sector; it is tied up to service delivery and the desire of government to deliver better services to its citizens. In Public Sector, associated with e-government there are definitions that present the leverage of ICTs to support citizens, to modernize and improve service delivery.

Public Sector has been very active, extremely responsive to the new mandate of the government in power for almost a decade now. Under this mandate a variety of national, horizontal initiatives were launched to launch digital transformation initiatives, to engage departments in this new journey, in promoting its mandate by promoting the value and the benefits of digital transformation to public servants, in encouraging the level of adoption of Digital Transformation from within the public sector, and equally to Canadian citizens.

At the global level, Public Sector demonstrated an “united front” with bureaucratic institutions and private sector from around the world to initiate or join forces in various major initiatives, or unique endeavours, “pilot” initiatives. Canadian public sector has been equally keen in joining global initiatives in Digital Transformation, as partner, initiator, or lead of some of the initiatives, playing in some cases the role of an “innovation lab”; these initiatives are meant to fulfill the mandate of the government in power, and the digital transformation global movement that is taking place for the last couple of years around the world.

Table 11: Digital activities in Canadian public sector from 2012 to 2022

Year	Digital Policy	Details	Referenced to Digital Transformation
2012	Canada, a member of the Open Government Partnership (OGP)	A multilateral initiative by 75 member nations and several national government members; it aims to secure concrete commitments to promote transparency, empower citizens, fight corruption, and harness new technologies to strengthen governance, in partnership with civil society and the private sector.	

2016-2020	Government of Canada Information Technology Strategic Plan	Government of Canada Information Technology Strategic Plan 2016-2020	
2018-2022	<p>Digital Operations Strategic Plan for 2018-2022.</p> <p>Source :</p> <p>https://www.canada.ca/en/government/system/digital-government/government-canada-digital-operations-strategic-plans/digital-operations-strategic-plan-2018-2022.html#ToC1</p>	<p>It builds on and expands on the Government of Canada Strategic Plan for Information Management and Information Technology 2017 to 2021 (2017 to 2021 GC IM-IT Strategic Plan), which itself built on and expanded on the Government of Canada Information Technology Strategic Plan 2016-2020.</p> <p>Includes digital standards (principles for making digital government work), accessibility, inclusion, digital transformation, user-centered services,</p>	<p>It introduces the vision of Government of Canada vis-à-vis Digital Government and Digital Transformation:</p> <p>” The Government of Canada is an open and service-oriented organization that operates and delivers programs and services to people and businesses in simple, modern, and effective ways that are optimized for digital and available anytime, anywhere and from any device. Digitally, the Government of Canada must operate as one to benefit all Canadians.”</p> <p>It presents reference to Digital Government and the need to develop a new Digital Policy.</p>

			<p>In this strategic plan it is referred to the Government efforts since 2016 to initiate major transformation across all departments and agencies:” Budget 2016 also announced the development of a client-first service strategy to promote service improvement and transformation and improve the experience of Canadians and businesses dealing with government. ” In Budget 2016 are presented the strategic directions and the main objectives of the government:”</p> <p>3 objectives: to design and deliver client-centric services across all channels; to provide an online experience so easy that users would choose the digital channel; to offer a tell-us-once experience to services.”</p>
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		<p>It presents the integrated directions for the government on digital transformation, service delivery, security, IM, and IT.</p> <p>It is a key input to service improvement and digital transformation initiatives.</p> <p>It outlines the leadership in digital ecosystem, and the role of public sector in “spreading digital government ideas, convening partnerships, and sharing successful approaches and innovations between jurisdictions.”</p> <p>It mandates all Government of Canada departments and agencies to pursue and adopt digital transformation</p> <p>“Departments, agencies, and all public servants are key partners in this digital transformation</p>
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			<p>and in delivering on these strategic actions.”</p> <p>It presents reference to the first Government of Canada Central Agency’s Digital Transformation Office and its services to support implementation and adoption.” Digital Transformation Office co-creates prototypes, sets concrete usability targets, and runs usability tests with Canadians. ”</p> <p>A Maturity Model and a Digital performance measurement framework is put in place to measure progress on digital transformation.</p>
Feb. 2018	Canada signs Digital Nations Charter	Canada is joining leading nations with the mission to harness digital technology to benefit citizens.	https://www.leadingdigitalgovernments.org/canada

		<p>Canada issued the Digital Nations Charter</p> <p>The Digital Nations is a collaborative forum of the world's leading digital governments that aims to use technology to improve citizens services in Canada and globally.”</p>	<p>https://www.canada.ca/en/government/system/digital-government/improving-digital-services/digital-nations-charter.html</p> <p>https://www.canada.ca/en/government/system/digital-government/digital-nations.html</p>
Nov. 2018	The Government of Canada (GC) Data Strategy Roadmap	<p>It sets strategic priorities for a unified and collaborative approach to managing government-wide data as an asset while respecting privacy.</p> <p>“The volume of data that governments, businesses and Canadians produce is growing exponentially, animated by digital technologies. Public service modernization efforts focus on a more transparent, collaborative, citizen-centered and digitally enabled public service.”</p>	<p>https://www.canada.ca/content/dam/pco-bcp/documents/clk/Data_Strategy_Roadmap_ENG.pdf</p> <p>https://www.canada.ca/en/private-council/corporate/clerk/publications/data-strategy.html</p>

Oct. 2020	The Government of Canada (GC) Enterprise Architecture Review Board (GC EARB)	<p>Mandate: set out in the Policy on Service and Digital(2019), to “define current and target architecture standards for the GC and review departmental proposals for alignment.</p> <p>“The enterprise architecture framework is the criteria used by the Government of Canada enterprise architecture review board and departmental architecture review boards when reviewing digital initiatives to ensure their alignment with enterprise architectures across business, information, application, technology and security domains to support strategic outcomes.”</p>	https://www.canada.ca/en/government/system/digital-government/policies-standards/government-canada-enterprise-architecture-framework.html
2018 - 2020	Deputy minister committees	To make policies more coherent government-wide and to promote a whole-of-government approach to management, human resources, and policy planning.	https://www.canada.ca/en/privy-council/programs/appointments/senior-public-service/deputy-minister-committees.html
2018	In Canada the Prime Minister makes the digital		

	government a separate portfolio with its own minister		
2018	The CIO of GC is elevated to a DM level, supporting the new Digital.	“Alex Benay, currently the Chief Information Officer of the Government of Canada, has been elevated to a deputy minister-level position, effective July 2, 2018. As outlined in Budget 2018, this change is a reflection of the Government’s commitment to redefine this role to better protect Canadians’ data and strengthen information technology in the federal government. Mr. Benay will also support the Honourable Scott Bison in his new role as Minister of Digital Government.”	https://pm.gc.ca/en/news/news-releases/2018/07/20/prime-minister-announces-changes-senior-ranks-public-service
2020	The Policy on Service and Digital (2019)	Developed with stakeholders from across Canada, came into effect on April 1, 2020. Along with their supporting instruments, they articulate how GC organizations are to manage service delivery, information and data, information technology (IT)	

		<p>and cybersecurity in the digital era.</p> <p>“...it serve as an integrated set of rules that articulate how Government of Canada organizations manage service delivery, information and data, information technology, and cyber security in the digital era. “</p>	<p>https://www.central_agency-sct.canada.ca/pol/doc-eng.aspx?id=32603</p>
2020	<p>The Government of Canada Digital Standards</p> <p>Public Service Digital Standards, the DNA of digital services, “open by default”</p>	<p>Outline the guiding principles for how all public servants must work in the digital age</p>	<p>https://www.canada.ca/en/government/system/digital-government/policies-standards.html</p>
<p>April 2020</p> <p>Revised in May 2022</p>	<p>The Policy on Service and Digital (2019)</p> <p>The Directive on Service and Digital</p>	<p>As supporting instruments, they articulate how GC organizations are to manage service delivery, information and data, information technology (IT) and cybersecurity in the digital era.</p> <p>“Articulates how Government of Canada organizations manage service delivery,</p>	<p>https://www.central_agency-sct.canada.ca/pol/doc-eng.aspx?id=32601</p>

		<p>information and data, information technology, and cyber security in the digital era.”</p> <p>“The Treasury Board has delegated to the Chief Information Officer of Canada the authority to issue, amend and rescind supporting instruments, including standards, mandatory procedures and other appendices.”</p>	
July 2020	<p>The GC-wide greening IT working group.</p> <p>The GC Strategy for Greening: Greening Government Strategy: A Government of Canada Directive</p>	<p>A working group of CIOs, aim to implement greening IT policies, actions, strategies</p>	<p>https://www.canada.ca/en/treasury-board-secretariat/services/innovation/greening-government/strategy.html</p>
2021	<p>The Government of Canada (GC) Digital Operations Strategic Plan (DOSP) for 2021–2024.</p>	<p>The DOSP supports the Canada’s Digital Government Strategy to fulfill the responsibility of the Chief Information Officer of Canada, set out in the Treasury Board</p>	<p>https://www.canada.ca/en/government/system/digital-government/government-canada-digital-operations-strategic-plans/digital-operations-strategic-plan-2021-2024.html</p>

		Policy on Service and Digital (2019) for “approving an annual, forward-looking 3-year enterprise-wide plan that establishes the strategic	
2021	Launch of the Digital Strategy	“to providing Canadians with the online service experience they expect in a digital age.”	https://www.canada.ca/en/treasury-board-secretariat/news/2021/06/minister-murray-releases-canadas-digital-government-strategy.html
Spring 2021	GC’s first Minister of Digital Government Release the Canada’s Digital Government Strategy	To lead the transition to a more digital government and make Canada a leading digital nation	https://www.canada.ca/en/government/system/digital-government/digital-government-strategy.html
2021-2024	Digital Operations Strategic Plan 2021-2024 GC Strategy in Action 2021-2024 Identified priorities and actions for the 4 strategic pillars of the 2021-2024 DOSP. A third iteration of the plan has been issued in	Strategic pillar 1: Modernize legacy IT systems. Strategic pillar 2: improve services. Strategic pillar 3: implement enterprise. Strategic pillar 4: transform the institution	https://www.canada.ca/en/government/system/digital-government/government-canada-digital-operations-strategic-plans/digital-operations-strategic-plan-2021-2024.html https://www.canada.ca/en/government/system/di

	<p>August 2022, to align the management of IT and IM with the focus on the digital government; it is a Digital Operations Strategic Plan is the strategic plan</p>		<p><u>gital-government/government-canada-digital-operations-strategic-plans/digital-operations-strategic-plan-2018-2022.html#ToC1</u></p>
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In only a decade, the public sector has been very active getting ready, and developing the path to adopt digital transformation at the public sector level, as well as at the society level. Government has initiated policy transformation endeavours in the past five years, creating new policies, merging, revising, and amalgamating policies, retiring the obsolete policies to convey the need for new, modern, and efficient services delivered in leveraging the digital technologies. It developed in less than a half of decade several IM and IT strategies to support the transformation from within of public sector, modernize services, educate, and increase awareness of public servants in meeting citizens' expectations.

3.4 Digital vs. Regular IT Projects

There are various definitions for an information technology (IT) project as well as for digital projects. In general, the IT projects are considered temporary information technology endeavors, that incorporates all the attributes of a project according to existing project management standards (i.e., provides values, have an established beginning and end time, have a set of defined tasks, and assigned resources, initiated, and undertaken to develop a unique product, service, or a result). In parallel, the digital technology projects are projects with unique identifiers as the ones presented by project management standards, with the specificity that digital technologies are leveraged to create value by developing a unique, product, service, or a result.

According to (Kohli & Melville, 2019); (Nambisan et al., 2019), digital transformation (DT) projects will leverage digital technologies to develop digital innovation which applies to products and services, business models and processes (Kohli & Melville, 2019). Digital transformation

(DT) projects are diverse, came in the form of digital infrastructure, enhancing digital technologies for building collaboration, simulation, modeling tools and systems; they came in the form of changing the organizations to adopt new information and technologies, replacing a legacy system that is not responding to the current and anticipated needs of the organization. They also come in the form of introducing new digital technology (platforms, systems, tools) to support the business needs, to improve business lines, or support the implementation of new business, services, and products for users; they come in the form of new technology for organization to experiment, using an “innovation lab” approach, mainly in public sector, on new technology such as Artificial Intelligence, Cloud Computing, develop and use of Internet of Things, leverage Big Data, among other digital transformation (DT) projects.

In the context of this research, IT projects and Digital Projects are mentioned along with Digital Transformation. This terminology is used often and broadly; however, it carries a great deal of customization given that no formal definition could be identified and accepted in the academic literature on project governance (A. U. Musawir et al., 2023).

When discussing these two types of projects in the context of this research, in public sector, we consider that each of them is included in the project portfolio of the organization that is defined as per (Petit, 2012), as “a collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives.” (Petit, 2012). There are still research questions seeking to elucidate the question related to the difference in between a traditional IT project and a digital project conducted during the digital transformation in an organization. A wider perspective of governance is required to integrate all forms of projects along with a coherent governance at the strategic level (A. ul Musawir et al., 2020).

Table 12: Digital transformation, definitions of IT and digital projects

IT Projects		Digital Projects	
Definition	Source	Definition	Source
“Information technology (IT) projects are	Chapter 7: Information Technology Project Management: Providing	“Will leverage digital technologies to develop digital innovation which	(Kohli & Melville, 2019) “Digital Innovation: A Review and

<p>organizational investments.”</p> <p>“...A temporary endeavor undertaken to create a unique product, service, or result [1], such as the development of a software application, the migration of a database, the enhancement of an IT infrastructure, among others.”</p>	<p>Measurable Organizational Value, Fourth Edition by Jack T. Marchewka Chapter 8: https://www.oreilly.com/library/view/information-technology-project/9781118057636/08_chapter-01.html</p> <p>“Implementing Success Management in an IT project” by João Varajãoa,b,* , Luis Magalhãesa,b, Luis Freitasc, Pedro Ribeiroc, João Ramosb,d a Department of Information Systems, University of Minho, Campus de Azurém, Guimarães 4804-533, Portugal; CENTERIS – International Conference on Enterprise Information Systems / ProjMAN – International Conference on</p>	<p>applies to products and services, business models and processes.”</p>	<p>Synthesis,” Information Systems Journal (29:1), pp. 200-223.</p>
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	Project Management / Hcist – International Conference on Health and Social Care Information Systems and Technologies, CENTERIS/ProjMAN/ Hcist <u>2018</u> .		
<p>With a focus on the technological solution, IT projects can be described as temporal.</p> <p>Organizations that aim to contribute to an organization’s success by means of improved technological.</p> <p>Functionality and reliability, and by lower operational costs, while not changing the organization’s operations themselves.</p>	<p>“Technochange Management: Using IT to Drive Organizational Change,” Journal of Information Technology (19:1), pp. 4-20.</p>		

With digital transformation being researched only since the 2000’s there is still work undergoing to research its characteristics, the implementation learning, consideration of success, even if we are already contextualizing digital transformation in a digital age. In some areas, such as information systems, there is not yet enough evidence, digital transformation is positioned “as an unexplored and emerging phenomenon” (A Preliminary Literature Review of Digital Transformation Case Studies). Observations on some of the characteristics of digital

transformation include irreversibility given the benefits of the new digital technologies, the impact on the users, and the new array of transformative benefits provided to their users. Inevitability is mentioned as well as one of the digital transformation characteristics given the global movement on embracing and adopting digital technologies in private and public sector; the digital transformation journey of societies, the increase level of maturity of organizations in adoption and understanding of how the evolution of new technologies allows for development of solutions for complex projects.

Operationalization of digital transformation reveal characteristics related to the processes and operations around digital transformation technologies that needs to be flexible, adaptable, and versatile given the uncertainty around these new, innovative technologies. Given the need to consider digital ecosystems, digital transformation brings the characteristics of constant change and evolutive nature, with integrability at the horizon.

Desired digital transformation implementation expectations include efficiency and consistency by enhancing performance; accessibility; facilitation of collaboration and communication; increase employee's productivity, and improvement of business processes. It fosters for *reaching competitiveness* and *foster value creation* in both private and public sector.

3.5 Digital Organizations and Capability Maturity Perspective

While most traditional organizations are familiar with digital projects and programs of small projects, few have entered the “bulk of change” phase where the organization becomes digital.

This is where BTM professionals at all ranks become essential, where the organization becomes truly digital, i.e., BTM leaders help making products, process, people, partners, and business portfolios more agile in using IT.

Beyond that point, the digital transformation is self-funding through internal savings and renewed competitive positioning.

Table 13: Digital Lifecycle

Features \ Activities	Adoption	Optimization	Innovation	Diversification	Transformation
IT Mandate	Development	Management	Development	Governance	Operation
IT Impact	People	Processes	Products	Partnerships	Places
IT Benefits	Simplify, open perspectives, collaboration, speed, effective.	Open source, reuse, acquire, integrate, standardize	New model, new arch., new code, new apps, new users, new value	Assets, supply, competitive, new products, market access	Mobile, things, intelligent, real time, analytics-driven
Expertise	User Experience	Architecture	Entrepreneurship	Value Strategy	Infrastructure
Role	Translate user requirements to ensure best solutions	Design new way of working and delivering value with existing IT.	Create concepts and models at core of new solutions	Advise on use of IT for new value, link to market vision	Integrate new solutions and help users adapt practices
Partners	End-Users	Line Managers	Engineers	Executives	IT Vendors

3.6 IT Governance

Organizations relies on IT to achieve their strategic and operational goals and objectives, in a continued effort to meet their business needs, implementing IT best practices, standards and methodologies. IT governance is part of corporate governance, focused on information technology (IT), its performances and its risks. It focuses on improvement of management of IT seeking improved value from the information technology's investment.

As an element of corporate governance, IT governance is aiming at improving the IT management and leveraging IM and IT to deliver value for business. It represents the tools, processes and methodologies that enable an organization to align business strategy with IT services, infrastructure, and its business environment.

3.6.1 Project Governance

Project governance is key to success of project deliver, and any organization is working to set up and put in place a governance model that support the organization on its strategic and operational needs. PMI defines project governance as “the framework, functions and processes that guide activates in projects, programme and portfolio management.”

In the (Project Management Institute, 2013) “A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Fifth Edition”, project governance is defined as an “oversight function that is aligned with the organization’s governance model and encompasses the project life cycle.”

Project governance is defined as a “set of policies, regulations, functions, processes, procedures, and responsibilities that define the establishment, management and control of projects, programmes, and portfolios. It gives an organisation the required internal control, while externally, it reassures stakeholders that the money being spend is justified” according to the Association for Project Management (APM) Governance Special Interest Group (SIG) defines governance (Chow & Cao, 2008) (APM, 2006, 2011, 2017).

OPM defines project governance: “Governance is the framework, functions and processes that guide activities in project, program, and portfolio management. In organizational project management (OPM), governance provides guidance, decision making and oversight for the OPM strategic execution framework” (Source: <https://www.pmi.org/learning/featured->

[topics/governance](#)). “The ISO 21500 Standard clearly states the concepts of high-level support of the organizational management through the corporate governance and its project governance component, as follows. Governance is the framework by which an organization is directed and controlled. Project governance includes, but is not limited to, those areas of organizational governance that are specifically related to project activities” (Source: https://www.researchgate.net/publication/349054238_ISO_215002012_vs_Other_Project_Management_Standards#pf7). The governance of projects is the way of overseeing the projects, ensuring adoption and support, and the necessary decisions are made. IT project governance has though the elements of project governance and the elements of IT governances. Public Sector Opportunities and Challenges

The last decade were times of major changes where the public sector has been called upon to face major, unprecedented transformations, with citizens new expectations and renewed mandates of newly elected governments.

Major challenges that public sector are facing: the legacy systems don't offer the level of service required in the 21st century and they need to be replaced; the new technologies need to be embraced and adopted by public servants; that brings a major transformation of business, cultural change is a major opportunity and an impediment given the lack of readiness of the workforce and the cultural resistance; the policy reform is hard to put in place in such a manner to support the new complexity that are required to be managed.

3.6.2 Challenges Specific to Government Transformation

The public sector transformation towards a digital government, and their shift to the digitization of services is faced with a variety of challenges. The main ones noted as part of this research includes:

- budgetary restrictions: limited funding impedes the long-term investments; the funding model lacks flexibility creating constraints for easy access to necessary funding; inconsistent funding model across public sector agencies; funding access for individual departments is dependent of a central funding cycle; access to different sources of funding (for maintenance of existing legacy, archaic structures versus funding for new systems, technologies).

- organization readiness, knowing the slow pace of bureaucratic organizations to be responsive to major changes. “The word “agile” by itself means that something is flexible and responsive, so agile methods imply its “[ability] to survive in an atmosphere of constant change and emerge with success” (Chow & Cao, 2008). As (Hunt, 2006) indicates “....agile also implies being both effective and sufficient for the current situation.” ;
- level of adoption of digital technologies of employee and staff as well as external stakeholders.
- digital literacy, availability of skills and readiness of public sector employee and leadership team to use, adopt and promote digital technologies.
- societal readiness to use new service, or access enhanced serviced redesigned using digital technologies.
- alignment among all agencies across public sector to use and adopt digital technologies.
- readiness of the societies to understand the need for digital government and the transformation journey of public sector from electronic to a digital government.
- communication and transparency efforts to increase awareness of users, citizens.
- direction for implementing digital government (top to the bottom versus bottom to the top).
access, affordability, ability to adopt the new digital services, and fully adopt them.
level of scale up of successful implementation projects.
- collaboration and resource sharing among various agencies within public sector.
- digital divide among public and private sector, and among various public sector jurisdictions.
- regulatory barriers within public sector, lack of flexibility of existing regulatory system;
readiness to develop the framework that allow implementation of digital government while rationalizing its need.

3.7 Conclusion

Government transformation is a proven fact. It is not a desirable aim rather it happens, and it has been taking place for the last few years. It is a unique, major endeavour at the societal level, at the public and private sector level. Digital transformation is a journey.

Digital transformation within the public sector requires major transformation at governance, policy, structure, skills, management, and leadership level.

This is a journey that requires to be a co-creation effort with full involvement of the users, the citizens and not solely left on public administrations. The users, the citizens are not only clients of public sector and public administrations, rather they need to be partners that helps to transform public sector organizations as an active party in the service delivery offered by public service delivery enabled by new technologies.

To add the value of digital transformation within public sector, it requires to be measured by the adoption of digital technologies internally within the public sector, and by its citizens, present the value creation.

4 METHODOLOGY

4.1 Introduction

This is an exploratory, qualitative research. The methodology used here considered gathering information from two rounds of interviews with public sector CIOs, along with a review of sources of information, project artifacts of projects presented by the CIOs of public sector in Canada during their interviews.” Qualitative researchers typically study a relatively small number of individuals or situations and preserve the individuality of each of these in their analyses, rather than collecting data from large samples and aggregating the data across individuals or situations” (Maxwell, 2012).

4.2 Research Approach

This exploratory study is based on the qualitative methodology that is used due to the lack of studies and models for the CIOs and their role. It aims to construct a theory through a methodic, iterative data gathering, systematic observation and data analysis.

The basic dimensions of this approach consider the focus on developing a theory grounded from data in the field. Data is collected using interviews with 20-30 individuals to “saturate categories and detail a theory”. Data analysis will include coding (open, axial selective or conditional matrix). This paper focuses on dynamic capabilities and, more generally, the resource-based view of the firm. We argue that dynamic capabilities are a set of specific and identifiable processes such as product development, strategic decision making, and alliancing. They are neither vague nor tautological. Although dynamic capabilities are idiosyncratic in their details and path dependent in their emergence, they have significant commonalities across firms (popularly termed ‘best practice’). This suggests that they are more homogeneous, fungible, equifinal, and substitutable than is usually assumed. In moderately dynamic markets, dynamic capabilities resemble the traditional conception of routines. They are detailed, analytic, stable processes with predictable outcomes. In contrast, in high-velocity markets, they are simple, highly experiential, and fragile processes with unpredictable outcomes. Finally, well-known learning mechanisms guide the evolution of dynamic capabilities. In moderately dynamic markets, the evolutionary emphasis is on variation. In high-velocity markets, it is on selection. At the level of RBV, we conclude that traditional RBV misidentifies the locus of long-term

competitive advantage in dynamic markets, overemphasizes the strategic logic of leverage, and reaches a boundary condition in high-velocity markets (Eisenhardt & Martin, 2000). The interview sampling and process are systematic and inductive, with aim to construct a theory through methodic data gathering and data analysis. It will include a qualitative methodology of comparative case studies (Eisenhardt & Martin, 2000) and will study about 10 full cases of public sector organizations having attempted a major transformation and innovation project.

The construct of case study and the debates arounds their use will be discussed, as well as their appropriateness in the context of the current research. The lack of a well defined and accepted definition of the case study will be addressed in the context of this research and various positions will be considered. The case study approach is described by (Eisenhardt, 1989) as “..... a research strategy which focuses on understanding the dynamics present within single settings.” (p. 534). In this research will analyze the use of case studies as a methodology, or as an object of study, considering the views of the literature associated with the 3 disciplinary research areas of BTM, OPM, and TIM. Case study may be considered a methodology. Data collection for theory building, use of interviews will be discussed, along with the debates around its validity. The use of the interviews conducted with various BTMs representative, at various levels of organizations and the specific use of the semi-structured interviews will be analyzed in the context of this exploratory research aiming for theory-building purposes. “Semi-structured interviews are an appealing option since the data collected must be suitable for both theory-testing and theory-building analyses” (Alaranta, 2006).

As this research was initiated early during the doctoral courses (January 2016), we proceeded with 2 rounds of interviews, in 2016-2017 and in 2020, of CIOs in public sector agencies in Canada; this was most likely to find the lineage of CIO competencies that are most conducive to successful medium-term digital transformation, and as such pinpoint the right model that enhances BTM Executive impact.

4.3 Grounded Theory

Several principles from Grounded Theory guided our research and case analysis. We followed the references cited by Harnois (2022, p. 158) in his doctoral dissertation, which outlined features of grounded theory key considerations.

Table 14: Features of Grounded Theory

Features	Main Benefits	Authors
Evidence-Based	Qualitative data collection avoiding interference from theoretical analysis and concerned with “data thickness”, quality, and reliability.	(B. Glaser & Strauss, 1967)
Inductive Reasoning	“Inductive approach to the study of social life that attempts to generate a theory from the constant comparing of unfolding observations”.	(Babbie, 2013, p. 307)
Theoretical Sampling	Rely on opportunistic and theoretical sampling to enhance sources of relevant evidence.	(Babbie, 2013, pp. 190–191; Corbin & Strauss, 2015, pp. 134–152; Creswell, 2013, p. 86)
Data Linking	Systematic and rigorous use of memos and diagrams to enable cross-interview and cross-case evidence finding.	(Corbin & Strauss, 2015, pp. 106–133; Creswell, 2013, pp. 83, 89; Miles & Huberman, 2003, pp. 140–146)
Data Saturation	Sampling of subjects may evolve as the structure of the situation being studied becomes clearer and certain.	(Babbie, 2013, p. 191)
Context Linking	Importance of the respondent’s experience and context to enhance evidence finding.	(Corbin & Strauss, 2015, pp. 153–171, 268–282)
Process View	Bringing process into analysis, reflect complexity of actors and interaction networks, and integrating categories.	(Corbin & Strauss, 2015, pp. 283–309)
Theory Building	Using various techniques for achieving theoretical integration.	(Babbie, 2013, pp. 392–393 for integrating theory from data; Corbin & Strauss, 2015, pp. 187–202)
Theory Emergence	Use of open coding to identify concepts, expand definitions, and allow constructs to emerge.	(Babbie, 2013, pp. 389–412; Corbin & Strauss, 2015, pp. 220–238; Miles &

		Huberman, 2003, pp. 109–140)
Theory Continuity	Establishing standards for validation about grounded theory, ensuring theory building is linked with later stages.	(Creswell, 2013, pp. 260–262; Miles & Huberman, 2003, pp. 501–506)
Analysis Tools	Use of a computer program (e.g., Nvivo) for qualitative data analysis.	(Corbin & Strauss, 2015, pp. 203–213)
Writing Style	Keeping a good writing structure for grounded theory, allowing more emergent storytelling as opposed to theory verification case style.	(Creswell, 2013, pp. 229–232)

Source: Harnois (2022, p. 158)

Ground Theory Feature 1: Evidence based: During the data collection process I was concerned, continuously preoccupied in gathering high quality data and information; data that was reliable, accurate, relevant, and reliable. The data collected has not been impacted or interfered in any manner with the theoretical analysis conducted throughout my research.

Ground Theory Feature 2: Inductive reasoning: Throughout this research I was constantly in a process of conducting comparisons among similar information gathered from various research subjects, the individual CIOs, and their specific projects, with the aim and to generalize, identify patterns, generate a theory based on the new observations made.

Ground Theory Feature 3: Theoretical sampling: Theoretical sampling is a valuable and practical method. It was assured in this research by relying on and seeking opportunistic data sources as relevant evidence for the research. This was done by following where the data led to expand and refine the research during the analytical process. Practically this was done by engaging more CIOs and their projects as cases as sources of data for the research and conducting two rounds of interviews for widening the scope of the subjects with additional diversity of attributes within the same group.

Ground Theory Feature 4: Data linking: The data collected during this research from various data sources such as interviews with CIOs, project artifacts, public sector information has been compiled, collated to create a more useful, more valuable data source, richer data set. Cross – case and cross-interview exercise has been conducted to identify patters and to enable richer findings among all data sources and data collected.

Ground Theory Feature 5: Data saturation: Data for this research was collected in two rounds of interviews at several years difference among the two rounds of interviews. As the situations presented by the CIOs in the interviews become clearer, and the number of subjects were limited and not accessible, there was the possibility of the value-added information gathered to be limited for any further data collection; at that point data saturation was reached.

Ground Theory Feature 6: Context linking: In this research all the research subjects, CIOs in Canadian public sector had broad and extensive work experience, some of them with long tenure as public sector, some of them with long tenure as CIOs (mainly the ones in 2016), and some in their early years as CIO (some of the ones interviewed in 2021). Their understanding of the public sector context and its transformation, aligned to their personal and professional career, their business acumen and technical expertise, knowledge and experience support and enhance the value of the evidence finding of this research. The context of the public sector transformation has been taken into account in each of the interviews with CIOs and the information has been gathered as part of the project artifacts.

Ground Theory Feature 7: Process view. Using the grounded theory implied the theoretical sampling, the iterative, continuous recruiting process of the research subjects, the CIOs, while conducting the analysis of the data already gathered, and adjusting as needed. The complexity of the role of the CIO, their professional profile, tenure as CIO, with public sector, with the organization, complexity of the project were key factors in the recruiting criteria selected.

Ground Theory Feature 8: Theory building: The amount of data collected was impressive and data analysis was a complex process. A few techniques were used for theory building among which the following were most useful for this researcher: writing individual interview notes, developing summary and descriptive memos for each cycle of the interviews conducted, using integrative diagrams, periodical reviewing and sorting through individual summaries, identify patterns, attributes, commonalities for each of the two cycles.

Ground Theory Feature 9: Theory Emergence: For concepts identification, expansion of definition and constructs to emerge this researcher continue the observations and development of the case studies of the relevant, logic information.

Ground Theory Feature 10: Theory continuity: Several validation rules were put in place.

Ground Theory Feature 11: Analysis Tool: The qualitative data analysis was done in an iterative, manual, and no software was used.

Ground Theory Feature 12: Writing Style: Keeping a good writing structure for grounded theory, allowing more emergent storytelling as opposed to theory verification case style.

Narratives are important so they must be reflected and synthesized with fidelity. Familiarity of the researcher with the topic presented presents an advantage in presenting the ongoing transformation in an organization and influencing the change of the transformation in an integrated narrative of the findings. (Dalpiaz & Di Stefano, 2018; Madden et al., 2018; Solouki, 2017)

Reflexivity helps theory building by pinpointing weaknesses in practices “Textual practices used by researchers aremulti-perspective, multi-voicing, positioning and destabilizing.” (Alvesson & Willmott, 2003; Ripamonti et al., 2016)

Find inspiration from prior literature without being influenced nor creating a theory bias Value of the contextualization of the literature review conducted versus the classical literature review is key to research not only to find inspiration from previous literature and research but to better position the new research. “(Dunne, 2011; M. Alammar et al., 2019; Thornberg, 2012)

Theory contributions are mostly incremental and seek improvements to practices as opposed to generalizations. The authors underline the importance of “lived experience” (Cicmil, 2006;)(Lewis & Kelemen, 2002; Söderlund, 2004; Thompson, 2011)

Building theory from practice aims to transfer knowledge between contexts (Gregor, 2018; Sanchez & Heene, 2017; Tourish, 2013; Van De Ven & Johnson, 2006)

4.4 Expert Interviews

The expert interviews were selected as an interview method, aiming to investigating implicit expert knowledge, gaining information about, or exploring a specific field of action mainly related to the role of the CIO in leading digital transformation successfully. We have conducted two rounds of interviews with CIOs of various agencies of public sector in Canada. The interviews took place in 2016-2017 and in 2021. The interviews were partially in person, at the location of their work offices; some interviews were conducted virtually given the COVID telework conditions. The interviews were 45 min to 1 hr in duration, and the main researcher

interviewed the CIOs. Each of the CIO was invited to participate in the research and were provided with an invite to participate with details of the interview process, the research summary, and the interview questions, along with individual consent.

This research was conducted in compliance with UQO's Research Ethics Committee guidelines. For the expert interviews the interview subjects, the CIOs, were presented with an Executive Summary of our research project, along with a "Research Participant Consent Form".

4.5 Population Interviewed

Table 15: Types of Projects /Initiatives led by the CIOs as per 2016 interviews.

Type of Project / Initiative led by the CIO, presented as part of the 2016 CIO interviews	Main Driver of the initiatives	Number of initiatives/projects out of the interviews conducted in 2016	Initiated by the CIO since in the role	Inherited by the CIO from the predecessor
A mandatory initiative / project initiated by the CIO in response to a new policy	A new policy in public sector	Department #1		Development of the IM/IT Strategic Plan
A mandatory initiative / project initiated by the CIO in response to a new policy	Revisions of an existing policy	Department #2		A transformation initiative preparing the organization for implementation of the Digital Strategy

		Department #11,14	integration, and various levels of complexity incorporated. IT-enabled business transformation, a large-scale transformation program.	
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CIOs interviewed in 2016 and 2021 have a various and broad professional and educational background. A quick summary is included in this table.

Table 16: Professional and education profile of CIOs (2016 and 2021).

	Differences	Commonalities
2016	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Previous Senior Management experience: 9 CIOs • Duration of Senior Management experience: • Between 1 and 2 years: 1 CIO • Between 2 and 5 years: 1 CIO • Between 5 and 10 years: 4 CIO • Over 15 years: 2 CIO • Over 35 years: 1 CIO • Tenure with Public Sector: • Between 1 and 2 years: 1 CIO • Between 2 and 5 years: 3 CIO

		<ul style="list-style-type: none"> • Between 5 and 10 years: 5 CIO • Over 15 years:1 CIO • CIO at DG or ADM level: • DG: 4 CIO; ADM: 5 CIO • Previous Experience in IM IT: 7 CIOs • Retirement or leaving public sector:1 CIO. • Education-degrees: • Economics: 1 CIO • Commerce: 2 CIOs • Leadership:2 CIOs • Finance/Accounting: 1 CIO • Science: 1 CIO • Arts: 2 CIOs • Engineering:2 CIOs • Business Administration: 3 CIOs
<p>2021</p>	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Tenure with Public Sector: • All the CIOs interviewed have extensive experience in Public Sector, over 5 years to two decades. • Previous Experience in IM IT: • All CIOs share a broad IM IT experience combined with private public experience. • Education-degrees: • The CIOs have in general an undergraduate degree combined with additional graduate degrees in computer science, finance, accounting, project management. • Some CIOs have undertaken executive Leadership, governance education and professional certification in IM IT, in economics, accounting, finance, among other areas of study.

		<ul style="list-style-type: none"> • Career Path of CIO (for 5 out of 9 interviewed): <p>CIO #1:</p> <ul style="list-style-type: none"> • 2 yrs. As a CIO • CIO at DG level • Education: Science, Project Management • Over 30 years of Senior Management • Strong involvement in CIO network <p>CIO #2:</p> <ul style="list-style-type: none"> • 1 year as a CIO • CIO at ADM level • Education: Science • A decade of Management in public sector, and central agencies, and public sector • Strong involvement in women in IM IT groups, IM IT councils, board of directors <p>CIO #3:</p> <ul style="list-style-type: none"> • 2 years as CIO • CIO and DG of IM IT • Education: Science • Management experience in public sector; work experience in private sector • Involvement in IM IT associations <p>CIO #4:</p> <ul style="list-style-type: none"> • 5 years as a CIO • CIO and DG of IM IT • Education: Science • Management experience in public sector
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		<ul style="list-style-type: none"> • Involvement at national and international level in IM IT networks <p>CIO #5:</p> <ul style="list-style-type: none"> • Over 7 years as a CIO • CIO and DM of IM IT • Education: Business Administration, leadership, governance • Management experience of over 2 decades with public sector • Strong involvement with IM IT, Service delivery, Data at national and international level with CIO community
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Table 17: Profile of CIOs interviewed in 2021.

CIO Professional Education Profile	Group / level. Title	CIO Main role	CIO Additional role	Tenure as a CIO	Previous leadership roles	Education level (degrees/certification)	Digital Mandate	Size of the organization
CIO # 1	EX-02 Executive Director	CIO	CSA Cyber security agent	2015-2021	At national and international level	Bachelor of arts Master of Science MBA	Develop and Implement Digital Strategy	<500

CIO # 2	EX-05 ADM	CIO	n/a	2016-2021 Over 30 years of IT	Executive roles in public sector	Bachelor IT systems Accounting certifications		<5,500
CIO # 3	EX-03 DG	CIO	n/a	2016-2021	Executive roles in public sector	Master Public Administration		<17,500
CIO # 4	EX-06 DM	CTO	n/a	2016-2021	CIO roles in public sector	MBA		<44,000
CIO # 5	EX-03	CIO	n/a	2016-2021	DG roles in public sector	Bachelor's degree Financial background	Digital Transformation	<5,500
CIO # 6	EX-03 DG	CIO	n/a	2016-2021	Executive roles in public sector	Bachelor's degree	Digital Transformation	<5,500
CIO # 7	EX-04	CIO	n/a		Management roles in	Computer Science		<1,000

	ADM				public sector			
CIO # 8	EX-03 DG	CIO	n/a	2018-2021	Management roles in public sector	Computer Science Project Mgmt.	Digital Transformation	<1,000
CIO # 9	EX-02 DG	CIO	n/a	2017-2021	Management roles in public sector	Bachelor's degree	Digital Transformation	<1,000
CIO Reporting	<p>CIOs at Executive, and Director General level reports to the ADM of Corporate Services</p> <p>In one instance the CIO at DG level, reports to the Deputy Minister (DM)</p> <p>CIOs at ADM level reports to the Deputy Minister (DM)</p> <p>CIOs at DM level reports to the President, or the Minister</p>							
Size of the departments of the 9 CIOs Interviewed in 2021	<ul style="list-style-type: none"> • 1 department with less than 500 employees. • 3 departments with less than 1,000 employees. • 3 departments with less than 5,500 employees. • 1 department with less than 17,500 employees. • 1 department with less than 44,000 employees. <p>Source : https://www.canada.ca/en/treasury-board-secretariat/services/innovation/human-resources-statistics/population-federal-public-service-department.html</p>							
Size of the departments of the 14	<ul style="list-style-type: none"> • 1 department with less than 500 employees. • 3 department with less than 1,000 employees. • 6 departments with less than 5,500 employees. 							

<p>CIOs Interviewed in 2016</p>	<ul style="list-style-type: none"> • 3 department with less than 9,000 employees. • 1 department with less than 35,000 employees. <p>Source : https://www.canada.ca/en/treasury-board-secretariat/services/innovation/human-resources-statistics/population-federal-public-service-department.html</p>
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The table below presents the CIO tenure time from CIOs in 2016 and 2021 interviewed.

Table 18: Tenure of CIO’s interviewed (2016 and 2021)

	Differences	Commonalities
2016	n/a	<p>CIO position level in Public Sector:</p> <ul style="list-style-type: none"> • 4 CIOs at DG level <p>5 CIOs at ADM level</p>
	n/a	<p>Duration of the CIO tenure:</p> <ul style="list-style-type: none"> • between 1 to 5 years:3 CIOs • between 5 to 10 years:4 CIOs • between 10 to 15 years:2 CIOs • over 15 years: n/a
	n/a	<p>Previous CIO/CXO, ADM, other Sr. Mgmt. roles experience in Public Sector:</p> <ul style="list-style-type: none"> • as CIOs: 5 CIOs • as ADM: 1 CIO <p>as Sr. Mgmt. role: 3 CIO</p>
	n/a	<p>Previous senior level involvement in CIO communities</p> <ul style="list-style-type: none"> • Members of CIO community: all

		BOD Members, Presidents of CIO CIO's organizations: 2
		Education in IM IT: <ul style="list-style-type: none"> • Between 20 and 35% of the CIOs interviewed IM IT related education
	n/a	From the 14 CIOs interviewed in 2016: <ul style="list-style-type: none"> • CIOs retired as of 2021: 4. • CIOs who left GOC as of 2020: 1
2021	<ul style="list-style-type: none"> • Almost 10% are new CIOs. • Almost 10% are acting CIOs. • Almost 50% are in CIO role for less than 5 years. • Almost 30% are in CIO role for more than 5 years. 	CIO position level in Public Sector: <ul style="list-style-type: none"> • 8 CIOs at DG level • 1 CIOs at ADM level
		Duration of the CIO tenure: <ul style="list-style-type: none"> • between 1 to 5 years: 5 CIOs • between 5 to 10 years: 3 CIOs • between 10 to 15 years: 1 CIOs
		Previous CIO, CXO, ADM, other Sr. Mgmt. roles experience in Public Sector: <ul style="list-style-type: none"> • as CIOs: 1 CIO ; as ADM: 1 CIO; as Sr. Mgmt. role: 7 CIO
		Education in IM IT: Less than 20% of the CIOs have IM IT related education
		Senior level involvement in CIO communities: <ul style="list-style-type: none"> • Members of CIO community: all

		<ul style="list-style-type: none"> • BOD Members, Presidents of CIO CIO's organizations: 4
		<p>From the 9 CIOs interviewed in 2021:</p> <ul style="list-style-type: none"> • CIOs retired as of 2021: • CIOs left GOC as of 2020: 2.
Tenure	<p>Tenure of CIO of Public Service in Canada</p> <ul style="list-style-type: none"> • CIO #1, almost 7 years in the CIO role • CIO #2, almost 2 years in the CIO role • CIO #3, almost 2 years in the CIO role • A/CIO #4, for less than 1 year in the CIO role • CIO #5, for a year in the CIO role 	

This table presents the size of the departments of which CIO's were interviewed in 2016/ 2021.

Table 19: Size of public sector organizations of CIOs interviewed in 2016.

2016 Departments where CIOs interviewed	Population of the department
Department # 1	<500
Department # 2	<5,300
Department # 3	<17,500
Department # 4	<5,000
Department # 5	<5,000
Department # 6	<44,000
Department # 7	<1,000
Department # 8	<1,000

Department # 9	<500
Department #10	<500
Department #11	<2,200
Department #12, 13	<6,000
Department #14	<1,500

Source: Population of the federal public service by department
<https://www.canada.ca/en/treasury-board-secretariat/services/innovation/human-resources-statistics/population-federal-public-service-department.html>

4.6 Data Sources

For the current research the data is collected from a variety of sources: the in-depth interviews conducted with CIOs of Public Sector of Federal Government of Canada; from group interviews with representatives of CIOs and BTM Business Technology Management community; and from project artifacts. The data collection process is longitudinal, all the CIOs interviewed are employed across the Public Sector-Federal Government.

The researcher carried interviews and developed detailed case studies of completed IT-enabled transformation projects in agencies of various sizes and mandates. This research aims in developing a complete leadership framework model, that once finalized and adopted, can predict the overall performance of projects and IT-enabled transformation initiatives.

As inductive methodological research this researcher seeks to gather observations and details, and systematically to identify patterns of best practices related to the leadership role of CIOs and governance framework in digital organizations, for most successful CIOs. As the used methodology, the research subjects are asked to use as example(s), projects or transformation projects that are completed, and allow access to this researcher to project artefacts.

The procedure for the recruitment of the participants has been open and non-structured, based on our professional network, to whom an invitation letter outlining the thesis project is sent

(Appendix I). Given the limited number of potential interview subjects, CIOs for Public Sector, it was proven effective to rely on contacts within Federal Government. Prior to each individual interview the research methodology is presented to each of the subjects, along with the research consent form (Appendix II).

The number of interviews is an often-debated topic in various academic reviews, aligned to the research method used. For the Ethnography and ethnoscience, in the case of the grounded theory methodology, (Creswell & Poth, 2016) indicates 20-30 interviews.

For this research, our opportunistic sampling of 10 organizations, and 20-30 respondents is based on finding the highest-ranking executives representing the whole scope of CIO and CDO responsibilities. They are chosen to represent a cross-section of government policy challenges in digital transformation.

4.7 Interview Process

Using interactive, semi-structured interview model the researcher is seeking clarification, elaboration of the themes of interest, leadership role and competencies of CIO, governance, while “reading “the problem beyond the answers.

The semi-structured interviews are used for data collection; the interviews are conducted in the setting of the CIOs work environment. The semi-structured interview is the opportunity to observe the personal behavior, the way the CIOs answered the questions, while creating the environment to openly share thoughts, ideas, information, and concerns and to answer in their own terms, smoothly guided by answers and open-ended alternative questions.

We follow the interviews in 2 phases. In phase 1, an open-ended interview questionnaire (Appendix III) is used to gather as much strategic-level information as possible from CIOs and CDOs. We ask respondents to select a project of their choice that meet the criteria of being completed successfully and in which they contributed even if the project was not fully initiated or managed while in their role as CIO: “What has been your agencies most recently completed IT-enabled transformation, and what factors to you believe have facilitated/impeded its performance?”.

This first round allows us to outline how their innovation projects contribute to the digital transformation of their agency service models and processes. Our research questions are

seeking to pinpoint project success, speed, and cost-effectiveness, focused on the two-main research interest, leadership, and governance. Two types of questions are emphasized, asking respondents to share their best practices on their role and competencies as leaders, and to address the governance framework aspect of their projects.

In phase 2, we invite direct reports to substantiate the changes that have occurred through these digital transformation projects, using a second round of more detailed, yet open-ended questions (Appendix IV). We ask the respondent to select a successful project of their choice, already completed or close to completion, and to discuss the role and competencies exercised throughout the life cycle of the project.

4.8 Data Analysis

The strategy engaged for the analysis of the data collected is thematic, with the objective of identification of pattern(s) across the data collected, the convergent and divergent areas. The data for this research is still under collection, with additional data collection activities in place.

Once all the data will be collected, various statistical analysis software will be used to support the coding and analysis process of data.

“When analyzing qualitative data, we develop explanations or generalizations that are close to concrete data and contexts.” (Neumann, 2009).

Data analysis will follow the regular typology of data analysis for the qualitative data collected.

It will start with data analysis and preparation:

1. Development of a familiarity with the data (basic observations, identification of patterns, transcribing the data)
2. A review of the initial research objectives, and identification of the questions that can be answered via the research questions.
3. A review of all the questions used in each of the stages of the data collections.
4. Development of a framework, coding, or indexing; at this stage the researcher will identify broad ideas, behaviours, concepts, phrases after which will use the basic types of coding, open, axial, and selective coding.
5. Identify patterns and connections; once all the data collected will be assigned codes, this researcher will identify themes, looking for commonalities, patterns, identification of data

or patterns that can support the process of answering the research questions. At this point the researcher will seek for additional findings or research areas for further exploration.

Data collection and data analysis will be well documented, as an integral part of the validity and rigour given to the case study methodology engaged here. Consideration will be given to the areas of analysis and individual attributes to be used for the analysis of the case studies, and their review conducted based on the research of (Pare & Elam, 1997) , (Lee, 1989), Benbasat et al. (1987); (Yin, 1994); (Eisenhardt, 1989); and (Lee, 1989).

As part of this analysis the researcher will analyze the content gathered, followed by an analysis of the narrative of various sources of information (interviews, observations, etc.); a discourse analysis will also be conducted given the specifics of the context in which the interviews were conducted. Grounded theory will be considered to explain leadership and governance phenomenon identified or observed considering artifacts, observations, raw data gathered.

For this reason, the qualitative research method is one of discovery, and “it grounds a theory. (B. G. Glaser & Strauss, 1967).” Open, axial selective or conditional matrix will be considered as well (Creswell, 2003). The final intent is for the relationships between concepts to be identified, followed by an aggregation into themes, identification of patterns and then develop the map of the CIO leadership role along with the governance framework.

4.9 Conclusion

This qualitative research has been conducted over several years. As part of this research, various qualitative methods were used to gather information, using expert interviews with CIOs across public sector in Canada; various sources of information were accessed.

The research was conducted according to the ethical guidelines of the University of Quebec, informing all the research participants (CIOs) about the elements of this research.

5 LEADERSHIP

5.1 CIO role

During the interviews with CIOs, in 2016 and in 2021, each of the CIOs were keen to share their personal perspectives regarding the future role of the CIO.

The CIOs interviewed in 2016 were very involved in the transformation projects supporting organizational needs; CIOs were very involved as well in horizontal projects.

Table 20: CIOs role (2016 and 2021)

The new role of CIO	Differences	Commonalities
2016	<ul style="list-style-type: none"> • CIOs not to be a “wet blanket” (reference to the Fortune article: https://fortune.com/2016/03/10/why-no-one-wants-to-be-a-chief-information-officer-any-more/) • Low level of CIO authority; not at the Deputy level. • CIOs at DG level face issues related to budget approval, funding availability, authority to steer the project and influence the peers’ views on the project. • Some CIOs can have a very large, diverse, and heavy in operations portfolio that can include beside IM IT, Research, ATIP, Digital transformation initiative CIO’s large span of controls and responsibilities. 	<p>Common CIO Roles:</p> <ul style="list-style-type: none"> • Liaison • Communicator • Authority of the role • A subject matter expert • A service delivery expert • A recruiter • A financier • An experienced manager • An innovator • A change manager • Relationship builder <p>Soft Skills</p>

		<ul style="list-style-type: none"> • Trusted at horizontal, vertical level. • Accountable • Negotiating and Mediating skills • CIO personality, key to success • Steering capabilities
<p>2021</p>	<ul style="list-style-type: none"> • Limited tenure in the CIO role • CIO leadership role varies in public sector. • Size and complexity of the CIO portfolio • HR challenges for CIO to recruit project resources. 	<ul style="list-style-type: none"> • Majority of the CIOs have been in the CIO role for 5 to 7 years. • All CIOs have between 10 to 20 years of work experience in public service. • CIOs advanced on their career path with various jobs in public services. • All CIOs touched on the future role of the CIO and the transition towards the new roles of the CIOs. Discussions introduced challenges at the organizational level that the CIOs are facing in transforming their own role while the

		<p>organization in parallel is going through transformation.</p>
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CIO ROLE: 2016-COMMONALITIES

The CIOs were very generous in sharing information regarding the new role of CIOs, the role of a successful CIO.

- LIAISON: CIO was a liaison between the internal stakeholders and all the external stakeholders; a liaison between the 2 organizations at all levels; a liaison with his own peers, and with the CIO of OGDs; a liaison with central agencies.
- COMMUNICATOR: CIO was a communicator for all the vertical and horizontal communications; constant good communicator at all vertical and horizontal levels; involved in all the consultations and discussions; a translator of the business, bottom to the top and vice-versa; Communicate status updates, call meetings to discuss challenges and barriers; CIO, a storyteller (plain language, simple story for complex situations); CIO was at the fore-front of the communication; Debrief DG ADM DM Minister as needed, stand by them and provide support with difficult sensitive situations.

SOFT SKILLS:

- CIO has the ability to build trust at all levels, horizontally and vertically, among its own org. and with OGD; the ability to develop trust and confidence in dialogues and actions; the ability engages and keep momentum of consultations among the internal and the external stakeholders; a strong, committed; a reasonable personality, ability to pick the battles; accept directions, recommendations, comply with required recommendations; a champion for engagement, relationship, communication, mediator, negotiator, and implementer ;
- CIO personality, a big factor in the IT Business relationship; Flexibility, adaptability
- Ability to explore options, the art of possible; CIO got involved in all the negotiations and consultations; Accountable, Reliable; A Strong believer in the value of the project.
- Relationship with ADM – DM: CIO good relationship with ADMs and Business leader

- Relationship with Business units: CIO got involved in all the consultations at all levels and discussions; support the identification of the roles for the 2 org.: a bridge builder between the two areas: background, work experience, education in Business makes a difference; collaborate as business partners, with equal voice at the table.
- Relationship with OGDs: Define, agree and follow through the role required (i.e. lead, implementer, etc.); A trusted partner; CIO was the broker in the relationship with the SSC for negotiating the infrastructure; CIO was a partner rather than a leader; Work with key stakeholders, including heads of communications, chief information officers (CIOs), departmental security officers (DSOs), data owners, functional specialists, and access to information and privacy coordinators to ensure the implementation of the directive.
- Bring to the deputy head's attention any significant difficulties, gaps in performance or compliance issues, and develop proposals to address them.
- CIO Level of Authority: CIO had the right level of authority for the project.
- CIO: A subject matter expert: fully involved in the program, from its planning stage up to its completion; CIO to have the ability to speak the language of the business; CIO advocate the use of pm methodology, managed the project methodology and the required project artifacts (waterfall methodology used); A planner; CIO fully involved in the project, from its planning stage up to its completion.
- CIO: A recruiter, Trainer, Retention: Hire, educate, develop, build Professional project manager capabilities of PMs for the org.; Train staff on new tools, systems, services.
- CIO steer the project: when the sponsor does not want to shut down the project, rather to have the requested capabilities. It is the CIO's role as an Implementer to make the decision on how the project needs to change.
- CIO, An Experienced Manager: Manage the IM / IT Portfolio of the departments, heavy operations while managing the information management project; Focus on budget, cost and funding to maintain the day-to-day operations, while maintaining the funding for the project; Manage the resources and the impact of the organization restructuring (DRAP, restructuring / re-organization of Justice).
- CIO, a financier: CIO has a unique role, authority level and responsibilities for the CIO in charge of an IT enabling portfolio of projects, with over 0.5 billion overall budgets.

- CIO, Strong Leadership Capabilities: Management of large, complex, sensitive, costly portfolio of projects (i.e. Only 2 out of 43 yearly projects are CIO sponsored, and all the other ones are IT enabling projects; complex and strategic projects under his responsibility; Majority of the projects have budgets with over 8-9 zeroes); led all the steering committee meetings (DG, DM, and ADM level); CIO, thought leadership, with a strategic view; A Champion of the project; Oversee the implementation and monitoring of the Directive on Open Government; Ensure that corrective actions are taken to address instances of non-compliance. Corrective actions can include additional training, changes to procedures and systems, and other measures as appropriate; Report any performance or compliance issues to the Chief Information Officer Branch of the Treasury Board of Canada Secretariat; Provide final approval for data and information release and approve AAFC's OGIP; Strong self-awareness; Consensus builder.
- CIO, Service delivery: CIO design, implement and manage new service delivery; identify new ways of delivering services created via digital transformation, and business transformation projects; CIO, genuinely open to solve major issues, and to collaborate.
- CIO, Strategist: participate, provide input, on development and implementation of organizational strategy; CIO role has changed from the "Short order cook to the banker organizer".
- CIO, an Innovator: Explore benefits and opportunities of the new technology that are beneficial for business clients and for the organization as well as at the horizontal level; a constant proactive stand, come forward with ideas and improvement, inform and negotiate and present opportunities and impact; CIO, a visionary, how IT will look like in Government in the next 5-10 years, what about in 20 yrs.
- CIO, a Change Champion: Lead Change Management efforts across the organization, educate team, staff and senior – executive management; develop and put in place change management processes; identify opportunities in internal and external change requests; for any change request, negotiate the terms of the change, present the risks, the opportunities, current and future opportunities for the future. CIO, a key promoter of change, introduced the Business Bus concept (change, adventure, new horizons—an attitude of exploration and openness, etc.).

- CIO, High level of Accountability: CIO run and ensure a healthy, well conducted stage gate process for the project.
- CIO, a Risk Mediator: CIO has a Leadership role in mitigation of risk factors: Discussing and analysis if the buy versus builds & negotiating with SSC the infrastructure; CIO had a Leadership role in mitigation of all the risks identified.

CIO ROLE: 2021 OBSERVATIONS

The CIOs interviewed in 2021 were keen in sharing information about their education, professional career path, involvement, and engagement at national and global level. For privacy reasons the information presented here is detailed in a non attributable, identifiable manner. The information gathered is presented here.

Observations gathered during the 2021-2022 interviews with CIOs. The role of the CIO has changed, evolved, and transformed in the last decade. It has visible changed since the interviews conducted back in 2015-2016. The following present the major observations regarding the role of the CIO:

A revised Policy on Service has been issued, with horizontal applicability across all public sector organizations (<https://www.central-agency-sct.gc.ca/pol/doc-eng.aspx?id=32603>). This policy entered in use in took effect on April 1, 2020. It replaces the: *Policy Framework on Information and Technology; *Policy on Management of Information Technology; *Policy on Information Management.; *Policy on Service.; *Policy on Acceptable Network and Device Use.; *Directive on Management of Information Technology.; *Directive on Information Management Roles and Responsibilities; and *Directive on Recordkeeping. The policy supports the mandate of the Minister for Digital Government in leading the Government of Canada's digital transition. According to this policy CIO's responsibilities in public sector are mandated in this policy, as per the following:

- Provide advice on governing and managing enterprise-wide information, data, cybersecurity, and service design and delivery.
- Prioritizing public sector demand for IT shared services and assets
- Using emerging technologies
- Providing direction on the enterprise-wide transition to digital government
- Prescribing expectations regarding enterprise architecture

- Establishing priorities for IT investments
- Facilitating innovation and experimentation in service design and delivery, information, data, IT and cyber security
- Each organization in public sector has to have a CIO responsible for leading the departmental IT, information, and data management functions.
- The CIO has now access direct to the Deputy Minister of the organization.
- The management of these functions is guided by a commitment to the guiding principles and best practices of the Government of Canada Digital Standards: design with users; iterate and improve frequently; work in the open by default; use open standards and solutions; address security and privacy risks; build in accessible from the start; empower staff to deliver better services; be good data stewards; design ethical services; collaborate widely. For the source, please see the GOC Digital Standards: <https://www.csps-efpc.gc.ca/tools/jobaids/digital-standards-eng.aspx>.

On Governance, according to the Policy on Digital Services, is presented (<https://www.central-agency-sct.gc.ca/pol/doc-eng.aspx?id=32603§ion=html>), the deputy heads in each public sector organization “Establishing governance to ensure the integrated management of service, information, data, IT, and cyber security within their department.” .

During the 2021 interviews, CIO talk about their role, and underlined the soft skills, personal traits of a successful CIO:

Daring: CIO is brave, dare to challenge the status quo, to be blunt, honest, ethic and feel comfortable to initiate, advocate, promote ideas and reach decision.

Negotiation: CIO finds the mechanisms needed to be part of the necessary conversations, to participate actively in organization’s activity and decision – making process, to use strong communication skills, with the ability to rationalize and adapt communication style to various audiences; and be transparent.

Honesty: CIO present painful truth in any situation, is open minded, increase the “brand” and visibility of the CIO role, ensure that reality and truth are presented. CIO is ready to defend its updates and present the necessary materials (such as dashboards) to keep his leadership peers and supervisors up to date and informed. CIO is presenting the reality of its operations, teams, and status of the projects.

Communicator: CIO can communicate at all levels in the language of the audience, is understood by the audience and initiate actions such as:

- To demystify the operations and activities in IM IT area, present them in the language of the audience; “When things are explained to them, people become less cynical and better cooperate.”
- To talk to the organization, at all levels, periodically, in their language, mainly the business language, and avoid the IM IT language as much as possible.

Diplomacy: CIO is a strong diplomat, understands the basic principle of diplomacy, apply them to business and public sector environment. CIO exercise diplomacy with peers, the leadership team, with all teams across the organization, and horizontally, across public sector, with peers, the CIO community, and peers’ leaders.

- CIO engages business players, identify the key partners.
- CIO connects with peers across GOC, adopt, and adapt. CIO embrace an existing business model, incorporate it into the existing environment, and propose new models as necessary.

Digital lead, digital acumen:

- CIO and the Digital Champion steer all the projects across the organization
 - CIO is the implementer of the Digital Government agenda.
 - CIO is a “Special Advisor” to the Digital Champion
 - CIO is “nudging” the Digital Champion, and the peers ADMs.
 - CIO is promoting digital knowledge across the Government, to the own team and to the entire organization.
- CIO is the lead for digital innovation, encourages, support innovation projects with a digital component. “Innovation is a muscle, if you do not use it, you lose it.”
- CIO build a Digital Transformation Team with various skills set, technical, project managers, infrastructure specialists, behavioural science analysts, etc.
- CIO is supporting the team to increase their digital literacy level, and to have the right behaviour.

- CIO is the lead for digital innovation, encourage and fully support all the innovation projects with a digital component. “Innovation is a muscle if you do not use it, you lose it.”
- CIO is supporting the team to increase their digital literacy level.

Project Management: Project management is important; Project gating is proven to support project success. Organization to rely on a public sector model and adapt it to the organization’s individual needs. CIO leverage and promote Agile practices.

Relationship with CXO and ADM-DMs: CIO support to DM: The CIOs are fully involved in preparing the ADM and the DM for reporting at all DM level committees (i.e., PSMAC) and in their daily operations, providing reporting and information for the decision – making process.

Trusted partner:

- CIO become a trusted partner, has ability to engage in multifaceted perspectives.
- CIO is an equal partner among leaders, an enabler.
- CIO is the broker in the relationship with all groups of the organization.

CIO is a Champion for Diversity and Inclusion; has a high level of credibility for that role.

Business Acumen: CIO uses Behavioural economics theories, mainly nudging.

Liaison: CIO is working collaboratively with the CIO community, and with his team to exchange information, leverage know how, for each project; consider the opportunity to recycle parts, components, structure, knowledge of previous projects and initiatives that have been developed successfully by other departments. At the horizontal level, across Public Service, have been initiated and put in place DM -level committees on transformation / digitization / digital services: (<https://www.canada.ca/en/privy-council/programs/appointments/senior-public-service/deputy-minister-committees.html>); Only a few of the CIOs interviewed are part of this committee given the DM level required for the participants; the other CIOs work with their ADMs/ DMS to prepare / brief them for the participation to this public sector – wide governance group.

CIO Personal traits:

- Be transparent all the time; Celebrate success.

- “An early read is a good read”, be open, transparent, reliable; be up to date, be aware with all that works and what doesn’t work all the time; “ The early I know, the easiest is to intervene”.
- CIO has a humanistic nature: able to help, escalate as and when needed, appreciate, recognize, give credit, show empathy, appreciate the effort.
- CIO Takes high pride in job, and in the role, CIO has to play in these times ‘Leader is a title; there is need for empathy”.
- CIO can work along well with the others, to allow and appreciate success; CIO facilitate the team building, a major achievement.
- CIO to have fair, open, and up to date conversation with deputies on the challenges the CIO is facing.
- CIO can mobilize people across the organization on an urgent basis.
- CIO is open, transparent and is very business oriented.

CIO ROLE: 2021-DIFFERENCES

Only 20% of the 2021 CIOs interviewed have been in the role for less than 2 years. Only 10% of them have been in a CIO role for more than 5-7 years. CIO leadership role varies across the public sector. Factors such as size of the organization, mandate of the organization, size of the IT team, impact the CIO role. There are also differences as well in the size and diversity of the portfolio, the budget authority, the size of the team that CIO role implies. The place at the CXO level is equally impacted by the factors above presented.

In one case:

- According to the revised mandate, the CIO oversees besides IM and IT the development of the Data Centre and the Digital Strategy, as this is a new role for the CIO and for the organization.
- The CIO is challenged for how the new role of the CIO will be defined, what it will consist for, to explain it to peers, to the DM, and CXO peers, and to the overall organization.
- The main difficulty is related to the traditional role of the CIO to be an IT role. This new CIO role needs to be defined, and to be explained across the organization, as the CIO role continue to be perceived by the organization as an IT role.

- The CIO is challenged by the HR team: (1) their lack of understanding of the new role of the CIO; (2) the lack of understanding of the new skill set required in the CIO team; (3) the lack of understanding of the new role that the CIO wants to create, of a Digital Officer in charge of development of the Digital Strategy.
- CIO Leadership Role: Efforts made by CIO or the predecessor to ensure project success and mitigate any impediments from within and outside your agency.

5.2 CIO future role

All CIOs interviewed are concerned about the future role of the CIO, in public and in private sector. The CIOs presented their views in an aspirational manner on the future role of the CIO; they used the format of “do and don’t”, presenting best practices and lessons learned. A summary of the findings is presented here below:

- CIOs to stop being in control, rather focus to ensure that education and awareness of employee are at the forefront, upskill the workforce of the organization, increase the level of knowledge of teams and of peers’ leaders.
- CIO to stop seeking control, rather admit that they are enablers and behave accordingly.
- CIO to get out of the way of innovation; rather, to encourage, promote, and advocate.
- Future CIOs in public sector to be more bold, courageous, willing to take risk.
- CIOs to use AI and support AI pilot projects, where CIO lead the innovation projects and IM teams manage data and the information. CIO and CDO to collaborate on AI projects.
- Big data is key to decision making, CIOs and the organization to learn to understand it and leverage it. In majority of the organizations, there is an overload of available data that is not understood, nor used, or analyzed. This is acknowledged as a major challenge for CIOs, given the culture of the organization not to promote the use of data.
- In departments with predominant scientists and researchers, CIOs needs to use scientific staff and researcher to analyze data for further research and share data across the public sector and private sector equally.
- CIOs to initiate pilot project to analyze scientific, program, and corporate data available across public service departments.
- Data is an asset to be acknowledged; CIOs to learn how to leverages it.
- CIOs to consider the applicability of blockchain in public sector.

CIO collaborates with the Digital Champion, and the CDO :

- CIO is working to cultivate the digital transformation within the organization.
- The CIO works closely with the ADM Champion for Transformation, who speaks on behalf of the CIO, ensure visibility, bring credibility.
- CIO is driving the Digital Innovation across the organization.
- CIO collaborate with the Digital Champion in developing the Transformation Agenda and the Digital Transformation strategy of the organization.
- The CIO spends a lot of time promoting digital.
- CIO acknowledges that the organizations are only at the beginning of the digital journey.

5.3 CIO hard skills

All CIOs interviewed shared their professional background and their education. They have presented their keen interest to continue their professional development, maintain their connection with IM IT network and CIO peers in private and public sector across all jurisdictions, at national and global level. CIOs have indicated their interest to continue their education, upskill themselves, maintain their relevance vis-à-vis the changes in the society, technology changes and transformation of public sector. CIOs presented the hard skills that are valuable, necessary, and needed for CIOs, as per the summary here below:

Project Management

CIO practice project management practices and encourage staff to increase their skills: Planning is key in all CIO activities.

Some of the CIOs indicated that they “made a sacrifice when joined the organization to get the “house in order”” in their first year in the role. This included assessing the state of the organization, taking stock of projects undergoing and the failed one, availability of resources and skills set, and capacity needed, operational needs and the strategy of the organization.

Governance: In a few cases, the CIOs participates fully in the governance exercise of the organization. In this capacity, the CIO is attending the departmental Coordination Committee; in weekly meetings with all Deputy Minister (DM) level of the organization to discuss operations. (HR, Corporate matters, Operations, Risk, etc.). CIO is part of the Management Advisory Committee, at ADM level, chaired by the Associate DM, with all the chairs of all departmental

committees; participates on the Executive Committee with the Associate DMs and the DMs, a committee lead and chaired by the DM, on topics related to resources, and transformation. CIO is periodically invited to present to this committee.

CIO set up a dedicated committee to discuss IM / IT topics, at EX -01 level, with representation from each area (including DM office, Audit, Security, Corporate Services, Cybersecurity); the committee is a sounding board for the CIO, to get feedback from them as users and main stakeholders.

Oversight, Audit: CIO is attending Departmental Audit Committee (DAC) to present items of interest: in management of complex IT transformation, change management, adoption challenges, cost overrun, timelines. It provides the DM a thorough understanding of the IM IT work, its importance, the value to the organization, increasing the importance of IM / IT.

Operational versus Strategic: CIO work duties are predominant operational for all CIOs across the public service: “Only if the systems perform well, the CIO has time to prepare the Transformation Agenda of the organization.”. In all the 2021 interviews conducted CIOs expressed their desire for their role to move towards a predominant strategic role and have an impact on the organization’s vision. Overall, the distribution of the CIO work duties has changed. One of the CIO see the role “as a broker”, pivoting new ideas, spending more time with business groups, and talking strategy, pivoting their new role. The CIO’s work duties are split 50 / 50 to broker – relationship management and strategy. The CIOs would like to reach the 75% point spent on strategy, facilitating business directions, making corrections, having direct impact on how the business of the organization is conducted. In some instances, CIO’s view their role as an actual CTO role, managing operations, the tools, systems, platforms, and their operations with no time allocated for strategic work.

Change Management: CIO ensure that change management processes are in place and are applicable. As change requests are coming in, the CIOs ensure that proper conversations take place to assess changes, their progress and the necessary adjustments are taken.

Expertise, Knowledge: CIO has strong understanding of the business, surround itself by professionals, by well versed business staff, conducting together best business practices, to know the ins and out of the project, be able to convince the business partners to support the CIO and adopt the recommendations. CIO understands the context and find the right balance between business and technical requirements and policy needs.

Flexibility, Malleability: CIO feel the need to adjust (i.e., the new governance structure was “too tight”, it has been adjusted to be more agile, as the organization mature on embracing proper governance). CIO is versatile; develop and introduce various types of presentations to educate the senior management, and the audience at large, to get them used with concepts, terminology.

Cybersecurity: CIO is ensuring that security and cybersecurity are well supported as important aspect of organization’s health. CIO assessed the organizational needs and presented the governance gaps with the need for a policy framework to be put in place.

CIO Initiated a committee co-lead by the Chief Security Officer and the CIO to address security issues, physical and personal security/cybersecurity/IT security matters. Business staff is invited to challenge IT.

Training: CIO demystify on how IM IT area operates; “When things are explained to them, people become less cynical and better cooperate.” CIO educates senior manager and the workforce on IM IT, on digital transformation, developing digital skills. CIO put a focus on the users’ experience and users’ needs.

Engagement: CIO is encouraging people to bring ideas, innovate, and support them to reduce their risk level.

Path Finder: CIO initiate, and demonstrate that things can be done differently, better, under the CIO new tenure.

Organizations have much potential to achieve better outcomes if they would understand how to accept, adopt, integrate evolutions in health, education, infrastructure, water, technology, as there are so many parallels and so much potential.

CIO spend time to educate senior management to IM IT, also to inform them about governance, and needs of the organization. In anticipation of cloud migration needs in public sector, one of the CIO introduced a series of cloud presentations, to expose new terminology, new concepts, educating and informing the peers and counterparts.

5.4 Strategy process – tenure

During the interviews with CIOs several information has been gathered to better support us understanding their personal a professional profile, and their career path.

2021 Differences: In one case, the CIO presents personal views on the CIO role:

The CIO has been actively engaged internationally, with peers CIOs. The CIO participated to a series of conferences focused on building collaboration, IT, program, business aspects of management of facilities supported by the department the CIO represent and similar ones across the globe. The CIO was a presenter, and a facilitator of various national and global IT groups, members of the associations. The CIO exposed at the international level to the Technology groups composed of mainly vendors. As the only CIO in these organizations, the CIO advocated for open source.

The CIO identified multiple commonalities at the international level for the IM IT services that the department the CIO belongs deliver to Canadians in areas such as duty of care, health, core principles, business processes. Sharing data, information, best practices, tools, platforms, systems can be done at global level. CIO was involved in signing an agreement with one of the North America countries in this sense. The CIO talked about experiences of other countries where technology is leveraged better than here and where integration of various sources of data is omnipresent in CIO work; talk about integration of various sources of data, the opportunities for GOC departments, other org from public and private sector in Canada, and from global entities, to allow people and org. to pull rather than push data / info needed. Governance and standards to facilitate service delivery.

The CIO presented another international activity initiated for a collaboration to introduce wi-fi, and good bandwidth for users of the services delivered by his GOC department who require to have more social interaction time, that needs to be tracked, given the oversight requirement, for which good tools are required. Using paper-based system to track these types of activities is time consuming, inefficient, unreliable, old fashioned, obsolete. The CIO presents the effort put to develop an app and the testing of the prototype for this mobile application to allow users to track their activities, necessary to fulfill their oversight requirement.

The legislation offered an opportunity, and the CIO and the CIOB team developed this proof of concept presented at the international level. The CIO indicates that the international party is interested part of this collaboration to adopt the tools and systems developed in Canada, and they also open to share data and integrate databases and various sources of information. In an international experience, the CIO engaged with peers in public sector where support was offered to manage catastrophic events, such as access to technical solutions, support, and open sources.

2021 Differences: In one case, the CIO presents personal views on the CIO role:

It is important for CIO to think outside of the box, not only to the benefit of their own projects for the benefit of their organization, but also for its applicability to other public / private sector organization, for bettering / applicability of the solutions, and to find ways to made that happens.

CIOs to think outside the "local" solutions, to improve business, and to consider access to global level opportunities. It is also important for CIOs to have vendor relationship management knowledge, skills, experience to understand the current and future dynamic in this area.

CIOs need to balance the need for open source versus vendor solutions, as vendors do not want open- source solutions. There is an interesting relationship with vendors, competing interests, the need to maintain and ensure a functional relationship; competition is tough as the space is limited and the number of beneficiaries as well. CIO highlights the positive aspects of the open source, and open government. "We are breaking down walls to a certain degree; there is still hesitation at times, as we have a mentality of "keeping close", we haven't embraced what "open" means. There is a lot to be done".

CIO talk about old mentalities regarding access to information, and a different way of thinking of various generations.

On the culture change and the notion of risk, the CIO presents one of the visionary conversations had with his Deputy Mentor about CIO vision to maximize results for Canadians and how management of risks would be his focus. In Public Service managing risk is a heavy conversation, and there are no discussions about the benefits of risk; many criteria such as level of comfort, age, seniority, are factors that impede the discussions about risk. In GOC people do not embrace risk, as people associate risk with failures. In GOC people need to learn the benefit of failing, and the work required to get used and comfortable with this way if thinking.

On bureaucracy, CIO faces a lot of pressure given the political environment.

There is a need for deconstruction to have more success in public sector. The art of the possible is important; Digital Strategy, its implementation is not easy. The approach is to move away for the strategy development, the scientific approach, the research, towards a practical approach. To use the modular approach, design / test / implement a module /see how it works, ensure to

demonstrate that to people, assess level of adoption. “Sell digital transformation using a modular approach.”

On Digital Strategy, the CIO indicates that his organization does not yet have a digital strategy, and once it will be developed and put in place, CIO would recommend being done by training, support, continue customization, where digital technology can help adoption level. Counterparts in Europe (Sweden, Germany, Swiss) consider deconstruction for the purpose of the digital transformation at the enterprise level approach.

On research, the CIO wrote a paper that will to be published soon; it was presented to the Executive table. The topic of the paper was about the opportunities created by COVID, the appetite for change, for new, on what people had to do to manage the personal and work situations, and the potential it brings.

CIO discuss about the heaviness of the operational requirements (multiple yearly releases), and the opportunity to shift priorities, do less operations and free up time for digital technology, exploration, build economies, pivot digital technology. This will require to free up resources as the major cost in the department are salary cost, no other funding allocation.

On CIO tenure, in the 80's, CIOs were staying in their jobs for 20 years. The “Curse of the incumbent” is presented by the CIO, as an example of how CIOs get stuck in their role. Transformation of the CIO role started during that time; CIOs had time to be strategic, consider strategic partnership with the business, see how the technology can be leveraged, how available information can be “read, and understood” and transformed in data.

2021 Differences: In one case, the CIO presents personal views on the CIO role:

CIO is a very important role in any organization; mainly in public service, the CIO is a servant leader and in the service of the users.

CIO needs to engage and collaborate with all internal and external stakeholders; to provide the organizational architectural assessment to support the prioritization, financial analysis, to support capital investments for the fiscal year. The role of the CIO is set in the departments' agenda. The organization also has a CTO Chief Transformation Officer who is developing the digital transformation strategy for the organization with whom the CIO collaborates with, and together should know how to manage the priorities. In public sector, the CIO is making large

investment of time and energy in building relationship with other GOC departments, for a successful collaboration. The projects are usually challenging, as the benefits changes often, and there were specifics for the delivery based on the province, and specific needs of the users.

CIO should take good care of the team to ensure they have what it takes, and what they need to deliver; to ensure budget is available, and whatever they need (space, equipment, etc.) to deliver successfully. CIO is to ensure that all stakeholders understand the times we are in; for example, if the banks will go soon in cloud than public sector organization should be also ready to go to cloud and support their users. CIO need to ensure they build the necessary capacity, to ensure business continuity, and the availability of the skill set required in short and long term.

Despite of the intense effort, CIO needs to develop skills to be able to influence the GOC community on horizontal initiatives; to influence and show benefits; to be a path finder; to engage and work horizontally as a whole, rather than as individual GOC departments.

In the daily activities, CIO is a facilitator at the horizontal table with all other CIOs, promoting the need for a horizontal approach in face of cyber security threats, while sharing the knowledge of the organization the CIO is leading with other departments.

CIO ensure accountability, according to the Management Accountability Framework (MAF). As a deputy, a CIO is accountable to the internal organization, and outside the organization.

For the success in the role, and for the success to the projects assigned, the CIO needs to ensure full alignment with their Deputy Minister. CIO revealed that this was achieved due to the long – term relationship, the respect that the CIO has within the organization, the ability to deliver on scope and on time, the respect the CIO gained at the horizontal level in public sector due to the way decisions are made, the fact based, evidence-based discussions the CIO is launching with peers and the Deputy, level of openness, and fairness.

The CIO revealed the openness demonstrated to receive the advice from the Deputy, for projects monitored by the Deputy, by the Board of Management, and by the Minister. By adopting this approach, the CIO has secured the respect and trust of the deputy (the DM) and Minister, who never doubt the CIO ability to deliver or signal issues.

The CIO is a translator in plain language of all technical terms; asking the team to present all the concepts in plain language, using business value terminology (what is the value for the user, which are the benefits, which are the roadblocks, etc.).

The CIO is engaging a dialogue with the DM and the Minister, in a non – technical language, focus on business conversation clear to the audience (i.e., what would be the business impact if a component is failing, rather than to focus on the technological component).

Regarding the role of the CIO moving forward, the CIO shared the following: the role of the CIO continue to be a partner (Data officer, Privacy Officer, Transformation Officers, etc.); the emergent technology present opportunities for CIO on how to work with business clients, adopt new ways to deliver business services in a way not yet considered; via pilot, experimentation, to de-risk the adoption; engagement with clients (what are your business challenges, what are you looking to improve, what is the business problems, explore it deep down to each individual business requirement in order to see how technology can help); it is vice versa from the old way of addressing a business problem, with a pre conceived view on the solution.

Pre business solution conversations are needed with each business partner to understand the business problem from the user lens, developing a relevant business solution.

The CIO will engage all sectors, parts of the organization to talk about digital strategy, digital economy; to explain what the Digital Transformation is, to make it clear for all the executive cadre team; to develop a digital strategy team of ambassadors to convey the digital strategy message across the organization and to the senior / executive committee; to develop communication materials.

2021 Differences: In one case, the CIO presents personal views on the CIO role:

The CIO and the CIO team is the enabler of the digital transformation.

The CIO is the lead for developing the digital transformation and will work as a partner with the Digital Transformation Champion (once the position is available, and the person will be hired).

For any project, CIO will be a partner, and the CIO team will carry the responsibility to prepare and present the transformation. The CIO and the CIO team has worked on the Open Government Plan: Open Government Implementation Plan: Open Government, Government of Canada.

5.5 CIO career path

The CIOs interviewed in 2016 and 2021 come from various walks of life, many of them have a high level of seniority in public sector, and many have private sector experience, or a well-rounded professional background that combines private and public sector background. A few of the CIOs have a strong IM IT background, and long-standing tenure in IM IT area. Their career path included business, financial, project management and technical education, with increase professional work responsibilities that leads them to the CIO roles either from within the organization or outside public sector.

5.6 Influencing decisions of other CXO peers (i.e., CFO)

The relationship of CIO with its peers was recognized of high importance by all the CIOs interviewed. The relationship of the CIO with its peers is a collaborative, dynamic, active, with a competitive nature at times and with variations based on the level of authority of the participants. Findings from the interviews conducted are presented here below.

Table 21: CIO influencing decisions of CXOs (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> n/a 	<p>The level of influence that CIO exercise span across various roles that CIO plays.</p> <ul style="list-style-type: none"> CIO is a lead of the project. CIO, a champion for engagement, relationship, communication, mediator, negotiator, and implementer. CIO, a Transformation Leader: CIO, a trainer, and subject matter expert:

		<ul style="list-style-type: none"> • CIO leverage the process used to brief senior management: at the operational level; at the decision-making level. • CIO, a governance transformation leader • CIO, an influencer of organizational culture and work environment • The CIO engaged central agencies (i.e., central agencies), departmental teams.
<p>2021</p>	<ul style="list-style-type: none"> • n/a 	<ul style="list-style-type: none"> • A transformed role of the CIO with impact on the relationship with other CXOs • A renewed role, with increased authority and ability to negotiate. • An increased level of influence over the internal decision-making process. • Increased level of influence throughout the life cycle of the project • CIO influencing at all levels during the Transformation project.

		<ul style="list-style-type: none"> • CIO’s level of influencing is supported by the increased level of versatility in the use of various tools, the mechanisms engaged, the style of communication, supported by the skills, and competencies of the CIO:
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INFLUENCING DECISIONS OF OTHER CXOs: 2016-COMMONALITIES

The level of influence that CIO exercise span across various roles that CIO plays.

CIO as the lead of the project: In this capacity the CIO conducted all the consultations with internal and external stakeholders.

- Played a major role in influencing the parties involved throughout the life cycle of the project.
- CIOC ‘s ability to speak the language of the business.
- CIO role as a liaison among all the parties, including central agencies, and private sector.
- CIO is a champion for engagement, relationship, communication, mediator, negotiator, and implementer.

CIO as a Transformation Leader:

- CIO supported and influenced the CIO of OGDs other public service departments that were stakeholders in the project.
- CIO worked very closely with own ADM, and with the ADM of OGDs,
- CIO engaged closely with the GOC CIO, and the CIOs community across GOC on policy, strategic and operational matters:
- The successful implementation of an enterprise solution brought additional partners at the table that CIO to launch / implement this enterprise-wide solution.

CIO as a trainer, and subject matter expert:

- Leveraging the Training Material developed: the business transformation knows how, and training material was used as a baseline; it has been adapted to OGDs' needs; updated and returned to the CIO. Online modules were created for the ongoing use within OGDs.

CIO leverage the process used to brief senior management:

- For DM and Minister briefing, CIO put in place a process for using the same BN information and templates; all DMs of respective OGDs stakeholders of the project got together to discuss and it made for a very short meeting.
- CIO as initiator of policy, and governance committee.: To better influence decisions across OGDs and to support further policy and strategic work, CIO provided input in the initiation of a series of horizontal groups across GOC:

At the operational level:

- Participant to the interdepartmental Working Group to serve as a forum where members can identify and coordinate federal initiatives to enhance Canada's agenda; to develop policy recommendations for senior decision-makers and promotes greater communication and cooperation across the federal government.
- Active participation in three standing committees — Policy, Operations, and Legal Issues — support Interdepartmental Working Group' decision-making. Members are at the director and/or senior analyst level. Most committees meet monthly. The Interdepartmental Working Group also called for ad hoc working groups as needed.

At the decision-making level:

- Assistant Deputy Minister Security Committee
- The Chair of Interdepartmental Working Group reports to the ADM committee lead of the horizontal initiative. Members are at the ADM level of core departments and agencies and is chaired by the ADM of one of the public sector organizations; the committee provides direction and guidance on major policy and legal issues to advance the agenda. The committee does not report to any other committee or working group, although its chair provides updates and debriefs at other Assistant Deputy Minister-level meetings to inform and seek direction from the broader federal community.

CIO, a governance transformation leader:

- The CIO influenced internally via the governance model put in place for the organization with direct influence from the corporate offices to the project team, to the CIO counterparts, via the Program Authority – the DM.
- The CIO influenced externally the CIO community with the project management approach selected and the external governance model put in place for the organization.
- CIO engaged with CIOs and GOC CIO community to discuss the process and requirements of central agency's Enterprise Project Oversight Committee during the life of the project and discuss the impact it has on the progress of the project and its overall success; the main imposed requirements were discussed, and recommendations presented to central agencies (i.e., periodical internal and external audit, the independent review required for projects to move from one gate to another);
- CIO, sharing best practices and engaging the CIO community to solve and address issues.
- The CIO shared periodically with CIO community the challenges and the successes of the transformation project and shared openly the processes and the approach used.
- CIO knowledge and best practices sharing solutions for CIOs community to use and access.
- The CIO engaged with CIOs of OGDs. Interested to join the E-services (i.e., For Case Management and the new "commercial off-the-shelf" solutions (COTS) put in place.

CIO, an influencer of organizational culture and work environment

- The CIO engaged and influenced unions, staff, and senior management on the implementation and outcomes of the project.

The CIO engaged central agencies (i.e., central agencies), departmental teams.

INFLUENCING DECISIONS OF OTHER CXOs:2021-COMMONALITIES

The CIOs interviewed in 2021 discussed about the revised, almost transformed role of the CIO in public service. Given the transformation of the role, there is an evident impact in the relationship between CIO and CXOs, and the level of influence over the decision-making

process. The new, revised CIO role that the current CIOs helped to transform, brings a new dynamic in the relationship between CIO and CXO. Given the current role, the new CIO role brings an empowered, highly increased authority and ability to influence her peers, and the CXO team. The level of influence that a CIO has over the decision-making process refers to internal decisions (users that receive services, and users that are using the systems), and the decisions with impact over the external parties (clients, central agencies, other departments, private sector organizations). The CIO influenced his peers and the stakeholder throughout the life cycle of the project:

- Throughout all the stages of the project planning, execution, risk management, integration of data sources with OGD.
- The CIO in the new role, is influencing at all levels, horizontally and vertically, the challenges and the difficulties of the Transformation project:
- resistance of the organization to the transformation project
- communicate constantly about the changes at governance and business approach of the transformation.
- communicate and influence senior management on the value of digital transformation .
- reporting with the business owner
- changes of the governance model
- advocate and support the adoption level at the organizational level: Henry Ford :” if I had asked people what they wanted, they would have said faster horses.”
- CIO’s level of influencing is supported by the increased level of versatility in the use of various tools, the mechanisms engaged, the style of communication, supported by the skills, and competencies of the CIO:
- Ability to communicate.
- Capability to engage all business players, identify the key partners.
- Ability to connect with peers across GOC and embrace an existing governance model.
- To communicate to the organization in their language, mainly business language, and almost at all in IT language
- To educate senior manager on IM / IT and on digital transformation.
- Increase digital literacy of the workforce.
- To educate the senior management on digital concepts, terminology.

5.7 Business – Technology alignment

During the interviews with the CIOs, alignment was discussed at large. This process was mentioned as the need for the business of each of the departments across public sector to use IM IT to achieve business objectives.

Table 22: Business Technology alignment (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> • There are inconsistent views over the need for strategic alignment between business and technology. 	<ul style="list-style-type: none"> • Tools and practices of CIO to ensure alignment.
2021	<ul style="list-style-type: none"> • CIO introduced a flexible way for change management, with increased accountability, engagement, consultations. The project was business lead, but the business was integrated in the project team and in the IT team. Integrated business team was maintained to strategize and continue to stay in the IT team. Value the specialized resources and allowed them to take ownership of their skillset and the impact on the project. 	<ul style="list-style-type: none"> • CIOs underline the importance of strategic alignment for all the projects initiated and implemented. • Strategic Alignment: projects need to be align with Government of Canada objectives; meets the Government of Canada vision, supports the departmental goals and objectives; meets all legislative and policy-driven requirements; ensure that all legislative and policy-driven requirements will deliver the solution efficiently; collaborate with other Government Departments to ensure strategic alignment of platforms, develop a common

		<p>information architecture (IA) data integration plan and ensure IA-related systems and platforms.</p>
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BUSINESS – TECHNOLOGY ALIGNMENT: 2016-COMMONALITIES

CIO put in place a series of tools and practices to support business technology alignment across the departments and within public sector in Government of Canada (GOC).

- Developed Sector Readiness Scorecards
- Created to solicit buy-in and engagement.
- Developed transition planning to ongoing operations.
- Put in place Service Level Agreement (SLA) between technology and business groups.
- Use of working groups, for ex. For incident, release, training and change to conduct the operational process development.
- Initiated joint Human Resource planning to align resources to operational commitments and priorities across the organization.
- Initiated Joint planning and execution meetings with decision makers across the organization.
- Developed and implemented the Go/No Go process for prioritization and planning of new initiatives.
- Initiate discussions across setting expectations for a stabilization period.
- The CIO ensured that the business transformation initiative is aligned to the IM IT Strategic plan of the home organization and of other departments. Involved in this strategic initiative.
- The relationship between the CIO and the Business areas of the organization has changed, for a better communication, a better alignment of strategic goals of the organization and the ability of CIOB to execute of delivered commitments.

- This was a major change given that in the past, any changes would just take place, without consultations, without engagement of all parties involved, without communication.
- The new business transformation project / program was a strategic alignment of Government of Canada, for modernization of internal services necessary to deliver GOC services to Canadians, and Services & Programs on behalf of other departments and agencies; to reskill / develop and prepare the workforce for operational needs of the organizations.

BUSINESS – TECHNOLOGY ALIGNMENT: 2021-COMMONALITIES

CIOs discussed the intense efforts to ensure alignment of business and technology, that includes initiate renewal projects where technology was used to manage business needs driven by policy changes; initiate projects to support key business capabilities and processes.

CIO use “Build standards-based” solutions to:

- adhere to GC technical standards and guidance, leveraging open standards when possible.
- leverage common business capabilities and harness GC-wide solutions that can be reused across the enterprise.
- build innovative technology (such as API First) business lines and services, exposing data and functionality, to foster data sharing within GC and externally.
- build microservices that work together within an ecosystem allowing for rapid deployment and built-in redundancy.
- build API first meant to “Build toward One GC”: • One GC is where digital business changes are built to support a government as a platform where everyone can maximize shared capability (Platforms) and minimize unique department products.

CIOs presented alignment at various levels:

- alignment internally between IT and business.
- alignment between the policy requirements, balance between business / technical requirements and policy needs.

- alignment of the project with the organization mandate letter.
- alignment of the project with the GOC IM IT Transformation Agenda.
- alignment of the projects to the GOC Digital Policy and Digital Transformation agenda.

5.8 Talent management and transformation team (TMTT)

CIO has a strong relationship with the transformation team and usually he is an active member of this team. As a member of the CXO team, the CIO is preoccupied and is an active contributor to the organization’s efforts to prepare and acquire a well equipped, well skills workforce necessary for the organization needs to achieve the overall business goals.

Table 23: CIO and TMTT (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> • In one instance the CIO was also leading the development of Project Management (PM) capabilities across the organization; The organization has in place its own project management certification. • In one instance the business transformation project was to set up and put in place a Talent management Program for all staff. 	<ul style="list-style-type: none"> • CIO reports to an ADM • CIO is educating the CXO peers, the CIO team and the organization to support the implementation of IM IT Strategy and the Digital Strategy
2021	<ul style="list-style-type: none"> • Inconsistent Talent Management approach across public sector • Challenges accessing funding. 	<ul style="list-style-type: none"> • CIO is actively involved in Talent Management needs of the organization.

	<ul style="list-style-type: none"> • Low pace of actions required for the Talent Management activities. • Various factors with direct impact on the recruitment, hiring, retention of employees that support the current and future activity of the organization. 	<ul style="list-style-type: none"> • CIO initiate actively support Talent Management needs. • CIO is supporting the organization for the adoption of digital practices. • CIO assess risks and work with the organization to mitigate Talent Management risks.
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Talent Management and Transformation Team : 2016 – Commonalities

In general, the CIO who is at the Director General (DG) level leads IM and IT, reports to the Associate Deputy Minister (ADM) of Corporate Services. The Organization. Chart of the organization researched presents a structure where the CIO reports to:

- The ADM in charge of the Integrated Services, who reports directly to the Deputy Minister (DM) of the organization.
- The CIO reports to the ADM of Corporate Services who reports to the DM of the organization who reports to the Minister.

The CIO developed and put in place a project management capability model and developed the tools and knowledge required by the org. to manage its projects. The CIO oversaw:

- Technology Planning and Governance
- Client Support Services
- Innovation, Architecture and Security
- Application Development and Support
- Field Systems
- Information Management and Record Keeping

- Telecommunications and Network Services
- Access to Information and Privacy

TALENT MANAGEMENT and TALENT MANAGEMENT TEAM : 2016 – DIFFERENCES

There is no consistent approach on how talent management, hiring/recruitment/retention of staff, or how the development of the digital team is done across organizations. The pace of Talent Management actions and preparing a Talent Management Team varies across the public service. The availability of funding is another major constraint that CIOs mentioned.

The size of the organization, the funding allocation, the project management maturity level, and the advance of the digital transformation are some of the factors that have a direct impact on the recruitment, hiring, retention of employees that support the current and future activity of the organization.

Some organizations are more advanced than others in identification the resource gaps and talent need for management of current projects and future strategic actions.

In some cases, organizations took upon themselves re-training, re-skilling the current workforce, while engaging in training their staff with internal resources.

TALENT MANAGEMENT and TALENT MANAGEMENT TEAM: 2021- COMMONALITIES

In general, the CIOs discussed the importance of resources in management of their projects, mainly the challenges they face. Scarce skills set, limited resources, inexistent capacity with the right skill set, limited level of digital knowledge of the existing resources, extensive duration of the HR processes, are a few of the limitations and constraints indicated by the CIOs. In one case, the CIO presented the plans to acquire, re-train, re-skill the resources to support the current and future needs of the organization.

CIO is supporting the organization for the adoption of digital practices. The CIO and the team engaged in a series of-“digital 101”- activities, putting in place a communication and engagement plan along with a series of activities initiated. CIO is preparing staff and capacity by reorganizing the team, the structure of the organization (model of Team A, and model Team B), the Talent Management and readiness of the organization for the future.

The CIO has identified a series of risk related to capacity, skill set, the present and the future needs for the IM-IT activity and the Digital Office. One of the main areas of risk identified is resource management. Small organizations are faced with challenges and limitations regarding its human resources capacity. Immediate resource management needs:

- Employee engagement at all levels
- The appropriate talent and tools
- Effective management of resources

At the enterprise level, the organization tailored engagement activities and people management initiatives to attract, develop, retain, and maximize the contributions of its workforce.

The organization launched its new long-term People and Culture Strategy, which is based on the vision and priorities laid out in the organization's Strategic Plan. The strategy is promoting a culture of accountability through empowerment and change for growth and modernization. Training, re-skilling, work life balance, flexible work arrangements, work-life balance and a commitment to mental health and well-being are some of the objectives of this strategy to support hiring, recruitment, and retention of the necessary work force.

The organization has revamped its recruitment approach and launched an enterprise talent acquisition framework, which features an integrated vacancy management strategy, coupled with robust outreach and staffing processes. Launched activities to advance its Public Service Employee Survey Action Plan, developing a learning curriculum for leaders, creating a talent management program, reviewing, and updating the staffing policy, identifying a Wellness Champion, establishing, and staffing a new Ombuds Office to provide a safe, respectful and judgement-free resource to support staff. The organization implemented new corporate commitments in its assessment of performance to better focus on "how" results are achieved in addition to measuring the results themselves. Also, launched modernization initiatives for staffing policies, practices, and assessment methods, streamlining its staffing processes and reducing administrative burden, allowing for a greater focus on the quality of the candidate. A new staffing policy was put in place facilitating the organizations move from a rules-based system to one that balances compliance with agility, principles of fairness and transparency.

In another case the CIO initiated actions at various levels:

For the team: The CIO is focused on training and development opportunities for the team, managing and developing existing talent, and addressing the ongoing issue of recruitment and retention of IT talent.

The CIO team managed the projects with internal resources and professional contractors. To support the continue execution of the projects, and the implementation of the IM IT Plan, the CIO presented an ask to equip his team with additional resources that have the skill set required to manage the projects, and to recruit and hire additional resources that will support the future implementation of other projects and initiatives: Enterprise Architecture (EA), Innovation and Experimentation on AI, machine learning, block chain, etc.; Cyber Security; Strategic Planning; Cloud Centre of Excellence (CCOE): cloud application developer/ cloud infrastructure technician

GC Cloud: the organization is exploring this opportunity. As Talent Cloud is an experimental new staffing model for GOC, focused on bringing in high performing external talent for project-based work. It is the world's first public sector marketplace for the gig economy, structured around next generation of workers.

For the CIO: The organization. Is focus on CIO Talent Management. As CIO are becoming business enablers rather than technical specialists, the succession plan builds on the ever-evolving role of the CIO. The talent management plan aims to challenge IM/IT executives to develop service design and delivery skills, and act as enablers of enterprise transformation.

In another case, the organization is developing its workforce, ensuring the employee health, well – being and safety. The organization is key in equipping the employee with the digital tools needed to effectively deliver world class services and support the internal transformation. It focusses its energy on training, improve. Enhance existing skills, and upskilling where needed to address business requirements of staff and management The organization is to ensure participation of each employee in advancing the digital mindset, encouraging bold and creative ideas. The organization intends to have in place a diverse, service oriented, digitally savvy workforce, in an inclusive, healthy, accessible, and connected work environment.

5.9 Business Technology staff exchanges

In an era of transformation, public sector is faced with a shortage of personnel, with insufficient or scarce qualified resources, with existing staff that might not be fully qualified to manage the IM IT modernization and the digital transformation, or with limited access to available qualified resources. The CIOs from both round of interviews conducted part of this research were preoccupied by the access and availability of skilled resources necessary to form the project team and to maintain the resources necessary to successfully manage the projects. They touched heavily on this topic, presented their constraints, challenges, and committed actions.

Table 24: Business Technology staff exchanges (2016 and 2021)

	Differences	Commonalities
2016		<ul style="list-style-type: none"> • CIO collaborate well with business partners; increase collaboration for the benefits of projects and successful implementation of Strategies. • CIO balances effort to sustain the needs of the organization while responding to central agencies requirements. • CIO share best practices of business technology collaboration.
2021	<ul style="list-style-type: none"> • Project resources are acquired via procurement or via HR actions, internal or external to the organization, and across public sector. 	<ul style="list-style-type: none"> • In general, there are intense efforts from the CIO’s part and the Business part to support each other projects, to align business -technology needs, and ensure required capacity of

	<ul style="list-style-type: none"> • Agreements among deputies in public sector, allow CIOs to staff their project teams. 	<p>the projects, including exchanges of staff.</p>
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BUSINESS – TECHNOLOGY ALIGNMENT: 2016 – COMMONALITIES

CIO collaborate well with business partners and increase collaboration for the benefits of projects and successful implementation of Strategies.

CIO balances effort to sustain the needs of the organization while responding to central agencies requirements.

CIO share best practices of business technology collaboration.

For the projects where CIO is the Transformation Lead, that require collaboration. The project was a collaboration with OGDs: “It’s hard to change the engine while you’re flying the plane.” CIO engaged in co-operation of current partners and encourage collaboration of both teams.

- Managing expectations of ‘good enough’; having the right people to satisfy the needs: how much documentation, process is enough to satisfy the needs of the collective. The further apart the parties the more rigorous documentation required. “Building relationships is hard work! Almost like an arranged marriage. You must work out the details.”
- OGDs seen as wanting too many “adaptations”; the CIO of the home organization seen as being inflexible at times.

When the project was conducted across multiple venues which added to the complexity of building cross-team based relationships.

As Business processes will be impacted, there is a need for earlier engagement of business process owners; start early on developing Service agreements, over-estimate the time and resources required to develop the SA/SLAs.

There is a need for defining single service levels across the partnership.

Within the organization, the CIO manage the set up the Program using the Chief Information Officer (CIO) office, staff from the BMU business management unit, and the PM of the Program Leads: Solutions Management Team, Release Management team, and Enabling Service Transformation Team.

The CIO managed the project with the Director General (DG) from the CIO Bureau and from the Business Management Unit (BMU). Commercial off-the-shelf solutions (COTS) and professional consultants were used.

The CIO managed the project. Obtaining contracted IT resources required a bidding process. New rules enacted in January 2016 have imposed a longer period for RFPs a requirement to go out to more parties than before.

Existing contracted resources cannot be readily deployed to the project from existing projects (several of which are mandatory). This caused delays in starting and completing the project, unless the organization can move available resources within, or access to resources available in OGDs is possible.

BUSINESS TECHNOLOGY ALIGNMENT: 2021-DIFFERENCES

There does not seem to be any differences among the departments' practices of which the CIOs were interviewed in what would be an exchange of staff during any of the projects presented.

However, a few of the CIOs indicated that some of their project resources was acquired by the means of using HR actions (assignments, interchanges, secondments) in bringing public servants from other departments on a short term. These actions were initiated in agreement between the deputies of the departments involved. This is a practice within public service.

BUSINESS TECHNOLOGY ALIGNMENT: 2021- COMMONALITIES

To support the business technology alignment, and ensure consistent exchanges among these units, the CIOs has initiated a series of activities that are undergoing: intense and continue consultations with each of the business lines with each of the internal / external stakeholders. The CIOs sits with ADM of each business lines, who are part of the 4 governance committees. CIOs mentioned that digital transformation started almost 30 years ago; it is now in a new stage, transforming the business with technology for a stronger foundation. The CIOs worked vary

hard to build and transform this relationship with the business groups; IT and Business to be partners; IT advises the Business group, present with recommendations; IT can be a service provider only if it is a partner with the business side; IT can demonstrate the art of possible, and value it brings. IT can build the trust in the relationship with business, to demonstrate how can deliver; when the previous IT and Business relationship was disastrous; barriers had to be removed. The CIO and the Digital Office are developing an Agile approach with pilot projects with all partners (IM, IT, Internal Business units, External Partners, 3rd party, business services), to digitally enable their functions; work with business units to transform the culture of the organization. The business groups hire people, based on work preferences. There is strong internal resistance as it affects people. CIOs put in place project team with staff from the CIO office, under assignment across GOC. A unique organizational model for each project, a matrix environment within the department, with staff from the CIOB and the Business groups.

6 GOVERNANCE

6.1 Value Measurement

The leadership team showed strong interest to deliver successful projects; CIOs are the top leaders in charge of these endeavours. CIOs are aware that each project delivered needs to bring the values initially anticipated. CIOs ensure the changes brought by the project outcomes would bring value to the organization, taking the organization towards a higher level of level of measured performances.

Table 25: Value Measurement (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> No formal value measurement. 	<ul style="list-style-type: none"> Projects were completed successful. Value of projects is measured by its outcomes, ensuring that committed deliverables have been delivered.
2021	<ul style="list-style-type: none"> Value is inconsistently defined and measured. Impact of project management maturity of the organization. Scarce value measurement system 	<ul style="list-style-type: none"> CIO defines and communicates value throughout project life cycle. Forms and attributes of value measurement.

VALUE BENEFITS: 2016-COMMONALITIES

With all projects completed in time, scope and in budget, the CIO’s viewed their success as a main measurement of value of these projects. CIOs define and communicate projects ‘ values

from the outset throughout projects life cycle. Creating a knowledge base that can be “re-used” for other similar projects within the organization or across GOC; an opportunity to replicate at the horizontal level.

The solutions implemented / system were finalized, continue to function well, may have new functionalities introduced since the completion, have been potentially expanded, were further developed, enhanced with new functionalities, continuously added.

In some instances, the value measurement of a successful project was the decommissioning of the old system (legacy system) for the new one to fully take over.

CIO ensure projects achieve the short term/ long-term goals of the organization:

- Short Term Goal:
- To reduce administrative costs by implementing a client-centred service delivery model (“Click-Call-Consult”) for the delivery of internal services and using automated transactions, self-service, and enhanced consultation support within a tiered, client-focused service model.
- Improvement of the effectiveness of internal service delivery
- An improved client experience, increased efficiencies, stewardship of resources
- Long Term Goal:
- to deliver simple, integrated internal services, built on a modern technology platform to improve the organization’s ability to be efficient, provide value for money to Canadians.

VALUE BENEFITS: 2016 – DIFFERENCES

The projects researched neither one had formal value measurement defined in the project management framework; nor in the implementation approach, on specific measurement tools indicating how well projects teams are achieving specific goals set for the project.

VALUE BENEFITS: 2021 – DIFFERENCES

There were noted Inconsistencies in defining and measuring value at project level. In only a few cases the CIOs discussed value under the Triple Constraint. In one case only the CIO presented the benefits realization plan developed for each of the projects of the organization, per the project management framework of the organization. At program level, value measurement is usually measured based on the funding requirement set by central agencies

or the funding source authority. At the portfolio level, the departments in public service define value based on the departmental mandate letter. The level of project management maturity of the organization was an indicator of the formal way the value is defined and measured. In one instance the realized value of a project (i.e., Cloud technology adoption) was measured by attributes such as: more effective collaboration across business sectors of the organization and with external partners; increased mobility of the workforce; access to documents on mobile devices; improve interoperability with other systems.

VALUE BENEFITS: 2021-COMMONALITIES

CIOs discuss value measurement presenting metrics for the project deliverables and outcomes. Value measurement is also presented in the project prioritization process, project selection at the program and portfolio level.

- In general, the CIOs present value – based outcomes, prescriptive, measurable. Value is measured at business, user, and customer level. Project cost is considered as well.
- CIOs ensure that the success of the digital transformation project brings the expected value for the organization (i.e., a collaborative platform to allow staff to work remotely and have access to all the necessary tools required).
- Value for the organization can have various forms and attributes. It is defined and approved in the organizational strategy and the operational plans.:
- internal collaboration (i.e., improving the business technology relationship)
- process improvement.
- technology that meets the organizational needs
- the organization – wide transformation activities for increased accountability (i.e., establish a modern performance information system to support fact-based decision-making, an updated Departmental Results Framework, a full review of the outward facing performance indicators and logic models for scoring programs)
- prepare the organization for the future.
- greater transparency
- improved timeliness of program delivery
- increased engagement and collaboration internally and with external stakeholders.
- increased ROI.

6.2 Governance

Decision making process in public sector is a correlation between the mandate of the elected government, election cycle, political responsiveness, fiscal responsibilities and fiscal discipline, and program effectiveness. These are some of the factors that affect the decision-making process in public sector, along other factors such as policy priorities and resource allocation.

During the interviews with the CIOs in 2016 and 2021 each of the CIO presented information related to the decision – making process and the decision – making structure of their individual organization. Information gathered are presented in the table below:

Table 26: Governance observations (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> • Governance Model • Varies across public sector. • Inconsistently defined. • Impact project objectives. • Customized across organizations. 	<p>Governance Model</p> <ul style="list-style-type: none"> • Internal and external models. <p>Role of the CIO in Governance</p> <ul style="list-style-type: none"> • CIO participation to the governance model. • CIO contribution to governance models.
2021	<p>Governance Model</p> <ul style="list-style-type: none"> • Impacted by the size of the organization, and project management maturity level. • An evergreen effort across public sector organizations 	<p>Governance Model</p> <ul style="list-style-type: none"> • Formal structure and processes in place for some organizations • Impact on Digital Transformation • Impact on Digital Strategy

		<p>Role of CIO in Governance</p> <ul style="list-style-type: none"> • Promotes for a flexible model. • Participate in the decision – making process. • Level of authority of CIOs • Governance’ know – how.
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GOVERNANCE: 2016-DIFFERENCES

The major differences noted were related to the model of governance used. One of the main findings related to the governance model of the organizations where CIOs were interviewed is the inconsistency of the governance model across public sector organizations: they are not always formally defined; it varies from one project to another, from one organization to another; does not always support the project objectives; the internal and external models are customized, defined for each project. “Governance is a requirement to be checked off only, Governance must have a purpose.”

In one of the organizations there was no governance in place, rather the decision-making process was light, informal, with a very small group of individuals involved in the decision-making process. In some cases, the CIO was leading the PMO and the project team:

Internal Governance

- In several organizations there was no governance documentation.
- The CIO had periodical briefs with the supervisor, the President/ADM of the organization.
- CIO conducted strong front-end planning of the program for its implementation.
- CIO used the lessons learned from the implementation of a similar, fully customized program.

External Governance

CIO initiated consultations with external groups part of the other government departments (OGDs) and central agencies. In one instance the CIO expressed the following views on governance:

The governance model in place in Government does not support the project objectives.

- large organizations at the federal government level have set rules, with the same model of governance, and the expectation that the model will ensure overall success for all departments and for each project; “one size fits all” approach.
- Governance is there to assist with a successful deployment. If the governance creates more work, it is a wrong governance.
- Governance is there to push the progress of the project, and not to ask CIO to do more work, to explain more, to create and deliver more papers and reports, and to become heavy, extenuating.
- For every release the CIO oversees 10-12 projects. Each of them needs to have their own project and governance system; “I can’t go to 12 DG level meetings, for each release, when I have multiple releases, and where they discuss one thing only, and I am one person”.

Governance is a requirement to be checked off only, Governance must have a purpose.

- In public sector senior management thinks of governance first, and then why the model of governance is used.
- Governance is needed because of the high level of IT failed projects.
- There is an industry of project management and its governance to be considered.
- To satisfy each client, for each project, CIO need millions in cost added, to have the necessary resources needed to support the governance for each project.
- When there is trust build, with an existing partner, there we can work with minimum governance.
- In case we have new partners, then we have more regimented governance model applied, until the CIO developed a certain level of trust.
- We need governance, to support the needs of the projects and the organization.
- Current governance model includes audit (internal, external), oversight of independent reviews (external); compliance require high levels of work and resources.

- When internal and external audit, and an independent review are conducted for an organization at the same time, by the time the recommendations for one of these are received, the CIO has the option to do nothing and wait, or, to continue and mitigate the recommendations. Often, by the time CIO receives the recommendation from one review or audit, CIO was moving to another gate, otherwise would have delays and never finalize the project. “What good, in this case, would be to have the audit and the oversight of an external review?”
- By the time, the recommendation of a review for a certain gate is received, CIO must start doing the review for the second one; there is no alignment, sequence, there are delays in conducting the review process, and receiving timely the recommendations.
- There is a need to have a high level of flexibility and adaptability in the governance model that public sector chooses to have.
- The recommendations for reviews and audits in IT are not realistic (i.e., “You must complete an independent review before you proceed with the next gating process.”)
- There is a need to take an incremental process for IT projects, impact business and operations, and governments operations and services.
- There is a new service strategy in works at central agency, but this comes with privacy; CIO community got scared; bounced back and forth between service delivery and privacy, and the public sector organizations continue the circle.
- Oversight from the central agencies is useful but constitutes an overburn and an overkill; The governance model has created a big risk for each project.

GOVERNANCE: 2016-COMMONALITIES

The areas of commonalities noted include governance model, and the role of the CIO in Governance. At the Governance Model, the internal and external model for IM IT projects across public sector follow the central agencies IM IT policies for management of investment projects. Role of CIO in Governance has been presented by majority of the CIOs: CIO is part of the CXO team who develop the governance model; CIO is part of majority of the governance committees; CIO is setting up innovative governance models and working groups necessary for the successful implementation of projects; CIOs shared their specific governance models

for various type of IM IT transformation and Digital projects. In the following section is presented specific governance information shared by the CIOs interviewed.

Governance model for a complex, sensitive, security related project

Internal Governance: Project Board Review

- A 5-gate process, different from the 7-gate process in use by central agencies
- The departments scale the project documentation based on the size of the project (3 tiers of projects: less than 250,000, between 250,000 and 1 mil, and over 1 mil)
- Internal reviews and audits are customized based on the size, and project importance.
- Using the 3rd party independent reviews
- Strong front-end planning (at the high level of granularity that includes resources used, insource, outsource, type of procurement vehicles used, implementation plans, risk and mitigation plans, communication plan, along with analysis of complexities, Multiple releases, incremental
- CIO work to support the organization to comply; support the conduct of internal audits and independent reviews commanded by the organization, due diligence with independent audits at each stage of the project.
- Implemented all recommendations received from the internal and external audits and reviews; considered all the advice, and there were no giant surprises due to the incremental approach.

External Governance:

- Central agency Oversight, led by the ADM and the CIO of Government of Canada
- Bring the right people in from central agency; there is gain for the organization to receive and make good recommendations.
- The central agency oversight, as an entity, does not bring specific value, but their recommendations can be useful across public sector.
- Oversight has several connotations; CIO would want them to get into an advisory role and taking over accountability. Advice and recommendation are useful, but dictating or authoritative support is not desired.

- Project does not guarantee success.
- The difference between the theory and practices: In practice, there is a lack of people skills and soft skills among project and program managers.
- It is obvious and surprising the lack of ability that people must properly conduct a project due to the lack of understanding of the value of teamwork.
- Mastering and managing the resistors staff

The Matrix structure, a challenge in federal organizations:

- People understand the need for participation as shared resources, but managers do not understand the matrix resource allocation and structure.
- People are pulled in many directions; some of them are okay, some might like this status; managers and people who run the projects require 100% access to their resources; it is not something to generalize but it occurs across public services.
- To develop a more modular “platform organization” for project portfolio management; This is what the department is doing now, and it is open to Lean Agile and waterfall methodology; Waterfall is challenging to our environment.
- Agile is a new methodology and is welcome to be used in an organization in public sector, it is considered widely in some projects However, it fits very poorly with the IT gating approach, mainly for the Investment projects that require a gating approach, with the oversight of central agencies.
- Agile is a recipe of scope creep, it can be used for small-medium projects, but for any higher cost projects public sector organization will continue the waterfall projects.

Governance model for an enterprise solution when the organization delivers services to Other Government Departments (OGDs):

Internal Governance model:

- Steering Committee (ADM – DM level)
- Sponsoring Committee (CIO, EX, DG level)
- Functional Advisory Group (Program Manager and the DG of Enabling Services), leading:
- Client Advisory Board (DG level)

- Business Advisory Committee (DG level)
- Business Advisory Committee

Working groups as needed:

- Core Design Team
- Integrated Planning Working group
- Integrated Change, Communications and Engagement Working Group

External Governance model:

- Central Agency IT Stage approach & Central Agency Oversight committee
- Government organization requires intensive and profound changes, revisions, Agility, and the right circumstances.
- The need for constant review of business processes (modernization) and business architecture.
- Optimization and efficiency are needed.
- Concerns about IT having the capacity to deliver.
- Business maturity level of an organization is important.
- Change management and IT role (ex. Microsoft Dynamics and the changes it brings to the IT group, shifting their responsibilities towards the Business Management unit)
- IT is territorial and does not always have the capacity to deliver.
- The need for skilled capacity

Governance model for an IT enabled Business Transformation:

Internal Governance:

- No governance documentation
- The CIO had periodical briefs with his boss, the President.
- Strong front-end planning of the program and its implementation
- Used the lessons learned from the implementation of a similar by fully customized program.

External Governance:

- Consultations with union and central agencies: “In Government rules are made to take care of the system and not so much of the people and the deliverable.”

Governance model for an IT enabled Business transformation

Internal Governance model:

- An evolving process for an ever-changing governance process, non-existent prior
- The CIO has formalized a formal governance:
 - A steering IM – IT committee (DG level and up)
 - Commitment of the President
 - Parliament assigned a project-program.
- Role of evaluation of projects; use of a self-experimenting the prioritization and selection criteria of projects, currently done on a yearly basis, using a combination of 4 models, as following:
 - (1) individual selection of 1-20 projects
 - (2) selection of projects & voting,
 - (3) use 3-4 selection criteria based on which the voting takes place, and
 - (4) a combination of the 3 models combined

External Governance model:

- Central agency IT stage approach and Oversight committee (when applicable)

Governance model for Digital Transformation:

- A Digital Champion was designated.
- CIO asked to be the key in promoting and advancing the digital transformation; Champion for Digital Transformation worked closely with the CIO to promote / advocate the project during its life cycle of the project.
- A Steering Committee: A Business Transformation Committee with all stakeholders.
- During the project, the CIO left public sector, and went into private sector.
- An engagement strategy put in place, included a series of “Persona Co-create Workshops” at the outset; “out of the box” tools used and customized.

Governance model for the development of the IM IT Strategy of GOC:

Internal governance to the central agency

- A consultative working group, with CIO, IM, IT, Security, Privacy, Service teams

External governance to the central agency

- Consultations with OGDs
- Consultations with CIOC community and its members

Governance model for a telecommunication project:

Internal Governance model:

- An evolving process for an ever-changing governance process, non-existent prior
- The CIO formalized a governance model.
 - An IM – IT steering committee (DG level and up)
 - Commitment of the President
 - Parliament assigned a project-program.

Role of the IM IT steering committee:

- Evaluation of projects
- A self-experimenting the prioritization and selection criteria of projects, that is currently done yearly, using a combination of 4 models.
- Selection of 1-20 projects.; selection of projects & voting; use 3-4 selection criteria based on which the voting takes place, and a combination of the 3 models combined.

External Governance model:

- Central Agency IT Stage Approach Over and sight committee (when applicable).

Governance model for a departmental business IT enabled project:

Internal Governance model:

- An evolving process for establishing the level of governance required.
- Internal (operational and strategic) and external governance groups (strategic)

- Project Board Review (meets twice per year) (PMs, staff representing each jurisdictional departments)
- Departmental buy-in ensured via an ADM Steering Committee (including jurisdictional departments and central agencies), DG Champions Committee, Engagement of Sectors from within the organization.
- Steering Committee (ADM and DM level)
- Sponsoring Committee (CIO, EX,DG level)
- Functional Advisory Group (Program Manager, DG of Enabling Services):
- Business Advisory Committee (DG level)
- Working groups as needed: Planning and Design Team; Planning Working group; Change, Communications and Engagement Working Group

External Governance model:

- Central agency's IM IT stage approach and Oversight committee as per the policy in place (when applicable)(led by the ADM, twice per year); CIO prepare and present project updates, progress, issues.
- The CIO agrees with the approach of a modular platform for project portfolio management; better than a bi-modal approach, it will support a fusion model.
- CIO is in support of an organization to have the bi-modal approach when needed; The complex projects are managed using the waterfall-based methodology.
- Projects can be phased delivered and in between stages, the projects may be on hold for extended periods of time.
- A robust equitable governance structure with senior level participation for decision-making and problem resolution; with the set expectation that parties within both Departments assigned to the partnership to resolve issues at the lower levels of authority, when appropriate.

Observations from CIOs on governance:

- Heaviness of the governance model for the large investment project created a big risk for the project.

Future of the governance:

- Agile project management is the answer for the success of the projects.
- Progressive adoption; already used in some departments.
- A manner for progressive project delivery that worked well for some projects.
- Previous CIO of the Government asked for large complex projects to be compartmentalized to mitigate risk, ensure a thorough monitoring process, concept that any project with big budgets fails.

GOVERNANCE: 2021-DIFFERENCES

The main differences noted from the interviews with the CIO revealed the following main differences: governance is impacted by the size of the organization, and the level of project management maturity of the organization. Governance models across the public sector organizations is under continue development.

Large organizations have made progress in the development of the Digital Strategy, and its implementation. The same progress is noticed in the level of maturity of the organization's project management practices. Some public sector organizations continue to improve the skills set required for new or existing capacity required to implement long term digital strategy directions.

There is an inconsistent level of digital readiness of organizations, staff and management noticed in large organizations versus small and medium ones. There is a noticeable inconsistency in the approach and the model considered for the governance revisions considered by organizations in public sector. Some are creating new committees; other, revise the mandate of the existing committees', or they are amalgamated with other committee to create governance models that can be integrated within the existing ones, with the level of authority or decision making necessary to address transformation projects and strategic initiatives, and digital strategy development and implementation.

IM IT investment projects comply with the oversight requirement from the central agencies according to the policies of management of IM IT projects, and policies on digital services.

GOVERNANCE: 2021-COMMONALITIES

During the 2021 interviews with CIOs the main commonalities noted were related to the governance models of public sector organizations and the active role of the CIO in the governance models of the organization:

On governance model, many public sector organizations have a governance model in place with established processes and structure around the elements of the governance. The existing governance models might pose challenges for Digital Transformation as shared by some CIOs. The governance model impacts the organizations readiness in implementing Digital Strategies.

On the role of CIO in governance, CIOs have been generous in sharing personal and professional feedback on governance, its model, implementation, implementation, and effectiveness: CIOs promotes the need for a flexible governance; CIOs are in general accepted and invited to the decision-making table. Still, there are CIOs that are still not directly taking part of decision – making table; they are not at the same authority level as their CXO peers; they make their voices heard via their deputies; The level of authority of all CIOs should be at the deputy level;—currently only CIOs in large organizations are at this level; CIOs bring governance experience to the role along with views and best practices on governance models and their structure and attributes.

Majority of the departments have a governance structure in place. However, the model used is very different from one organization to another. In general, there are processes already established, and a certain number of governance bodies. CIOs' general view is of a flexible still efficient governance structure, light, with no interest to add any more committees if the existing models are efficient. If not efficient, these bodies are to be “tweaked”.

A flexible yet adaptable governance model is the overall governance model noticed across public sector organization. There is a level of concern around the governance model required for digital transformation that may slow down the decision- making process. Majority of the CIOs mentioned the importance to their role to sit at the table with all the other CXO, sit at the EXCO

table, and any other decision – making forum. CIOs also indicated the need for their role to report to the deputy minister and have access to all strategic discussions. All CIOs agreed that internal governance is important and setting up the governance is necessary to ensure the level of authority required to manage and to steer each of the projects. In general, the governance bodies have a different nature, scope, and role. In many cases, the organization's governance is under review given the development of Digital Strategies across public sector. The governance model for digital efforts across the public sector is inconsistent, is not easy to be developed and put in place, and the journey of organization to reach to a full model and integrate with the existing governance model is very different from one organization to another.

A general concern of CIOs is the readiness of organization to remark the digital efforts to develop the Digital Strategy and its implementation. To address the scarcity of resources; in a few cases the CIOs have initiated actions to mass educate the teams, the organization, and the management team. They are using internal qualified capacity to train and coach colleagues, and instill new skill set and capacity development. They are also using external resources of other public service organizations to learn from their digital efforts, as well as to bring qualified resources; they are also using digital resources offered by professional external providers.

Overall observations on governance:

Public sector is faced by major transformation. Digital agenda of Government poses challenges across the organization that may not be ready to take on this major change on how government operates and how it delivers its services. The flexibility level of public sector organizations in how internal governance is defined and used poses some challenges for a proper and successful design and implementation. In some instances, some organizations don't have a formal governance model, framework, process put in place; the decision – making process consist of decisions made by the senior management team.

CIO Recommendations on governance:

- A 360 – degree review of public sector governance, internally and externally to individual departments, would be beneficial to identify models used, best practices, processes for creation of a knowledge management on governance across public sector, for continuous improvement.

- Governance models across public sector should go through a periodical revision process, to allow for an increase efficiency and effectiveness and for supporting the organizational changes.
- Governance challenges faced by individual organizations in public sector and across the government at large should be used for in the process of policy reforms and policy revisions.
- Governance success across public sector organization should be shared across the individual organization and among organization for supporting continuous improvement.
- Open government, governance readiness presents the opportunity for governance reforms.
- Outcomes and recommendations of internal and external oversight and control activities (i.e., audits) to be public and discuss and shared at the CIO community table-horizontal level, and across public sector leadership teams.

CASE: CIO initiate new governance committees:

- A Digital Innovation Steering Committee (DIST) was introduced by the CIO in one of the organizations. This is an architecture committee, with the mandate to ensure a state of art of the enterprise technology architecture of the organization.
- The organization is using a project management (PM) framework for gating; the necessary architecture is in place to support the gating process for all projects. In this case the CIO is supporting the organization to transition from project to product.
- The CIO put also in place the Digital Enablement and Digital Architecture committee, part of the enterprise governance model. This model includes groups from across the organization: a Policy Committee, a People, Culture and Change Committee, an Intelligence Body Committee, Digital Innovation Steering Committee.
- The organization has a Management (MAC) Management Advisory Committee to which other governance groups report to; MAC gather updates to present feedback and report to the EXCO that consists of directors, the CEO (DM level) and Chief Executive Officer (Deputy Minister level), DMs, ADMs, and the legal counsel of the organization, deputy directors (Assistant Deputy Minister level), assistant directors (Associate Assistant

Deputy Minister level), and the general counsel of the organization. EXCO ensures that the essential conditions – internal coherence, corporate discipline, alignment to outcomes are in place, for providing effective strategic direction, internal oversight, and the delivery of cost- effective results.

- MAC is a standing committee that supports EXCO by providing direction and oversight for the internal services priorities, programs, policies, processes, and systems that sustain the organization’s business operations, operational program activities, and policy development initiatives.
- Both MAC and EXCO are comprised of senior executive, all of whom are well versed in the diversity space. Related matters are also brought to these committees annually for updates and discussions.

CASE: CIO initiate a review of the governance model.

CIO has taken the initiative to contact other departments to access successful projects that might be beneficial to the department, to implement them and learn from lessons learned. Collaboration is paramount for achieving success. The CIO is of the opinion that the governance model needs to be flexible and nimble.

CASE: CIO presented a set, clear and effective Project Governance Structure for the multi-organizational project, aimed at:

- Ensuring project success and delivery of project outcomes
- Defining the accountabilities and responsibilities associated with the project.
- Ensuring timely and effective project decision making
- Provide a structured approach to ensure consideration of a wide range of stakeholders.
- Making use existing central agencies (i.e., central agency) and governance bodies of other departments
- Satisfy central agency guidelines and approval.

For the Governance put in place, the CIO has “re-used the existing governance” structure, and ensured that is was fully aligned to the Central agency Tier 1 Gating Process.

For governance at project level, CIO initiated a revision of the governance and recommended the creation of two digital committees.

- the Project Steering Committee (membership: CIO, VP of Operations, and the VP of Policy); the members are experts in their field, support and rely on each other.
- The CIO was the Vice Chair of the Technology Investment Committee, the highest-level committee to make innovation decisions at the enterprise level; the CIO's VP was the Chair of the committee.

The Executive committee is the governance body that the CIO reported to periodically, where the CIO is inviting them to "demo days".

To ensure Data Integration, the governance model included a Data Committee, and all the departments involved were invited and considered.

As a governance pillar, the CIO focus on establishment of a common Governance Structure: an IA-Ecosystem (Information Architecture) Steering Committee consisting of all impacted departments; departments involved. The CIO identified commonalities and differences between various IA-related systems, establish a common data sharing framework and build towards a single user experience for IA stakeholders. The committee meets on a regular basis, periodically, and as required on an ad-hoc basis. Ensure agency and departmental representation is linked back to respective Project Governance Bodies for respective IA systems. The CIO ensured that central agencies are engaged and aware of the governance interconnections.

CASE: The oversight of the transformation project was ensured by a Steering Committee, with IT and Business Sponsor team representation. The organization was lacking governance at the capital investment level; the project did not have any visibility as a transformation initiative.

The organization's PMO did a good job in setting up the necessary artifacts of the project, however the project framework and the project documentation were not well used, were not well adopted, or socialized across the organization. The management of the project had to be reconsidered, the health of the project needed improvement. CIO initiated and conducted an

assessment, findings and the business case presented to senior management, project scope, business and technical requirements revised, additional funding submitted to central agencies.

As a new CIO role, the CIO initiated a review and an assessment of the status of all projects, mainly the transformation one. The key findings that CIO identified during the process were provided to the senior management: the DM did not seem surprised to learn about the findings; approved all CIO's requests including the CIO request for a short pause of the project to reorganize and re-start the project. The CIO proposed a new governance: a joint business – IT co-leadership committee, led by Business team, while the project team was working in a matrix environment, and was under the leadership of business. The "Construction" of the team needed to have all the stakeholders, the IT, Business, Policy, Program Delivery, regional representation, front line groups, change management; the team was co-located.

The governance changes proposed and introduced by the CIO constituted a tremendous change at the enterprise level. All capital and IT projects, with no exception, were included, included real property projects. Within IT, it is recognized that this has been a CIO effort. Within the Business area, this is also well understood; however, across the organization this is not the case. The training and the knowledge at the organization level was missing; staff who have been in the organization their entire life was not aware of the value of governance, nor did they have any project management basic knowledge, or basic principles. Given the changes, all IT projects are now reviewed by the IT Strategic planning committee and IT management; they go than to the ExCom, and then to the DM level approval.

CASE: CIO presented to Senior management the need for improvement of the governance between the departments and SSC (the service integration organization in public service). At the enterprise level the public sector integration organization (SSC) focus was, and still is. On the overall public sector solutions. Roles and responsibilities between departments and the integration organization were clarified; for the 43 departments, this integration organization continues to tilt – pivoting the horizontal model while forming the structure that changed to horizontal business lines. An example presented was of an individual department that more than 5 years ago went through a cybersecurity attack. A large group of people from that department, experts in department's infrastructure and technology, went to SSC to maintain the

needs of the department while the transition to SSC took place. When SSC tilted, people were sent to other departments. As a result, whenever there is an urgency for the home organization, SSC may not have the depth of knowledge to manage the issues of individual departments. In another governance example at SSC, shared by the CIO, was on the launch of the SSC Act back in 2011. The governance model was a top-down governance, very flexible and nimble: Minister, DCIO and 4 ADMs would meet daily to manage the changes, to manage crisis. Few years later, in 2017 the SSC Act was amended to allow delegation of authority to other ministers. At that time SSC was very agile as an organization, using a new way of doing things, where “the accountability, the authority, and the ability to move things was phenomenal”. The governance at SSC was “very top down, very fluid, and it was actually « a green field »”. « The Government of Canada operates under a federated operating model. SSC is positioned at the asset-optimising delivery model; however, Partner and Government of Canada expectations are more aligned to the service-optimising/shared-service delivery model. »(Source : <https://www.canada.ca/en/treasury-board-secretariat/corporate/reports/shared-services-canada-resource-alignment-review.html>); See the Model Hierarchy. As per the CIO (former), at SSC, the Governance is still the major and critical gap. See the Potential Future-State Governance Structure (<https://www.canada.ca/en/treasury-board-secretariat/corporate/reports/shared-services-canada-resource-alignment-review.html#toc207>); GOC Strategic IM / IT plan 2019-2021: http://publications.gc.ca/collections/collection_2017/sct-central_agency/BT22-183-2017-eng.pdf.

CASE: CIO (former) shared the experience when was the CIO with another department. In presenting the Governance, the decision- making process at the department was lacking; it consisted of the senior executive committee, a senior management committee that included the President and the VPs, where the President was the one taking all the final decisions, in a very directive manner. The organization changed a lot when a new President arrived. This change had a major impact on the CIO, given the organizational culture; “a DM can tilt the culture, until it permeates, from top to down”. People loved how the President was engaging staff to consider new approaches to do things that were not always doable. This was very important for the CIO in its work. “As a CIO, if you join at the same time with the President and the VPs (equivalent

to Minister, DMs), you can join forces and be well supported. However, when a CIO join in the middle of the President's mandate, one (CIO) did not have too much support, minimum endorsement, and can't bring or make changes". CIO was reporting to a VP that oversaw a large and broad portfolio including IT, Design and Fabrication, Health and Safety, and Business Management. The DM -level person in charge at that time did not delegate at all, and the CIO was caught in the middle of this difficult decision – making exercise. With no governance in place, the CIO initiated a technology committee. The VP at that time, that the CIO reported to, and the SEC, were the only decision – making entity; they had a limited bandwidth, however everything had to go through this decision-making process. Currently, the new DM -level person in charge and one of his team members are putting in place a digital committee. While in this department, the CIO worked on the « reimagine technology » initiative to build the governance between SSC and the department. The CIO travelled the world and looked at various research organizations that require autonomy and flexibility for models that were beyond what SSC can offer, seeking for a model to supporting research and other GOC departments. Almost a decade ago the organization had a new mandate to function as a research center that could not be set up or supported by SSC.

The horizontal model of SSC could not support well the department. As a new CIO, when the CIO joined the department, the new CIO worked hard to find commonalities within the organization to understand the needs of users and stakeholders; with disappointment, the CIO learn that despite intense efforts, putting things together, “box them”, was a wrong approach. Around 2019, the CIO was asked to join SSC, given the CIO vision for his home department and for all research / science departments across public service. The President of SSC, realized that the organization was good for delivery of services, but had gaps in the security department, and gaps for supporting science departments, and data protection. In CIO view, unless a new model was to be put in place, no governance will work, as “nothing is a priority, and everything is bubbling up and is a crisis”. At his home department, the VP that the CIO reported to, changed the governance to move it up at the top level.

The right governance in place does not always work, as organization need to see its compatibility with the governance model put in place. The role of the CIO is to make sure that the technology supports the organization; in many cases the technology does not mater, rather the data. It is difficult for the CIO when some of the department's technology is specific, cannot

be integrated to the one supported by SSC, when the department has some very old technology that works well, and is almost impossible to be replaced, but cannot be supported by SSC.

CASE: CIO finds governance extremely valuable and required. Equally important is to have a strong DM to provide support, and to have a healthy relationship. For governance to succeed, there is “a need for alignment between CIO and the DM who needs to be a Champion of transformation”. CIO needs to educate the DM to be appreciative of the goals, and the challenges. All these are key to the organization to successfully deliver the transformation. Otherwise, it will be an imbalance between what the business side needs, and what IT can do and can deliver. The CIO revealed that has a great relationship with both DMs; one of them has been in the role since 2016, and as a DM is very appreciative of the CIO work and the team. The DM is a strong supporter of the CIO and the work of the team for supporting the organization. The DM represents the IT interests very well, is a defender, an advocate, and a champion. Given the COVID, the organization become a leader at the ADM table on horizontal initiative (i.e., One GC, Sign DG, Digital IT); horizontal initiatives represent government -wide initiatives. The CIO’s experience of the cyber attack occurred in 2020 propelled the CIO to advocate, facilitate and initiate discussions across GOC for a horizontal approach, part of the large eco system; the organization had to influence the overall IT and transformation agenda. The CIO has the responsibility to ensure alignment to the centre (digital principles, how IT systems are built). The organization has 3 (three) committees at DM and ADM level:

- (i)The corporate committee, focused on IT, HR, and Finance
- (ii)The Priorities and Planning committee, with a focus on the organization’s vision for 2030, and the corporate business plans
- (iii)The Transformation oversight committee, with a focus on the transformation initiatives that occurs in the organization.

The organization has also a Human Resources Committee that manages the investments and IT projects, and the successful completion of projects from the budget/ scope / deadline perspective, by using a gating methodology, and the availability of funds being released according to the gating process. The organization has also a Board of Management (BoM), that has a fiduciary responsibility; the committee meets on a quarterly basis.

Overall summary on the organization's IM IT Governance:

Managing IT is about applying the appropriate management framework to organize and execute IT tasks, projects, and products, whether business or IT-driven. The department's Information Technology Branch (ITB) has sound processes for both decision making and implementation. Governing bodies ensure that all decisions are transparent, ethical, and fact-based. ITB's governance process guides structured interactions and fosters horizontality within and beyond the organization, including at the Government wide Enterprise Architecture Review Board. Organization's large project/programs are managed by ITB and Business ADM level steering committees and the governance/Steering committees down to the working level. Organization's medium and small projects are governed within the portfolio of an assigned Director General or Director. Existing IT architecture governance bodies and processes ensure that all stakeholders are engaged, impacts are considered, and innovation activities are leveraged to build business solutions that deliver the greatest return on investment. ITB has well-defined IT architecture frameworks, governance bodies and practices. ITB's Emerging Technology Innovation Board makes strategic decisions that inform architecture strategies and set IT direction. Research is conducted to leverage emerging technologies and bring value to our business. The organization's research continuum is well supported by the ITB's Emerging Technology Ambassador Innovation Council, that provides oversight and communication to Senior Executives. The Resource Management Committee (RMC) is responsible for the oversight and progress of major project investments within the CRA strategic investment portfolio, as well as the control and allocation of the financial resources set aside in the Strategic Investment Reserve to fund most of these investments.

CASE: The conversation on governance is a very difficult one for the organization. The governance model was introduced 6 years ago, and it was not well received. The DGs pushed back the concept, and various other models that were created. The current DM is very interested to "get it right this time", to continue the work. For the Digital Strategy, a new governance model is to be put in place:

- A Digital Committee is needed; to work with SSC on governance for now. Once the new governance is approved, the CIO will approve any new solutions, to be

compliant with all digital standards; across Senior Management to demonstrate that they follow these new standards: i.e., architecture, etc.

- The CIO need to check what other departments are working on and the solutions they proposed. Need to leverage the existing model of governance of the agency and the ones across GOC.
- A new role for the CIO is defined, where the CIO is a liaison and a broker.
- The CIO is responsible for establishing and providing a framework for service delivery, information and data management, digital services, and cyber security.
- Under the new Governance Framework is very important to design and implement this digital governance committee; under this model all to be submitted to the Investment Committee, and the Executive Committee. All digital investments must go through CIO; this is a new role; the CIO must approve the digital investments and make investment decisions. The CIO will be the lead of the digital governance committee. This is a new role, and the CIO is moving towards a strategic partnership across the organization. The digital transformation is not IT, it is horizontal, with a link to IT, data, cyber security, privacy, IM / IT, use of AI tools, consideration.
- Under the new mandate the CIO must set up and develop the Data Centre, to develop the Digital Strategy, starting with the Terms of Reference (ToR) of the Digital Transformation Committee that is under development. According to the new planned Digital Strategy, and the governance revisions, all IT projects, all emergent technology projects, will need to be presented to this new committee, along with a rationale that explain / demonstrate that the projects are aligned to the Digital Standards and Digital Policy on service of central agency They must present their solution to the Committee before gate 2 (as per central agency project management gating model), and the CIO will review the proposals, and approve it or not. Based on the work done so far, the security aspects are still missing.
 - The membership of this new committee will include representatives from the data, privacy, security representatives; will also include representatives from the other sectors: from Project Management area, from finance. They are all at senior level,

- with the role to weight in the business value of proposals and recommend approval or not. The new committee will replace the current Steering Committee
- Under the new governance committee, the CIO will have access, review, and recommend for approval all IM IT projects; currently she does not have access to any of the projects from other sectors.
 - The new digital committee will have a horizontal mandate; now, other sectors will need to present their projects, and they all need to comply to the digital standards as per the central agency policy. The CIO does not have in the team a digital specialist, and all IM IT projects are not compliant to the digital standards.
 - The mandate of the committee is an evaluation committee, that recommends and make decisions regarding strategic orientation over digital initiatives of the department. It is fully integrated within the governance and the oversight of investments, with the role of measuring the impact of these initiatives in the organization. The activities of the committee include:
 - verify to ensure that digital initiatives are according to the strategic orientation of the org. and integrated with the digital transformation, that includes service delivery, information and data, and cyber security.
 - evaluate if digital initiatives are according to the GOC and its tools for evaluation.
 - identify the need for some digital initiatives to be presented to the organization Integrated Architecture Committee.
 - ensure the knowledge sharing of best practices in digital transformation.
 - The Terms of Reference (ToR) of the newly formed Digital Harmonization committee (mandate, mission, type of activities, membership, roles and responsibilities, frequency, authority, etc.)
 - Governance impact. Due to the addition of the new committee, the organization's governance is very heavy; this committee is adding a new layer that complicate and creates delays in the process.
 - The CIO and the team will need to demonstrate how important the Digital Strategy is, also the changes to the CIO role, and the value of this new committee.

CASE: CIO is working to develop the Digital Strategy with peers to define the governance model for the Digital transformation.

- The Terms of Reference (ToR) has been drafted, the Deputy Minister (DM) of the organization has approved the concept, the main basic principles as well. It is hard for the organization to decide on the model, and to agree to revise the governance model and integrate the digital committee within the current organizational model.
- This new committee must be approved by the Executive Committee of the organization to launch the development of the Strategy.
- The CIO challenges were to find the right skill set required to support the development of the Digital Strategy, and to have the strategic mind set required to do such work.
- The CIO major issues faced: the lack of qualified capacity and the right skill set.
- The capacity includes experts and operationally staff but does not include the right skills set necessary for the development of the Digital Strategy and its implementation.
- The CIO presents the need to educate staff and senior management, to equip them with the right skill set, educate them in project management, agility, value of data, how to use it, collect it, access it; what is digital strategy, what is the life cycle of data and information.
- To refine the Digital Strategy, the CIO plans to access external resources acquired via procurement actions. These professional resources (contractors) will engage parties of the organization to finalize the strategy for presentation to approval.
- Another challenge presented by the CIO in the development of the Strategy is the slow processes that Human Resources team have in place, as well as the lack of support from HR to develop the new positions required in the digital team.
- Digital education is needed across the organization.

6.3 Digital Projects

For 2016, the commonalities noted include the very few talks about digital government and digital services. Less than 5% of the CIOs interviewed identify their projects as digital in scope, nature, technology used, objectives. See the 2017 Budget “Building a strong middle class” for additional plans on digital government and digital services: <https://www.budget.gc.ca/2017/docs/plan/budget-2017-en.pdf>.

For 2021, the commonalities noted during the interviews with CIOs are presented as individual cases, summarized.

DIGITAL PROJECT: 2021 Commonalities:

In one case, the CIO presents personal views on the CIO role:

The CIO was a pioneer in preparing the organization for introduction of digital, for aligning the department to the future waves of digital changes. The CIO Transformation initiative conducted with its 12 projects were meant to prepare the organization for Digital Government, digital technology, digital skill set required for the existing and future capacity. The CIO in 2019 become the first CDIO across GOC. The CIO in 2020 along with other internal business partners become the lead in the development of the Digital Strategy of the department and played the role of digital advocate within her own departments and across the GOC, within the GOC community.

CIO was very involved outside of the department in a series of initiatives (Women CIO, CXO-Exchange) to discuss digital, to brainstorm digital issues- blockages-best practices.

2021 Commonalities: In one case, the CIO presents personal views on the CIO role:

The CIO implemented a Digital Office that required an impressive volume of work. From an order taker, the CIO role is moving towards changing this role, towards being an enabler. The CIO changes the internal processes. The CIO worked very hard to build and transform this relationship with the business groups and given this intense effort the IT and the business are partners now. IT advise the business group and present them with recommendations. The Digital Policy of GOC (issued by central agency) helps a great deal, as it indicates clarity on the role of the CIO level of authority; it also indicates that the CIO needs to sit at the same table with the CXO, to be at the same level of authority, support the decision-making process.

2021 Commonalities: In one case, the CIO presents personal views on the CIO role:

The CIO presented a transformation project, the modernization of a system that manages the main business line of the organization. This is a business transformation for the organization, that usually takes place once every 15 – 20 years across the organization. CIO assessed the project status and reviewed the initial Business Case focused on the technology aspect rather than the digital aspect. With a weak business case lacking rigour of the discipline (i.e.PM), and a low consideration to risk, the CIO initiated the review of this project of modernizing the system. The findings showed a lack of appreciation from the decision makers on the opportunities created by Digital transformation, by the transformative initiatives.

The organization needs extensive time to articulate the vision of their own transformation; has no acceptance to take advantage of what has been created, available and ready to use. There is no desire to build a vision for the organization on how the organization look in long term, and how Digital Transformation can support the implementation of that vision. The CIO need to educate senior manager on IM / IT on digital transformation, and the digital skills that the workforce and the organization needs to have. The CIO spends a lot of time promoting digital and acknowledges that is only at the beginning of the journey to cultivate the digital transformation within the organization.

6.4 Cultural changes (CXO, CDOs)

In both rounds of interviews with CIOs, the cultural changes occurring due to the IM IT transformation projects or digital transformation projects was well discussed. In both rounds of interviews CIOs were focused to get their organizations ready, and to prepare them to undertake the projects while supporting staff and users to adopt the outcomes of successful projects. In some cases, the CIO takes over the Lead Change Management role to support the organization. The Digital transformation projects become predominant in CIOs portfolio starting the 2020's times, and some were in full development during the interviews in 2021 with CIOs.

Table 27: Cultural changes (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> • In one instance, the CIO role moves towards service delivery, being involved in all Business – IT enabled projects across the government. • In two instances, during the project, the CIO was the Lead Change Management Champion to support the project and the organization readiness through the cultural changes brought by the project. 	<ul style="list-style-type: none"> • GOC not yet advancing digital strategy. • CDO roles not yet present. • CIOs did not mention CDO role, nor CIO – CDO role, or efforts to create the CDO role, or transform CIO role towards the CDO. • Many CIOs are part of the Corporate Services Sector.
2021	<ul style="list-style-type: none"> • There were various ways in which CIOs and their sponsors approach the noticeable cultural change that occurs during the project implementation. • Some of the CIOs see the opportunity that this cultural shift has over the entire organization and started training the organization in acquiring skills required to manage the project and to support the organization 	<ul style="list-style-type: none"> • CIOs shared the challenges faced during their IM IT transformation or digital transformation projects, such as the readiness of the organization to go through major transformation. • Organizational Context, Project Scope, Project Implementation, Business Technology and Strategic Alignment have a major organizational cultural change brought by the Digital Transformation project, and the

	<p>once the transformation project was completed.</p>	<p>set up of the Digital Office in the organization, along with all the efforts initiated by the CIO.</p> <ul style="list-style-type: none"> • In general, the projects helped foster a service culture in the organization.
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CULTURAL CHANGES: 2021-COMMONALITIES

Almost all CIOs acknowledged the challenges faced during their IM IT transformation projects or digital transformation projects, such as the readiness of the organization to go through major transformation.

Factors such as Organizational Context, Project Scope, Project Implementation, Business Technology and Strategic Alignment have a major organizational cultural change brought by the Digital Transformation project, and the set up of the Digital Office in the organization, along with all the efforts initiated by the CIO. In general, the projects helped foster a service culture in the organization. The organizations in general were not ready, it had to be “educated” by the CIO and teams to learn how to be ready, to prepare staff and management to understand the major changes. The projects directly support and align with the Government of Canada’s objectives and the organization’s core mandate. The Engagement Streams of the projects are built on the considerations of a good project management framework, with a strong Stakeholder Management Strategy, complemented by Project Communication and Change Management. In general, the projects helped foster a service culture in the organization. CIO underlined the need for staff to be adequately equipped with the digital tools needed to effectively deliver world-class services. In the context of the projects, CIO underline the importance for every employee see themselves as having a role in advancing the digital mindset within a culture where creative and bold ideas can be realized. Through continuous improvement and by fostering a culture in which everyone and everything works together, the Agency can put in place accessible, seamless solutions that provide users a positive first digital experience from end to end. In general, the organizations developed a cultural shift to support in long term staff, to engage, adopt, align to digital transformation. To effectively deliver world-class services, it is important

that all staff be provided with opportunities to develop the expertise necessary to apply digital principles and methods to enhance service quality, increase efficiency, and create a culture where creative and bold ideas can be realized. The aim of the organizations is to establish a fluency with the digital principles and methods across the organization. The organizations plan to hire new employee who are already familiar with digital approaches and technology, able to work in a virtual environment, avid learners, flexible, adaptable, willing, and ready to be exposed and adopt the organization’s values.

6.5 Communication and influence

Both CIOs interviewed in 2016 and 2021 were strong communicators. They were keen of sharing the importance of communication exercised horizontally and vertically within their organization, with their CIOs community, with public sector horizontally, and with private sector.

Some of the CIOs interviewed are versatile communicators, presenters at national and global level, participating as speakers in various settings to promote the role of CIOs, the role of CIO in public sector, and the future of CIOs in a digital society.

As influencers, CIO can communicate at operational and strategic level, engaging the decision – making team in reaching agreements that allow advancement of transformation and modernization.

CIOs are working in building relationships, improving their influencing, and traits, for maintaining professional networks where CIO professionalism is recognized and where CIO authority is respected. The main aspects are presented in the table included below.

Table 28: Communication and Influence (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> n/a 	<p>Influencer</p> <ul style="list-style-type: none"> CIO exercises the influencing role in any collaboration with staff and peers.

		<ul style="list-style-type: none"> • CIO influence the organization to set up a structure and the teams to support implementation of projects. • CIO influences the benefits of the project, plays an oversight role. • CIO is a trusted partner, a broker. • CIO has a major leadership role. <p>Communicator:</p> <ul style="list-style-type: none"> • CIO communicates horizontally and vertically, with peers, and supervisors. • CIO communicate internally and externally to the organizations, with central agencies, and private sector. • CIO is a relationship builder, a liaison, and an implementer, communicating actively to ensure needs are considered.
<p>2021</p>	<ul style="list-style-type: none"> • There are differences in the approach CIO takes based on the level of authority, ability to engage with CXO peer, sit at the decision-making table and be part of the decision – making process. • CIO experience plays a major role in the ability to communicate and influence stakeholders, the CXO peers, and all stakeholders. 	<ul style="list-style-type: none"> • Communication is important to CIOs. • CIOs are versatile communicators, using various means and tools. • Communication is key in Digital Transformation • Communication and influencing are skills acquired in time.

	<ul style="list-style-type: none"> • Seniority of CIOs in senior leadership roles influence the ability of the CIO to find ways to communicate at vertical and horizontal level within the organization and outside the organization, within public service and with private parties. 	
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COMMUNICATION and INFLUENCER: 2016 – COMMONALITIES

Influencer

Overall, the CIO exercise influencing skills, traits, aptitudes in the collaboration internally and externally to the project and its stakeholders. The CIOs initiated a new approach in launching and executing the project, such as setting up of a business transformation (BT) unit. With a new BT added to the organization, the CIO’s role was to consult and to be consulted, provide internal resources, be briefed, and be communicated, and be involved in all IT related / It enabled decisions of the organization. The CIO ‘s role moves towards an “internal oversight’ for the project. The BT unit has been dismantled after the successful launch of the project; its operations were moved towards IT and business units of the organization. CIO was a trusted partner, and this aspect has multiple facets. CIO was the broker in the relationship with the SSC for negotiating the infrastructure. CIO was a partner rather than a leader. CIO run and ensure a healthy, well conducted stage gate process for the project. CIO had a Leadership role in mitigation of risk factors: Discussing the buy versus built and negotiating with SSC the infrastructure required.

Communicator

Overall, one of the main roles if the CIO is Communicator and Influencer. CIO plays the role of Communicator with the project team, the ADM, the DM, the Minister, with Central Agencies, with the CIO of Government, and other departments involved. CIO is a strong communicator with central agencies, and the oversight bodies, with the jurisdictional partners, and with the

private partners. CIO is a Communicator and ensures full cooperation and support from the private partners. CIO led all the steering committee meetings (DG, DM, and ADM level). CIO is a Relationship builder, working closely with all peers, and colleagues across the organization and across public sector. CIO is an Implementer, of all business and IT enabled projects and initiatives. In all the activities, CIO is a Liaison; between peers and teams, between the deputies, business and the IM IT teams, between private and public sector, between own organization and other public sector organizations.

COMMUNICATION and INFLEUNCER: 2021 – Commonalities: The CIO presents personal views on the communication and influencing, when the CIO is the lead of the project developed and its implementation.

CIO developed and engaged in project communication and developed the change management strategy. In this role, the CIO ensured regular project communication as well as coordination of communication as part of the broader change management plan. In the 1st stage of the project, as part of the Digital Design phase of the project, CIO and the team developed the communication strategy to outline the approaches for engagement. The aim was to inform project definition, design, and implementation stages. CIO continue its engagement efforts as part of the project planning and implementation, for stages 2 and 3rd of the project; that includes the implementation of the communication strategy for continued engagement and for keeping internal and external stakeholders engaged.

CIOs likes to communicate, are keen in sharing their interest in communicating with all parties. All CIOs interviewed indicate the high value of communication in their job as a CIO. CIOs presented the various means of communication, the channels used, the need for customization of their communication based on the needs of their audiences, the importance of communication in each step of their work duties. CIOs is aware of the evolution of communication process necessary in transformation projects and digital strategy. CIOs expressed extensive points regarding the need for influence, the ability to influence and the level of influence CIO exercise. Influencing is described by CIOs as a skill acquired over the years, in which previous senior management experience and seniority on the CIO role were important factors in developing a high level of acumen in the art of influencing. CIOs mentioned

the various situations in which influencing was needed, mainly the ones related to decision making process, or negotiation process for supporting new and existing needs of the CIO branch needs. The Project's Engagement Streams were built on the considerations outlined for the 3 stages of the project, based on the Stakeholder Management Strategy.

- The 1st stream includes Project Communication, and Change Management (project communication, and communication for implementing the change management plan.
- The 2nd stream included the User Experience Design, where communication was incorporated to consider direct user feedback throughout the development cycle (human-centered design); this was conducted to reduce costs and create products and tools that meet user needs and have a high level of usability.
- In the 3rd stream, the Stakeholder Registry stream, includes the lists of the stakeholders (organizations, groups, and individual stakeholders(that the CIO project team engaged with. In this stream, the Stakeholder Engagement Calendar was developed to provide a clear picture of all planned, upcoming, and past engagement activities.

CIO and the team developed a number of tools to support the engagement: the Engagement Activity Plan was used to document and easily communicate the details related to the planned engagement activity; the Engagement Decision Register captured all the approved recommended corrective actions that were created because of engaging with stakeholders; Communication channels used for Engagement: Stakeholder engagement activities will take place through a myriad of channels, including: Open Platforms (Open Canada blog, Agencies' Website, GitHub...); Social Media (LinkedIn, Twitter...); Email; In-person (one on one, focus group, meetings...); Tele or Web Conferences; Restricted GC Platforms (GC Collab); Online tools (surveys, User research tools...); Intranet & project tools (Trello, Enterprise...).

CIO presents personal views on the communication and influencing when the CIO develop and implement the Digital Strategy.

Employee feedback, accompanied by meaningful two-way flows of communication between all levels within the organization, is a critical element of any digital solution. Through continuous improvement and by fostering a culture in which everyone and everything works together, the organization can put in place accessible, seamless solutions that provide a People – First digital experience from end to end. Each element of the strategy has been subject to extensive internal

consultation, communication, and engagement with key stakeholders, with project team members and liaisons from each Headquarters branch collaborating to communicate and facilitate meaningful feedback. Consultations and research by Human Resources Branch have gone into the crafting of the People – First theme of this strategy; they provided and coordinated meaningful communication and feedback on all other elements from a human resources management perspective. One of the Digital Strategy objectives is to Develop digital projects through extensive consultations and open collaboration. The CIO indicated that engagement, inclusiveness, influence, collaboration, and consultation with internal and external stakeholders are key for the successful development of the Digital Strategy and its implementation; the engagement of partners in the organization's strategic thinking are key to advance the relationship and presents potential for growth for both parties.

CIO presents personal views on communication and influencing, considering CIO role and authority level in the organization:

CIO – DG Role at a very large department: In this role the CIO manages a portfolio of over 1.5 billion dollars, and large teams; CIO learn continuously the importance of having experience in partnership management building and development of healthy relationship with over 43 departments. The CIO can have a large level of influence within and outside the organization, with peers, CXOs, and the CIO community, among the major stakeholders of Public Service.

CIO- DG Role in a small organization: At this level the CIO budget is over a few million dollars, leads IM IT teams of up to 50 employee and rely for advocacy and decision making on constant support from the deputy of corporate services.

CIO role with a science and research organization: In this role, the CIO can make a significant change given the research mandate of the department combined with public service needs of the organization. In one case, the CIO made a major shift, brought together data and technology. That was a major transformative journey, where researchers, and technology that did not worked together before, have been brought to work along and support the needs of the organization and support the development of a Knowledge Information Technology System.

CIO in an acting CTO role with a central agency: the CIO exercised the art of the possible, that is the art of pragmatic. With a certain level of authority and visibility across all departments in this role, the CIO can “sell a vision very well, at the executive level”. The art of pragmatic is

important, there are 165 organizations with different cultures, working towards creating “synergies”, commonalities, and differences. The previous CIO experience helped to understand the accountability and pressure that deputies (ADM) put on their DMs and is managing what can be done; is suggesting that a ‘GOC Concierge” is required to share the common aspects. In this role, CIO has a centralized influence with no specific authority; is influencing the behaviour for other CIOs in other organizations to work together and create enterprise solutions. In this role, the CIO is thought as a technology footprint leader, “ Digital « is the Trojan Horse: when a “horse” comes in, you have technology, culture, and policy; the technology is just a component.”

As an CIO, one must be a convenor, be able to understand the business, and be authentic, understand the business without one can't convey the message. “ Digital is what we try to achieve at the high level and working from top to the bottom to see all the parts”.

At the enterprise level, the major governance gap is the lack of having a COO for the GOC, as there are no strategic discussions to see what government is overall trying to bring, what is the GOC digital vision. The Ministers of GOC are trying to establish that, however, not all ADMs support their outcome; the current situations are still very vertical.

Role of the CIO and the importance of the Police on Service

The policy supports the mandate of the Minister for Digital Government in leading the Government of Canada's digital transition. The management of these functions is guided by a commitment to the guiding principles and best practices of the Government of Canada Digital Standards: design with users; iterate and improve frequently; work in the open by default; use open standards and solutions; address security and privacy risks; build in accessible from the start; empower staff to deliver better services; be good data stewards; design ethical services; collaborate widely. More resources here: Canadian Public Sector Digital Standards: <https://www.csps-efpc.gc.ca/tools/jobaids/digital-standards-eng.aspx>; according to the Policy on Digital Services, the CIOs role and mandate, the governance in organization ids is clearly presented: https://www.central_agency-sct.gc.ca/pol/doc-eng.aspx?id=32603§ion=html; the public sector governance model (4.1.3): see 4.1.3.2 and 4.1.3.5; planning and reporting functions (41.1.3.7.): Deputy heads approve a 3 – years plan, aligned to the enterprise-wide integrated planning for integrated management of Service, IM, Data, IT, cyber security.

7 CONTEXT

7.1 Public Sector Digital Readiness

All CIOs interviewed presented elements related to the readiness of their organizations to go through IM IT transformation or engage in digital strategy implementation. In general, CIOs found their organization not yet ready for be involved in these major endeavours due to a variety of factors, among which: the level of knowledge and awareness, accessibility, and availability of skilled resources of all staff, or, of peers, the CXO team awareness of the transformation process and its magnitude, the level of knowledge of the CXO team and of the staff on the transformation, change management and new technologies, the culture of the organization, the readiness of the organization to manage change .

The information gathered from CIOs is presented in the table below:

Table 29: Public Sector Digital Readiness (2016 and 2021)

	Differences	Commonalities
2016	n/a	The CIOs presented the environment in their own organizations and presented information on the readiness of the organizations to go through IM IT transformation, or digital transformation projects.
2021	<ul style="list-style-type: none"> Organizations' readiness has different meanings to different public sector organizations. 	<ul style="list-style-type: none"> When discussing about public sector readiness almost all CIOs presented the hard work required to support the organization, staff and peers, and the management team. They talk about change management and the

		<p>approach taken to manage change during the transformation projects, and the digital strategy. The approach was less formal for some organizations; more formal for other public sector organizations that put change management first, from the outset of the transformation project.</p>
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Key commonalities among cases are observed in 2016 regarding public sector digital readiness.

Project presented by CIO #1:

- Low level of digital education across the organization, low readiness of the organization for the transformation project.

Project presented by CIO #2:

- Transformation and use of new systems required intense training and readiness of staff for the two departments involved.
- It is required for the organizations to have a long – term view, ensure alignment with the project, as a starting point to the ongoing operational environment.
- The success of the initiatives is not in the sophistication of the software solution, rather the level of readiness of the organization, to adopt and increase the level of knowledge as users.
- The partnering departments must recognize that each works under the same conditions, rules, policies, laws (i.e., procurement, Human Resources); and expectations to be managed with this understanding. These interdepartmental partnerships are not like contracting with a private sector service provider.

For future similar transformation projects, it is required:

- The work never ends.
- Dealing with players' changes over time (i.e., client, team, SSC)
- Continue to refine processes (change, release etc.)
- Continuing to manage expectations.
- Develop a partnership work plan for future years.
- The 'seal is broken'.

Project presented by CIO #4:

- The importance of the CIO personality over the role it plays within an organization.
- The type of relationships built with colleagues and peers, and the ability to deliver IT and business transformation services and projects.
- The need for continued and increased knowledge in project management, technology, and communication of senior management.

Project presented by CIO #6:

- The transformation project brought "transformation and culture changes" across the organization. CIO managed the project methodology and the required project artifacts (waterfall methodology used)
- CIO had to manage the resistance to change and the readiness of the organization to execute the project and to operationalize I; to decommission the old legacy system:
- The high difference between the theory and practices: In practice, there is a lack of people skills and soft skills among project and program manager,
- It is obvious and surprising the lack of ability that people must properly conduct a project due to the lack of understanding of the value of teamwork.
- CIO had to master and manage the resisters staff.
- The Matrix structure is a challenge in federal organizations:
- People understand the need for participation as shared resources, but managers do not understand the matrix resource allocation and structure model, process, etc.
- People are pulled in too many directions; managers running the projects require 100% access to their resources; it is not something to generalize but it occurs.
- The Change management aspect of the users

- Implementation of a new model (COTS), a challenge for users across the board; Set the user focus from an old, long- lasting system to a brand new one.

Project presented by CIO #7:

- A great deal of resistance across the organization, starting with the ADM level colleagues, and the Executives, down to staff.
- It is all about change management and story telling.
- IT leaders need to know business to align it with IT.
- The CIO advice to all future IM/IT leaders: “Go and work in business offices and get to know their world before they join IT area.”
- IT is changing, and CIOs needs to change with it: in the future it will be less about doing, and more about managing.
- CIOs needs to become good at vendor management, partnership management, CIOs to keep up with the changing competencies. Knowledge of IT is good but is not enough, and soft skills are crucial.

Project presented by CIO #8:

- Given that the transformation project brought a new approach for HR field and for Central agencies, there was a great deal of resistance from these key stakeholders.
- Resistance from employee, concerns about personal data (i.e., performance management.) being collected.
- The project encountered delays due to the organizational readiness in areas such as the Security and Privacy concerns.
- There were additional cost / delays due to PIA Privacy impact assessment. Concerns on Security aspect of their personal info (i.e., personal info) collected and maintained during the implementation process: As a result, to Security and Privacy concerns resulted in the outcomes of the PIA for the transformation projects scope changes were required:
- Confirm the authority, the validity of the scope of the project.
- Present with recommendation to build an alternative solution.
- Build a data base to maintain the personal results without to connect it with the core Performance Management System
- The CIO offered as elective (opt in and opt out)for all employees.

- To prepare the organization, the CIO had to meet with the Union, and had a series of discussions.

Project presented by CIO #10:

- CIO, a Change management Champion: Leading the Change management across the organization.
- Convey the value of the business transformation.
- Keeping people optimistic and motivated
- When the CIO joined the organization, the infrastructure was weak, the team was very resistant, passive resistance, not believing that CIO is the leader of change, not seeing the CIO as a leader of change.
- The team is getting better and better now.
- This was a digital transformation and information project. The CIO did a lot of work on bringing rigour, project management standardization, skills, and structure.
- The CIO changed the governance model to include representation from one of the main stakeholders that showed resistance.

Public sector readiness varies, and this is visible in the differences noted in 2021.

Organizations' readiness has different meanings to different public sector organizations.

- It meant to some: providing training, awareness sessions to staff, informing CXO peers and senior management. For others it meant hiring new staff, with skills, experience, and competencies the organization is lacking, ensuring the required capacity while building the capacity in long run. For other organizations it meant re-skilling existing staff with skills and resources necessary for the transformation or digital strategy projects, ensuring their readiness throughout the life cycle of their projects.
- For some CIOs it meant accessing new hiring mechanisms to complement existing capacity with resources from outside public service, as contractors, or a new employee.
- For other CIOs, it meant re-structuring and re-organizing their teams with impact across the entire organization; in one case the CIO created two teams in the organization, where

the new team with train, coach and support the existing team to upskill them, adopt, and embrace the new emerging technology used part of the transformation projects.

Yet the cases studied showed interesting commonalities in 2021 demonstrating public sector readiness for digital transformation is improving. When discussing about public sector readiness almost all CIOs presented the hard work required to support the organization, staff and peers, and the management team. They talk about change management and the approach taken to manage change during the transformation projects, and the digital strategy. The approach was less formal for some organizations; more formal for other public sector organizations that put change management first, from the outset of the transformation project.

In one case: The Change Management activities were managed by the project team with membership from various public sector organizations, under the CIO leadership. Given the GOC wide nature of one of the projects (Cloud), the department along with other central agencies, and other government departments (OGDs) OGDs has put in place a special team to manage the further implementation, adoption, and all change management aspects.

In one case: On Change Management, the organization uses a set of guiding principles that entrusts stakeholders with designing, implementing, delivering, monitoring, and continuously improving processes, practices, activities, and IT services. The organization is committed to evolving IT processes and capabilities through continual improvement, client-centric design, and service-oriented delivery. The organization adopted the IT Infrastructure Library (ITIL) as the framework for creating the organization IT Information Management Program. Over the last 20 years numerous initiatives have been successfully completed to advance the creation of national IT IM service management processes and procedures as well as the acquisition and implementation of central IT IM management transaction recording, monitoring, and reporting tools. The IT IM Service Management Program promotes a service management lifecycle in alignment with the Policy on Service and Digital (2019), with an emphasis on building service quality and increasing client satisfaction, while maintaining appropriate privacy and security measures.

The program oversees the enterprise IT IM service management Program processes and practices ensuring horizontal alignment between Process Managers and Practitioners within a variety of organizations. The IT IM service management Program seeks to improve the quality

and cost effectiveness of IT support services by monitoring, measuring, analysing, and reporting performance metrics to ensure client satisfaction. Through clear and consistent communication and cooperation with the IT Support Community, Stakeholders, and Clients, IT IM service management Program strives to mature the national IT support program by directing and employing initiatives that deliver more effective and efficient IT support services. The IT IM service management Program is responsible for the development and implementation of a series of IT Service Management practices and processes for the organization's portfolio of applications. The focus of Change Management is to promote the stability of the Production environment and minimize impact of change-related incidents using standardized processes and procedures. The focus of Configuration Management is the development, promotion and delivery of policies, standards, core processes and best practices that govern how IT configuration information is identified, recorded, and maintained. The primary goal of the Incident Management process is to restore normal service operation as quickly as possible and minimize the adverse impact on business operations, thus ensuring that the best possible levels quality of service and availability are maintained. The primary objectives of Problem Management are to prevent problems and resulting incidents from happening, to eliminate recurring incidents, and to minimize the impact of incidents that cannot be prevented.

7.2 Budget control and rigor

All public sector organizations follow a well – defined budgetary process. The budget of each public sector organization is approved by the government. “Federal Budget: The Budget is a blueprint for how the Government wants to set the annual economic agenda for Canada. It's the job of the Department of Finance to prepare it. The budget, tabled early in the year, is preceded in the fall by another major statement, the *Economic and Fiscal Update*.” (Source: <https://www.canada.ca/en/department-finance/services/publications/federal-budget.html>) This process applies at federal and provincial government level, on planning, control and accountability for funding spending. The players at the federal level, central agencies have well established roles in the budget planning and approval process: “The central budget office function in Canada is divided between the Department of Finance and the Treasury Board Secretariat. The Department of Finance is responsible for general economic affairs and for the fiscal policy framework. In addition, it is directly responsible for the administration of several

transfer programmes. The Minister of Finance presents the budget to Parliament. The Treasury Board Secretariat is responsible primarily for the operating costs and capital components of the budget and for general management in government.” (Source: <https://www.oecd.org/gov/budgeting/40140423.pdf>).

The findings are on the accessibility of funding, approval level given the authority of CIOs for budget management, among others.

Table 30: Budget control and rigor (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> n/a 	<ul style="list-style-type: none"> Budget approval process is delegated to the executive team of the organization.
2021	<ul style="list-style-type: none"> Oversight and controls are exercised across all public service organization with a level of rigour that is regulated by the existing policy in place. Each organization chooses how the outcomes, and the findings of these exercises are applied, and how these are considered for continued improvement of management of projects, program delivery are areas to be further explored and research to be conducted. 	<ul style="list-style-type: none"> In majority of the cases, the funding for the projects were part of the investment budget of the organization. Funding was requested as part of program delivery budget, and long – term investment, with submissions to central agencies.

Some common themes are observed in 2016. Budget approval process is delegated to the executive team of the organization. In one case, the budget request is approved by the CEO, the highest in rank in the organization, the CIO reports to this role. In another public sector organization, the budget is approved at the ADM. CIOs who were at the DG level, they reported to the ADM of Corporate Services who approved the budget. Budget control, and rigor are regular practices across public sector. CIOs share best practices, lessons learned, and present recommendations.

CIOs add audit clauses in all collaboration agreements. For joint projects with other public sector organizations the responsibilities of Departmental host and organizations involved are clearly defined and agreed upon. Differential roles and responsibilities for teams and organizations when move from project to operations. Ensure clear Governance, decision-making process, and rights. Engage, adopt a cost sharing directive, with incremental versus shared costs. Various projects require various additional reporting demands (such as MAF, Audits, Oversight, etc.)

In one case: The budget authority was at the CIO level, as the CIO was at the ADM level. Oversight functions assured by the departmental internal audit of the organization; the oversight is ensured by the central agency's Oversight team, External Audits, involvement of the Office of Auditor's General (OAG). CIO reporting at ADM and DM level.

In one case: The budget authority is at the CIO level, and not at the ADM that CIO reports to.

In one case: The budget for the project (over \$25 mil.) was under the authority of the ADM in charge of Corporate and Portfolio Sector. Internal reviews and audits are customized based on the size and importance of the project. The organization is accessing 3rd party independent reviews. The only project under the central agency Oversight, requires endorsement of the Steering Committee at the ADM level; the committee includes the CIO, CFO, all the ADMs and DMs. Organization is conducting internal audits and independent reviews commanded by the organization. Conducted additional due diligence with multiple independent audits at each stage of the project.

In one case: Rigor was ensured by internal governance (steering committee; sponsoring committee; advisory group; working groups) and external governance. The budget rigor was assured by periodical in depths, customized reporting, and central agency Oversight review for

IT stage approach review, Oversight committee requirements (internal audit, and independent review).

In one case: Strong accountability of the CIO and of the Senior Management. CIO had regular debriefed with the DG in charge and with the DM – The President of the organization.

In one case: Strong Commitment of the President. Parliament assigned the project-program to public sector though the accountability and reporting requirements at the CIO and ADM/ DM level; CIO lead the project. This project is mandatory; it has been imposed after the 2014-2015 IM/IT project planning investment cycle. The projects have been approved by the IM/IT Steering Committee, scoped, and sized. The human resource capacities for IM/IT and the business sectors have been identified and assigned to the approved projects and were not necessarily available for this project. Priorities for 2014-2015 had to be realigned, and some other projects delayed, to accommodate this mandatory project.

In one case: Commitment of the CIO of GOC, Commitment of central agencies, the President; Commitment of all GOC CIOs, and CIO community; Commitment of industry partners. Commitment of the Minister, the DMs/ADMs, the CIO.

As for 2021, key themes in budget control were more diverse. **In one case:** The budget of the project was part of the departmental strategic and operational plan. This was planned, discussed, and approved by Senior Management prior to project's inception.

In another case: About the sources of funds, the project was funded through the CIO Office, and the Policy and Operations budgets. Incremental funds sourced the initiative. Comparing the Options and Project Scoping, the organization has analyzed the proposed business requirements and costing options to better inform the project scope. High level project estimates were developed to establish initial budget baseline. The CIO referenced the central agency gating process. The project was implemented and managed under the central agency Project Management Stage Gate (See central agency Project gating:<https://www.canada.ca/en/treasury-board-secretariat/services/information-technology-project-management/project-management/guide-project-gating.html>).

Project assurance comes in a variety of forms, such as the following: the project's day-to-day processes and controls (such as those for scope and quality management). The governance in place, such as clear and signed-off terms of reference denoting roles and responsibilities for all

governance bodies that play a role in the assurance regime. Independent assurance conducted by internal sources (such as internal audits) and external sources (such as third-party independent reviewers)

In one case: The budget of the project was over 20 mil \$,for this 3-years project. The CIO worked with the department's corporate office to prepare and submit the central agency submission necessary to access funding. The organization was lacking governance at the capital investment level. The governance structure put in place by the CIO was slowly adopted across the organization, now applicable to all IT projects and capital investment projects. The organization conducts its activity according to the Financial Management Act (FMA), and public sector policies, including the policies and rules related to oversight, internal and external audits. The organization has it own structure that support the rigour of cost and expenses, that includes various controls such as internal and external audits, oversight, the Ombudsman's office. Some of these controls repeatedly pointed to the silos within the organization as barriers to the free exchange of information that would improve the quality of the client services. Recent program evaluations and internal audits in the have observed many opportunities where greater collaboration across organizational boundaries would improve outcomes, most notably as they apply to compliance management. The organization recognizes that good digital governance supports ongoing collaboration, effective decision-making, reduces risk, enables innovation and responsible experimentation. It also ensures proper oversight and strategic prioritization, while ensuring that the organization learns from past mistakes and builds on. The organization has one of its priorities to recommend and support a governance regime for the org. digital agenda that makes sense and that balances prudent risk management with orchestrated advancements in transforming the org. into a digital-first organization. The focus of this oversight will be the expedited delivery of initiatives that are transformational and horizontal in nature, with emphasis on those that deliver better service to Canadians.

7.3 Minority Government and Accountability

The election and political environment influence how public sector operates. Each minister and its organization operate based on the newly elected government and implement the government agenda implementing the departmental mandate.

Some of findings gathered from the interviews with CIOs in 2016 and in 2021 are presented here below.

Table 31: Minority Government and Accountability (2016 and 2021)

	Differences	Commonalities
2016	n/a	<ul style="list-style-type: none"> • IM IT Transformation projects and Digital Transformation projects are aligned to the agenda of the government in power.
2021	n/a	<ul style="list-style-type: none"> • The major commonality of all the projects presented by the CIOs in this 2nd round of interviews is the transformation of the organizations in public service. • The wave of transformation is a result of the government’s agenda: delivering better services to Canadians, ensuring a modern and realisable, well protected infrastructure. • The implementation of these projects ensuring a skilled, well trained, well prepared, and well – equipped workforce properly equipped with modern tools that allow them to embrace and adopt new technologies while they use reliable, scalable, and up to date tools.

The issues of minority government and accountability were important and well underlined as per the information gathered during the data gathered in 2016. Overall, the projects researched were initiated to satisfy the IM/IT Government agenda for modernization across public sector, to find efficiencies, to ensure proper functioning of tools and systems, find enterprise solutions that will support the needs of Canadians.

During 2016-2019 IT Strategic Plan of Government of Canada focused on modernization and transformation agenda, within four main areas:

- Service IT, the use of cloud computing, technology sharing platforms, and the tools to manage service delivery and to improve client satisfaction.
- Secure IT, focus on strategies to reduce exposure to cyber threats has become predominantly present in these strategic documents; actions oriented towards an increased awareness and understanding to proactively manage these threats, with protective measures for a secure processing and sharing of data and information across public sector.
- Manage IT, for stronger governance approach, with a focus on an evolution of IT management practices, process and tools needed for innovation and sustainability.
- Work IT, it introduces actions for a skilled, high-performing IT workforce, a modern workplace that provides tools need to public sector employee to do their jobs.
- Source: 2016-2019 GOC IT Strategy of GOC <https://www.canada.ca/en/treasury-board-secretariat/services/information-technology/information-technology-strategy/strategic-plan-2016-2020.html#toc1> (Appendix C: for Government of Canada 2016-2019 Modernization Priorities)

A geo-socio-political analysis would reveal how the political agenda of the Government in power and the previous one constitutes a driver for the transformation projects considered in this research, presenting a more detailed analysis of the context, the political pressures, the accountability model across the GOC, and to identify the changes from the before the current leading Government.

One of the projects, as per the CIO's interview, was initiated given the political pressure of the government of that time to modernize the major services (<https://www.elections.ca/content.aspx?section=abo&dir=adv/acpp/sum/rep13&document=p3&lang=e>) . A priority of the government, this strategic project's aim was to "identify, elaborate on, select and implement transformation opportunities across all aspects of ... processes, so that they are increasingly accessible, convenient and effectively delivered to" its users. The project was part of the mandate letter of the department assigned to this project, with a

modernization, transformation need to “improve existing processes, introduce new processes, consider introducing technology to meet changing expectations of Canadians, to research and analyze possible impact of potential policy reform on processes and services.”

In one project, a “transformation” initiative was initiated due to agenda of the Government in power, for modernizing and transforming the IM IT in one of the departments. Both projects were identified as high priorities on the internal IM IT plan of the department assigned to lead, and benefited from attention, visibility, and support of senior and executive management of the organization.

7.4 Strategy context

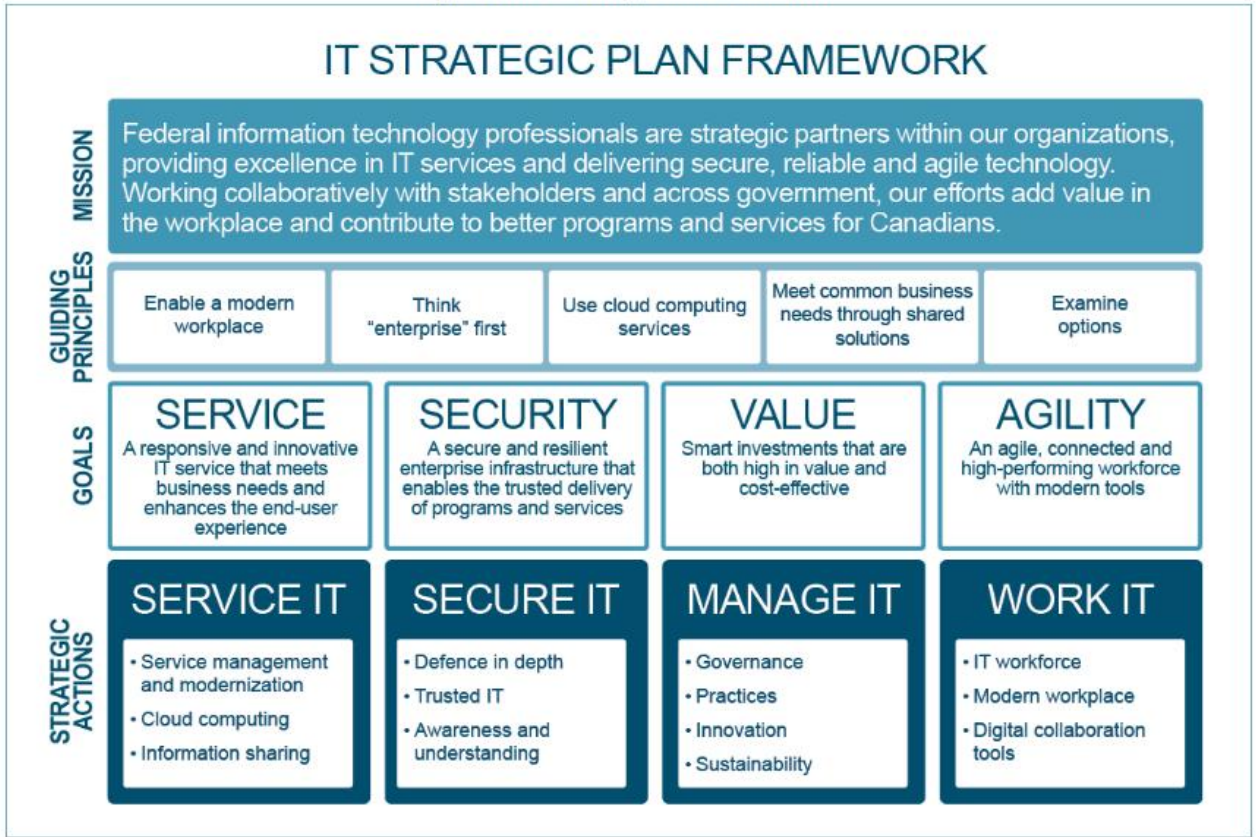
The public sector strategy context is impacting IT projects from two fronts. First, policy making front central agencies is a key influencing factor. Second, is the procurement.

7.4.1 Policy

Many of the CIOs interviewed referenced the Canadian public sector Policy on Service and Digital (2019), The Service Policy Framework, the impact of the policy on the organization, on the development of the Digital Strategy, on the role of the CIO, the Governance, and the oversight.

Between 2016-2020 public sector’s focus was on modernization from within, ensuring transformation of its infrastructure, improving its services, and ensure security. CIOs contributed to the development and implementation of the IT Strategic Plan (see below) that presents a focus on four main areas: service, security, value, agility. That is an efficient and innovative services, with a secure and resilient enterprise framework, with valuable and cost-effective IT investment, accessible and available to an agile, well-equipped workforce equipped with modern tools. A visual of the IM IT GOC Strategy is presented here.

Figure 01: IT Strategic Plan Framework



Source : <https://www.canada.ca/en/treasury-board-secretariat/services/information-technology/information-technology-strategy/strategic-plan-2016-2020.html>

Around 2018 it was very prevalent the desire for digital services with a constant presence in strategic and operational plans in Public Sector. For example, the Digital Operations Strategic Plan for 2018-2022 of Government of Canada, focuses on management of technology and technological change in government, and serves as a strategic plan for information management (IM) and information technology (IT). The strategic plan directs public sector leaders to focus the work in their organizations on digital transformation, to advance the digital agenda; “digitally, the [Government of Canada] must operate as one to benefit all Canadians.” It is the time when public sector moved from an IM-IT perspective towards digital transformation. The move from an IM-IT strategic plan to a Digital Operations Strategic Plan supports this ideal and acknowledges the need for greater integration in government to deliver on this digital vision, including across functional communities and within teams.” The strategic initiatives put in place according to the strategic plan aim to modernize service delivery, “improve sustainability and

promote digital government.” (<https://www.canada.ca/en/government/system/digital-government/government-canada-digital-operations-strategic-plans/digital-operations-strategic-plan-2018-2022.html>).

Source: [Government of Canada IT Strategic Plan Framework](#)

7.4.2 Digital

Between 2018 and 2022 public sector in Canada initiated a variety of internal digital initiatives meant to modernize public administration and increase adoption of digital technologies.

Issued in 2021, the “Digital Operations Strategic Plan: 2018-2022 – Canada.ca” aimed to pursue the agenda of the government in power, while modernize public sector and move towards the adoption of digital technologies. This “Strategic Plan establishes the integrated direction for the government on digital transformation, service delivery, security, IM and IT” as indicated on the Government of Canada website.

A year later, in 2022, public sector declaring its intentions for Canada that “aspires to be among the best of digital nations and to keep pace with our peers”(<https://www.canada.ca/en/government/system/digital-government/digital-government-strategy/global.html>), issued the Canada’s Digital Government Strategy, a commitment to a digital society. Canada joins a variety of digital related initiatives to align its digital transformation efforts while pioneering many digital transformation initiatives, from Open Government to E-government efforts, a signatory of Digital’s Nations Charter supported by the first Digital Nations Secretariat. At the same time Canada initiated the first the Minister of Digital Government. All these initiatives are grounded in a verity of long- standing challenges and gaps that public sector was eroded and continued to be faced with lack of skilled workforces, gaps of digital skills, challenges in recruiting qualified workforce, outdated and obsolete procurement and project management processes, outdated IM, and IT infrastructure, “technical debt” where maintenance and reliability required high costs and are risky investments, a fragmented approach to IT infrastructure.

Major initiatives are launched and pursued since 2017 forward; they continue “ to transform Canadian’s experience with government”, starting with the establishment of the Canadian Digital Service in 2017; set up the Digital Transformation Office in 2018; in the same year it is established Digital Academy, and launched the GC Digital Standards; a year later, Canada establishes the first ever Minister of Digital Government, and in the same year, launches digital identity pilot programs in Alberta and British Columbia. In 2020 Canadian public sector bring a new Policy on Service and Digital(2019).

7.5 Procurement versus internal

Acquiring resources in public sector continues to be a challenging endeavour. This section presents the findings from the interviews with the CIO when discussing resourcing the project teams; consideration was given to the access of internal human resources, as well as to access external resources to the organization, either from other public sector organizations, or, to access using procurement actions to acquire professional services.

Table 32: Procurement versus Internal (2016 and 2021)

	Differences	Commonalities
2016		<ul style="list-style-type: none"> • Project resources are represented by the internal staff to the CIO team and staff of corporate offices. • When engaged in horizontal projects, across public sector, resources are acquired in collaboration with similar teams in other departments. • CIOs use the procurement vehicle available, access existing standing offers, to acquire technical solutions, and professional consultants. • Staff within the department or across GOC form the project team along

		with resources acquired via procurement vehicles.
2021	<ul style="list-style-type: none"> In one instance the CIO indicated the need for a “Fast Track, Vendor-Based Implementation” of the projects. The deliverables were outsourced to external vendors, as internal capacity would not deliver the solution in a short timeframe. 	<ul style="list-style-type: none"> Project resources were internally to the department from CIO team or from the business and corporate team, via procurement vehicles, or externally to the department, via various HR vehicles (assignments, micro-missions, interchanges)

Several commonalities are observed in 2021 as they pertain to procurement. Project resources were internally to the department from CIO team or from the business and corporate team, via procurement vehicles, or externally to the department, via various HR vehicles (assignments, micro-missions, interchanges)

Project resources are ensured via employee of the department, and consultants accessed via procurement vehicles. Resources required are ensured by regular staffing actions, and access to internal employee. The procurement vehicles were used to acquire missing / scarce skilled professionals (i.e., developers, architecture specialists), and resources with new skill set (i.e., senior business analysts, design thinking, change management, project managers).

The projects teams are usually built in a matrix environment with staff from the CIO team. In some instances, resources are also acquired / accessed from the Business teams, as well as from the corporate teams of the same department / organization. In some cases, the project team is formed with access to public servants from other departments, brought on short / medium term assignments from across public sector.

Majority of the CIOs have indicated the challenges of recruited the necessary qualified staff; the lack of required qualified resources, the extensive duration of the current HR process; the volatility of the mechanisms used to acquire the required project resources. This creates a high level of uncertainty over the project resources with direct impact on project completion and

project success. For. Ex. The CIOs may initiate the upgrading of the analytics systems in which case a contract with an outside vendor was put in place to capture and refine its complex intelligence requirements, identify key business processes to streamline, and implement foundational components in support of the ongoing modernization of its analytics systems.

7.6 Transformation versus innovation versus traditional low-cost

This section presents information regarding the aim of the projects, to transform their organization, bring innovation versus projects that aim for low – cost investment to maintain existing infrastructure.

Table 33: Transformation versus Innovation (2016 and 2021)

	Differences	Commonalities
2016		<ul style="list-style-type: none"> • For business transformation and for digital transformation projects the CIOs engage a variety of internal and external solutions to support the transformation, modernization of their departments while engaging various technical solutions (such as COTS, or enterprise-wide solutions applicable for horizontal projects across GOC). • Technical solutions were designed by the CIOs, over the option of selecting cost effective solutions.
2021	<ul style="list-style-type: none"> • The AI and cybersecurity are not yet present consistently across public sector organizations. It is mandated 	<ul style="list-style-type: none"> • Transformation over innovation decisions is made based on the political agenda of the

	<p>across the public service given the 3-5 years strategic directions (IM IT Strategic Plan, Digital Services Strategy, etc.). The rate of implementation differs based on a variety of reasons.</p> <ul style="list-style-type: none">• Less than 30% of the CIOs interviewed engaged AI and Cybersecurity in their projects.	<p>government in power, and the horizontal policies approved for implementation across public sector.</p> <ul style="list-style-type: none">• CIOs shared practical examples related to transformation versus innovation projects.
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Among 2021 common themes, transformation versus innovation was an important debate. In one case, the CIO is engaged in cybersecurity and AI given the purpose and the mission of the organization. The organization is engaging in a series of efforts with other GOC departments collaborative efforts at national and global level, accessing common resources, to ensure protection and security of information required to make decisions related to urgent and sensitive matters.

In one case, given the nature of the projects implemented (i.e., risk reduction related to the security of information)cyber- security was at the for front of the project. For this analysis, will use the definition give by the organization for cyber-security:” The body of technologies, processes, and practices designed to protect electronic information and information infrastructure from mischief, unauthorized use, or disruption; a subset of the processes and practices of IT security, which includes the broader application of policies and people-focused security management techniques.”

In one case, the CIO mentioned that given the cybersecurity attacks faced by the organization, the CIO was permanently focus on cybersecurity. In these circumstances the CIO had to initiate actions / and projects to protect the users, the agency suspended online services to prevent additional cyber-security attacks. Cybersecurity is a very important priority for the organization and is one of the main goals parts of the Digital Strategy.

7.7 COVID

Since 2019 the world has been faced by a unique situation related to a global pandemic. Work environments, working tools, management of employee are only a few of the areas that were heavily impacted by this pandemic. The CIOs interviewed in 2021 have noted some of the changes resulted, and how a global pandemic impacted workforce, move towards remote work, and work environment.

The government in power brought a series of legislations that had a huge impact on public service. In general, all the CIOs indicated that the global pandemic is a major, never seen situation that humankind has been faced with, and has been “a major earthquake on the bureaucracy, and not only.”

Table 34: COVID (2016 and 201)

	Differences	Commonalities
2016	n/a	n/a
2021		Special circumstances such as COVID was a unique situation with major impact at global and national level. Private and Public sector were very hard impacted; in public sector CXOs, and CIOs and public sector staff were faced with new circumstances that impacted their organizations.

Significant common factors are observed in 2021, a major phase and inflexion point in the COVID pandemic. In one case: COVID was the main driver of the launch of the Digital Transformation Project (i.e., MS Teams) given the need for the entire organization to work remotely.

In one case: The impact of COVID on the implementation of Digital Strategy, while maintaining business continuity, and taking over duties of other departments given the COVID and the readiness of the organization to manage new priorities of the government.

In one case: COVID impacted the organization, the CIO, the pressure of strategic and operational urgencies, work life balance, technology availability and readiness of employee and the organization.

In one case: The COVID had an impact on the organization on multiple fronts:

- the GOC asked the agency to deliver several relief measures, including the CERB and the CEWS. The agency was able to deliver, drawing from its experience gained in updating its digital services and working in OneGC space.
- obsolete workflow of operations, used of paper-based information was a big challenge during the pandemic, as employee were working remotely, and they could not access the information from where it was stored. The agency identified tis as a main objective in the Digital Strategy, to modernize processes and systems to make them digital service.
- pandemic experience formed “a line in the sand” for the agency.
- the return to business would need to be accompanied by an evident change in how the Agencies conducted their business on three fronts:
- something had to be done to address paper-based workflows that piled up as employees worked from home.
- the adoption of a virtual workplace seemed inevitable; and
- digital solution development must be accelerated.

All of these were viewed as issues that needed to be addressed in support of a new way of doing business as all areas of the agency resume operations. During the pandemic, the agencies excelled by working together to successfully deliver multiple new programs at an unparalleled pace. COVID and digital transformation created new expectations for service delivery; clients and employees have increased expectations in service delivered, the pace and models of service delivery. The organization has in its Digital Strategy a strategic objective to modify, update or entirely shift mindsets, processes, and business through the integration of modern technologies and practices.

Remote Work: COVID brought a major shift, a change across Public Sector. What used to be a “Special work environment” became the norm for over 250,000 employees, the full work force of public sector. New tools, new policies, new ways of managing, new ways of conducting work were implemented across public service.

In one case: Almost the entire organization has been working remotely since March 2020.

The CIO indicated that from the CIO team almost 80% of her employees work remotely, while the other ones are required to be in the office (as needed) given the sensitivity of their work duties and the high level of security level required to access the information needed to do their work.

In another case: All employee worked remotely; consideration was given to the impact it had on staff, **management**, the tools required, processes had to be changed.

7.8 Digital Services

The CIOs showed their commitment and high preoccupation for supporting, advocating and implementing Digital Strategy, developing new services, delivering digital services while continue the IM IT transformation, and initiating new, transformed services.

Table 35: Digital Services (2016 and 2021)

	Differences	Commonalities
2016	<p>The public sector organization-initiated projects to modernize, increase efficiency, and move towards offering digital services, to align to the IM IT agenda of modernization, seeking efficiencies, increasing quality of the services.</p> <p>In this period, public sector was in the very early stage of digital services.</p>	<p>In general, the CIOs did not mention pressure for digital or work towards digital transformation.</p>

	<p>In a few instances, the projects intended to implement enterprise-wide solutions across Public Sector, bring efficiency, modernize various major corporate services and systems used (i.e., Finance, HR).</p>	
<p>2021</p>		<p>There is a wave of digital and transformation projects across public services, in almost all the departments where CIOs were interviewed.</p> <p>The government in power issued in 2019, the “Policy on service and digital.”, that direct the public sector “how Government of Canada organizations manage service delivery, information and data, information technology, and cyber security in the digital era.</p>

Implementing digital strategies requires revamping public services and programs, a key issue throughout 2021.

In one case: There is a high pressure for Digital. The CIO has indicated the high level of pressure to implement the GOC Digital Strategy agenda, and to introduce digital across her organization. The CIO initiated the set up of a Digital Office across the organization, and is working hard to consult all business units, learn about existing business lines and the need for their transformation to adopt digital technology and leverage it. The CIO indicated the organizational efforts to adopt AGILE and support the transformation from projects to product

as part of the implementation of the Digital Strategy. The planning, implementation, governance, oversight for the strategic initiatives is using an Agile approach, whereas the project is aligned to the Minister's mandate letter for the political pressure and the mandate of the Government, along with the new Policy that set the Information Architecture requirements.

In one case: The Digital Project, and the Digital Strategy were planned and implemented considering the IM IT public service transformation, the horizontal Development of the Digital Service policy.

In one case: The digital projects intend to deliver digital services, and to prepare the delivery of digital services within the department, and across the GOC. The projects are aligned to the Digital agenda of the departments and the GOC. For presenting this information, the CIO indicated that the following definitions were identified by the department: Digital: Processes, practices and technologies related to the production, storage, processing, dissemination and exchange of electronic information and applications, including artificial intelligence systems. It refers to, among other things, information and communications technologies, infrastructures, and the information they produce and collect.

In the context of the interviews, digitally enabled represents Government operations and services that are supported by strategically leveraging information and information technologies, infrastructures, and the information they produce and collect.

7.9 Artificial Intelligence

In 2021 the conversations on AI were present in a few instances during the conversations with the CIOs interviewed. In 2016 there were no remarks about AI.

Only few CIOs were involved in leveraging AI within their organizations. From the ones that engage efforts in AI are included the following remarks.

In one case: One of the CIO is very active in the AI community. The CIO has been an active speaker to a variety of AI conferences. CIO engages periodically with subject matter experts to share their knowledge about a wide variety of topics related to the development of successful AI strategies in the enterprise context. In addition to covering high-level topics, CIO discussed practical tips and real-world examples related to the development of successful AI strategies within enterprises, with specifics in public sector.

“These subject matter experts will share their knowledge about a wide variety of topics related to the development of successful AI strategies in the enterprise context. In addition to covering high-level topics, these panelists will also discuss practical tips and real-world examples related to the development of successful AI strategies within enterprises.”

In one case: The organization did not experiment with any AI tools, they are not applicable for the current projects, however, the deliverables of two major projects prepare the ground for innovation and for application of AI.

7.10 Outsourcing

All CIOs interviewed mentioned resources and the scarcity of qualified, skills resources necessary for their IM IT transformation projects. To access resources, CIOs are using human resources recruitment vehicles that are many times combined with procurement activities that allow easier, faster access to resources.

In one case: Procurement vehicles available at the disposal of the entire Government of Canada (GOC) were used by some of the GOC departments to secure the professional services required to implement MS Teams as a digital tool across the organization. Considering the future for Cloud adoption, the CIO foresee an intense effort on procurement for cloud technology.

In one case: The capacity of the project was ensured by internal employe, by staff on assignment from organizations across GOC. Employee worked in a matrix work environment internally to the departments (based on an agreement between the Chief Information Officer Bureau (CIOB) and the Business groups), along with professional consultants.

In one case: The project team include external resources that supplement the skill gap, and the limited resource of the organization given the heavy workload and the short time commitments (i.e., budget preparation).

8 SUCCESS FACTORS AND CHALLENGES

During the interviews, CIOs were very generous in addressing our interview questions:

- **About CIO Leadership:** What CIO can do to help champion and guide innovation projects, reduce knowledge and talent gaps throughout the lifecycle, at all levels of management, within and outside their agency?
- **About Governance Framework:** What could be the architecture for a more flexible IT governance framework to improve the performance of innovation projects, from inception to completion?

8.1 Success Factors

The CIOs shared success stories, and success factors (SF) gathered from their leadership experience, from their professional experience as CIOs. The following is a compilation of the factors that ensured success in the CIO role as well as success of the projects CIOs lead.

Table 36: Digital Services – Success Factors (2016 and 2021)

SF	Differences	Commonalities
2016		<ul style="list-style-type: none"> • Success factors when CIO is leading the project. • Success factors when CIO is leading a horizontal initiative collaborating among Other Government Departments (OGD)s. • Success factors when CIO and procurement is involved. • Success factors when CIO is leading a business transformation project.

		<ul style="list-style-type: none"> • Success factors when CIO-IT is engaging with the business units.
<p>2021</p>	<ul style="list-style-type: none"> • The role of the CIO and the authority level are impacted by the size of the departments. • In small departments, CIOs continue to be at the DG – level, have a low level of authority; participate indirectly to the decision-making process, and influence via their deputies. • Access to funding continue to remain a challenge, as IT transformation projects or digital transformation projects must compete with existing portfolio of projects. • Business acumen, personal and professional background, tenure as a CIO, a CXO are subjective and personal success factors. 	<ul style="list-style-type: none"> • CIOs shared a variety of success factors (SF) identified by CIOs for the successful completion of their projects. • Success Factors areas identified: CIO’s personality, CIO professional profile, CIO brand and reputation, relationship with deputies and CXO peers, previous leadership experience, management of projects within the organization, management of horizontal projects, collaboration with central agencies, oversight of IM IT capital investment projects, project management maturity level.

SUCCESS FACTORS: 2016-COMMONALITIES

CIOs shared success factors; they are categorized based on the involvement of the CIO.

Common success factors when CIO is the leading the project:

- Consideration to the sensitivity and the nature of the project
- Periodical and consistent communication with all parties involved.

- Accountability of the CIO and the Senior – Executive Management team to the project
- Strong, knowledgeable, and right people on the project team and the business team
- Strong relationship, strong mutual trust with the Senior – Executive Management team

Common success factors when the CIO is leading a collaboration among Other Government Departments (OGD)s:

- Strong desire to succeed from the CIOs of both organizations.
- Dedicated support from both public sector departments
- Central agency support for the CIOs of both organizations involved in the project.
- Hard and Intense efforts for building trust and confidence within the team, with deputies and other internal as well as external stakeholders.
- Flexibility of the work environment for the project team (s): Co-location of the team.
- Opportunities for development to project team members while on the project.
- Adoption of open collaboration among both groups
- Development of the costing model, and service agreement agreed upon by both teams.
- Openness, transparency among the project team members and with Senior and Executive Management team
- CIOs and teams' knowledge of the work environment (i.e., a CIO who previously worked with the OGD involved)
- CIO key role is the communication and liaison role with CIOs of public sector, with central agency's oversight, with the jurisdictional partners, and with the private partner.

Common success factors when CIO and procurement is involved:

- Select the best resources (qualified, experienced, professional), not the available ones.
- Qualities of the private partner: strong cooperation relationship, maintain the business relationship while the organization faced internal and procedural delays.
- Full cooperation and support from the private partner from the outset to project completion; in times of delays (due to various circumstances, context), the private partner continues to patiently wait for the contract to continue and deliver work and advice despite uncertainty (such as weekly calls to CIO).

Common success factors when the CIO is leading a business transformation project:

- What started and failed as an IT project, has succeeded once it was moved towards a business transformation project.
- Changing the mind set of an IT project (to replace of an old technology with a new one), to a business transformation approach (“what I am going to do with the new technology, how can I make it useful in the new environment, why are we are working on this change, etc.”).
- Build trust and confidence to the teams that might have been involved in series of failures of the project.
- When the project is business lead, the business know – how to be integrated in the project team and in the IT team.
- Integrate CIO team with the business team, common efforts to collaborate, communicate, strategize.
- Value the specialized resources of both CIOs and business teams, allow them to take ownership of their skillset and the impact on the project, reward success.
- CIO’s intense and consistent effort for engagement, consultations, communication at horizontal and vertical levels, at all levels, with all staff and professionals, creating a cultural change of the work environment.
- Understand the organizational level of readiness for adoption of a major culture shift.

Common success factors when CIO – IT is engaging with the business units:

- CIO ‘s ability to enable businesses to be conducted differently, while guiding project teams to work collaboratively and adjust.
- High level of engagement of the Business Unit
- Right people selected part of the project and the business teams.
- Continuity of the subject matter experts in both CIO and Business Unit
- High level of retention of the project team members
- CIO’s business acumen and business expertise
- CIO ability to “clear the way for the project team at any time and provide full support.”
- CIO eliminated the politics form the floor and kept them all in the CIO office.
- CIO building trust and confidence.
- CIO’s openness, transparency.

SUCCESS FACTORS: 2021-COMMONALITIES

The CIO role has changed; its level has been augmented in several large public service departments from a DG level to the ADM level.

CIO role:

- CIO is a partner with the Business unit of the organization.
- CIO has the same level of authority as the CXO peers.
- In some instances, the CIO has the necessary authority to make decisions.
- CIO sits at the decision-making table.
- CIO is at the Deputy Level in central agencies (i.e., the CIO of Government of Canada), and for large departments.
- CIO is part of all the strategic, and tactic conversations on planning, initiating, budget approval, implementation and executing major projects and strategies.

CIO access to resources:

- CIO has access to resources (human resources and financial), can restructure and reorganize their team, in some cases CIOs pilot new organizational models.
- An organizational model includes a core team of full-time employee who maintain the operations of the CIO team (mainly IT operations); a 2nd team, a special group of specialists, “free agents”, within the same organization, with special skill set and competencies, with the role to train the core team and support adoption of new skills and practices. The skills set / traits / competencies of this group include digital competencies: Agilist, Scrum Masters, Story Tellers, Infographic, social media, Marketing, Communication, Project Managers, Strategist, Information Architecture, Technical Architecture, Cybersecurity specialists.
- CIO support the implementation of the Digital Strategy in an agile, flexible, adaptable manner using a “hybrid” team, as described before.
- Access to qualified and sufficient resources for IT and strategic planning, project implementation
- CIO build a team with the skill set required for the project, with user and client-oriented people; resources support the current and future strategic needs of the organization.

Relationship between CIO team and other functional teams of the organization:

- IT can be a service provider only if it is in a partnership relationship with the business side.
- IT can demonstrate the art of possible, demonstrate the value it brings; IT can build the trust in the relationship with business, demonstrate the value in the delivery of services.

Policy changes that occurred in the last 5 years in public service:

- Harmonization and amalgamation of a variety of policies
- Launch and early implementation of the Digital Policy applicable to all public service departments.
- Harmonization of Service Policy with the Digital Strategy, impact on all internal and external services delivered by CIOs.

Creation of Digital Offices across public service due to the launch and early implementation of the Digital Policy across GOC.

Support and endorsement of the Executive cadre, the deputies to CIO and Digital Transformation:

- Commitment from the higher public service decision makers: “When the Clerk of the Public Service talk about MS Teams, that is a sign that Digital Government is in place.”
- Support from the deputies (ADM, DM) that CIO reports to.
- Leadership’s understanding on the evidence-based decision-making process, support for CIO to take time to do it properly.
- In some instances, the Deputies to be the Digital Transformation Champions
- To offer the highest level of visibility of the projects

An Agile approach for development and implementation of digital strategies:

- Co-creation, and co-design of the digital government well supported by groups of early adopters: “There is no need to talk about transformation, we are digital, and this is the future”.
- CIO focus their efforts on the 80% of staff, the early adopters.
- CIO’s continue efforts for piloting for a successful “formula” to implement digital transformation.

- CIO and the Digital Champion, two new roles in the Digital Transformation area
- The Digital Champion roles, at deputy level, a conscious decision of the department
- The Digital Champion role put in place prior to the arrival of new CIO's, or, in agreement and collaboration with the new CIO.

The size and diversification of CIO portfolio:

- In many cases the CIO's portfolio includes IM, IT, the Deputy Chief Security Officer role, the Chief Enterprise Architect role, along with involvement in Digital Transformation.
- Despite the heavy workload and capacity issues, a broad portfolio exposes CIO role at all levels, create opportunities to demonstrate the value of the complex role of the CIO.

A horizontal informal structure within a bureaucratic environment:

- In organizations with very little red tape, CIO can better reach horizontally and vertically.

Relationship with peers:

- CIOs build, develop, and engage in building healthy collaboration with other peers (i.e., VP of Corporate Services, VP of Policy)
- CIO build long term business and strategic relationships; In one case, CIO build an extensive relationship with the Chief Risk Officer(CRO) in charge of Audit, Evaluation, Risk, and advisory services. CIO conducts engagement with CRO to ensure that IT security risks are identified, assessed, and mitigated; CIO team develops a risk methodology to assess IT security risk tolerance, IT risk, funding required for investments; the methodology was shared with GOC departments and globally.
- CIO build strong partnerships with other CXO colleagues: Digital Officer, Privacy Officer, Data Officer, to work together and resolve business challenges.

Level of trust with CXO team:

- CIO develops and maintain good partnership and business relationships.
- CIO's ability to evolve, revise, and propose a new governance model, an enterprise model for all capital projects.

- Collaboration and consultation with all the groups of the organization and with the deputies, that increased the CIO credibility.
- Collaboration with CXOs and peers.
- CIO contributes for a revised governance structure; proposes governance models adopted across the organization, applicable for all IT and capital investment projects.
- CIO had the trust of the Business team.
- CIO is well supported by the deputies (DM, and the ADMs (i.e., the CFO), as CIO's best allies in the digital transformation endeavour.
- CIO to empower the deputies (DM, and the ADM) to become an advocate, a strong supporter of the IM IT work within the organization, and outside the organization, across public sector and private sector.

Personal and Professional Profile of the CIO; Reputation of the CIO:

- In this role, a successful CIO is a non – biased, agnostic CIO.
- CIO needs to strive and desire success.
- Respect, and good reputation.
- A successful CIO is a visionary, that trust that the organization will be better after the transformation initiative is completed.
- CIO build a reputation with CXO team, and with the entire organization.
- CIO has strong technical and digital knowledge. In one case, the CIO indicated the importance of knowing what the minimum viable product (MVP) is required to be delivered; the CIO understood what can be done manually and what can be done automatic; this helped the CIO in the decision-making process, in engaging the organization at all levels.
- CIO's level of knowledge of the organization: "You can't do the CIO job if you don't understand the business of the Government of Canada."
- COVID times allowed CIO's peers to understand the cost effective, the valuable work that CIO team is doing, the accountability demonstrated whenever is needed.
- CIO with a finance background is an important asset required to conduct the conversation to access funding, provide financial reports, show ROI for IT investments.

- CIO to create a strong relationship with Finance team; CIO made Finance group the advocates and partners for CIO and all its projects.
- CIO understand very well which the services are delivered, what is the business model, what clients needs, and their challenges.
- During the strategic financial planning exercise, CIO team conducted architectural assessments, bringing evidence to the decision – making table; secure support in putting forward a united front for the strategic investment.

Organizational Project management maturity level:

- CIO adopt agility.
- CIO recognize the need for a hybrid approach in the management of projects.
- CIO support the development and implementation of a PMO, CIO train staff on project management.
- CIO advocated for planning. “Good planning is essential: put in place a smart and through planning process.”
- CIO to develop a project management framework aligned to public service and central agencies requirements and approved strategies.

Alignment:

- Alignment of CIO’s agenda to DM’s agenda and organizational needs.
- CIO to ensure alignment of CIOs’ agenda to the CXO, and Deputies’ main agenda.
- CIO to ensure alignment of CIOs to organization’s urgencies.
- Development of the IM IT planning process, aligned to the mission and vision of the organization.

CIO, an educator, trainer:

- CIO provides training to all peers: communicate It matters in plain business language; CIO present IM IT, digital transformation concepts in simple business concepts manner; CIO use plain language; CIO avoid technical terms, acronyms; CIO to make the audience part of the conversation rather than a static audience.
- CIO present business value in all its projects, in all asks; CIO present business impact, carry a business conversation, not an IT conversation.

CIO respect enterprise risk:

- CIO address the risk for the projects; present them to CXO, to the business unit and other organization functions; identify risk, and the business impact; assess project and organizational risk; track, monitor and report risks.

Level of Oversight:

- An oversight of IT and capital projects ensures continued improvement; however, a stringent, strict, very structured oversight impede most of the time the project progress; a level of flexibility over the oversight is needed.

Access to funding:

- Early Funding allocation is key to the success of the project.
- Access to project funding, financial resources, should not constitute a problem, a constraint, or a limitation.
- Periodical financial review of project funding is valuable; CIO to comply and initiate conducts periodical financial and budget meaningful conversation.

Political agenda:

- Projects to be fully aligned with the mandate letter of departments, as they are well supported by deputies and the organization. These projects have an impact at the enterprise level and a personal impact over the performances, progress, and progression, and advancement of CXO team.

Governance:

- A 360 – degree review of public sector governance, internally and externally to individual departments, would be beneficial to identify models used, best practices, processes for creation of a knowledge management on governance across public sector, for continuous improvement.
- Governance models across public sector should go through a periodical revision process, to allow for an increase efficiency and effectiveness and for supporting the organizational changes.

- Governance challenges faced by individual organizations in public sector and across GOC at large should be used for in the process of policy reforms and policy revisions.
- Governance success across public sector organization should be shared across the individual organization and among organization for supporting continuous improvement.
- Open government, governance readiness presents the opportunity for governance reforms.
- Outcomes and recommendations of internal and external oversight and control activities (i.e., audits) to be public and discuss and shared at the CIO community table-horizontal level, and across public sector leadership teams.

8.2 Challenges

The CIOs interviewed in 2016 discussed the challenges they face related to the projects they have chosen to present in the interviews. Each of the CIOs presented a variety of challenges that impeded the progress of their projects or had a major impact (such as major delays) on the project. A variety of these challenges were common across various projects, even if the type of project scope of project, the context of the projects was different. There are a series of common challenges that impede the project success. They are presented in the table below:

Table 37: Digital Services- Challenges (2016 and 2021)

Challenges	Differences	Commonalities
2016	<ul style="list-style-type: none"> • CIO's challenges with the oversight system in place required for IM IT Capital investment projects. • CIOs mitigate their challenges by customizing their approaches to the specifics of their projects and organization. 	<ul style="list-style-type: none"> • Project related challenges. • Access to resources. • Impact and influence of consultants. • Personality of CIOs • Oversight system in place. • Pressure and needs of customers and users. • Political context

<p>2021</p>	<ul style="list-style-type: none"> • The type and level of challenges are related to the size of the organization and the project. • Role of the CIO is inconsistent across public sector. • CIO’s portfolio and workload • Digital Transformation journey 	<ul style="list-style-type: none"> • Every single CIO shared a series of challenge factors (CF) that they have faced and continue to face over the years in their roles as IM IT leaders.
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CHALLENGES: 2016 – DIFFERENCES

All CIOs mentioned a variety of challenges throughout the life cycle of their projects.

Project challenges include the complexity of the project; sensitivity of the project; project team’s roles and responsibilities; the definition of the roles assigned within the project in each organization; the level of acceptance of the roles assigned within the project in each organization.

Resources: CIOs noted the challenges brought by the long -term presence of consultants, and their role changes over time, and their level of influence and role can change, with a direct impact over the project. In some cases, their roles change from subject matters experts to executive roles.

CIO personal work style: CIOs were humble and open to admit the impact on project success and on the employee of the CIO’s personality and work style. In one case it was mentioned the impact of a very engaged, dynamic work style of a CIO that received and disseminated constant pressure on employees and peers, putting pressure and high demands but lacking constructive feedback and active communication at all levels with peers and employees.

The oversight system is mandatory for IM IT Capital investment projects over a threshold (<https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32593§ion=html>) across public sector. Periodical assessment, reporting, and acceptance of 3rd party audits are some of the additional complexities for projects.

CIOs mitigate these challenges by customizing their approaches to the specifics of their projects and organization.

In one instance: The Oversight committee of the main central agency in public sector challenged the performances and the progress of the project.

- The project was threatened to be closed
- At the time of the shut off notification, almost half of the project budget has been spent
- CIO of the organization has asked CIO to immediately consider shutting down the project
- Deliverables were in full jeopardy
- The genesis of the public sector integration agency (SS) created major delays in delivering services requested

CIO's role to initiate a series of actions to mitigate the risk: *communicate* with central agency, with CIO of the Government, and other OGDs involved; CIO exercised relationship builder skills, CIO was a liaison among all internal and external parties. The Oversight committee recommendations were considered, for the organization to conducting an architecture audit, and conduct an Independent Review Process (3rd Party review).

One of the major challenges was related to *business requirements* and global location of all the offices involved. Major issue was encountered, related to requirements definition, as they were done individually by each group of users; rather the process was conducted ad-hoc, at various stages throughout the project. Requirements were developed on an exception basis rather than a rule basis.

A major challenge was the *pressure*, and expectations to respond immediately to all individual requests from customers. The large number of the offices geographically distributed across the globe (over 60 offices, plus tens other offices in Canada) all considered for this project.

Another challenge was related to the *national and Canadian legislation* required to acquire, implement, implement the new COTS systems. As part of the project outcomes, all systems needed to be integrated; the main challenges were related to the various systems and platforms that were used individually by each individual client.

An organizational challenge noted by the CIO was the impact of transforming a dispersed system to a centralized system for such a large infrastructure. Efforts and attempts were made for a better system, without to due diligence (i.e., basic functionalities available to all clients).

For political, highly sensitive projects, CIOs mentioned specific challenges, difficult to mitigate:

- Inability to schedule the project major releases; not knowing the date when the project is ready to be launched, dependant on when the PM Prime Minister calls the elections)
- The need for an urgent submission to central agencies when the funds were pre-approved
- Re-allocation of resources for when needed during the life cycle of the project

In several cases, CIOs mentioned as one of the main challenge *the inability to access the required resources*, or to lose unexpectedly their specialized resources; in one case, half – way through the project the organization lost its main senior architecture specialists.

CHALLENGES: 2016-COMMONALITIES

CIOs have been faced with a variety of challenges during their work as CIOs, and while leading projects. More than 50% of the CIOs interviewed presented the following challenges:

Change management.

- Organization's readiness for change is a common theme among al CIOs.
- Leaders' ability and readiness to manage change.
- Skills set required by CIOs and CXOs to accept and manage change.
- Culture of the organization for a smooth and fast adoption of change.
- CIO's challenges when CIO is the Change Management driver for the organization.
- Pressure from the organization, staff, users, internal and external stakeholders.
- Adoption, and acceptance of the new technology
- Resistance to change of the organization from within, from peers, staff.
- Change journey from an archaic platform to a new technical solution.
- Staff fear of change; high level of anxiety, change impact.
- Lack of employee's engagement; and CIO staff

- Motivating employee, a continued challenge
- Keeping people patient, optimistic
- Difficulties with the clients, resistance to change, hard to be convinced, slow adoption of the new work style, and the new work environment.
- Level of adoption of the younger generation, users of social media aspect of digital transformation, versus the more senior staff.
- “Selling” the new technology to users, and to all staff.
- Changing the culture of some professions (such as the legal profession): A consolidated area, open by default, a whole of Justice approach, it is a tool that enable this approach.
- A continuous struggle for the CIO is that employee used the new digital solution; they don't seem to understand the business value that it brings; the biggest challenge is that mainly the senior level people don't see the true value of the collaboration, and the new ways of working, and as a result money are not made available to continue the project.
- Authority, and support of deputies
 - Pressure due to the authority level of CXO peers and their deputies.
 - Level of commitments of deputies to make implementation a success.
- Project challenges
 - Large scale Projects / programs.
 - Focus on yearly commitments, underestimating the complexities of the projects.
- Strategy, and alignment
 - CIO's projects and Business Alignment.
 - Competing priorities: Management of major initiatives in parallel with strategic initiatives; daily heavy operations, management of large teams and management of relationship with various groups of the organization.
- Resources
 - Very hard to access funds.
 - Reduced level of support of senior management support to continue project funding; at the senior/executive level value is not always received and well understood.
 - Availability of qualified resources.
- Project Management knowledge, capacity, resources, skill set, level of maturity

- Project management capacity in the organization.
- Project management framework.
- Business – IT relationship
 - Dysfunctional relationship between Business and IT groups
 - Resistance from the Business group on the use of PM methodology
 - Lack of trust from OGD to the business idea, and in CIO ability to implement the solution in their own environment.
 - Lack of confidence in the solutions proposed.
 - Conflictual relationship between CIO and counterpart at the OGDs
 - Skepticism in the execution model suggested, and the success of the collaboration.
 - Level of collaboration and trust among teams
 - The collaboration, the relationship between the Business Director and the CIO were different and separate, not well defined, not understood, and not agreed upon.
 - The level of distrust between the two roles
 - Personality of the CIO was a big factor in this dynamic.
 - Lack of trust in CIO team and its ability to deliver.
 - Lack of understanding of what the team can do, can deliver.
- Presence of SSC across GOC :
 - For horizontal projects, across public sector it was very difficult to manage; the integration was difficult; working with major integration organizations to set up the environment was challenging, a difficult endeavour.
- Senior – Executive Management team:
 - Turnover of the ADMs
 - Lack of trust in CIOs' ability to deliver.
 - An approach for which support from central agencies was not available.
 - The authority of the CIO as an ADM to run the business transformation project.
 - Lack of full support from the CIOC members
 - For CIOs who reports to an ADM, the need to fully consider ADM focus, agenda, priorities, needs and views.

- For horizontal projects:
 - Delays on the CIOs requests for extensions, difficult to rationalize requests.
 - One of the CIO who initiated and created a community, an interdepartmental committee; that over time grew to 26 departments; the leadership of this public sector – wide committee led by a CIO; The CIO balanced the departmental focus, needs and ensure the GOC is well supported; the CIO made a lot of effort to promote this big change across the entire government; To promote this enterprise -wide approach, the CIO was supported by a cluster of CIOs in front of the CIO of GOC
 - Lack of consistent agreement among CIOs (i.e., on schedule)
 - Delicate situations to handle, such as when the Strategy has been placed on hold for a while, and than it become a priority –an urgency.
 - The need for CIO to do a lot of networking, socializing, the enterprise approach at the GOC to ensure alignment across GOC that was a heavy, difficult process.
 - Alignment across GOC:
 - Heavy efforts for conducting discussions with CIO across public sector; efforts for negotiation ad collaboration with the integration and procurement agencies (Shared Services Canada (SSC) and Public Works Government Canada Services (PWGCS)) to engage public sector’s community together and manage resistance.

CHALLENGES: 2021-COMMONALITIES

The commonalities identified from the interviews conducted with CIO in 2021 have been grouped in several clusters.

Work environment:

- The silos mode of working in the organization.

Organizational Culture

- The resistance to change of people, from CXO to all staff across the organizations; the inability of people to let go and to engage in a new way of working.

- Push back from the ones do not open to change and are not interested to change.
- Obsolete human resources processes, with specific, inflexible work descriptions
- Roles and responsibilities are not always well defined; Employee refuse some of the work assigned; people have preferences on the work they want to do.
- People are afraid of changes and the impact that digital will have on their individual jobs and their future employment opportunities.
- People fear the loss of control.
- Public servants learn by doing, rather than doing it by learning.
- Staff is not ready for change.
- Across the organization, staff is not used to ask help or support from outsiders; all need to be solved and addressed internally.
- Not all the public sector organizations are used to ask for help; when offered, they refuse it, don't consider it.
- In general, people in public sector stay in an organization their entire career, they do not know anything else; however, what they know, they know it very well.
- Organization does not want to accept internal struggles towards achieving a change.
- The organization hire specialists, experts (employee or contractors) whose opinions and advice are disregarded once they present the reality, or "uncomfortable" solutions or realities; the findings of their work are not considered and are wasted.
- Some organizations might not have a dedicated ADM responsible for the transformation project; this ADM would have the right resources, authority, ability to hire staff in permanent positions and retain the skills set, "the best and the brightest."
- A constant struggle is for organizations reluctant to embrace outside policies, guidelines, and best practices.

Short tenure of the CIO role

- Personal: Less than two years in the role
- Professional: A evolution of the role due to the major changes introduced by the CIO in implementing digital transformation; time to demonstrate value of the changes made

Human resources capacity

- Intense and heavy workload, impact on employee, continuous operational needs of systems that need to be maintained.
- Regulatory demands are ongoing, with impact on operations.
- The project teams are usually formed by internal employee and staff on short term assignments from other departments, contractors, and contractors; the team is very volatile, as at any point in time the home department can ask for their employee to return.
- Gaps in the skills set required to develop, launch, and implement the Digital Strategy.
- The CIO is organizing the team, creating a new organizational structure, and is searching for other competencies (data scientist, management of data). Additional competencies will be needed such as: Data scientists.
- Management of data, Cyber Security specialist, Digital strategist, Cloud specialist, IM IT Cloud Architecture specialist, Senior digital strategist, Develop the digital strategy, Liaison to work with all sectors as a strategic partner, liaison to work with all sectors on digital economy, space / science and technology, emerging technology (i.e.AI) and needs consideration for the digital strategy, Strategic planning, Strategic communication.

Limited funding

- Limited funding available to maintain the current systems, many time archaic and obsolete.
- Limited funding, an impeding factor; the technology is cheap, but the overall digital investment requires funding that is not always available. Technology in general is not well funded.

Resource Management

- Small organizations facing challenges, limitations related to human resources capacity.
- Employee engagement at all levels
- Appropriate talent and tools
- Effective management of resources

Overlapping priorities

- CIO roles continue to be very operational, while the digital transformation, adoption to cloud, change of the business operating model, are necessary to be implemented.

Knowledge level

- Often the level of knowledge of senior management needs to be improved.
- Lack of knowledge and awareness of all staff on transformation.

Risk appetite.

- In public sector, risk-taking “ is a muscle that is “atrophied””; decision makers are afraid of taking risks in their decisions.
- Organization are afraid of risk, are not ready to use risk for their own benefit.
- The consideration that organization carries a constant fear of the transformation.

Governance

- Inability to report directly to the business owner, given the governance model.
- Revising the governance model, a challenge due to resistance and organizational culture.
- Convincing peers across the organization, at all levels was a big challenge; Henry Ford: “If I had asked people what they wanted, they would have said faster horses.”

Project Management maturity

- In many organizations there is no project management framework, or PMO in place.
- Projects managed in an ad hoc manner, using best practices, lessons learned at best.
- In some organizations, there a lack of the discipline of going through the process, following a structured process was not easy for the organizations to be adopted.

CIO role

- CIO role and level is inconsistent across the public sector.
- In some organizations CIOs are at DG level and are not involved in the strategic and tactical conversations, not involved in the decision-making process “not sitting at the table with the grown ups, just at the kids’ table”.
- A lack of appreciation from the decision makers of the opportunities created by Digital transformation, by the transformative initiatives.

Strategic approach

- The organization needs extensive time to articulate the vision of their own transformation.
- The organization has a low level of acceptance to leverage of what has been created and what is available to be used.
- A low level of vision for the organization, in long term, and how Digital Transformation can support the implementation of that vision.

COVID

- CIO and all staff are tired, they are asked to do more with less, people are impacted; people are implicitly asked to increase their level of resilience.
- There are various work life initiatives to support staff (i.e. one day per week with no meetings to allow people to breathe, think and get their own pace)

The level of attention of Senior Management

- It is always a challenge to obtain the attention of senior management on transformation projects, mainly for an enterprise or an IT generated requirement, mainly given that 95 % of senior leadership time is on urgencies, policy, and strategic, sensitive projects; also, due to the short project life cycle (for ex. For 5 months is a very short window of time)

Multiple players

- In the Public Sector there are many players involved in IT: CIO, the SSC, central agencies (policy); CSC (Cyber security), and other players (for ex. PSPC for procurement services at enterprise level; PCO for Cabinet Privacy Confidential documents, Safety of networks / info).
- The balance between all the parties is needed: it is never easy, as the business reach CIO and ask for flexibility; while the CIO has the duty to protect the information of the organization.

The need for intense discussions within and outside the department

- The collaboration role that the CIOs plays, given the limited authority of the CIOs. For ex. For horizontal projects, there were lots of delays created by SSC to find time and resources to analyze requirements; they have a shortage on the skill set; and a great

deal of confusion into “who is doing what”. Level of Accountability of SSC has an impact on the project success. Despite the Client Business model of SSC, the organization remains highly complicated.

Funding, IT is a costly endeavour.

- The need to acquire equipment to ensure Security and Supportive services. Needs a very solid business case, do very well the work to present the funding ask. CIO has not been able to get solid in costing of the needed platform, as SSC is not doing their job to support this endeavour. CIO needs to get the level of details required from SSC, and the CIO needs to get the quality assurance of the information compiled.

Everything is taking such a long time in Public Service to get done.

- The CIO engaged central agencies and SSC to change the governance for some sensitive horizontal matters(i. e Secret Solutions), he was successful, to get all the parties involved back together, central agencies to re-establish the committee at very senior level (at ADM level), with membership at CIO level.
- SSC needed the revamped governance to prioritize the work. The current work environment is speeding up on the current needs. This is one of the hard-to-understand challenge by the Senior Management. To do it well, this needs to be done at various levels.
- The departments need to be streamlined, better governance is required, discussions at the senior level need to take place and commitments to be made. The ADM level interdepartmental committee is a step in the right direction.

IT – Digital literacy & Digital Transformation

- Central agencies are trying to tackle the IT literacy of senior leaders, and they need to become participating in important discussions on strategic and operational level, to develop common knowledge. “Data collected from 269 IS professionals supported our hypotheses that common knowledge has an impact on requirement determination, which, in turn, leads to better project performance. “ (HSU, Lin, 2011)

- The level of knowledge required is at IT, IM, and Digital knowledge level for all Senior Management. Even IT does not speak the proper business language so that Sr. ADM can understand. CIO to develop communication skills required to convey msg.
- The IM is the “poor child” of the corporate knowledge. IM is critical, a s majority of GOC are knowledge-based org., and for this is needed to have solid IM tools, and IM solutions. Prior investing in IT solutions, there is a need to have IM knowledge, and to assess risk and impacts. This is a 25 – years long issue.
- Central agency presented the future of IM for Public Service. The development of AI will bring a new level. When clients are asked to populate meta data (solution to track knowledge management cycle), CIO suggest investments in IM.

Every CIO can help as an individual, and CIOs as a community.

- The decision to establish at CSPS The Digital Academy, a place where training is established for staff and decision makers. CIO attended some sessions, helped to establish the Academy. The Digital Academy is not resonating very well with non -IT people. In the organization there is not too much time for that, as the work to “crunch numbers and provide policy advice” is very heavy and almost constant.
- Digital transformation is needed at various levels: on how to transform operations in serving Canadians.
- Engage CIO community: under the Digital Initiative Strategy implemented by the CIOB in central agencies, initiated under the previous CIO, engaged all DMs Deputy heads in IT conversations; this was a full one-day symposium on IT and IT matters and Digital transformation conversations. The ADM come back with thousands of ideas, a forum of ideas exchanges, how to do better to support employees.

On Digital Transformation

- A way central agency to ensure that deputy heads are aware of what transformation is happening for CIO to have a direct line of reporting to DMs.
- In one case the current DM is a great advocate and supporter of digital transformation, with background from private sector and understanding of the major transformation.
- CIO and the CIO community will take actions on SSC challenges:
 - the way SSC is working is getting better and better.

- CIO believe in the IT approach, the need to streamline the cost of IT investments, avoid duplication of work and solutions, Enterprise solutions are good to spend less. The SSC leadership are on the right track, and there are improvements. SSC as an organization is here to stay, they have improved, they have more mature processes; there are a series of strategic and niche projects where they need to improve. For the major projects (i. e.365 Project) the departmental CIO works directly with SSC. The CIO is impressed by the SSC skills their workforce has and the quick turnaround they have demonstrated in one of the migration projects.

In some cases

- The relationship with the Chief Financial Officer (CFO) is sometime challenging, mainly at the personal level, the ability to trust the advice from the CIO is difficult. When the CIO has financial experience, education, expertise, the CIO can fully understand the CFO position. To better this relationship, in an instance the CIO brought in the IM IT team a Director of Finance to manage all financial aspects of IT operations. The challenges faced include the approval of funding required for strategic initiatives; despite the efforts to present reports, to be fully transparent, to allow full access to the CFO for any investment decisions.
- There is an imperative need for CIO to educate peers, for all to see and experience firsthand IM IT work, financial needs, value of IM IT investment and the impact at the organization level.
- The CIO presents the challenges they face to have the necessary level of HR capacity, and the skill set required. As a strategic, proactive leader, the CIO has partnerships with few, organized special recruitment day at the university and hired an impressive number of students for few universities across the country, and hired ½ of them full time in various roles. Flexibility of the work environment is considered and offered in the organization with full support of the CIO. This is an impressive effort, to recruit, hire, train, retain and train the future workforce required by the organization.
- The CIO takes care of the team and is very concerned about the health and wellbeing of the team while daily priorities and operational requirements continue, and the priorities are almost constantly being shifted.

- The CIO acknowledge the high level of stress and tiresome that staff and the CIO are facing and the inability to take care of their health and recovery and take time off.
- When the organization is called on short notices to support other public sector organizations, or deliver programs on behalf of other organizations, the organization must “reinvent itself” to find way to set itself up for delivery of these important initiatives.
- Externally, the management of the relationship with other departments that are strategic partners of the organization, as well as with central agencies is an intense effort that require a structural approach, and a high level of commitment and diplomacy.
- Internally, the CIO team provides support to the entire organization, managing the operations and managing the days to day urgencies; this is a very high time-consuming part of the CIO work. Managing a very large workforce is a huge challenge, as well as managing hundreds of applications requires an intense, prolonged level of effort given the heavy workload, the intense level of operations and strenuous effort to ensure business continuity while facing daily changing of human resources and operations.
- CIO found that is quite challenging to work horizontally. Many departments look at their organization and how they can meet and support the needs of Canadians.
- The organization was very engaged in the initial phase of the digital transformation and the CIO engaged a strong collaboration with CTIO to support the organizational transformation.
- The organization lacks business architecture, and the ability create a horizontal view of the overall ecosystem. This is a priority of the CIO, not a priority of the organization; the size of the CIO team and the current priorities do not allow CIO to focus on this area.

CHALLENGES: 2021-DIFFERENCES

- Role of the CIO: in some departments the role of the CIO continues be a predominant IT role; there are slow changes in the authority level; slow changes of CIO role from IM IT versus digital role.
- There are differences in the type and level of challenges noted in the discussions with CIOs. In small departments, the role of the CIO is more slowly changing rather than in large departments.

- CIOs' portfolio is extremely diversified, predominant with IM IT projects, and predominantly operational.
- The CIO level of authority in these organizations continues to remain in some cases way lower than in the medium-size, larger organizations.
- The CIO is not invited at the decision-making table and has their ADMs/ DMs representing their needs and advocating for CIO proposed projects / initiatives.
- In some of these departments, Digital Transformation in its early stages in some of these departments, and in some cases the speed of transformation is slowing down.
- The level of investment in IT solutions is low and there is a need for organizations to have IM knowledge, and to assess risk and impacts.

9 ANALYSIS

9.1 Model

The interview results presented so far demonstrate the complexity of arriving at an emerging theoretical model following Grounded Theory methodology. To help enrich the BTM BOK, the foregoing analysis will reuse its chapter 2 outline, where we identify 3 domains of executive action in digital transformation: opportunity, decision, and accountability. Each is sub-divided with 5 sub-domains, which are not linear but instead function as concurrent concerns managed with an agile approach, representing a set of executive roles that allow digital leaders to guide transformation at all stages. As presented in Figure 3:Business Technology Management Body of Knowledge (BTM BOK) , chapter 2 of BTM BOK relates to other chapters that influence the whole framework of BTM expertise, namely the career lifecycle in chapter 6, which also integrates the various professional practices outlined in chapter 3. Therefore, while the present analysis focuses on OPM at the executive level of BTM careers, findings relate also to PM expertise for digital projects at the professional level of BTM careers.

Figure 3: Business Technology Management Body of Knowledge (BTM BOK)



Source : <https://github.com/Digital-Innovation-Foundation/btmbook>

9.2 Opportunity

9.2.1 Scan

This section informs how BTM leaders identify IT enablement opportunities. Scanning business opportunities in Public Sector has unique meaning in comparison with what scanning represents for Private Sector. In public sector there is rarely a formal business scanning exercise conducted, given the mandates politically assigned to all federal departments from the government in power, the provision of the mandate letter that assign strategic directions to each deputy for ensuring its implementation. In private sector the organizations are in constant look for opportunities that allow opportunities for improving services and products, finding, and maintaining new markets while maintaining their desired priority in the competitive markets. In private sector, companies are seeking opportunities, anticipating low-end competitive threats early and for developing strategies to overcome competition while taking advantage of new opportunities and new technologies.

The interviews conducted with the CIOs in 2016 revealed a series of commonalities and differences among the CIOs interviews. The following represents the generalized findings:

Table 38: Scan (2016 and 2021)

Scan	Differences	Commonalities
2016	<ul style="list-style-type: none"> • Projects/ initiatives are aligned to the minister's mandate letter and the overall Government agenda and to the strategic plan of the organization. • BTM leaders do not always identify IT enablement opportunities. 	<p>CIO seniority on the role</p> <ul style="list-style-type: none"> • CIOs interviewed had seniority in their roles. <p>Portfolio ownership and portfolio heritage</p> <ul style="list-style-type: none"> • The IT Enablement opportunity (IT EO) exemplified by the CIOs in the interviews were initiated by them, while in the CIO role. • Only in a few instances the projects / initiatives were inherited from their predecessors and taken over by the CIOs as part of their legacy. • A limited number of failed projects have been inherited by the CIOs. <p>IT Enablement Opportunity (IT EO) identified throughout this round of interviews:</p> <ul style="list-style-type: none"> • mandatory, response to a new revised policy. • an urgency of the Government, horizontal • modernize / consolidation / improvement of an existing system, for new capabilities / functions.

		<ul style="list-style-type: none"> • addressed a strategic or operational urgency. • implemented enterprise-wide solutions. • a departmental need (strategic, operational) <p>Aim of the IT Enablement opportunity (IT EO) :Majority are Business – IT enabled, aiming to:</p> <ul style="list-style-type: none"> • develop solutions to achieve efficient, effective business processes for service delivery. • potentially transform business practices • implement changes to existing products, results, services, applications, or systems.
<p>2021</p>	<ul style="list-style-type: none"> • Digital Transformation and Scanning • CIO role • CIOs and IM IT Transformation projects • CIOs and Digital Transformation projects 	<ul style="list-style-type: none"> • Digital Transformation and Scanning • CIO role • Scanning and the scope of the projects • CIOs and Digital Transformation projects

SCANNING: 2021- Differences

One area of differences noted is Digital Transformation and Scanning: 25% of the CIOs shared personal views on CIO role, skills, work duties. In general, Digital Transformation in many public sector organizations, it is in very early stages of the development. A part of the implementation of Digital Strategy, some organizations are launching projects that enhance digital technology to support the needs of the organization. Only 40% of the CIOs interviewed presented their digital transformation projects.

Another area of difference is the views on the CIO role. Majority of the CIOs interviewed indicated that they are ready to move from the day-to-day operational role towards a role with a focus on IT – enabled business transformation projects, and involvement in horizontal projects across all government departments, with a high demand for integration, and various levels of complexity. In one instance, the CIO was new to the organization. Rather than presenting a project, the CIO presented overall observations on the role of the CIO, from the personal experience as a new CIO, on the background, the education, work experience; also talk about governance within the organization and across public sector, and shared views on areas of improvement within public sector and within the individual organization. The CIO presented details about the role of the CIO personal changes brought to the role, and, within the CIO community. In one instance, the CIO presented the personal career path as an executive within IM IT area in public sector, and personal observations while in various executive roles within different GOC departments. The CIO shared observations on the role of the CIO, its evolution, the changes, transformation, challenges, and key areas of success for successful projects, and observations at the organization and government wide level.

An area of difference is the CIOs and Digital Transformation projects. CIOs presented personal views on the journey of public sector to a digital government; to develop the departmental digital strategy. There is a strong sense of digital transformation across public sector with involvement of CIOs to engage organizations in their readiness journey, to support the adoption of digital technology, to implement and deliver successful projects to transform organizations and workforce for the new digital era.

Regarding the CIOs and IM IT Transformation projects, almost 25 % of the CIOs interviewed presented projects in IT Modernization Transformation projects (project.3 and project 4). The

projects presented by the CIOs are at departmental level, or government – wide transformation projects, meant to improve the functionalities of existing systems / tools, or replace the malfunctioning or outdated, legacy systems / tools. The transformation projects presented, they all bring radical changes across the organizations, and a sense of continuous transformation at organization, and public sector-wide level. Only one of the CIOs mentioned that as part of scanning process, under the Open Government Portal, the information resulted is periodically made available. It is now the role of the CIO to ensure that pertinent, up to date, relevant required information, is publicly available via portals such as the Open Government

SCANNING: 2021- COMMONALITIES

In the areas of Digital Transformation and Scanning, CIOs were scanning for project opportunities. CIOs are active advocates at national and global level for digital government, IM/IT business transformation led digital projects. A summary of the individual aims of the projects is introduced here:

- Project # 1: A Digital Transformation project: Introduction of the MS Teams, as a collaborative platform across the organization.
- Project # 2: The role and path of the CIO in public sector, and in the Digital Government
- Project # 3: An IT Modernization Transformation project; leveraging and renew an outdated system, to address legislative and policy driven business requirements.
- Project # 4: An IT Modernization Transformation project to replace a low functioning, obsolete case management system.
- Project # 5: Observations on the role and evolution of the CIO role, CIO's experience in various public sector, the career path; observations on the governance in public sector.
- Project # 6: A Digital Transformation to launch major initiatives, the migration to the Cloud, for data centres; and the modernization of the IT network.
- Project # 7, 9: A Digital Transformation across the organization; Transformation of business and IT across the department
- Project # 8: A Digital Strategy development, in its early stage; organizing the IM and IT to prepare the launch of the development of the Digital Strategy; staffing the team; requirements of the Digital Strategy, and the need for the Digital Economy.

As a commonality, the CIOs shared views on the CIO role: CIOs interviewed were new to public sector, of young age, and in very early stage of their career as a CIO. A commonality is regarding scanning and the scope of the projects, that include:

- To respond to the COVID 19 reality at the organization and society level: the need for the workforce to be able to collaborate, to embrace the use of the new technology, to adapt, to be productive, to have the right tool set and be well equipped to do their jobs.
- To building on an existing experience: to renew the existing systems to address current legislative and policy driven business requirements.
- To address in IM IT systems and tools the new legislation: to address concerns about previous reforms and the need to modernize.
- To replace an outdated, obsolete legacy systems, some built 2 decades ago: Due to the lack of ability to troubleshoot it, support its users, ensure its properly functioning, mainly due to the obsolete technology, and no skill set required available on the market to support the system / tool.
- To modernizing the IT infrastructure, to bring it to the reality of the 21st century: to bring it at par with the development, support the security requirements; to allow the organization to launch long standing projects, to enhance the digital technology to support the business and technology needs of the organization.

A common area is related to the CIOs and Digital Transformation projects: all CIOs shared views on the Digital Strategy and Digital Projects in Public Sector organizations.

- Public sector organizations are at various levels of maturity on the development of the Departmental Digital Strategy; due to size of the department, the availability of the skill set required, the mandate letter of the department, the type of services and their urgency for the users and the society.
- Several CIOs initiated the conversations with their CIO peers and within their organization about Digital Strategy (i.e., its scope, development of the strategy, process, stakeholders, the skill set required).
- Several CIOs are well advanced in the Digital Strategy development (received approval of the business case, have educated teams on the purpose, the scope, the

needs, the requirements, and the skill set required, initiated consultations with stakeholders, best practices, lessons learned from within the CIO community).

- Several CIOs brought external resources with experience in private sector.
- Digital Strategy: to increase the level of awareness within their departments, educate peers and employees on Digital Strategy, support the cultural change, develop, and implement the organizational Digital Strategy.
- Several CIOs received approval on the development of the Digital Strategy and started building the project teams.
- CIO's areas of concerns: internal resistance (from peers, Human Resources and Policy teams, and Senior Management), the constraints (i.e., such as the skill set required to build the project team, the lengthy and cumbersome recruitment/ hiring processes).

9.2.2 Discover

In the BTM Body of Knowledge the discovery is defined as the activity that “the BTM leaders define new IT projects, assess relative impact, customization of costs”. The discovery is one of the most important stages in a projected definition; this is the initial step of project development, aimed at collecting information about the project to identify its Vision, Goals, and the Scope.

Table 39: Discover (2016 and 2021)

Discover	Differences	Commonalities
2016	<ul style="list-style-type: none"> • Funding Model • Formality of the discovery process • “Drivers” of the discovery 	<p>Discovery – a CIO approach (define new IT projects, assess relative impact, customization of costs)</p> <ul style="list-style-type: none"> • CIOs leading the projects /initiatives. • CIO's supporting the Champion leading the project / initiatives.

		<ul style="list-style-type: none"> • Project management (i.e., costs, funding, deliverables)
2021	<p>Discovery – a CIO approach</p> <ul style="list-style-type: none"> • In only one instance, the CIO conducted a full “Discovery” process to assess the needs of the organization. • One of the CIO assessed the level of adoption of the “user design” approach, to be used in the digital project. The “Discovery” was conducted in parallel with the implementation of the user design approach. 	<p>Discovery – a CIO approach (define new IT projects, assess relative impact, customization of costs):</p> <ul style="list-style-type: none"> • For mandated projects, the “discovery” is an ongoing process. • CIO’s efforts to seek optimal solutions, seeking the right skills and resources needed, customization of project management methodology

DISCOVERY: 2016 – DIFFERENCES

One difference related to the discovery process is the funding model and the budget allocation model, that is customized by each of the departments. Overall, the organizations are not using a standardized process.

Regarding the formality of the discovery process, there doesn’t seem to be a formal “discovery” taking place that results in the initiation of the project; rather a planning process, followed by an established, agreed upon, mandated, already approved project. As part of the discovery, the CIOs presented a rather fragmented map of the projects initiated:

- Only 10% of the CIOs interviewed presented examples of projects / initiatives that have an enterprise-wide / horizontal scope.
- The other 90% of the CIOs presented departmental projects / initiatives.
- Only 10% of the CIOs interviewed presented projects / initiatives focused on the consolidation of existing systems, to increase efficiency, enhance functionalities.

- Two of the CIOs presented projects / initiatives politically mandated by new or revised policies, urgent priorities.
- One of the CIOs presented a digital transformation project; the other CIOs have presented IT-enabled business transformation projects.

DISCOVERY: 2016 – COMMONALITIES

As part of the commonalities identified, all the CIOs interviewed (BTM leaders) define the new IT projects once the project was approved to be initiated.

Also, when CIOs lead the project, they build the team from within, with their employee of their teams. When CIOs are stakeholders to the project, they bring forward and participate in consultations to define the IT projects. Less than 50% of the interviewed CIOs presented information regarding their work towards assessing the relative impact of the project. All the CIOs interviewed present information regarding outcomes, value measurements and deliverables. The project costs are managed within the requested and approved project budget. Usually, the budget is allocated according to the annual parliamentary budget cycle. Existing or new funding is requested and allocated assigned to the project, and the costs are customized as required and allocated internally. Majority of the projects seek enhancements, improvements, filling a business gap, addressing nonfunctioning, or issues of legacy systems. In this context, the discovery refers to the approach considered by CIOs to manage the projects, as the scope of the project is well defined from its outset. The machinery of government is looking into its transformation; efficiency of the current service delivery that is important to all CIOs, the ability to find new, better ways of delivering new services that can meet the needs of the main services the citizens. CIOs are asked to consider these calls for transformation in their strategic and operational approaches.

DISCOVERY: 2021- COMMONALITIES

Discovery – a CIO approach. One of the commonalities noted is the case where the project is a mandatory project, such as a digital project mandated across public sector, to all departments, given the COVID-19 and the available technology approved to be used and implemented across public sector and support all employees working remotely. In this case, the “discovery”

is an ongoing process that the CIO is undertaking throughout the planning/executing/implementing the project. In the CIO's interviews, the "Discovery" refers to the tools, the optimal among the available software solutions. It also refers to the "Discovery" of the skills set required for the project team, availability of the resources, the efforts to attract, recruit, and hire the qualified resources, for the project. "Discovery" refers to the identification and customization of the Project management methodology, the approach required for the management of each project, the skills set required for the project team. Lastly, the "Discover" refers to the assessment and identification of the organization readiness to embrace change.

In cases of digital projects, either the development of the Digital Strategy, or a project that emerge from the implementation of the Digital Strategy the "Discovery" represents the CIO efforts and its counterparts / peers along with the project team to manage the project successfully, for successful completion.

The "Discovery" may be at the level of lessons learned and best practices for a similar project across GOC; the "Discovery" may be in the management of the project using an such as the Agile; it may be in identifying the skill gap of the organization, the HR approach to attract and retain qualified resources across GOC; it may be in the discovery of the training and awareness required by the organization, including the executive management cadre; it may be in the initial assessments that the CIO is taking to assess the situation, identify the business requirements, conduct the business assessment to identify needs/solutions/ options, explore and understand customer journey, etc.

In these interviews, the CIO and the project team is engaging various costs and financial assessments (top to bottom, bottom to top) to estimate the project cost, including the cost of decommissioning, replacement, and maintenance; the cost information informs CIO in the preparation of the funding ask for the annual financial planning.

9.2.3 Prioritize

The "Prioritize" indicates that leaders target digital transformation program, projects sequence, feasibility use project portfolio management prioritization for planning purpose. It represents the process of determining the most urgent and important projects that are considered for

implementation; it refers to new and existing projects. Under this context several findings and observations are concluded during the interviews with the CIOs presented here below.

Table 40: Prioritize (2016 and 2021)

	Differences	Commonalities
2016	<p>CIOs views and organizational practices on prioritization</p> <ul style="list-style-type: none"> • In some instance the projects are selected and prioritized to address an organizational long – term need. • Prioritization consider service delivery model, long term needs of the organization, strategic priorities such as service delivery and user need. 	<p>CIOs views and organizational practices on prioritization</p> <ul style="list-style-type: none"> • Prioritization, aligned to the organizational strategy. • Prioritization as part of the public sector Transformation efforts
2021	<p>CIOs views and organizational practices on prioritization</p> <ul style="list-style-type: none"> • Only 20% of the CIOs presented an example of a project / initiative that addresses an organizational long-term need (i.e., talent management/retention/development of HR capacity; future work environment; an IT strategic vision). • Only 30% of the projects exemplified present collaboration with other departments based on the service delivery model in place of each of the departments. 	<p>CIO prioritizes.</p> <ul style="list-style-type: none"> • The prioritize for the CIOs interviewed in 2021 revealed meanings, and the overall observations are as per the following: • Neither one of the CIOs interviewed presented their projects as being part of a formal prioritization exercise that has been used in the organization, rather:

	<ul style="list-style-type: none"> • Only 50% of the projects are focused on supporting user needs and improvement of service delivery. • One CIO presented the project as a priority; presented the context in which the project is a priority, the reasons, the criteria used. In this situation, the project has been deemed as “highest priority level” for the organization, "requested and mandated” to all deputies of departments”. The driver of this “high priority” project was the response to the COVID global pandemic, need to immediately respond. 	<ul style="list-style-type: none"> ○ Projects part of the organizational IM IT Strategic Plan ○ Project part of the Government IM IT Strategic plan, a horizontal initiative ○ The initiation of the project as a priority for the department ○ The difficulties due to the inconsistency of the prioritization model; challenges of competing over funding with other projects, accessing funding for ad hoc projects initiated due to urgencies (i.e., COVID) • Prioritization mainly used at the operational level, to manage workload.
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PRIORITIZATION: 2016- DIFFERENCES

CIOs views and organizational practices on prioritization include the following:

- One of the differences noticed is that around 20% of the CIOs interviewed presented examples of projects / initiative that were selected and prioritized to address an

organizational long – term need (i.e., talent management, staff retention, development of human resources capacity, the future of work environment, and the IT Strategic Vision.

- 30% of the projects presented collaboration with other departments based on the service delivery model of each of the departments.
- Almost 50% of the projects prioritized focus on supporting user needs and improvement of service delivery.
- CIOs, the BTM leaders, were focused on immediate needs of the organization, mainly on the outstanding matters that impact the operations of the organization, and on the improvement of program delivery and ensuring continuity of services.

PRIORITIZATION: 2016- COMMONALITIES

CIOs views and organizational practices on prioritization include commonalities related to project selection and prioritization: in general, the CIOs, the BTM leaders interviewed, targeted transformation programs / projects as part of the strategic planning exercises conducted by the organizations. The CIOs presented for approval their short and their long – term transformation plans and exposed the roadmap along with the implementation plans.

The common drivers of the projects / initiatives initiated by CIOs are:

- the departmental mandate letter and the agenda of the government
- the public sector transformation agenda includes: the Transformation, Modernization, Integration of IT services, IT-enabled business transformation, IT improvement.
- the new authority added to departments for implementation / management of policies.
- creation of new departments that have a mandate to restructure and re-organize the management of IM IT needs of public sector.
- work force adjustment .
- policy gaps with impact at the operational level
- program delivery models.
- funding allocation for creation of new programs
- obsolete tools, technology, systems, platforms

- non-functioning systems, tools, platforms

BTM leaders prioritize their IM IT initiatives in alignment to the mandate of their department, in alignment to the government agenda. This is by far the major commonality among the CIOs interviewed. Majority of the example of projects/initiatives presented by the CIOs are driven by the transformation agenda of Public Sector.

9.2.4 Finance

The interviews with the CIOs allow the information gathering regarding financing model, estimate of project costs for various types of projects, access to finance, approval process, prioritization of funding for IM IT and digital projects. The commonalities and the differences in the two rounds of interviews with CIOs are included here:

Table 41: Finance (2016 and 2021)

FINANCE	Differences	Commonalities
2016	<p>Project Funding(size, approval, allocation)</p> <ul style="list-style-type: none"> • The budget of the projects varies from \$0.5 Mil. Of over \$150 Mil, duration of the project from 2 years to 7-8 years. Funding for a new solution could have an estimated cost over \$1 Million. Funding for a maintenance project could have an estimated cost over \$2 Million. <p>Project Funding for resources</p> <ul style="list-style-type: none"> • The projects / initiatives are carried using one or a combination of both of the following situations: <ul style="list-style-type: none"> ▪ work performed in-house. 	<p>Project Funding(size, approval, allocation)</p> <ul style="list-style-type: none"> • The authority for project funding is mandated by the policy in place.

	<ul style="list-style-type: none"> ▪ work contracted out to a Crown agent. <p>Note: consideration to the most cost-effective means for the program delivery (i.e., the knowledge, expertise, resources, or facilities required are available)</p>	
<p>2021</p>	<p>Funding (size, approval, allocation)</p> <ul style="list-style-type: none"> • Yearly funding was very hard to be secured given the unique funding model; CIOs had to compete with projects deemed by the decision makers as more important, higher priority. • The DG level CIOs had difficulties securing project funding due to their level of authority and the magnitude of the budget they were managing. • Revolving funds for long term projects were available only based on the cost recovery of the services rendered, creating a potential instability, and uncertainty around the life cycle of the projects to their full completion. • In only one instance the CIO reported the total budget cost of the project was under the CIO purview and authority. 	<p>Funding (size, approval, allocation)</p> <ul style="list-style-type: none"> • The budget of the projects presented by the CIOs was between 3 Mil and 20 Mil. • The CIOs presented funding information: <ul style="list-style-type: none"> ○ Access to the additional funding necessary for the project ○ The CIO authority for funding approval ○ The type of project funding is capital funding used for human resources, software, and hardware.

FINANCE: 2016 – COMMONALITIES

The authority for project funding is mandated by the policy in place. For all projects / initiatives, the legislation determines the authority vested in departments and agencies to carry out their programs and activities. Departmental Acts set out the responsibilities of a particular minister or department, or specific legislation that permits the establishment of a particular program to meet a specified need or service. General Acts such as section 19 of the FAA provide legislative means by which authority can be obtained. Projects require Central agencies' approvals.

Majority of the projects presented have the funding secured, and funding submissions prepared and submitted for approval 1-2 years in advance to initiate the project. This is the traditional appropriation in public sector, where funding to projects is allocated based on either budgetary framework in place (operational budget, major capital, separately controlled), or administrative arrangements (carry forward, OGD other government departments, allotment).

All projects were completed successfully, in time, in scope and within the budget. In majority of the cases the projects were part of the Strategic plan of the department, aligned to the mandate letter of the Minister.

9.2.5 Benefit

The benefit around these projects is defined in a variety of manners by the CIOs and has different meanings for the members of this group of leaders, as per the following:

Table 42: Benefit (2016 and 2021)

Benefit	Differences	Commonalities
2016	<p>Project benefit (definition, strategy, measurements)</p> <ul style="list-style-type: none"> The projects benefits are considered “benefits for the people” or “benefits for the organization”; they are defined, clarified, agreed, and approved, 	<p>Project benefit (definition, strategy, measurements)</p> <ul style="list-style-type: none"> All projects researched were closed as completed successfully. All projects were successful, with impact on the

	<p>measured throughout the life cycle of the project. However, the projects are deemed successful if they produce the desired deliverables in time and on budget.</p> <ul style="list-style-type: none"> • Across all projects / initiatives research there is no standard process for benefits management, and no formal benefits management in place. • Only one of the projects presented is a program for which the benefits are measured at the program level where the programs success was measured against the effectiveness of which the program delivers benefits. • For neither one of the projects were financial benefits defined in their business cases. 	<p>organization and individual CIOs executive performance management.</p> <ul style="list-style-type: none"> • The overall common definition of project success is meeting promised project benefits and committed deliverables. • For all the projects researched there is no clear pathway from the project to the strategic objectives of the organization, even though majority of these projects were identified in the strategy of the organizations. • The projects have deliverables identified from the outset; capabilities, benefits and the outcomes are not always defined nor measured. • The feedback from users, decision makers, stakeholders and the lessons learned process was planned to be completed.
2021	Project benefit (definition, strategy, measurements)	Project benefit (definition, strategy, measurements)

	<ul style="list-style-type: none"> • Benefits of the project for the organization • Benefits of horizontal projects • CIO reflection over project benefits • Project benefits versus user needs. 	<ul style="list-style-type: none"> • Inconsistent approach in defining project benefits.
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BENEFITS: 2021- Differences

In only one case, the CIO is clear about the value of the initiative led; it brings to the entire organization. In this instance, the CIO is focused on the level of adoption of the outcomes and deliverables of the project to each of the business. The CIO is very keen and passionate in talking about “the art of possible, to demonstrate the value it brings”. In only one case the CIO presented the benefits and opportunities of Digital Government created by special circumstances (such as COVID) launched across public sector. In only one instance, the CIO reflected on the overall benefits of projects initiated across public sector; despite the intent of delivering successful, beneficial, valuable projects, many of the projects are initiated and launched to rather address an internal departmental need.

A continue struggle: GOC “says” they want to deliver “better services to Canadians”, however, internally in each GOC organization, the user is totally forgotten and all that is done is supporting the internal needs of the department. In only one instance the CIO indicated that the main benefit of the project is the ability for the CIO to go beyond technology, and influence policy development and program development. “Novel ideas are inherently risky.

Because they are unusual, they lack strong precedent, and it’s tough to cite clear examples of success. So convincing stakeholders to invest in them can be difficult.” — Jill E. Perry-Smith, professor and senior associate dean for strategic initiatives at Emory University’s Goulet Business School, in “How Collaboration Needs Change From Mind to Marketplace”

BENEFITS: 2021-COMMONALITIES

Majority of the CIOs interviewed did not presented details on the value of the projects and the deliverables. There is no consensus across all CIOs interviewed on the definition, meaning, attributes, aspects of “the value” for a project and its deliverables.

There is no consensus across all CIOs interviewed on the stakeholders’ expectations for the “value” of the project and its deliverables. In general, the CIOs who presented IM IT Transformation projects, see value of their projects, the opportunity to replace outdated, obsolete, hard/impossible to customize and maintain system, with systems that work, can be customized, respond to the current and future needs of the department, allow integration.

In general, the CIOs who presented Digital Strategy projects, see the use and enhancement of digital technology as a benefit of the organization; an opportunity for transforming the business of IT, support the stringent priorities of the organization, opportunity to improve operations, share best practices with other government departments (OGDs), manage internal challenges, preparedness for moving to cloud.

9.3 Decision

Decision making process in public sector is exercised by CIOs mainly based on the authority (financial, and human resources) of their role, associated with their group and level in their organization. For CIOs, the group and level in public sector in Canada differ based on the size of the department; some CIOs are at the Director Executive, some at the Director General level, and a few are at ADM level.

9.3.1 Who?

This section presents how the decisions are made by this leadership group. They present decision making process under the authority of the CIO role, as well as the role of the governance in the overall decision – making process in the organizations. The authority of the individuals and organizational structure invested with authority are specific to the projects and to the public sector organization.

Table 43: Decision – Who (2016 and 2021)

Decision	Differences	Commonalities
2016	<ul style="list-style-type: none"> • In a few cases, the CIO was a stakeholder to the project; the lead role assigned outside CIO's branch. • CIO and the Business Unit set up a new structure in charge of the IT Enabled Business Transformation, led by a Transformation Champion; CIO had a support and advisory role, a partner. • CIO played the role of the Executive Sponsor of the Program, with the Deputy Minister as the Deputy Authority. The project team included the Solution Management, Release Management and Enabling Service Transformation Team, CIO office, and the BMU Business Management Unit. • In one case the project was led by the CIO of the host organization initiating the project, in a close collaboration between two other public sector departments and their CIO offices. 	<ul style="list-style-type: none"> • The major findings refer to the: <ul style="list-style-type: none"> ○ leadership role of CIO in managing the project/initiative, as well as ○ the structure of the team that CIO selects for the project / initiative. • In majority of the cases the CIO is the lead of the project / initiative. <ul style="list-style-type: none"> ○ The CIO and its team manage the project, along with staff from other units that join the project in a matrix environment. ○ The PMO manages the project when the PMO is lead by the CIO. • The CIO leads the engagement, consultation, and periodical reporting with decision makers (ADM, DM, Minister), with peers from

		<p>OGD, other government departments, and with Central Agencies (central agency, etc.)</p>
<p>2021</p>	<ul style="list-style-type: none"> • The leadership and the structure of the project team are the main differences. • In one case, CIO put in place a model for the project team, while preparing the workforce to manage the digital projects: <ul style="list-style-type: none"> ○ The “A” team, with special skill set (i.e., Scrum Master, Infographic, Story tellers, Visualization, Communication materials, Deck, Agile, Journey mapping, roadmap, persona, etc.). ○ The “B” team includes people with various knowledge and skills (organization, processes, architecture, etc.). ○ Team A trained team B to upskill, retrain and make them available for digital technology and digital transformation projects. 	<ul style="list-style-type: none"> • Overall, the CIOs are leading the project; with their Chief Information Officer Bureau (CIOB) IM IT teams. • In general, the CIOs have the level of authority to initiate and access procurement vehicle to bring qualified professional resources to support the project (Agile or Waterfall project managers, developers, architects, communication specialists, coders, architects, change management specialists, security, cloud etc.) • The CIOs managing Digital Strategy development projects, or Digital transformation projects share the challenges: <ul style="list-style-type: none"> ○ the capacity required to support the management of the projects:

	<p>Team B trained Team A on know how, processes, architecture models.</p> <ul style="list-style-type: none"> • In one case the CIO indicated the value of process re-engineering part of the digital transformation efforts. The CIO used the reverse psychology to implement the digital technology, prepare the workforce, and ensure the impact over the organization. • In one instance, the CIO is the lead of the Digital Transformation in organization. • In one instance, the CIO is playing the oversight role for the Digital Transformation, managed by a Digital Lead. 	<ul style="list-style-type: none"> ○ lack of the right skill set for Digital Transformation projects (i.e., digital architect), ○ lack of temporary / long term committed resources, extensive time to train and upskill the existing capacity, volatility of the additional resources- public servants who joined the project team on a temporary basis, part of on a short-term assignment. <ul style="list-style-type: none"> • CIOs managed large project, with IM IT teams of 50 to 250 people. • The Digital Strategy projects create opportunities for CIOs to inspire the organization, increase digital awareness across the organization and its team, train their own teams and their peers. • In general, the CIOs are co-leading the Digital Strategy / Digital Projects with the peer
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		Business Transformation Lead.
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9.3.2 What?

In this section we have gathered information about how CIO design the solutions.

Table 44: Decision – What (2016 and 2021)

What	Differences	Commonalities
2016	<p>Decision- What</p> <ul style="list-style-type: none"> • Only in one instance, the CIO design the digital solutions, integrated with the business transformation project and the digital strategic directions of the department. • In one instance, the CIO worked with a new OGD that join the solution /system initially designed the CIO (as part of the business transformation project) to share the new solution/ system. 	<p>Decision- What</p> <ul style="list-style-type: none"> • When CIO led the project / initiative, they support the design the solutions, integrate within existing IM-IT strategy of the department. • In several cases, the organization is part of a portfolio with other organizations with whom the organization had IM/IT Service arrangements. • CIOs part of the efforts that the departments make to expand partnerships to include OGD to offer or to

	<ul style="list-style-type: none"> The CIO continue to lead the design, business transformation initiative, define requirements with the partner department, support the onboarding on the system, and the host organization to become part of the service delivery as a new role. 	<p>receive services, application support services. In these cases, the design of the solution is done collaboratively, among all the parties involved in the proposed solution.</p>
<p>2021</p>	<p>Decision- What</p> <ul style="list-style-type: none"> In one case, the CIO assess the project set up/status, and noted that the initial focus on the technology should rather be on the digital aspect, and the project management approach was lacking rigour of the discipline (i.e.PM), and low consideration to risk. The CIO initiated the review of this project, conduct a series of 	<p>Decision- What</p> <ul style="list-style-type: none"> The CIOs initiate Digital projects and development of Digital Strategy, mandated by the mandate letter of the deputy minister. The CIO is initiating the organization Digital Office and promote the digital culture across the organization. When CIO inherit a project, usually they assess, become

	<p>assessments on a periodical basis (1st year, 2nd year) to assess, and shape the project.</p>	<p>aware, fully informed of the status (the progress, what has been done, what has been accomplished, gaps, documentation, engage project team, the stakeholders, etc.); present recommendations for moving forward, to cancel or revise the project (scope, approach, etc.).</p>
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9.3.3 Why?

This section presents the information gathered from the interviews with the CIOs related to the rationale of the projects / initiatives initiated and managed by the CIOs.

Table 45: Decision – Why (2016 and 2021)

Why	Differences	Commonalities
2016		<ul style="list-style-type: none"> • In majority of the cases the projects were part of the organizational Strategic plan, aligned to the mandate letter of the Minister. • In majority of the projects / initiatives they are carried using one or

		<p>combination of both of the following situations:</p> <ul style="list-style-type: none"> ▪ work is performed in-house because it is the most cost-effective means of program delivery (i.e., the knowledge, expertise, resources or facilities required are already available). ▪ work is contracted out to an agent of the Crown because it is the more cost-effective means of program delivery (i.e., the knowledge, expertise or facilities are not available in-house).
<p>2021</p>		<p>Decision- Why: For Digital Transformation projects, to implement the GOC Digital agenda.</p> <ul style="list-style-type: none"> • Projects were needed to provide employee ability to collaborate, meet virtually, connect, engage, learn a new tool, mainly due to COVID (75% of staff works from home; 15% staff still work in the office (due to security limitations / constraints) and the launch of Digital Government agenda of the current Government.

		<ul style="list-style-type: none"> Projects were needed as a modernization requirement (i.e., for IM IT), a mandatory requirement for the department given the changes in the legislation, and the need for systems, tools, processes, and business lines of the departments to be revised, able to respond to the new legislative changes (environmental and regulatory processes). <p>Decision- Why: For IM IT Transformation projects for modernization agenda of GOC</p> <ul style="list-style-type: none"> The projects were initiated to ensure business continuity, provide right tools to the workforce: to replace an outdated, obsolete, almost impossible to customize, and maintain systems, with modern, up-to-date system, that offers the opportunity for full customization based on current and future needs, to allows integration with other platforms.
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9.3.4 Where?

Table 46: Decision-Where (2016 and 2021)

Where	Differences	Commonalities
2016	<ul style="list-style-type: none"> In a few instances stakeholders were several organizations that have different mandates, with different levels of security and 	<ul style="list-style-type: none"> Almost all projects researched involved internal units (business, audit, governance, compliance, service, and program delivery,

	<p>various jurisdictions and authorities.</p>	<p>legal, communications, Minister, and DMs offices, etc.), external stakeholders (OGDs, Central Agencies, PCO), and public sector, academia, professional and private sector.</p> <ul style="list-style-type: none"> • In majority of the cases the CIO community also constituted a stakeholder, a consultative party. • For majority of the cases, the central agency-the Oversight team (EPOC Enterprise Project Oversight Committee) was an external stakeholder for the projects.
<p>2021</p>	<ul style="list-style-type: none"> • In only one instance, the CIO presented the users as main stakeholders (Canadian citizens), various consultations with the users in the planning stage of the project and during the execution of the project. • In only one instance, the CIO indicated as stakeholders the OGDs departments interested in building similar systems and had the need for the systems to be integrated. 	<ul style="list-style-type: none"> • CIO build the project team, engages internal and external stakeholders. • CIO office, CIO additional roles and departmental responsibilities

DECISION – WHERE: 2021- COMMONALITIES

Project team, internal stakeholders: Projects researched are within the CIOB Chief Information Officer Bureau's authority. CIOs build the project team with staff from its own team (M IT); engage staff from Business Units, in a matrix environment. To acquire the necessary skills, the CIO invite staff from other groups (Security, ATIP, Policy); the groups are consulted as part of the stakeholder management process. CIOs report to the ADM of Corporate Services; the same, for the Business Unit lead.

CIO office, and stakeholders: Within the Corporate Services Branch, the CIO is the IM Senior Official (IMSO) leading the IM IT Directorate (IM ITD), that provides leadership, strategic planning, services, ensure the provision of effective, innovative information and technology management in support of departmental business objectives. For horizontal projects, CIOs present assignments to all public servants.

Observations on stakeholders: Internal stakeholders: include teams of the organization (IT, Policy, Business owner, regional employee., front line staff, Change Management, senior management), Senior leadership, ExCom committee members. External stakeholders: include CIO community across GOC; SSC Shared Services Canada; OGD departments with a vested interest in the project; central agencies; Crown corporations.

Observations on project risk management

For departments with an evolved project management maturity level (a PMO in place, a project management framework), the project risk was managed accordingly to the existing framework, aligned to the departmental risk framework, and central agency's requirement for management of risk for IM IT Projects. The CIOs only indicated that the projects were completed successfully, was awarded by the DM and MIN, and completed with zero risk. For departments that are on an early journey of developing PMOs, a PM framework, the risk is managed based on the approach approved to manage the project.

9.3.5 How?

Table 47: Decision-How (2016 and 2021)

How	Differences	Commonalities
2016	<p>Project Management methodology, organization readiness</p> <ul style="list-style-type: none"> • Specifics project management approaches • Hybrid approach (agile, waterfall) • Concerns about the oversight process of central agencies, impact on the projects • Heaviness of bureaucratic processes, impact on projects and teams due to oversight, reporting requirements • The formality around change, the negative impact on the progress of projects. 	<p>Project Management methodology, organization readiness</p> <ul style="list-style-type: none"> • CIOs engages waterfall, and sometime Agile. • CIOs increase awareness of project management practices, train teams, advocates. <p>Stakeholder management</p> <ul style="list-style-type: none"> • Value of engaging internal and external stakeholders • Best practices in engaging external stakeholders mainly in horizontal initiatives; the value of formalizing the engagement with stakeholders.
2021	<p>CIO apply required practices, train staff, customize into, gather, and use best practices:</p> <ul style="list-style-type: none"> • CIO and Project management methodology • CIO advocates for project management practices: • Oversight and Reporting impact projects: 	<p>CIO apply required practices, train staff, customize into, gather, use best practices:</p> <ul style="list-style-type: none"> • CIO and Project management methodology, commonalities • CIO advocates for project management across the organization

	<ul style="list-style-type: none">• Project Capacity	<ul style="list-style-type: none">• CIO to move from operational, daily needs to Digital Government and strategic initiative.• Project Capacity• The CIOs focus on engagement via governance
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DECISION – HOW: 2016 COMMONALITIES

Project Management methodology, organization readiness: The CIO used and encouraged staff to use best project management practices. In majority of the projects CIO uses waterfall. In majority of the cases the CIOs ensure that PMO / CIOB staff was trained and equipped with the required project management tools and knowledge to manage the project. All CIOs applied existing best practices of project management from the industry and customized them according to the needs of their individual projects. Governance and Senior Management Support. Qualified project team members with extensive experience on the project are highly sought of and needed. There is a high need of flexibility to leverage qualified resources across the organization (i.e., in maintenance, for “crunch” times such as for testing). In all cases where IT driven projects are implemented, they fall under the central agencies oversight, and require the use of independent reviews, advisors, and consultants. CIOs are conscious of the need to have a strict control of scope for their projects.

Stakeholder management: The CIOs underlines the importance of stakeholder management, then need of engaging them from the outset to completion of the project.

In cases of partnerships, the Collaboration and Partnership Guiding principles were designed, agreed upon, and used throughout the life of the project / initiative.

These Principles were used to define the Service Level Agreements among the various public sector organizations. There is a major emphasis on developing trust at all levels, and ensuring departmental buy-in.

DECISION – HOW: 2016 DIFFERENCES

Project Management methodology, organization readiness: In one instance, for launching a new program, the CIO used the LEAD Program Development Framework. In one instance, the CIO decided to use a hybrid project management approach, designed, customized for the project, even though the entire organization was using only waterfall approach. In a few cases, the projects were managed via Agile, or a hybrid (waterfall-agile) approach. In one instance the CIO ensured CIOB and PMO teams are trained in project management; business processes were reviewed for optimization, to increase efficiency. The CIO engaged the organization in the development of all project management processes and documents required to manage projects, however, it advocates the idea of flexibility of the approach used in the management of individual projects. In one instance the CIO mentioned the impact of Treasury Board Secretariat Enterprise Project Oversight Committee (EPOC), initiated back in 2010, had on the progress and speed of projects. Reporting, formality, and structured approach, as well as the heavy governance requirements impeded the ability of the CIO and the organization to deliver, mainly when the CIO portfolio is heavy, including many projects, operations. The formality around change, the negative impact on the progress of projects. The project management approach, reporting, oversight, governance should be standardized but to allow the flexibility that CIOs need, to customize it, as needed.

The government is slow, a large, heavy, bureaucratic; on top it created more tools, processes, governance, more gates, and is becoming way slower than already is. There is a fear that the tools are all what matters, people are forced to see tools and not see beyond that.

DECISION – HOW: 2021 DIFFERENCES

Project Management methodology: In one instance where the initiative researched was a new program, the CIO choose to use the LEAD Program Development Framework. In another instance, the CIO decided to use a hybrid project management approach, specifically designed, and customized for the project, even though the entire organization was using only the waterfall approach.

CIO advocates for project management practices: In one instance the CIO engages all his division and the Project Management Office (PMO) to be trained in project management and

review processes for optimization and increase efficiency. The CIO engaged the organization in the development of all project management processes and documents required to manage each of the projects, however, it advocates the idea of flexibility of the approach used in the management of individual projects.

Oversight and Reporting impact projects: In one instance the CIO mentioned the impact of the reporting requirements to Enterprise Project Oversight Committee (EPOC), initiated back in 2010 had on the progress and speed of projects. Reporting, formality, and structured approach, as well as the heavy governance requirements impeded the ability of the CIO and the organization to deliver, mainly when the CIO portfolio is heavy, including many projects, along with operations. The CIO found that formality around change had a negative impact over the progress of projects. The CIO mentioned that the project management approach, including reporting, oversight, governance should be standardized and allow flexibility to each CIO for each project to customize it as needed. The government is slow, is very bureaucratic; on top it has created more tools, processes, governance, more gates, and we are becoming way slower than we already are. There is a fear that the tools are all what matters, and people are forced to see nothing else than tools and they don't see beyond that. In one case the CIO promotes the departmental project management framework, using a gating approach, and assess the existing / required architecture. The CIO is taking the organization on the transition journey from project to product management. The CIO introduce and use Agile across the organization, with intense work underway on this process. The CIO mentions the role of the newly created Digital Office, that is part of the CIO teams, in establishing an Agile Methodology, and the user driven approach; the CIO and her Digital Office is developing an Agile approach: (1) Developed pilot projects with all partners (IM, IT, Internal Business units, External Partners, 3rd party, business services), to digitally enable their functioning.

In this journey are important:(1) communication, marketing, training, awareness is needed (i.e. what is Agile, what does it mean for each); (2) Digital Office is going through this journey with users at the table (here the CIO used the analogy for building a house, where beside finance and constructors you need an architect); (3) the journey is a cultural shift; All GOC departments are going through this digital transformation; (4) one of the CIO's teams is preparing training / awareness Agile material to train the other team

Capacity: In one instance the CIO indicated that when the CIO took over the job and the team a series of assessments were initiated to assess the status of the project that was not progressing well; as part of this assessment, the CIO identified a need to : (1) revamp the composition of the team with new skill set, as well as with staff from all the internal and external groups of stakeholders, to ensure that all “voices” are heard, that consideration is given to the needs of each group of stakeholders. The CIO presented efforts for training, for increased awareness of staff and senior management. The CIO as well become an advocate of best practices required to manage the project: present the value of project management practices, support the “socialization” of project documentation developed, the processes in place mainly to senior management as well as to staff, project team, and stakeholders. One CIO mentioned the “Construction” of the team that need to include all the stakeholders, the IT, Business, Policy, program Delivery, regional representation, front line groups, change management, a multi-facet team, co-located together.” In one instance the CIO presented his personal observations related to the good and hard work initiated to assess the needs of the organization and the work done on a project that was not progressing well and the CIO took over it. In this case, the CIO worked with external professional resources (i.e., consultants), conduct various assessments, gathered information, prepare a report with findings and recommendations. The professional work done, and the recommendations was initially declined / refused / not considered by Senior Management. The CIO conducted many engagement activities to be able to present again these findings and have a meaningful conversation related to the benefits and values of the findings and consideration of the recommendations made.

In one case, the CIO initiated a digital engagement, planning and execution of the project:

- at the highest level: CIO created a “trifecta”, a close collaboration between the CIO, the VP of Policy, and the VP of Operations: It was initially an information relationship, that started the planning of the project; In time, this informal relationship become the Project Steering Committee. CIO conducted early engagement with peers and all parties involved, from the outset of the project; early engagement was key. The 3-membres group got “carte blanche: from the Deputy Minister (DM), and had free entry anytime was needed. The DM was happy with the approach and the collaboration of the CXO group.

- at the lowest level: The group of 3 planned the approach of the project together; they informed each of their teams; the CIO build the project team with staff from these 2 teams; the “trifecta” advocated to the other peers, and their teams.

DECISION – HOW: 2021 COMMONALITIES

Project Management: There is no one-size-fits-all methodology or system used across the project implementation to “guarantee “ the success of the project. In many instances, the implementation approach is waterfall, and this is for a variety of reasons:

- personal preference of the CIO,
- preferences of the project team,
- the organizational culture,
- the project management approved by the organization,
- the level of know how/ experience / education of the decision-making at individual /team/organization.

There are pros and cons of the waterfall approach, mainly the need for a balance between the bureaucratic organization in public service and the flexibility / openness/transparency among other Agile values. The Agile approach is also present; the organizations are usually in its very early stages of implementing this approach, and the level of maturity is low, towards an intermediary stage.

CIO advocates for project management across the organization: The CIOs are putting a great deal of effort to educate staff, teams, their own groups, and teams across the organizations. In these situations, CIOs are open to retain existing staff and educate them in the new approach, while building additional qualified capacity that can be the “advocates”, the “ambassadors” of this new implementation approach. In this case the CIOs indicated the pros and cons of this approach:

- pros- the ability to engage a small group of staff to manage the project and get results.
- cons- lack of capacity, readiness (rather the lack of) of the teams/ staff and organization to access this new methodology; readiness of the decision making

team to see the benefits and the value of this implementation approach; ability to recruit, hire, retain qualified staff to educate/train the existing staff while ensuring the HR capacity required for ongoing initiatives and new projects; -level of effort and commitment of the CIO to reuse to manage projects / educate staff & senior management/ engage in strategy rather than continuing to be operational.

In some instances, the hybrid approach is used, where waterfall and agile are combined either due to a cultural need of the organization, an imposed project implementation approach (of the departments or across the public sector). In this case, the organization is on a continued learning curve to properly manage the specifics and variations of these two approaches while managing the projects and the day-to-day operations. When the organization has a mature project management methodology in place, approved and agreed upon, the CIO manages the project or interact with the project team or the PMO in charge of managing the team. In the situations where the organization does not have a PMO, a project management methodology in use, the CIO is challenged in recruiting external professional consultants to take over this role or investing time and energy in educating internal staff and project teams.

CIOs may benefit by having time and the “luxury” to focus on results and benefits realization of theory projects and strategic initiatives rather than processes. This is a commonality observed across all the CIOs interviewed in 2021, the need, the strive, and desire to focus on Digital Government and strategic initiatives rather than day to day operations, management of “constant daily crisis”.

CIOs are very keen of applying the most relevant, up to date practices that support the development and successful completion of the project. The CIO is following the departmental project management framework, where available, with its processes, aligned with Agile values and principles, and its own gating process that is applicable to all projects with an IT component. The department uses project gating principles to manage milestones and delivery of projects with strong oversight at multiple levels depending on the complexity and funding level of the project. Projects are key enablers for program transformation and advancing the departmental vision. All projects follow a staged gate process with strong project management discipline and modern development methodologies. The org. has delivered large, complex projects with stringent guidelines and requirements for a long time.

In cases where the Office of the Primary Interest (OPI) for project management for the organization resides within the Finance and Administration Branch, that provide governance and oversight for large projects that are meeting specific set of criteria. The department has put in place a Project and Programme Management Policy that supports the selection, prioritization of projects and programs to enable realization of the expected benefits and sound stewardship. These projects must follow the outlined strict project structures and complete all the recommended artifacts. Projects at this level are managed and governed at organizational level, via the governance committees to closely monitor scope, time and costs as well as manage and mitigate risk. Plans and documents demonstrate the delivery and the realisation of expected benefits. The progress of such large projects is monitored at the Resource Management Committee level. The IT team uses project management principles and guidelines to effectively manage our multitude of small, medium, and large projects.

In some instances, the CIO presented details on the Project Management Framework (PMF) developed: it is around the 5 core process groups (initiation/planning/execution/closing/monitoring- controlling). The project life cycle follows the standard project life cycle identified in the PMI PMBOK. The PMF is aligned to GOC policies, standards, and gating requirements of central agencies, considering the organization role.

The focus is on project governance and engagement of senior management. It outlines a mandatory gating process, requirement for all projects to go through five (5) mandatory gating process and five senior management reviews and decisions to obtain approval to continue. The PMF is flexible to accommodate IM / IT projects regardless of their size and complexity; there are various project documentation requirements based on categorization of the project size and complexity ("simple", or, "complex"). The CIOs confirm that the project type determines:

- the project documentation required.
- the process
- the level of governance to be applied.
- the mandatory components to be completed.

The CIOs focus on engagement via governance: Management of IM/IT projects involves 3 primary stakeholders: project sponsor, business users, technology supplier.

- When a steering committee (SC) is needed, a representative from each of the stakeholders' group will be assigned to the SC. The project executive (usually the CIO) represents the project sponsors and has the authority to render decisions and chair the SC when one is required.
- All complex projects need a steering committee (SC). When multiple projects have the same business users, the same SC can be used.
- All simple projects will be led by the Project Executive that fulfills the roles and responsibilities of the SC and acts as the sole approver.
- The Terms of Reference (ToR) for the SC will provide details on the modus operandi.
- The Monitoring of project health is ensured by the POC project oversight committee chaired by the Deputy CIO.
- The ToR of the POC will provide details on the modus operandi.
- Beside SC and POC, other committee address IM/IT matters, with their individual ToR:
 - An executive (EXEC) committee
 - A management (MAC) advisory committee
 - A workplace committee (WC), advisory to MAC
 - An IM/IT consultation group (advisory
 - A financial, information, security committee

Capacity: In almost all the interviews conducted in 2021, the CIOs expressed a need for accessing, recruiting, and hiring qualified workforce that can respond to the today and tomorrow needs if the organization and support the development and implementation of digital strategies. The common essential remarks of the CIOs was the difficulty to find these resources, the retention factors in public service of the identified resources (that may be interested in short term opportunities with public sector rather than long term commitments), the cost and the duration it takes to invest and train the existing workforce, the skill gap notes across the GOC for occupations that are more and more in high demand given the digital strategy development and implementation.

All CIOs indicated that support is needed (from HR, from their ADMs) on how to get the right people, that have the right skills and the right mind set to get the right skills, in time, when needed to serve the public. In majority of the cases the CIOs indicated that they relied on

professional external resources (i.e., consulting companies) for qualified, skilled capacity required to support the projects in all stages, including initial assessment of failed projects, initiating, and executing new and existing projects, in all areas of expertise, business, technical, project management, change management, cloud, cybersecurity, etc.

Acquiring resources in public sector continues to be a challenging endeavour. This section presents the findings from the interviews with the CIO when discussing resourcing the project teams; consideration was given to the access of internal human resources, as well as to access external resources to the organization, either from other public sector organizations, or, to access using procurement actions to acquire professional services.

Table 48: Procurement versus Internal (2016 and 2021)

	Differences	Commonalities
2016		<ul style="list-style-type: none"> • Departmental Projects- HR Internal resources: Project resources represents the internal staff of the CIO team, and from corporate offices teams. • Horizontal Projects – HR Public Sector resources: When engaged in horizontal projects, across public sector, resources are acquired in collaboration with similar teams in other departments. • Matrix model used to staff project teams: Internal staff within the department, or across GOC prior to engage procurement vehicles. • CIOs use the procurement vehicle available, the existing standing offers, and acquire Commercial off-the-shelf (COTS) products that are packaged, ready-made technology solution, used as

		is along with access professional consultants.
2021	<ul style="list-style-type: none"> • In one instance the CIO indicated the need for a “Fast Track, Vendor-Based Implementation” of the projects. Most of the deliverables were outsourced to large external vendors, as internal capacity would not be sufficient to deliver the solution in a compressed timeframe. 	<ul style="list-style-type: none"> • Project resources ensured via internal staff, human resources staffing actions, and professional resources brought via procurement vehicles. • The procurement vehicles used to acquire skilled professionals (i.e., developers, architecture specialists); resources with new skill set (i.e., business analysts, design thinking, change management, project managers). • The projects teams built in a matrix environment. • Resources acquired / accessed from the Business, corporate teams of the same department / organization. • The project team is formed with access to public servants from other departments, brought on short / medium term assignments from across public sector. • CIOs’ challenges to recruit qualified staff; the lack of required qualified resources, excessive duration of the HR process; volatility of the mechanisms to acquire the project resources. The high level of uncertainty over the project resources with direct impact on project completion / success.

9.4 Accountability

9.4.1 Steer

In all the interviews conducted it was confirmed by the CIOs their role in steering the progress of their projects / initiatives. The way this is done, and the role of the CIO is presented here.

Table 49: Accountability-Steer (2016 and 2021)

	Differences	Commonalities
2016		<ul style="list-style-type: none"> All the projects were audited, presented updates to governance committees, reported to ADM, DM and Minister and stakeholders. Majority of the projects were under the auspice of CENTRAL AGENCY project gating framework for management of IT enabled projects; they were required to be reviewed periodically by the EPOC (Enterprise Project Oversight Committee) and were required to have a series of independent review when moving from one gate to another.
2021	<ul style="list-style-type: none"> In one case, the CIO indicated the intense effort to present various technical solutions to the project, the project management approach to be used, the construct of the team. Developed by CIO these were 	<ul style="list-style-type: none"> CIO is guiding digital strategy, as a leader, an advocate or partner. CIO might co-lead the development of the Digital Strategy with the co-lead selected, or the Business or Policy lead.

	<p>mean to meet stakeholders needs, meet the strict deadlines imposed by the mandate and policy requirements.</p> <ul style="list-style-type: none"> • When leading the Digital Strategy project CIO leads Digital Office implementation. • In some instances, CIO is an equal partner rather than an entity directing others or being directed by others; for the success of the project, “the CIO is not a leader, rather an enabler.” • CIO to change its leadership style, become more humanistic, more emotional: engage and adopt agile methodology that is proven to help, and bring people along. • CIO has the skills set to convince people; the CIO needs to continue stirring, and find better ways to engage staff, stakeholders, and senior management. 	<ul style="list-style-type: none"> • When leading, r co-leading the projects, or the Digital Strategy, the CIO is building the team, hiring, recruiting, working with HR, organizing the project team. • CIO ensure compliance by participating to all internal, external compliance activities (reporting to senior management, reporting to all stakeholders, internal / external audit, oversight activities of central agencies). The CIO leads steering committees, is part of the other governance groups, present updates. • CIO proposes business models (such as Business- IT joint co leadership) that might be, led by the Business teams, with the day-by-day operations of the project team led by the Business, where staff works in a matrix model. • CIO plays a consultative role, plays an advocate role for the digital strategy, CIO is a liaison with stakeholders, central agencies, and OGDs.
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9.4.2 Explore

The exploration engages CIOs in public sector in a variety of manners, in some specific to the department, the organization, and in some combined with the personal style and expertise of the CIO. The information gathered from the two rounds of interviews are presented here:

Table 50: Accountability – Explore (2016 and 2021)

	Differences	Commonalities
2016		<ul style="list-style-type: none"> • CIO’s exploration takes place in any of the two types of projects (IM/IT Transformation / Modernization, and the Digital Strategy development / implementation) at any time throughout the life of the project. The process is individualized, customized by the CIO, based on personal preferences, knowledge, organizational context, organizational culture, and other criteria specific to the organization. • In the case of IM/IT Transformation / modernization projects, the CIO, upon taking over the role, conducts periodical assessments of the business, revise the business case, and shift from the technical to digital transformation; assess services, IT network, etc. to benchmark performances, identify gaps and

		<p>areas of improvement, and assess potential technical solutions.</p> <ul style="list-style-type: none"> • The CIO engages central agencies, other government departments to explore opportunities and solutions and respond to the needs of the department. • CIO explores the urgencies and needs of the department. CIO identified the need for specific, sometime sophisticated IT infrastructure to secure, store and receive information and transaction. • The CIO explores the opportunities and the need to upgrade other systems (reporting, analysis, etc.); explores external service providers ready to deliver, identify the streamlines of internal business processes. The CIO explores the design of the Enterprise Architecture Strategy to allow the organization a future state for the Enterprise Architecture, scalable and secure. This strategy is now part of the long-term IM/IT strategy of the organization.
2021	<ul style="list-style-type: none"> • n/a 	<ul style="list-style-type: none"> • n/a

9.4.3 Align

All CIOs interviewed in these two rounds indicated directly or indirectly the importance of alignment for their projects. Findings gathered are presented here:

Table 51: Accountability-Align (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> • In one case, one of the CIOs mentioned the strong mis alignment between the work the CIO was promoting, in support of the organization and the plans and directions of one of the ADM, that the CIO reported to. • This misalignment had a negative impact on the ability of the CIO to promote the IM/IT agenda and support the organization to transform the organization. This had a negative impact on the relationship between CIO and CXO, where the lack of support was visible. 	<ul style="list-style-type: none"> • The projects researched are in alignment to the Government agenda (2016) and the mandate letter of the President / ministers of the organization. • The projects are aligned to the IM/IT Strategy of the individual department that initiated, launched the project. • At the horizontal level, across Public Services, the 2016-2019 GOC IT Strategy, and the revised version, the 2017-2021 GOC IT and IM Strategy are developed and implemented for a whole government (https://www.canada.ca/en/treasury-board-secretariat/services/information-technology/translating-priorities-actions.html). • Internally, CIOs worked with business units within the

		departments to align business technology needs, identify resources, engage, and collaborate.
2021	<ul style="list-style-type: none"> In a few cases, CIOs have not presented any details related to alignment, have not provided documents, or any details regarding their overall work to ensure alignment internally to the department or externally, across public sector. 	<ul style="list-style-type: none"> Value of alignment Alignment activities Strategic and business alignment

ALIGN: 2021- COMMONALITIES

CIOs are focused on business IT alignment, and they present details regarding internal and external alignment efforts made. The actions initiated by CIO to ensure alignment differ from one department to another and are not consistently pursued. The projects are in general aligned to the departmental mandate letters, to GOC IM/IT Strategy to modernize IM/IT across GOC. The CIOs are focused to understand the context and find the right balance between business / technical requirements and policy needs. The CIOs ensure that directly support and align with the Government of Canada`s objectives and the organization`s core mandate. Fully meets the Government of Canada vision, supports the Agency`s goals and objectives, and meets all legislative and policy-driven requirements.

Actions to ensure internal alignment:

The Projects presented are aligned to the departmental IM/IT Strategic Plans. In one case, the CIO initiated and conducted extensive consultations and engagement at large to help frame

business priorities for the departmental IT Plan. The main themes identified resonated with all teams consulted, ensuring IM/IT strategic priorities align with business needs, seeking innovative and agile solutions (cloud, network performance), balancing IT security requirements with business productivity and innovation. In this case, the CIO is also focused on government-wide transformation priorities and principles (including user design, iterate and improve frequently, build in accessibility from the outset, address security and privacy risks, empower staff to deliver better services, be good data stewards, and collaborate widely).

Actions to ensure external alignment:

For ensuring alignment at the GOC -wide level: The Department has an elaborate process to identify the IT investments to support the yearly IT Plan. The CIO is ensuring that the guiding priorities are enterprise transformation projects and solutions that support the principles outlined in the 5 years GOC Digital Operations Strategic Plan, including: service, security, value and agility.

Additional actions to ensure alignment: Periodically, yearly, CIO conduct departmental consultations with all branches that serves to frame business priorities as part of the preparation of the yearly plan. The CIO and his team extracted from the GOC Digital Operations Strategic Plan the projects – initiatives for which the Department is responsible (including those for which departments are not accountable and includes the strategic actions for which the Department has no planned activities). Several of the IT investments and projects presented aligned with ongoing initiatives started and new ones planned.

9.4.4 Implement

CIO implement projects towards their success. Findings gathered during the interviews with CIOs in public sector in the two rounds of 2016 and 2021 are presented here below.

Table 52: Accountability – Implement (2016 and 2021)

	Differences	Commonalities

2016		<ul style="list-style-type: none">• CIOs implement successful projects.• Implementation when CIO is a stakeholder.• CIO's level of authority and access to organizational governance• CIO personal traits and soft skills, key to success of the project implementation• Selection of solutions as part of the project implementation• CIOs views on the projects with collaboration of other ODG other departments of the government:• Value of support from Project Sponsor• Define and agree upon roles and responsibilities.
2021	<ul style="list-style-type: none">• Inconsistent implementation approach• Inconsistent project management methodology used for implementation.• Organization readiness to adopt and use consistently project management.• Digital transformation success and support from the C-suite stakeholders	<ul style="list-style-type: none">• Public Service organizations are service providers, with two main types of users.• Management practices of successful implementation of projects / initiatives• The long-term impact of digital transformation in organizations• The need for organizations in setting up a departmental Digital Program

	<ul style="list-style-type: none"> • Organization readiness and maturity level to run and adopt Digital Transformation • Limitations of organization to constantly adopt the need for lessons learned and best practices after the successful completion of projects. 	<ul style="list-style-type: none"> • The need to develop a framework for digital: • Build toward “One public sector – One Government.”
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IMPLEMENT: 2021 – DIFFERENCES

There is no consistent approach for implementation of projects, either IM/IT transformation type or Digital Transformation. There is no consistent project management methodology approach used across the departments of which CIOs were interviewed in 2021 to be used in the design and implementation of projects, either of the two types (IM/IT Transformation Modernization, and Digital Transformation): from PM methodology, presence /lack of PMO, Scope/Time/Cost Management Risk and Quality Management Communication and People Management. There is an inconsistent level of adoption to project Implementation from the C-suite stakeholders. In the case of Digital transformation projects less that 20% of the CIOs interviewed indicated a strong level of support from the C-suite stakeholders. There is a great level of inconsistency in understanding Digital Transformation across the departments. There are a few CIOs (less that 20%) that have heavily launched a very well organized, structured development process of Digital Transformation. In one instance only, for a Digital Transformation journey, the CIO indicated the acknowledgement of the senior management that things take time, there were not expected overnight revolutions; rather, the goal is long-lasting evolution, good progress, embraced and supported from the bottom of the organization with firm support from the top. Project management methodology is inconsistently used and adopted; majority of the CIOs declared Agile approaches the intended approach and acknowledge the need for the organization to be trained, increase their level of use and knowledge, awareness, and be ready to use it consistently across other projects. In lower than 20% of the CIOs interviewed, was

identified the need for lessons learned and best practices after the successful completion of projects.

The maturity level of organizations on the digital transformation journey is very low, very inconsistent, with majority of the organizations on the very early stages of adoption the digital transformation. Organization's readiness for digital transformation, and the adoption level is scarce, at a low level for staff level as well as for the senior leadership level.

IMPLEMENT: 2021-COMMONALITIES

CIOs present their organizational context: in general, the departments are service providers, and the CIOs present the clients and the users, for. ex. departments support clients for which the department provide services; and clients that are users of the systems owned by the departments.

Some of the CIOs identify their different types of clients:

- Users that are provided with services (i.e., technical support, etc.).
- Users, who are using systems, and clients (external clients, or partners, stakeholders)

The CIOs identify and acknowledge the existence and value of clients: (1) the ones who support the CIO_ Digital Office's business needs ; and (2) Clients, who provide to the CIO_ Digital Office with info according to the legislation, in partnership.

The spectrum of services delivered by the department are necessary, sine qua non for the business lines of the organization and for supporting with various services and deliverables (information; analysis; intelligence, etc.) with clients, external stakeholders.

The successful implementation of the launched projects is managed in a variety of manners by CIOs to ensure completion of the projects, and successful delivery. The CIO engaged in tenacious efforts to transform the business internally and externally. The CIO team, as an IM/IT shop (CIOB) does not depend by the business to provide what they need, as CIO and her Digital Office sit at the same table with them. The CIO and the Digital Office are developing an Agile approach for their business and for all projects managed. In the development of the projects, the CIO is engaging all partners (IM, IT, Internal Business units, External Partners, 3rd party, business services), in pilot projects, to digitally enable their functioning and their business lines.

In the digital transformation journey the CIOs indicate the value and the importance of the following factors as key factors of success: communication, marketing, training, awareness (i.e., what is Agile, what does it mean for us). The CIOs underline the long-term impact of digital transformation in organizations:

- This journey is a cultural shift and buy in of all team is key to success.
- All public sector departments are going through this digital transformation.
- Digital Office (DO) is changing processes, and how things are done; the other groups in the organization are joining CIO and the team.
- The digital transformation is trying to break the silos.
- The digital transformation journey needs to include training necessary to be provided to all staff and senior management.
- The CIO engage and communicate in all directions, teach the methodology; engage in the “Digital 10” with staff, with the executive team, with senior management at all levels.
- In some instances, the CIO put in place the Digital Offices (DO) of the department. The approach used by CIO to implement a Digital Office:
- CIO expose themselves to the various lessons learned from the CIO community, that are shared among the CIOs and the CIO community.
- Engage personally with each CIO and discuss best practices and lessons learned.
- in vary large departments, the implementation approach is somehow different: usually the CIO consider smaller parts of the organization, and launched pilots to transform the teams, the groups, one by one.
- The CIOs are going through this journey with users at the table, build together this entity that will work with all department’s teams, and will engage them all. One of the CIOs is using here the analogy for” building a house, where beside finance and constructors you need an architect (that is the CIO and the CIO team).”

CIOs shared their lessons learned:

- For Digital transformation projects, ensure that the Project Principles and Digital Standards are well presented, communicated, and advocated for.
- People expect government services to be simple and easy to use. This is achievable if the projects are implemented in alignment with the overall national public sector IMIT Strategic Plan and Central Agencies “One vision”, the technical solution provided will

respond to citizens' needs, will ensure the adoption of digital standards and principles to meet needs and work collaboratively with other departments to ensure that proposed solutions work towards a common user-driven experience.

CIOs presents the main principles to be adopted during its full implementation:

- Design the solutions with clients, for client needs, ensure user-centric approaches to the solution's design, involve clients in the design process where possible.
- Do the hard work to make it easy- the solution must be designed from the "outside in", early efforts so that clients can use the solution easily.
- Ensure a consistent client experience; the solution and the services provided are predictable for clients.
- Digital by design— ensure that services are designed for a variety of digital channels (i.e., web based, mobile, etc.)
- Iterate, iterate, iterate, iterate for ongoing improvements of the solution.
- Start small and build upon successes.
- Data and the code developed and used to be open by default; ensure that data and the code developed are shared. enabling clients to extract and create value.
- Ensure the project is fully aligned to the departmental mandate letter, to deputies' mandate, and to the public sector IM/IT Strategic directions to modernize IM/IT
- The CIO to continuously focus to understand the business and environmental context.
- The CIO to find the right balance between business, policy, and technical requirements.
- The CIO to have the ability to feel the need to adjust whenever is needed and influence this level of flexibility needed (i.e., the new governance structure was "too tight, it has been adjusted; it is now more agile, as the organization mature as it embraces a proper governance.")
- In the early stage of the implementation, the CIO and the project team to engage business tools (i.e., conduct an impact analysis) for achieving compliance with the policies in place and alignment; to identify gap(i.e., capacity, skill set, resource type, additional needs to evolve IT processes, required investments)
- For Digital Transformation projects, from the outset of the project and during the journey to increase awareness and training, ensure that terminology is defined and is clear,

develop a common vocabulary, ensure consistent understanding of the communication in place at all levels.

Some of the CIOs shared the definitions of the digital concepts:

- Digital: Processes, practices, and technologies related to the production, storage, processing, dissemination and exchange of electronic information and applications, including artificial intelligence systems. It refers to, among other things, information and communications technologies, infrastructures, and the information they produce and collect.
- Digital: definition of 'digital' to align with its business needs: The means of modifying, updating, or entirely shifting mindsets, processes, and business through the integration of modern technologies and practices
- Digitally enabled: Government operations and services that are supported by strategically leveraging information and information technologies, infrastructures, and the information they produce and collect.
- For departments developing the Digital Strategy, one of the CIO address the need for relevance:
- The CIO and the executive team of the department to ensure periodical refresh of the Digital Business Strategy annually, ensure the themes and objectives are subject to review, to ensure continued alignment with the needs of the organization. Future iterations to further embrace the digital mindset and build in objectives that tackle the strategic adaptability needs within the organization.

CIOs presented the need for setting up a departmental Digital Program:

- all areas of the organization must contribute bring together all departmental experts in digital by connecting them to a common movement that will benefit the whole of the organization, while enabling program specific ideas to prosper.
- allow and support the existing experts to develop further expertise and lead the organization in discussions that go beyond the current state.
- a primary role of the Digital Program is to shape and sustain the organization's digital journey.

- work with key stakeholders across the organization to identify short to medium-term initiatives to accelerate the organization's digital transformation.
- recommend and support a governance regime for the organization's digital agenda, that balances prudent risk management with orchestrated advancements in transforming the organization into a digital-first organization. The focus of this oversight will be the expedited delivery of initiatives that are transformational and horizontal in nature, with emphasis on those that deliver better service to citizens.

The need to develop a framework for digital:

- To further shape the Agency's digital journey by defining the vision of the organization for digital and the long-term outcomes to be achieved as the organization works toward realizing that vision.
- Define key principles for use in guiding the organization's decision-making in pursuit of the vision for digital.

The main elements of the digital framework to be firmly rooted in the vision and be guided by defined principles:

- Define an annual Digital Plan: to enable the delivery of the organization's immediate digital priorities and address key areas of risk.
- Put in place a Digital Acceleration Fund (DAF): as a demonstration of the organizational commitment to digital for both citizens and the organization, put in place a DAF with funding over 1-2 years to advance the digital transformation of the organization. The funds from the DAF to support ideas to accelerate digital in a transformational, evolutionary manner, involve the adoption of existing digital capability, enable research.
- Put in place a Performance Measurement System for the success of the digital strategy at three levels. For Short term actions: The achievement of immediate outcomes will be assessed quantitatively through the implementation of the projects and initiatives set out in the plan; Medium-term outcomes will be assessed qualitatively through an analysis of the contribution of completed projects and initiatives contribute to the fulfillment of objectives listed in the strategy. The overall success of the Digital Program will be judged based on the degree to which the organization, as an enterprise, has adopted the digital

mindset, matured as a digital enterprise, and how digital has contributed to the organization vision.

- Digital Strategy Team: Put in place a dedicated team endorsed and launched by the DM that analyze, validate wide ranging research and other information linked to how the agency could use digital to transform the way it does business.
- Consultations: The Digital Strategy was developed, each of its elements, based on extensive internal consultation and engagement with key stakeholders, with project team members and liaisons from each team.
 - CIO identified the need for and importance of the project implementation of the public sector Digital Standards and Architectural guidance:
 - Clearly define user needs
 - Conduct user research, requirements and usability testing must be incorporated and tracked from the very beginning of any digital project.
 - Use Agile approach.
 - Be an Agile Developer: Develop in an iterative manner, with key stakeholders' participation from the beginning, releasing minimum viable product as soon as possible and iteratively building out functionality.
 - Build standard-based solutions:
 - Adhere to the overall public sector technical standards and guidance, leveraging open standards when possible.
 - Leverage common business capabilities and harness public sector wide solutions that can be reused across the enterprise.
 - A holistic approach to securing public sector services for publicly accessible sites.
 - Build and develop open solutions.
 - Actively use and contribute to open-source tools and solutions “Data is the new gold”.
 - Develop in the open, sharing, reusing all types of code and platform configuration.
 - Actively use and contribute to open-source tools and solutions.
 - Develop in “the open” by sharing and reusing code and platform configuration.
 - Data to be complete, accurate, and timely to ensure a high level of data quality.
 - Ensure data can be shared and can be easily accessed.
 - API first

- APIs (application programming interface) created for every service, exposing data and functionality, ensure to foster data sharing within public sector and externally.
- Build microservices that work together within an ecosystem allowing for rapid deployment and built-in redundancy.

Build toward “One public sector— One Government” is where digital business changes are built to support a government as a platform, where everyone can maximize shared capability (Platforms) and minimize unique department products.

IMPLEMENT: 2016-COMMONALITIES

BTM leaders create, deploy, and enhance digital solutions and products for value. The CIO designed solutions as part of the project implementation, seeking the best options and solutions to support the needs of the department. In the case when the CIO was a stakeholder, engaged in the project, the CIO was all about the territory rather than the success of the project, or the project outcomes, and the project deliverables. The CIO had the title, the position, the expectations to attend certain governance meetings. During the project implementation, it is important the personality of the CIO; a few of the CIOs were different: some CIOs were playing a more supportive roles than others; other CIO played a more front - facing role. Some CIOs did not have enough charisma, or authority to represent the project or the needs of the organizations. In some projects, as part of the implementation:

- The lowest cost on-line technology was used, given the deadline constraints.
- The bulk of the design, development, and implementation required for the project was completed by contractors (e.g., an IT programmer, a business analyst).
- For the projects with collaboration of other ODG other departments of the government:
- intra-connectivity between departments was key to the implementation process,
- CIO redesigned an improved change management process,
- Commitment from the sponsor reached to access required skilled resources.
- Clear define the roles and responsibilities of all the stakeholders and the units involved.

9.4.5 Optimize

CIOs are keen to improve the business processes, better implement, successfully, the projects they manage. The CIOs interviewed indicated some of their practices as gathered here below.

Table 53: Accountability – Optimize (2016 and 2021)

	Differences	Commonalities
2016	<ul style="list-style-type: none"> Some CIOs were more prone to adopt a Project Management (PM) methodology versus other based on a variety of criteria (education, experience, age, individual skills set and expertise, and skill set of the team) 	<ul style="list-style-type: none"> CI's learning and best practices from implementation and running the services / systems put in place.
2021	<ul style="list-style-type: none"> Low level of adoption of PMO concepts and project management methodology Debates around various project management methodologies CIOs' efforts to promote value of change management. CIO role to educate peers, and the organization. CIO work to support cloud adoption. 	<ul style="list-style-type: none"> Presence of PMOs; use of a project management methodology Management of projects by the CIO aligned to the public sector IM/IT Strategy CIO implement Digital Strategy, and Service Strategy, prepare organizations for readiness and adoption.

OPTIMIZE: 2016 – COMMONALITIES

CIO's shared a variety of learnings and best practices from their project implementation experience: Conduct early technical (infrastructure) assessments, take stock of current situation; Ensure an early delivery of Software to production; Allowed for a different deep discussion during 'go-live' planning; Conduct proper implementation planning; Engage stakeholders early in the implementation (roll-out) planning, execution, as well as, through the post implementation phase was key to a uneventful deployment; Conduct "Rehearsal" of the merge/ conversion process to work out the potential gaps, shortages; Planning a staggered roll-out of the self service to the user community is key to minimizing the impact on the user support groups; Monitor and address potential performance issues; Focused and customized Change Management efforts; Leveraging business process and training material; Early engagement in the development of the Operational Cost model; IT team members of the external parties involved to meet to better understand each other's roles and responsibilities prior to the next election. This knowledge will speed up the exchange of information. It is recommended for projects that are more susceptible to changes (a brand-new software application such as VCR is a good example) to set up a small core team (2-3 individuals with multidisciplinary project team roles) to funnel, review, analyze and respond to change requests to shield the rest of the project from undue risks or potential distractions. Some Projects adopted both PM methodologies. Both agile and waterfall software development methodologies have strengths and weaknesses.

Adapting processes for the purpose of addressing its various project constraints such as timeline, scope, limited resources, and uncertainties. Continue to explore the right balance of activities and processes from both PM methodologies and develop a framework that is best suited for the environment. Authorize a project leadership role to undertake the development of the required framework to ensure all processes and parties consistently work in harmony towards project success.

OPTIMIZATION: 2021- COMMONALITIES

Majority of the CIOs manage their projects using a structured project management approach, with a PMO in place, and / or a PM Methodology, framework, tools. CIOs are managing their

projects aligned to the GOC Government of Canada IM/IT Strategy, and the Digital Strategy. CIOs are engaged in the development and implementation of the Digital Strategy and the Digital Office in the organizations. Where the digital technology projects were implemented successfully, the CIOs are looking forward to the implementation of the GOC Digital Strategy, and Service Strategy. There is a high level of engagement with CIOs peers across public sector, knowledge sharing. CIOs are collaborating and supporting each other to develop and implement IT Strategy and digital transformation. In some organizations, CIOs indicated that very few investments will be made for the old, archaic systems, and the available funding will be only to only to maintain the status quo. In general, CIOs need to change the operating model, prepare the organization readiness for digital government.

OPTIMIZE: 2021-DIFFERENCES

In one instance, the CIO indicated that the organization's PMO did a good job in setting up the necessary artifacts of the project, however, the PM process, and the project documentation were not well used, has not been well adopted nor socialized. CIO seeking continuous improvement; has initiated the need for the management of the project to be reconsidered, for the health of the project needed improvement. Agility is good, is helpful, but adaptive PM models are needed; a hybrid approach is needed. CIO to ensure change management processes are in place and are applicable. As change request are coming in, the CIO to ensure that proper conversations take place to assess progress and the necessary adjustments are made. The CIO needs to educate senior manager on IM / IT and on digital transformation, digital skills that the workforce, the org. needs to have a continuous learning path in place. In one instance, the CIO indicated the management of the project in alignment with the Government of Canada Strategic Plan for Information Management and Information Technology 2017 to 2021, the project will align with the plan's strategic goals, namely Service, Value, Security and Agility. The CIO initiative throughout the project lifecycle, the adoption of two methodologies. User Experience (UX) Design: The team will design the new solution according to the needs of clients & stakeholders, for a user-friendly and relevant solution that respond to their needs. Using a human centered design approach, the solution to (a) seek to understand stakeholder's needs; (b) answer those needs; (c) do it in a way that is efficient for the organization and provides an improved user experience for the stakeholders. Agile Project

Management and Delivery: The team will deliver the new solution in an agile fashion, develop successive iterations, and use the results of the observations to further improve design and overall solution. In one instance, the CIO stress the urgency to adopt to Cloud (mark it as the #1 priority), and the need for the CIO to work with the business to build the new “parts” of the new system to be added to the old system to make it adaptable.

10 DISCUSSION

10.1 Introduction

The role of the CIO is key to organizations in private and public sector, and along with CDO role, and/or within the CDIO integrate role, it plays leaders of digital transformation (Locoro & Ravarini, 2019). It has been admitted for the last four decades but it has never been so relevant and acknowledged as in these times. The evolution of technology, the new technologies, digital technologies bring an array of opportunities for organizations, business, and the society overall.

The roles of CIO have evolved from a predominant senior leader managing IT architectures for organization, troubleshooting technical issues of day-to-day operations, to a decision maker, sitting along with peers CXOs and being part of the development and implementation of organizational IM and IT strategies, a strong partner of organizational Digital Champion (Li et al., 2021). "CIO has become increasingly business focused and strategic. Soft skills dominate the critical competencies." (Lane, Koronios, 2007).

This research aims to present the role of the CIO in public sector, in the context of Canadian government, presenting findings on the evolution of the role, factors of success in CIO role and in successful delivery of projects, and findings related to governance models that support innovation, transformation, digital projects. The raw data was extracted from the interviews conducted with CIOs in 2016 and in 2021.

In this section we present the main findings of the research work conducted, and how these findings are responding to the research questions of this research study, which are still lacking in the academic literature (Kratzer et al., 2023; A. ul Musawir et al., 2020; Raković et al., 2022). We review the findings from each of the rounds of interview and compare findings for commonalities and new findings; "...a reminder of how much we might achieve through comparison." (Bartlett, L., & Vavrus, F. 2017). The information from CIOs was gathered during the individual interviews, where CIOs choose the project of their choice to present. Guided by the interview questions, the CIOs talk about their role, their actions and the project practice in place managing their portfolio, including actions, challenges, success factors, the relationship with CXOs and deputies in their organization, with CIOs peers across public sector.

10.2 Digital Executives Competencies

This section presents findings related to the competencies of the CIOs in the executive role is playing, as well as the digital executive competencies of CIOs. For context, a competency is any observable and/or measurable knowledge, skill, ability, or behaviour that contributes to successful job performances, performing something successfully or efficiently (Gouveia & Varajão, 2019).

The behavioral competencies include cognitive and personality characteristics, while technical competencies include learned expertise, such as Project Management and Governance (Shokouhyar et al., 2020). Competencies are associated with behavioural indicators, as groupings that represent different ways to demonstrate a competency. In discussing competencies versus skills, the latest are learned, applied where the knowledge of one are practically applied in an effective manner.

In 2016, CIOs shared behavioural and technical competencies for their peers and themselves, information gathered throughout all the interview questions.

In 2021, CIOs revealed several competencies: many of which are common to the ones gathered in 2016, with the addition of several competencies related to digital executive competencies.

Some of the CIOs competencies noted in 2021 are aligned to the ones indicated in the revised Policy on Service has been issued, with horizontal applicability across all public sector organizations (<https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32603>). This policy entered in effect on April 1, 2020.

The competencies gathered for CIOs during the 2021 interviews and from the 2021 Canadian public sector present competencies for visionary, transformational leaders, for leaders such as CIOs who are leading, advocating, supporting digital transformation in government organizations. See Table 54:Digital Executive Competencies (2016) and Table 55:Digital Executive Competencies (2021) for the main competencies of the new role of the CIO-CDIO.

There are new competencies identified during the interviews with CIOs in 2021. These are new competencies that complement the competencies of the CIOs gathered from the interviews with CIOs in 2016 for both types of behavioural and technical competencies. See Table 56:New Digital Executive - Behaviour competencies and Table 57:New Digital Executive - Technical

competencies for a comprehensive view of this research findings from cybersecurity, accessibility, emerging technologies, enterprise architecture among the technical competencies of the new digital executive technical competencies, combined with a CIO – CDO that is an enabler, a broker, a motivator, a mobilizer, demonstrates malleability, flexibility and adaptability, mobilize peers and organizations as a daring, caring leader.

These new 2021 competencies include the in the behavioural competencies category competencies that portrays a new type of CIO, a daring, brave CIO, who trains, coach, mentor and support the team while demonstrates a humanistic, ethical, transparent personality, a flexible and positive individual. CIO carries proudly the organization's mission, advocating for the role of the CIO to increase its visibility; inspire and mobile others while engaging and collaborating at all levels. This competency of the CIO as an executive digital leader include a variety of new behavioural and technical competencies (Khan et al., 2022). We have compiled these new competencies identified during our research.

The new technical competencies identified in 2021 are aligned to the new CIO - CDIO, the executive digital leader. In this role, the CIO address security and privacy, focus on architecture, data, design, develop accessible services, prioritize public sector services. The new CIO is aware and use open standards, is a data steward, direct enterprise-wide transition to digital government, and uses emergent technologies.

This new executive digital leader is a subject matter on digital technologies, digital innovation, process digital acumen and promote digital literacy, service design and delivery, providing advice on governing and enterprise-wide information (George & Howard, 2020).

10.3 Digital Leadership

CIO is a predominant, key figure in public sector. It is a leader that takes part in the day-to-day operations and in major strategic activities of the organization. During the interviews conducted in 2016 and 2021 the CIOs discussed about their role, the diversity of their responsibilities, the mix of operations and strategic activities, unique aspects of their role, the authority of their role in comparison with their peers, and shared views about their vision of this role.

The CIOs in 2016 and the ones in 2021 described themselves in their role and referred to their peers in describing and presenting this leadership role. CIO has a renewed role, with increased authority, and active participation in influencing CXO peers, and actively participate in the decision-making process. This leadership role is the CIO is the role of a super executive (La Paz, 2017). The tenure of the CIOs in their role is on average between 5 to 7 years, whereas in the 80's, as per the CIOs interviewed, the tenure was over 20 years. In this case the CIOs talked about "The curse of the incumbent" when CIOs were in the role for more than two decades.

Nowadays, on very few instances the CIO will be in their role for a decade or more, with very limited exceptions. The role is dynamic, and most importantly, the individual in these roles adapt themselves and their role to the context, the environment, to respond to the needs and deliver. For various business needs, and for various types of projects, the role of the CIO has its own particularities, and "There is no one size that fit all", which matches the diversity in private sector organizations too (Noonpakdee et al., 2020). See Table 58: Digital Executive: Leadership and Governance (2016 and 2021) for leadership and governance competencies gathered in 2016 and 2021.

Throughout the digital transformation journey, CIO face challenges and factors that impact the role. "It's hard to change the engine while you're flying the plan".

Several factors support the CIO to successfully perform the role. At personal level, the individual personality of the CIO, background, education, demographic, professional experience, soft skills that are attributes of the CIO. Evolution of technology, emerging technologies, the level of IM and IT knowledge and readiness of the organization creates opportunities and challenges for the success of this important role. The political context, its duration, the environment, and the government in power dictates with their political agenda the mandate of the public sector organization and the ability of the CIO to plan and implement (Manda, 2021).

The size of the public sector organization brings the authority for the role of the CIO, the profile of a CIO, including the decision-making process. CIO carries over "the heritage of the role"; this includes the impact of the personality of the predecessors, the relationship had with decision makers and the leaders of the organization; the projects and initiative inherited, a heavy operational portfolio, the IM/IT infrastructure and its maintenance, the traditional role of the CIO

with the organization for the past decades. CIO role is heavily impacted by the Talent Management (TMT) group, and its dimensions.

The relationship the CIO builds with the CXO team determines the support will get in the strategic and operation endeavours of the CIO; the relationship CIO has and build to maintain with the deputies (Cripe & Burleigh, 2022). As confirmed by various CIOs, one will achieve success if they join the organization at the same time with their deputies or have an existing relationship with the deputies. The quality of the relationship CIO has with the deputies is direct proportionate with the success of the CIO in the role. The collaboration and relationship with human resources, help define the recruitment techniques required for staffing the organization with the skills set and right fit required to develop and implement Digital Strategy. CIO carries the legacy of the predecessors in the role for the organization they join. The CIO understand the previous challenges of the role, the urgencies, and the needs, and at the same time build the reputation, brand of the new CIO (Carlton, 2017).

For a new CIO, the journey includes “onboarding time”, “healing time” and a “growing time”.

- During the “onboarding time” the CIO is introduced to the organization, to its peers, deputies, take ownership of the role.
- During the “*healing time*” the CIO take ownership of the heritage of the predecessors, meets the team, the organizations, understand failures and successes, challenges of the role from the people of the organization. This is the time when CIO receive a “transition binder” binder with this information and much more that is not written but is part of the history of the role.
- In the “*growing time*” CIO continue to introduce the vision the new CIO creates for the organization and introduces

The future of the CIO role is a journey of defining the role of the executive digital leader. CIOs have a vision about the future of the CIO role, and what a modern CIO is. Many focused on personal considerations for future CIOs: CIOs stop being in control, and rather focus to ensure that education and awareness of employee are at the forefront, upskill the workforce of the organization, increase the level of knowledge of teams and of peers’ leaders; admit that they are enablers. In the future CIOs to get out of the way of innovation; to encourage, promote, advocate, and enable new technologies to be adopted and supported by the organizations.

CIOs to focus on better using data for decision making process, engage research workforce to analyze scientific data and leverage its use across public sector.

CIO elevates communication skills to support awareness, adoption and learning across the organization; “When things are explained to them, people become less cynical and better cooperate”. CIO has a humanistic, social role. “Leader is a title; there is need for empathy” (Harwardt, 2020).

The CIO is supporting and collaborating with Digital Champion and works closely with the deputy Champion of Transformation; advocate for digital transformation, promotes digital, support the organization on its digital journey. CIO educates senior manager and the workforce on IM IT, on digital transformation, developing digital skills. CIO put a focus on the user” experience and user” needs. CIO is driving the Digital Innovation across the organization and at the horizontal level across public sector. CIO adopt change management practices, support the organization with best change management practices to go through transformation and digital transformation.

CIO in the new digital executive role shift operational focus towards strategy and digital development and implementation, developing what is called “governability” or a context conducive for IT project success (Müller, 2019). “Only if the systems perform well, the CIO has time to prepare the Transformation Agenda of the organization”. The modern role of the CIO is an evergreen role, flexible, adaptable, making a key contribution as a digital executive leader. CIO is a key executive digital leader that will continue to support public sector and private sector.

10.4 Project Governance

Project governance is often viewed primarily in terms of frameworks, but there is an increasing necessity to take a bottom-up view where it is rooted in complex practices (Brunet, 2019). In many ways, governance frameworks must be permeable and allow for change, while new methods of project leadership are tested and developed (Ferrer et al., 2021).

PMI Practice Guide on Portfolios, Programs and Projects (2016) define portfolio governance as “the framework, functions, and processes that guide portfolio management activities in order

to optimize investments and meet organizational strategic and operational goals.” Governance of Portfolios, Programs, and Projects: A Practice Guide (2016)”.

In public sector, governance is defined as: “The way in which departments organize themselves to collaboratively conduct and implement a policy, project, programme, framework or horizontal initiative, including the planning, development and implementation of process and control structures for decision-making, reporting and evaluation.” (Government of Canada, Policy on the Planning and Management of Investments, 2021).

The findings on governance in public sector in this research reveals information on internal and external governance across the organizations, governance practices and models mandated by the policies in place, governance models put in place by organizations, factors that impact the governance models, impact of governance on the success of the projects; it also includes the role of the CIO in the design, development and implementation, and operationalization of governance.

Public sector organizations comply with policies in place in the design of the governance model for management of capital investment, IM/IT business. The policy on Management of Investments, including the IM/IT investments, requires public sector organizations to ensure governance and oversight of projects and programs, and for the enterprise projects and programs are effective. For the governance of projects and programmes, organizations have the latitude on creating governance models “proportionate to the projects or programme’s materiality, needs, complexity, risk and scope”, ensure effective and timely decision-making, and are supported by appropriate structure and processes. For the enterprise projects and programs, organizations need to involve stakeholders in the governance, set up steering committee and have a sponsor for projects, programs.

The areas of commonalities noted include governance model, and the role of the CIO in Governance. At the Governance Model, the internal and external model for IM/IT projects across public sector follow the central agencies IM/IT policies for management of investment projects. The role of CIO in Governance has been presented by majority of the CIOs: CIO is part of the CXO team who develop the governance model; CIO is part of majority of the governance committees; CIO is setting up innovative governance models and working groups

necessary for the successful implementation of projects; CIOs shared their specific governance models for various type of IM/IT transformation and Digital projects.

Public sector organizations put in place governance models that suits their needs, aware that “one size might not fit all” governance model.

For internal governance model, it is used a project board review, with a 5-gate process, and number of tiers based on the value of the project, it level of risk and its complexity level; the model brings governance reviews and 3rd party independent reviews. Internal steering committees are usually complemented by sponsoring committees, functional advisory groups, and working groups to engage all stakeholders and bring to the decision-making table the necessary subject matter experts.

For external governance model, in horizontal initiatives, the governance committees are led by the ADM and the CIO of all public sector with direct participation of the CIOs of the organizations involved, and the oversight committees of Central Agencies.

CIOs would like governance to support a smooth implementation of the project rather than to require CIO to do more work, mainly when they manage a large, heavy portfolio of numerous projects: “Governance is there to push the progress of the project, and not to ask CIO to do more work, to explain more, to create and deliver more papers and reports, and to becomes heavy, extenuating”.

CIOs presented how Agile, and waterfall can support the governance of projects while impeding the progress of some major, complex projects. In some organizations, there was no formal internal governance; decisions were made based on the level of authority assigned to the individuals in that role.

CIOs initiate several main initiatives related to governance: a new governance committee, proposed new structures, such as a Digital Innovations Steering Committee, as an architecture committee with the mandate to ensure a state of art of the enterprise technology architecture of the organization. CIO initiates a Digital Enablement and Digital Architecture committee, as well as a review of the governance model; CIO contact departments across public sector to share best practices and lessons learned; propose a flexible and nimble governance model.

CIO propose a multiorganizational governance model for a horizontal initiative to ensure project success, establish accountabilities and responsibilities, ensure timely and effective project decision making, “satisfy central agency approval”. In the new governance models, CIO include a Data Committee, within the organization, and mainly for horizontal initiatives.

The new CIO - CDIO proposed a new governance: a joint business – IT co-leadership committee, led by Business team, while the project team was working in a matrix environment, and was under the leadership of business. The “construction” of the team needed to have all the stakeholders, the IT, Business, Policy, Program Delivery, regional representation, front line groups, change management; the team was co-located. Also, as a governance pillar, the CIO focus on the establishment of a common governance structure: an IA-Ecosystem (Information Architecture) Steering Committee consisting of all impacted departments.

CIO’s observations on governance touched on several broad and high-level issues, , see Table 59:Governance (2016 and 2021) for comprehensive findings:

- **Distinctiveness of Digital Transformation Projects:** Consideration for special governance model to be developed for large, complex investment projects that create a big risk for public sector, to be different from the one mandated by the policy of IM/IT enabled capital investment policy; this is too heavy, and reporting and fulfilling the requirements impede CIO’s ability to deliver. After 2000, the public sector organizations have started the development and implementation of Digital Strategy, governance is impacted by the size of the organization, level of project management maturity, and governance is under development.
- **Project Leadership Workforce:** There is progress to train, re-train and hire workforce with the new skill set required for development and implementation of digital strategy; the level of digital readiness of organizations is inconsistent, with progress noticed in large organizations rather the small and medium public sector organizations. Large public sector organizations have a well-- defined governance structure, with established and documented processes. They pose a challenge due to their regimented structure and processed.
- **Challenges of current governance models:** All CIOs mentioned the challenges they have vis-a-vis governance models in place. Among them some of the were predominant. CIOs

shared some of their challenges vis-à-vis governance: CIOs are challenged in their workload required by the mandatory oversight of IM/IT projects required by the policies, the gating model, and its heaviness in addressing the requirements. The recommendations for reviews and audits in IT are not realistic, “they are a burden, an overkill”. You must complete an independent review before you proceed with the next gating process.”

In many cases, for IT enabled Business transformation the CIO was instrumental in setting up the governance model and its operations.

Central agencies oversight, the model in place is found to be heavy in operations, tedious, with a major impact in CIO’s workload and activity. For CIOs with large, extensive portfolio of projects required to comply, the oversight process impacted CIOs and their teams in producing the periodical reporting, addressing periodical requirements, while managing the overlapping needs of multiple projects under implementation.

The access to skilled resources is a major challenge, limited availability of qualified workforce combined with the public sector remuneration and the benefits systems, the lengthy and heavy recruitment and hiring process demotivates candidates to join public sector.

The matrix work environment is a challenging factor: in place as a solution to bring required skill set from within or outside the organization, it poses challenges for the individual and for management, mainly due to lack of clarification of roles and responsibilities, reporting and the overall performance management system in public sector that is not designed for such work structure. The current governance structures and processes pose challenges for organization’s readiness in the development and implementation of Digital Strategies.

CIO made several recommendations for the future of digital transformation governance:

- **Project management practices and flexible governance:** Public sector to consider agile project management practices for a progressive project delivery, supported by a light, yet flexible governance. CIOs promote the need for a smooth, flexible governance, adaptable to each type of project.
- **CIO role in planning and overall decision— making process:** CIOs should be invited to the decision— making table given the authority vested in them, role in the organization, support to the deputies and advice on IM /IT. CIOs to sit at all decision— making tables,

from the planning of the strategy to its implementation. CIO to sit at the EXCO table where all decisions are made.

- **Governance and Digital Strategy in public sector:** In many public sector organizations, the governance is under review given the need for development of Digital Strategy and its implementation. In general, the governance for Digital Strategy is inconsistent across public sector. Public sector is faced by major transformation. Digital agenda of Government poses challenges across the organizations that may not be ready to take on this major change on how government operates and how it delivers its services. The flexibility level of public sector organizations in how internal governance is defined and used poses some challenges for a proper and successful design and implementation.
- **Governance review and transformation:** A 360-- degree review of public sector governance, internally and externally to individual departments, would be beneficial to identify models used, best practices, processes for creation of a knowledge management on governance across public sector, for continuous improvement. Governance models across public sector should go through a periodical revision process, to allow for an increase efficiency and effectiveness and for supporting the organizational changes.
- **Improve governance across public sector:** Governance challenges faced by individual organizations in public sector and across the government at large should be used for in the process of policy reforms and policy revisions. Governance success across public sector organizations should be shared within the individual organizations and among all public sector organizations for supporting an enriched governance body of knowledge across public sector, for continuous improvement.

Open government, governance readiness presents the opportunity for governance reforms. Outcomes and recommendations of internal and external oversight and control activities (i.e., audits) should be made public, discussed, and shared at the CIO community table-horizontal level, and across public sector leadership teams. New and improved technologies, and digital technologies have created new challenges for public and private sector; new business models, new forms of organizing and strategizing. Governance models in public sector worked for many of the projects internal to organizations or for horizontal initiatives across public sector. While preserving the value of traditional governance models, public sector is reinventing itself and is in need to transform from within to meet the needs of its citizens in the digital era. Governance

transformation will be continuously required, for governance to support bureaucratic organizations. Governance will need to support public sector and make it future-proof, able to adopt and adapt to new, emerging technology.

Flexible and easy adaptable governance models will be required, creative governance models to support decision making for traditional projects and new projects, a bridge between traditional public sector and the new vision for a model public sector.

10.5 Public Sector Context

Public Sector has been on a long and steep transformation journey for the last decade (Danielsen et al., 2022). For governments, organizational innovation is a growing imperative, involving the development of new policies and strategies, new service models, new business processes, new ways of managing people, and new technological architectures. In the times of profound transformation, public sector needs to disrupt or will be disrupted.

Public sector is changing rapidly and requires agencies to develop native innovation capabilities from within, where a lack thereof can lead to institutional stagnation (Hueso, 2021). As tools become more flexible and adaptable (e.g., Cloud, Big Data, Blockchain, Mobile Apps, Semantic Web, Digital technologies, etc.), public servants at all levels are called upon to get involved in IT projects and help develop innovative business processes and intelligence capabilities.

This priority remains high even at a time when public sector organizations struggle everywhere with budget reductions, including information technology (IT) capital and operating expenditures. In this context, CIOs are challenged to find cheaper and yet more effective solutions to help government become lean and agile (Lappi & Aaltonen, 2017). Public sector transformation and digital government can continue to improve its implementation considering several success factors resulted from this research from 2016 to 2021. The CIO role has changed; its level has been augmented in several large public service departments from a DG level to the ADM level. CIOs shared the basic success factors (SF) identified for the successful completion of their projects: CIO's personality, CIO professional profile, CIO brand and reputation, relationship with deputies and CXO peers, previous leadership experience, management of projects within the organization, experience in management of horizontal

projects, collaboration with central agencies, oversight of IM/IT capital investment projects, project management maturity level of the organization.

10.6 Success factors for CIO performance vary according to contextual factors.

CIOs shared success factors gathered from their professional experience as IM/IT and digital leaders: they were proud on how these factors brought them success in managing successful projects; these success factors were gathered and clustered in various categories.

- **Success factors when CIO is leading the project**, see Table 60:Public Sector: Success factors - CIO leads the :

- These are success factors related to the project attributes, underline the high importance of the support from the deputies, and the communication at all levels.

- **Success factors when CIO is leading a horizontal initiative with Other Government Departments (OGD)**, see Table 61:Success factors: CIO leads horizontal projects / initiative with :

- These success factors are related to the role of the as a bridge builder, common goals and interests of both CIOs, level of support from the central agencies, work models of the project teams, support from the deputies of the OGDs, support to project teams throughout the project life cycle and after the close out of the projects, collaboration models among OGDs.

- **Success factors when CIO and procurement is involved**, see Table 62:Success factors when CIO and procurement is :

- These success factors are related to the quality of the professional resources acquired and brought to the project team (i.e., contractors), the impact they have on the organization; the success of the projects is impacted by the quality of the relationship between the organization and the contracting agency.

- **Success factors when CIO is leading a business transformation project**, see Table 63:Success factors: CIO leads the business transformation :

- These success factors are related to the attributes of the business transformation projects: engagement, collaboration, stakeholders, business practices, leadership of the project, CIO activities and competencies, their interconnectivity and impact overall on the success of the business transformation project.

- **Success factors when CIO is engaging with the business units**, see Table 64:Success factors when CIO is engaging with the business :

- These success factors refer to CIO's actions, competencies, project teams, relationship between CIO and Business Unit and business practices established at the individual and team level, alignment of priorities, give credit to the collaboration among the teams.

- **Success factors for CIO as IM / IT digital leader**, see Table 65:Success factors for CIO as IM/IT digital leaders

- These success factors refer to the level of authority of the CIO within the organization and the impact it has over the direct access to the decision - making process; access to resources was for all CIOs a major impediment to project success given the limited availability of skilled resources, reduced incentive for qualified resources to join public service; relationship and level of trust with CXO peers and across the organization; level of project management maturity and adoption in the organization; adoption of digital technology and digital transformation; size and diversity of CIO portfolio; CIO personal and professional profile; soft skills; project oversight; political agenda of the government in power; governance;

10.7 Overall challenges of CIOs

CIOs are faced with challenges in their day-to-day activities, see Table 66:CIO day-to-day challenges for an overview of main challenges in the day-to-day life of a CIO.

These series of challenging factors have been personally faced in their role by the CIOs.

These challenges are at organizational level, at project and portfolio level, internal to the organization and external. A major challenge mentioned by the CIOs is related to change management, the readiness of the organization to face the transformation, knowledge to manage in times of change, knowledge of CIO and CXO to manage change, role of CIO and the authority of the role in the organization. The personality of the CIO can be a great success factor but equally a major challenge on the project success, on the relationship between the CIO team and the other teams, the relationship with CXOs,

The difficult role, the pressure of the major responsibilities with impact across the entire organization, the increase workload with multiple and conflicting priorities can have an impact on the work life balance of CIOs, on their mental health, on their personal lives. Limited access

to resources (employee or professional resources-contractors) along with adoption of information management practices constitute challenges in the day-to-day life of CIOs. Digital literacy of staff, CXO peers, level of adoption of digital knowledge and digital technology, across the organization, direct line of support to their deputies are challenges that can be insurmountable at times. Political context, policy changes and legislation are major external challenges that impact bureaucracy given the election cycle.

These are challenges that impede the full success of CIOs in their role and might have an immediate impact on the success of the projects, impact at the portfolio, strategic level, and direct impact at the operational level for a well functioning of their organizations.

10.8 As - Practice perspective

The as-practice perspective is useful to complement knowledge development (Collatto et al., 2018) and can serve to put establish links between research and practice for CIOs. It has been demonstrated in such fields as IT Strategy, IT Project Management, and IT and Enterprise Architecture (EA) Management (Gill & Chew, 2018).

These are executive leaders involved in digital transformation projects across public sector that provide first-hand information on real practice in a set environment such as the one of the bureaucracies. Researched initially in management, the as-practice perspective (Prashantham & Healey, 2022) reveals multi - fold benefits for understanding projects as practice, strategy-as practice, and leadership-as practice in public sector in the current context of this research:

- understanding of the practice in the applicability and implementation of policies in the individual context of various public sector organizations,
- understanding the role of the CIO as practitioners, understanding their practices, challenges in this role, success factors, professional profile, retention factors
- governance as - practice for leading IM IT and digital transformation projects.
- perspective as practice of the future CIO role, the new CIO-CDO role.
- maturity level of the project management practices.
- culture in the public sector.
- strategic role of CIOs- CDOs in leading digital transformation projects.
- implementation of IM IT investment projects in public sector

The as-practice perspectives are noted in the strategy-project alignment dyad (Ong & Uddin, 2020), the business-technology alignment (Kamariotou & Kitsios, 2021), and in the broader competency Business technology management framework (Gagnon, 2022).

From a CIOs viewpoint, projects within the as-practice perspective are one of the main findings of the research. It presents realities of public sector for supporting the understanding of the practice in IM IT, digital transformation projects in public sector. Introduces the actions taken in projects, how projects are identified, initiated, planned, conducted.

It also presents the practices of the people involved, their roles in the life cycle of projects, their role in the structure of the bureaucratic organizations presented in this research, as project team members, as stakeholders of various types of public sector projects: IM IT transformation projects internal to organizations, digital transformation projects, as horizontal projects across various public sector organizations in public sector. Also, for “projects – as practice” this research presents the project management practices and project management methodologies, the presence of waterfall for major projects, with a high tendency in public sector for Agile practices and mainly for hybrid project management practices. CIOs advocates for project management practices to be introduced, staff be re-skilled, recruitment of necessary skilled workforce with project management knowledge, experience, and competencies, acknowledging the value of project management maturity for the organization.

The perspective for “leadership as – practice” for the CIO-CDO reveals:

- the role it plays in actively leading IM IT transformation projects.
- the role it plays in development and implementation of Digital Strategy in public sector.
- the role it plays in actively leading digital transformation projects.
- the actions taken in the leadership role.
- the role in leading various types of projects at organizational and horizontal level.
- the relationship with deputies, with CXOs, with CIOs peers.
- the professional leadership profile for successful CIO-CDO.
- the engagement with CXO team at the decision - making table when the level of authority is invested in the role.
- the success factors for CIO-CDO, the new CDIO in leading various types of projects.
- the actions taken to acquire skilled, qualified resources, “construct” project teams.

The perspective for “governance as-practice of projects will shed light on one of the main areas of challenge for some of the CIOs interviewed, the governance model. The governance “as – practice” is a perspective that CIOs underlines in their successful projects, included in this research , it is “a dynamic process which impacts on three levels: the project, the organisational and the institutional” (Brunet, M. 2019). Governance structure for various type of projects and the impact it has on the success of the projects:

- role of CIO-CDO in setting up new iterative governance structures, new committees, revisions of existing committees.
- activities initiated by CIO-CDO in selecting / proposing the membership of governance committees.
- adoption at the organization and public sector level of the governance framework.
- operationalization of the governance structure.
- access to the organizational and public sector governance know – how.
- activities initiated by the CIO-CDO to integrate and ensure alignment among governance elements part of its structure.
- governance elements that support project success,
- practices that allow governance challenges to be overcome.

11 CONCLUSION

11.1 Introduction

The objective of this research is to look at public sector innovation projects, or IT-enabled transformation of service models and processes, and explore the Leadership of CIOs, and the governance model. The CIO leadership refers to the role of CIOs, evolution, and its status, the CIO contribution and how they can help champion and guide innovation projects, as well as reduce knowledge and talent gaps throughout the lifecycle, at all levels of management, within and outside their agency.

The governance framework explored as part of this research refers to the existing governance models used in public sector for a more flexible IT governance framework necessary to improve the performance of innovation projects, from inception to completion.

11.2 Contribution

The value of our findings can be assessed relative to recent studies of the role and the competencies of CIO (Kratzer et al., 2023). They have evolved and changed over the last decade, along with the technological changes, advancement, and innovation. The role of CDO has also emerged in the past decade as a dominant component either parallel or integrated to CIO role (Lorenz & Buchwald, 2023). As such, our study aimed to analyze the evolving integrated competency framework of the CIO-CDO or CDIO.

IT has become a central pillar of organizational governance in the public sector. CIOs have been called upon to become innovation champions, and help agencies become lean and agile through IT-enabled transformation programs. Our thesis explored how this major trend is changing the CIO function, and helped position it within the strategic project governance literature (A. U. Musawir et al., 2023). Following a brief definition of organizational innovation, governance, and IT in the public sector, we reviewed the academic literature on CIO competencies, and explored how they are to evolve in this emerging context and presented the specifics of public sector.

This led us to consider three key issues: CIO-CXO relationships in governance processes, CIO leadership at the core of key alignment dyads, and CIO championing role in the fuzzy front-end

of the organizational innovation lifecycle. We then proposed a competency model for the Next Generation CIOs, placing this leadership position at the center of alignment dyads of business-IT and strategy-project. The CIO, through renewed relationships with CXO and CIO branch leadership teams, would then focus on managing a program of innovative projects with IT as a core pillar.

The lack of evidence supporting the model is in fact indicative of the potential of further study. A more integrated role for the CIO has been hinted for a long time in the literature, and our model provides a rich and coherent framework to ensure this role complements overall innovative capabilities of the organization. The research presents valuable elements for recruitment, onboarding, and retention of next CIOs, the CIO-CDOs in organizations, well supported by practical aspects such as success factors for specific types of projects and challenges they need to overcome as digital leaders.

Given the practical nature of the IT management expertise, within BTM as its broader framework, this research agenda requires a strong partnership between leading CIO communities in government, CIO networks, and a rich knowledge-sharing network involving academia. This can lead CIO branches of various jurisdictions to develop a joint capability for “clinical research”, allowing joint teams of public-private-academic researchers to test and develop the proposed model, along derivative and alternative explanations.

Hybrid expertise requires a truly transdisciplinary approach if we are to help Next Generation CIOs face the accelerating challenges of organizational innovation in the public sector.

This is therefore a call for uniting expertise from several disciplines in the Administrative Sciences, i.e., Public Administration, Strategic Management, Project Management, and Business Technology Management.

11.3 Limitations of the Study

During this research, a series of limitations have been identified: the sample for the public-sector leaders was not stratified by age, or gender, professional experience, education, or other criteria.

The sample of research subjects does not include leaders outside Public Sector, and BTM business technology management area; the sample for the public-sector leaders at provincial,

territorial, and municipal level was not yet initiated; discontinuity of the information gathered due to changes in the role of the CIO due to attrition or organic leaves of CIOs. The list is not comprehensive and will be dynamic throughout the research process.

This research presents a series of delimitations presented here. The data for this research has been collected starting with late 2016 and restarted in 2021. The relevance of the data collected by the end of the research will be ensured via a validation process. The indicators for the main concepts and sub-concepts of the two areas, leadership and governance have been developed a priori to the start date of the initial interviews.

This researcher considers the spectrum of personal ontologies and acknowledge that population considered vulnerable have not been considered as research subjects.

The deontological stance of the researcher includes professional ethics, set of values, professional behavior, and the professional practices. In the case of this researcher, - consideration is given to the prescribed applicable Codes of Ethics: the one in Public Sector- as my employer of choice, the one in project management as per the area of my study, and the one of my professions as an engineer.

Consideration is given to the confidentiality of information gathered during the interview process, as stated in the informed consent agreement with the research participants, and the professional ethics exhibited by this researcher throughout the life cycle of this research. For the research subjects involved so far and the ones that will be involved at any point in time during this research, we consider their right to confidentiality unless specifically waived, with full consideration to their full safety and protection, with the aim to create a positive research experience. For each of the organization involved in this research, the confidentiality of their data will be as well respected and ensured. Finally, the ethical documentation necessary has been prepared, submitted, and approved by the Comité d'éthique de la recherche (CER), the Research Ethics Board (REB), at Université du Québec en Outaouais (UQO).

11.4 Implications for Professional Practice

The research will enhance the industry recognized organizational capability standards supported by the Body of Knowledge (BOK), e.g., the Business Technology Management BOK, the Project Management BOK, the Business Analysis BOK, and Software Engineering BOK;

contributing to the existing professional competency certifications such as the Certified Management Consultant (CMC), Control Objectives for Information and Related Technologies (COBIT), Information Technology Value Management (Val-IT), and competency standards (i.e. Skills Framework for Information Age (SFIA), the Management Standards Center's (MSC) National Occupational Standards, the BTM Revised Bloom's Taxonomy).

The research will support the continue development of the competencies and attributes of existing standards, such as the ones identified in the Business Technology Management (BTM) Body of Knowledge (BOK), <https://github.com/Digital-Innovation-Foundation/btmbok>. We aimed at the outset of our thesis to integrate our findings within a new section for the executive group, emphasizing the autonomy, influence, complexity, and business skills, as well as of other leadership competencies of the new Chef Digital Information Officer role.

At the practical level, the findings of this research will support the future of work in organizations, ensuring the readiness of staff for the level of innovation and digital transformation across the organizations where learning and development of personnel is triggered by the CIOs portfolios.

The research will support the Next Generation CIO-CDO or CDIO in preparing their research agenda: retain these executives in the organizations, integrate AI in their business lines and their portfolios, transform their organizations to improve their flexibility and fitness level, to respond to disruptions, and adapt (Christofi, 2024).

This research explored the revolution rather than the evolution of this role, seeking to depict the aspects that supports successful digital transformation and innovation, present the dynamic aspect of the proposed model, understanding how the fourth industrial revolution will revolutionize this role, to face the needs of the future of work, and the role will play in preparing their organizations.

11.5 Future Research

The future CIO-CDO or CDIO role, as part of the C-suite executive group will continue to evolve and become more relevant to organizations in the years to come. The last decade has seen the change from a classical role with core competencies in business and IT, with a transition towards innovation and leading digital organizations and mergers with other newly formed roles such as the one of Chief Digital Officer (CDO) forming the new Chief Digital Information Officer

(CDIO) role. These transformations require new forms of leadership, and new, evolved competencies.

At the practical level, the findings of these current research will equip CIOs, and human resources practitioners with knowledge necessary to support the career progression and professional development, the recruitment process in public and private sector, and the retention of CIO candidates for the Talent Management group. More similar research is needed with CIOs in various public sector jurisdictions , at local, provincial, and territorial jurisdictions, in academia and private sector for a comprehensive view to complement these findings.

At the theoretical and practical level, the findings of this research will enrich the level of knowledge of the necessary competencies of CIO leading digital transformation in organizations. It will also support a better understanding of the alignment of technology advancement and transformation of this role.

At the methodological level, there is an opportunity to revisit the findings from the “as-practice” perspective (Hällgren & Söderholm, 2023). This theoretical framework is in fact closely related to our methodological approach of grounded theory, where empirical findings closely codetermine the forms of project leadership practice (Kalogeropoulos et al., 2020). It is also closely associated with Action Design Research (ADR), a methodological approach favoring the iterative emergence of best practices and theories through experimentation, a necessary complement to knowledge development (Collatto et al., 2018). It has been shown to be effective at all levels of IT leadership, including at the highest level such as in Enterprise Architecture (EA) planning (Gill & Chew, 2018).

It is important to note that the “as-practice” perspective has been researched first in the strategic management discipline (Prashantham & Healey, 2022). It is likely that it will also allow a great focus on strategy-project alignment dyad (Ong & Uddin, 2020). As the “as-practice” perspective also takes roots in IS research, the business-technology alignment dynamics should also emerge more clearly (Kamariotou & Kitsios, 2021). The “as-practice” perspective is also a cornerstone of the BTM BOK, providing further opportunities to integrate these findings within the broader executive competency framework (Gagnon, 2022). Recent advances in IS research rooted in this perspective can also serve to reinforce the findings of this study (Högberg & Willermark, 2023).

12 APPENDIX A - RESEARCH PARTICIPANT INVITATION LETTER

Chief Information Officer (CIO)

Departments and Agencies

Government of Canada

Re.: Interview for a Research Project

Dear Sir or Madam,

I am most honored to invite you for a brief 1-hour interview as part of my doctoral thesis project at University of Quebec in Outaouais (UQO), under the direction of Prof. Stéphane Gagnon.

My thesis is entitled “**CIO Leadership and Governance Framework for Public Sector Innovation Projects**”. It deals with public sector innovation projects, or IT-enabled transformation of service models and processes.

We seek to analyze at least 20 case studies of recently completed innovation projects in agencies of various sizes and mandates. Our objectives are to identify impact on project success from 2 sets of factors: (1) the CIO’s leadership role throughout the project lifecycle, and (2) the various governance frameworks in and around the project, within and outside the agency.

The purpose of this first interview is to identify a relevant project for our study, discuss your leadership role and the governance framework of this project, and identify key contacts for further interviews, among others the Project Manager and some of your direct reports.

We will then interview these contacts within and outside your agency and ask them to fill out some brief online surveys consisting of about 30 questions, to confirm key factors, and build a forecasting model valid across all agencies and cases reviewed. We will then draft several case

study summaries, along with a storyboard, a risk factor influences diagrams, and a CIO competency profile. These will be reviewed by you and all respondents before being considered final material as part of my research process.

In compliance with UQO's Research Ethics Committee guidelines, please find attached an Executive Summary of our research project, along with a "Research Participant Consent Form". We will need this form to be signed by each person interviewed during our research project.

Thank you for kindly granting this interview opportunity and looking forward to meeting you and your team.

Best Regards,

Lily Murariu, M.Eng., DBA (Candidate)

Student, DBA in Project Management

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Stéphane Gagnon, Ph.D.

Associate Professor, Thesis Director

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13 APPENDIX B - RESEARCH PARTICIPANT CONSENT FORM

Business Technology Management (BTM) Executives,
Digital Transformation, and Project Governance in Public Sector

Lily Murariu, M.Eng., DBA (Candidate)

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4. **Invitation:** The purpose of this form is to solicit your participation in the abovementioned research, studying the Chief Information Officer (CIO) leadership role and governance framework for strategic innovation projects in the Government of Canada.
5. **Objectives:** Our research deals with public sector innovation projects, or IT-enabled transformation of service models and processes. We ask 2 research questions seeking to improve project success, speed, and cost-effectiveness:
 - **CIO Leadership:** In their leadership role, what can CIO's do to help champion and guide innovation projects, as well as reduce knowledge and talent gaps throughout the lifecycle, at all levels of management, within and outside their agency?

- **Governance Framework:** Taking a broad view of the whole Government of Canada, along with external entities and IT industry partners, what could be the architecture (possibly a “platform” organization as Gartner puts it) for a more flexible IT governance framework to improve the performance of innovation projects, from inception to completion?
6. **Interviews:** Your participation in this research project consists in granting an interview in company of Ms. Lily Murariu, student within the DBA in Project Management, and possibly her thesis director, Mr. Stéphane Gagnon, Associate Professor of IT Management at Université du Québec en Outaouais (UQO). The duration of our interview shall be around 60 minutes and can be carried out at your convenience in person, by phone, or by videoconference. No questionnaire is required, and issues proposed in the research project summary sent prior to the meeting. If you wish to do so, we can schedule supplementary interviews according to your interests and availability.
7. **Recordings:** Our interviews will not be recorded for archival, but simply to facilitate notetaking during and after the interview. These recordings will remain in the private care of the interviewer and will not be included as research material.
8. Confidentiality:
- a. The list of participants and all data collected during this study are entirely confidential, and it will not be possible to identify participants from research results.
 - b. To make our research results comparable, our goal is to properly classify the type of organization, whether small or large, private or public, growing or traditional.
 - c. We may mention in our future publications some information concerning you or your organization, in the form of examples, case studies, or testimonies. In this case, we will modify the names of personnel, organizations, and products, so that they are fictitious and unrecognizable.

- d. We will report any quantitative values at the highest decimals (i.e., ten, hundred, thousand, etc.).
 - e. We will only report affiliations at the highest level of aggregation, whether for industries (e.g., healthcare, manufacturing, etc.) or professions (e.g., computing, engineering, management, accounting, etc.).
 - f. If we want to report nominative information, we will make this request to you by email, and will invite you to revise and approve which information we have the right to publish or not. You shall have the privilege to retract information at any time before publication.
9. **Publication of Results:** Our research results will be published as part of a doctoral thesis, in academic journals in the form of articles addressing one or more components of competency profiles, in a book integrating all our results, on our web site as synopses of our articles and books, and as academic and professional conferences, where we will report briefly on our ongoing research.
10. **Data Protection:** The data collected will be kept in our personal computers under password protection. The only persons with access to this data are the doctoral student and her thesis director.
11. **Voluntary Participation:** Your participation in this study is completely voluntary. You are free to participate and can withdraw from it at any time without prejudice.
12. **Risks and Benefits:** The risks associated with your participation are minimal and the researchers are committed to taking the steps necessary to reduce any risks. The only inconvenience is the time spent during your involvement, approximately 60 minutes. The contribution to the advancement of knowledge in IT Management is the direct benefit anticipated. No monetary compensation will be provided.

13. **Contact Information of the Researcher:** If you have any questions about this research project, please contact the thesis director:

Mr. Stéphane Gagnon, Ph.D. Associate Professor in IT Management Dép. des sc. administratives Université du Québec en Outaouais	Pavillon Lucien-Brault 101, rue Saint-Jean-Bosco, A2228 C.P. 1250, succursale Hull Gatineau, QC, Canada, J8X 3X7	Tel.: 819-595-3900, Ext. 1942 Fax: 819-773-1747 Email: stephane.gagnon@uqo.ca Web: http://www.gagnontech.org
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14. **Contact Information of the Research Ethics Committee:** If you have any questions or concerns regarding the ethics of this study, please contact the Research Ethics Committee at Université du Québec en Outaouais:

Ms. Lucie Villeneuve, LLB Research Ethics Committee Office of the General Secretary Université du Québec en Outaouais	Pavillon Alexandre-Taché 283, Alexandre-Taché, E2100 C.P. 1250, succursale Hull Gatineau, QC, Canada, J8X 3X7	Tel.: 819-595-3900, Ext. 1942 Fax: 819-595-3924 Email: lucie.villeneuve@uqo.ca Web: http://uqo.ca/ethique
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15. **Permission for Secondary Data:** With your permission, we would like to be able to store the data collected at the end of the project for other research activities in the same field. In order to preserve your personal information and identity, the data will be de-

identified, that is, it will no longer be possible for anyone to link the data to your identity. We are committed to complying with the same rules of ethics as for the current project.

There is no need to consent to this part in order to participate in the current research. If you do not agree to it, your data will be destroyed at the end of this project. If you agree, your data will be kept for a period of 15 years after completion of the current project and subsequently destroyed.

- I agree to secondary use of the information I provide.
- I do not agree to secondary use of the information I provide.

16. **Agreement:** Your signature certifies that you understand clearly the instructions on your participation in the research project and indicates your consent to participate. It does not mean that you agree to alienate your rights or to release the researchers and others responsible for the project of their legal and professional responsibilities. You are free to withdraw from the study at any time without prejudice. Since your participation must be as informed as your initial decision to participate in the project, you need to be aware of the ins and outs of the project as the research is being conducted. Therefore, do not hesitate to ask for clarification or new information at any time during the project.

Upon reading the information regarding my participation in the research project, I am signing this form to indicate that I have willingly agreed to participate. I am retaining one copy of this consent form, which has been signed in duplicate.

Participant's name: _____

Participant's signature: _____ Date: _____

Researcher's name: _____

Researcher's signature: _____ Date: _____

14 APPENDIX C - SEMI-STRUCTURED INTERVIEW QUESTIONNAIRE

Research Questions: Our thesis deals with public sector innovation projects, or IT-enabled transformation of service models and processes. We ask 2 research questions seeking to improve project success, speed, and cost-effectiveness:

1. **CIO Leadership:** In their leadership role, what can CIO's do to help champion and guide innovation projects, as well as reduce knowledge and talent gaps throughout the lifecycle, at all levels of management, within and outside their agency?
2. **Governance Framework:** Taking a broad view of the whole Government of Canada, along with external entities and IT industry partners, what could be the architecture (possibly a "platform" organization as Gartner puts it) for a more flexible IT governance framework to improve the performance of innovation projects, from inception to completion?

Methodology: Throughout 2016, we will carry out 10 to 20 detailed case studies of completed IT-enabled transformation projects in agencies of various sizes and mandates. Our research process will involve the following steps with each agency:

1. **CIO Interview:** Hold a 1-hour interview with the CIO to identify a relevant innovation project, discuss their leadership role throughout its lifecycle, and identify relevant contacts and documentation.
2. **Interviews with PM and Others:** Hold a series of 1-hour interviews, as well as small focus groups, with the Project Manager (PM) and other direct reports of the CIO, to identify the key "pain points" impacting project performance.

3. **Online Questionnaires:** Request several project participants to answer a brief 30-questions online survey, seeking to confirm some factors identified during interviews, and develop a “forecasting model” across agencies.

4. **Case Study Analysis and Review:** Draft a case summary for the strategic project, a “story board” or timeline of key events, an “influence network” of facilitating/impeding factors, and a “competency profile” for CIO leadership.

Questions for CIOs

1. **Agency Innovation Project:** What has been your agency’s most recently completed IT-enabled transformation, and what factors to you believe have facilitated/impeded its performance?
2. **CIO Leadership Role:** What efforts have you or your predecessor(s) deployed to ensure project success, and mitigate any impediments from within and outside your agency?
3. **Governance Framework:** What was the impact on performance, as well as risk management, from the various IT project governance frameworks within your agency, throughout the government, and with IT industry partners, and do you believe it is possible to develop a more modular “platform organization” for project portfolio management?

15 APPENDIX C - RESULTS TABLES

Table 54: Digital Executive Competencies (2016)

Behavioural Competencies	Technical Competencies
<ul style="list-style-type: none"> • Build trust at horizontal and vertical level. • A relationship, a “bridge” builder 	<ul style="list-style-type: none"> • Business acumen
<ul style="list-style-type: none"> • Accountability 	<ul style="list-style-type: none"> • Technical knowledge
<ul style="list-style-type: none"> • Relationship builder 	<ul style="list-style-type: none"> • Storyteller
<ul style="list-style-type: none"> • Negotiator 	<ul style="list-style-type: none"> • Translator of technical and business communication
<ul style="list-style-type: none"> • Mediator 	<ul style="list-style-type: none"> • Issue Manager
<ul style="list-style-type: none"> • Steering capabilities 	<ul style="list-style-type: none"> • Strategist
<ul style="list-style-type: none"> • Liaison 	<ul style="list-style-type: none"> • Financial knowledge
<ul style="list-style-type: none"> • Communicator; Supportive behaviour (versus the directive behaviour) <ul style="list-style-type: none"> ○ Two-Way Communication ○ Active listening ○ Provide support, encouragement to staff, peers. ○ Facilitate interaction Involve follower in decision-making 	<ul style="list-style-type: none"> • A subject matter expert (knowledge, experience, expertise) <ul style="list-style-type: none"> ○ Information Management ○ Project, Portfolio Management; Project Performance Domains ○ Management(Financial, Human Resources and, Technology Management)
<ul style="list-style-type: none"> • Diplomacy 	
<ul style="list-style-type: none"> • Confidence 	
<ul style="list-style-type: none"> • Reasonable personality 	

• Ability to engage	
• Able to maintain momentum	
• A strong, committed personality	
• Pick the battles	
• Accept directions, recommendations	
• A champion for engagement	
• A strong implementer, get things done	
• An inquisitive mind, explore options, master the art of possible	
• A continuous learner	
• A recruiter	
• A trainer	
• A coach, a mentor	
• A consensus builder	
• A digital leader	
• Reliable	
• Accountable	
• A collaborator, a broker	
• An advocate	
• An innovator	
• A change champion	

Table 55: Digital Executive Competencies (2021)

Behavioural Competencies (2021)	Technical Competencies (2021)
<ul style="list-style-type: none"> • Daring: <ul style="list-style-type: none"> ○ CIO is brave.is blunt. ○ Challenge the status quo. ○ Feel comfortable to initiate, advocate, promote ideas and reach decision. 	<ul style="list-style-type: none"> • Prioritizing public sector demand for IT shared services and assets
<ul style="list-style-type: none"> • Negotiation: <ul style="list-style-type: none"> ○ CIO finds the mechanisms needed for various conversations, to actively participate in organization's decision - making process 	<ul style="list-style-type: none"> • Knowledge and user of behaviour economics
<ul style="list-style-type: none"> • Honesty: <ul style="list-style-type: none"> ○ Fair, honest, open, ethic, present painful truth in any situation, ensure that reality and truth are presented. 	<ul style="list-style-type: none"> • Using emerging technologies
<ul style="list-style-type: none"> • Open minded, explore, find solutions 	<ul style="list-style-type: none"> • Provide direction on the enterprise-wide transition to digital government
<ul style="list-style-type: none"> • Advocate to increase the "brand" and visibility of the CIO role 	<ul style="list-style-type: none"> • Prescribe expectations for enterprise architecture for digital government

<ul style="list-style-type: none"> • Communicator: <ul style="list-style-type: none"> ○ CIO communicate at all levels in the language of the audience, is understood by the audience 	<ul style="list-style-type: none"> • Establish priorities for IT investments. • Facilitate innovation, experimentation in service design delivery, information, data, IT, and cyber security
<ul style="list-style-type: none"> • Diplomacy: A strong diplomat, apply diplomacy to business and public sector 	<ul style="list-style-type: none"> • Build in accessible from the start
<ul style="list-style-type: none"> • Engage and collaborate 	<ul style="list-style-type: none"> • Use open standards and solutions
<ul style="list-style-type: none"> • Leadership 	<ul style="list-style-type: none"> • Use and address security and privacy
<ul style="list-style-type: none"> • Trainer 	<ul style="list-style-type: none"> • Design ethical services
<ul style="list-style-type: none"> • Coaching and development, mentor 	<ul style="list-style-type: none"> • Data steward
<ul style="list-style-type: none"> • Personality <ul style="list-style-type: none"> ○ Humanistic, ○ Flexible, ○ Positive • Credible 	<ul style="list-style-type: none"> • Subject Matter Expert: <ul style="list-style-type: none"> ○ Project Management ○ Information Management ○ Management

	<ul style="list-style-type: none"> ○ Business acumen (Financial, Human Resources, Technology)
<ul style="list-style-type: none"> • Transparent 	<ul style="list-style-type: none"> • Subject Matter Expert: <ul style="list-style-type: none"> ○ Digital innovation ○ Digital technologies ○ Digital lead ○ Digital acumen ○ Digital literacy
<ul style="list-style-type: none"> • Enabler 	<ul style="list-style-type: none"> • Provide advice on: <ul style="list-style-type: none"> ○ Business management ○ Lanning ○ governing ○ manage enterprise-wide information. ○ data ○ cybersecurity <ul style="list-style-type: none"> • Service design and delivery
<ul style="list-style-type: none"> • Liaison, Relationship builder, broker 	<ul style="list-style-type: none"> • Active decision - making participant
<ul style="list-style-type: none"> • Trusted partner 	<ul style="list-style-type: none"> • Design new governance models
<ul style="list-style-type: none"> • Get along 	
<ul style="list-style-type: none"> • Continuous learner 	
<ul style="list-style-type: none"> • Inspirational motivator, mobilizer 	

Table 56:New Digital Executive - Behaviour competencies

NEW Digital Executive - Behaviour competencies:				
<ul style="list-style-type: none"> • Daring: <ul style="list-style-type: none"> ○ CIO is brave. ○ Challenge the status quo. ○ Is blunt. • Initiate, advocate, promote ideas 	<ul style="list-style-type: none"> • Honesty: <ul style="list-style-type: none"> ○ Fair, open, ethic, present painful truth in any situation, ensure that reality and truth are presented. 	<ul style="list-style-type: none"> • Open minded, explore, find solutions 	<ul style="list-style-type: none"> • Advocate to increase the “brand” and visibility of the CIO role 	<ul style="list-style-type: none"> • Engage and collaborate
<ul style="list-style-type: none"> • Inspirational motivator, mobilizer 	<ul style="list-style-type: none"> • Personality <ul style="list-style-type: none"> ○ Humanistic ○ Flexible ○ Positive • Credible 	<ul style="list-style-type: none"> • An enabler 	<ul style="list-style-type: none"> • Broker 	<ul style="list-style-type: none"> • Advocate for digital transformation
<ul style="list-style-type: none"> • Engages with peers across the world 	<ul style="list-style-type: none"> • Malleability, flexibility, adaptability 			

<ul style="list-style-type: none"> • Prioritizing public sector demand for IT shared services and assets 	<ul style="list-style-type: none"> • Knowledge and user of behaviour economics 	<ul style="list-style-type: none"> • Using emerging technologies 	<ul style="list-style-type: none"> • Provide direction on the enterprise-wide transition to digital government 	<ul style="list-style-type: none"> • Prescribe expectations regarding enterprise architecture for digital government
<ul style="list-style-type: none"> • Establish priorities for IT investments. • Facilitate innovation, experimentation in service design delivery, information, data, IT, and cyber security 	<ul style="list-style-type: none"> • Build in accessible from the start 	<ul style="list-style-type: none"> • Use open standards and solutions 	<ul style="list-style-type: none"> • Use and address security and privacy 	<ul style="list-style-type: none"> • Design ethical services

<ul style="list-style-type: none"> • Data steward 	<p>Subject Matter Expert:</p> <ul style="list-style-type: none"> • Digital innovation • Digital technologies • Digital lead • Digital acumen • Digital literacy 	<p>Provide advice on:</p> <ul style="list-style-type: none"> • business management • planning • governing • manage enterprise-wide information. • data • cybersecurity • Service design and delivery 	<p>Active decision-making participant</p>	<p>Design new governance models</p>
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Table 57: New Digital Executive - Technical competencies

NEW Technical competencies				
<ul style="list-style-type: none"> • Prioritizing public sector demand for IT shared services and assets 	<ul style="list-style-type: none"> • Using emerging technologies 	<ul style="list-style-type: none"> • Prescribe expectations regarding enterprise architecture 	<ul style="list-style-type: none"> • Build in accessible from the start 	<ul style="list-style-type: none"> • Use and address security, privacy, cybersecurity
<ul style="list-style-type: none"> • Knowledge and user of 	<ul style="list-style-type: none"> • Direct the enterprise-wide 	<ul style="list-style-type: none"> • Establish priorities for IT investments. 	<ul style="list-style-type: none"> • Use open standards 	<ul style="list-style-type: none"> • Design ethical services

<p>behaviour economic s</p>	<p>transition to digital governmen t</p>	<ul style="list-style-type: none"> • Facilitate innovation, experimentation in service design and delivery, information, data, IT, and cyber security 	<p>and solutions</p>	
<ul style="list-style-type: none"> • Data steward 	<ul style="list-style-type: none"> • Subject Matter Expert: <ul style="list-style-type: none"> ○ Digital innovation ○ Digital technologies ○ Digital lead ○ Digital acumen ○ Digital literacy ○ Management 	<ul style="list-style-type: none"> • Provide advice on: <ul style="list-style-type: none"> ○ Governing ○ Managing enterprise-wide information ○ Data ○ Cybersecurity 	<ul style="list-style-type: none"> • Service design and delivery 	

Table 58: Digital Executive: Leadership and Governance (2016 and 2021)

<p>CIO Digital Executive Role</p>	<p>2016 -Role & Details</p> <p>A transformative leader</p>	<p>2021 – Role & Details</p> <p>An executive digital leader</p>
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Technologist	<ul style="list-style-type: none"> • Knowledge of technology, systems • A subject matter expert <ul style="list-style-type: none"> ○ Information Management ○ Information Technology ○ Project Management ○ Management 	<ul style="list-style-type: none"> • A subject matter expert <ul style="list-style-type: none"> ○ Information Management ○ Information Technology ○ Project Management* ○ Project Management methodologies: Waterfall; Hybrid, Agile ○ User of digital technology ○ Open Source • Using emerging technologies Prescribing expectations regarding enterprise architecture* • CIO responsible for leading the departmental IT, information, and data management functions*
Executive Digital Leader		<ul style="list-style-type: none"> • Digital Leader • Digital acumen • Digital advocate • Special Advisor to Digital champion • Implementer of Digital Agenda • Lead digital innovation. • Lead Digital transformation teams. • Promote digital literacy and digital knowledge across the organization, and peers.
Business lead	<ul style="list-style-type: none"> • Manager • Communicator • Leader • Operator • A recruiter 	<ul style="list-style-type: none"> • Use and knowledge of behavioural economics (to better understand the effects of psychological, cognitive, emotional, biases, tendencies, heuristics, cultural and social factors

	<ul style="list-style-type: none"> • A financier 	of individuals and organizations); use of nudge theory
Solution finder	<ul style="list-style-type: none"> • Research • Exploration • Optimization 	<ul style="list-style-type: none"> • Facilitating innovation and experimentation in service design and delivery, information, data, IT, and cyber security*
Regulatory	<ul style="list-style-type: none"> • Policy Development • Policy Compliance 	<ul style="list-style-type: none"> • Implementer of public sector Digital Standards (design with users; iterate and improve frequently; work in the open by default; use open standards and solutions; address security and privacy risks; build in accessible from the start; empower staff to deliver better services; be good data stewards; design ethical services; collaborate widely)**
Enabler	<ul style="list-style-type: none"> • Guidance • A service delivery expert • Visionary • An Innovator • Change Manager • Path Finder 	<ul style="list-style-type: none"> • Provide advice on governing and managing enterprise-wide information, data, cybersecurity, and service design and delivery* • Path Finder: CIO initiate, and demonstrate that things can be done differently, better, under the CIO new tenure.
Strategist	<ul style="list-style-type: none"> • IM/IT Strategy • Data Strategy, Data Steward • Digital Strategy 	<ul style="list-style-type: none"> • Prioritizing public sector demand for IT shared services and assets* • Establishing priorities for IT investments*
Catalyst	<ul style="list-style-type: none"> • Liaison 	<ul style="list-style-type: none"> • Relationship with CXO- TMT team

	<ul style="list-style-type: none"> • Relationship Builder • Social • Relationship • Consultation and Collaboration 	<ul style="list-style-type: none"> • Support deputies. • Trusted Partner • Equal partner • Broker of horizontal and vertical relationships • CIO takes high pride in the job. • Advocates for CIO role across public sector ad internationally
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Table 59:Governance (2016 and 2021)

Governance Models	2016	2021
For IM/IT Capital Investments projects	<p>Mandated by the public sector policy. (2021, Policy on the Planning and Management of Investments</p> <p>The 2021 version of the policy replaces the 2006, 2009, 2016, 2019 versions.</p> <ul style="list-style-type: none"> ○ 5 to 7 gating process based on size, complexity, risk level of the project. ○ Waterfall. Agile, Hybrid project management methodology ○ Investment oversight of central agencies during the project/program life cycle 	
For sensitive projects (political, security, etc.)	<p>Internal governance</p> <ul style="list-style-type: none"> • A 5-gate process, versus a 7-gate process used by central agencies. • The organization scale the project documentation based on the size 	

	<p>of the project (3 tiers model for projects: less than 250,000, between 250,000 and 1 mil, and over 1 mil)</p> <ul style="list-style-type: none"> • Internal reviews and audits are customized based on the size, and project importance. • Using the 3rd party independent reviews • Strong front-end planning. <p>External governance</p> <ul style="list-style-type: none"> • Oversight from central agencies and CIO of public sector. 	
<p>For enterprise solutions delivered to other organizations</p>	<p>Internal governance-structure</p> <ul style="list-style-type: none"> • Set up a Steering committee at deputy level. • Set up a Steering committee at CIO and director general level. • Set up Functional advisory groups at management level *(various functions) • Set up working groups *(Design, planning, integration, change, communication, engagement) <p>External governance-structure.</p> <ul style="list-style-type: none"> • Oversight from central agencies and CIO of public sector 	

<p>For IT Enabled Transformation Projects (model 1)</p>	<p>Internal governance</p> <ul style="list-style-type: none"> • No governance structure. No documentation. • Governance ensured by the decisions of individuals with the level of authority. <p>External governance</p> <ul style="list-style-type: none"> • Engagement with central agencies • Consultations with unions <p>“In Government rules are made to take care of the system and not so much of the people and the deliverable.”</p>	
<p>For IT enabled Transformation Projects (model 2)</p>	<p>Internal governance</p> <ul style="list-style-type: none"> • A 5-gate process • No governance structure. CIP put in place an evolving governance structure. • A steering IM -IT committee • President commitment • A political initiative <p>External governance-structure.</p> <ul style="list-style-type: none"> • Oversight from central agencies and CIO of public sector. 	
<p>For development of a cross-departmental</p>	<p>Internal governance</p> <ul style="list-style-type: none"> • Sponsoring committee (CIO, EX and DG level)Operational and strategic committee 	

<p>business IT - enabled project</p>	<p>External governance</p> <ul style="list-style-type: none"> • Steering committee (At deputy(DM) / ADM level) • A Project Board review committee • A DM level Steering committee (for buy in of all organizations) • DG Champion Committee(for engagement of all organizations) • Functional Advisory Group (At DG and Program Manager level) • Business Advisory Committee(DG level) • Working groups (Planning, Design, Change) • Oversight from central agencies and CIO of public sector. 	
<p>For development of the IM/IT strategy of public sector</p>	<ul style="list-style-type: none"> • Internal governance • A CIO (ADM and DM) Committee <p>External governance</p> <ul style="list-style-type: none"> • Consultations with all public sector organizations • Consultations with CIOC community 	
<p>For Digital Transformation</p>	<p>The governance model for Digital Transformation varies across public sector. The steering committee set up a Business Transformation Committee, with a Digital Champion assigned, and an</p>	

	<p>engagement strategy to involve all stakeholders, the CIO as an advocate, a promoter of digital transformation.</p> <p>Internal governance:</p> <ul style="list-style-type: none"> • A Digital Champion assigned. • CIO, a Digital Transformation advocate • A Steering Committee • A Business Transformation Committee (with all stakeholders) • Use Design thinking (Co-creation) for product development. 	
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Table 60:Public Sector: Success factors - CIO leads the project.

<ul style="list-style-type: none"> • Consideration to the sensitivity and the nature of the project 	<ul style="list-style-type: none"> • Periodical and consistent communication with all parties involved.
<ul style="list-style-type: none"> • Strong relationship and strong mutual trust with the Senior - Executive Management team 	<ul style="list-style-type: none"> • Strong, knowledgeable, and qualified project team members and business team
<ul style="list-style-type: none"> • Accountability of the CIO and the Senior - Executive Management team to the project 	<ul style="list-style-type: none"> • Continued and direct support from the deputies

Table 61: Success factors: CIO leads horizontal projects / initiative with OGDs.

<ul style="list-style-type: none"> • Strong desire to succeed from the CIOs of both organizations. 	<ul style="list-style-type: none"> • Dedicated capacity and support from both public sector departments 	<ul style="list-style-type: none"> • CIO key role is communication horizontally and vertically, internally, and externally.
<ul style="list-style-type: none"> • Central agency support for the CIOs of both organizations involved in the project. 	<ul style="list-style-type: none"> • Intense efforts for building trust and confidence within the team, with deputies, internal, and stakeholders. 	<ul style="list-style-type: none"> • Opportunities for development to project team members while on the project.
<ul style="list-style-type: none"> • Flexibility of the work environment available for the project team (s): Co-location of the team. 	<ul style="list-style-type: none"> • Development of a costing model, and service agreement agreed by organizations. 	<ul style="list-style-type: none"> • Adoption of open collaboration among both groups
<ul style="list-style-type: none"> • Openness, transparency among the project team members and with Senior and Executive Management team 	<ul style="list-style-type: none"> • CIOs and teams' knowledge of the work environment (i.e., a CIO who previously worked with the OGD involved) 	<ul style="list-style-type: none"> • CIO liaison role with all CIOs of public sector, with central agency's oversight, with the jurisdictional partners, and with the private partner.

Table 62:Success factors when CIO and procurement is involved.

<ul style="list-style-type: none"> • Select the best resources (qualified, experienced, professional), not the available ones. 	<ul style="list-style-type: none"> • Qualities of the private partner: strong cooperation relationship. • Maintain the business relationship while the organization faced internal and procedural delays. 	<ul style="list-style-type: none"> • Full cooperation and support from the private partner from the outset to project completion.
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Table 63:Success factors: CIO leads the business transformation project.

<ul style="list-style-type: none"> • What started and failed as an IT project, has succeeded, once moved towards a business transformation project. 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Changing the mind set of an IT project (to replace of an old technology with a new one), to a business transformation approach (what I am going to do with the new technology, how can I make it useful in the new 	<ul style="list-style-type: none"> • Build trust and confidence to the teams that might have been involved in series of failures of the project. 	<ul style="list-style-type: none"> • When the project is business lead, the business know - how to be integrated in the project team and in the IT team.
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		environment, why are we are working on this change, etc.).		
<ul style="list-style-type: none"> Integrate CIO team with the business team, common efforts to collaborate, communicate, strategize. 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Value the specialized resources of both CIOs and business teams, allow them to take ownership of their skillset and the impact on the project, reward success. 	<ul style="list-style-type: none"> CIO's intense and consistent effort for engagement, consultations, communication at horizontal and vertical levels, at all levels, with all staff and professionals, creating a cultural change of the work environment. 	<ul style="list-style-type: none"> Understand the organizational level of readiness for adoption of a major culture shift.

Table 64:Success factors when CIO is engaging with the business units.

<ul style="list-style-type: none"> CIO 's ability to enable businesses to be conducted differently, while guiding project teams to work collaboratively and adjust. 	<ul style="list-style-type: none"> High level of engagement of CIO team with the Business Unit 	<ul style="list-style-type: none"> Right people selected part of the project and the business teams. 	<ul style="list-style-type: none"> Continuity of the subject matter experts in both CIO and Business Unit
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<ul style="list-style-type: none"> • High level of retention of the project team members 	<ul style="list-style-type: none"> • CIO’s business acumen and business expertise • CIO ability to “clear the way for the project team at any time and provide full support.” 	<ul style="list-style-type: none"> • CIO eliminated the politics from the floor and kept them all in the CIO office. 	<ul style="list-style-type: none"> • CIO building trust and confidence. • CIO’s openness, transparency.
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Table 65:Success factors for CIO as IM/IT digital leaders

Success Factors	Details
CIO authority	<ul style="list-style-type: none"> • CIO is a partner with the Business unit of the organization. • CIO has the same level of authority as the CXO peers. CIO is at the Deputy Level in central agencies (i.e., the CIO of Government of Canada), and for large departments. • Often, the CIO has the necessary authority to make decisions. • CIO sits at the decision-making table. • CIO is part of the strategic, and tactic conversations on planning, initiating, budget approval, implementation and executing major projects and strategies.
CIO access to Resources	<ul style="list-style-type: none"> • CIO have access to resources (human resources and financial). • CIO restructure and reorganize their teams. • CIOs pilot new organizational models: a core team of full-time employee who maintain the operations of the CIO team (mainly IT operations); a 2nd team, a special group of

	<p>specialists, "free agents", within the same organization, with special skill set and competencies, with the role to train the core team and support adoption of new skills and practices: digital competencies: Agilist, Scrum Masters, Story Tellers, Infographic, social media, Marketing, Communication, Project Managers, Strategist, Information Architecture, Technical Architecture, Cybersecurity specialists.</p> <ul style="list-style-type: none"> • CIO support the implementation of the Digital Strategy in an agile, flexible, adaptable manner using a "hybrid" team, as described before. • CIO has access to qualified and sufficient resources for IT and strategic planning, project implementation. • CIO build a team with the skill set required for the project, with user and client-oriented people; resources support the current and future strategic needs of the organization.
<p>CIO relationship with other functional teams</p>	<ul style="list-style-type: none"> • IT can be a service provider only if it is in a partnership relationship with the business side. • IT can demonstrate the art of possible, demonstrate the value it brings; IT can build the trust in the relationship with business, demonstrate the value in the delivery of services.
<p>CIO relationship with PEERS</p>	<ul style="list-style-type: none"> • CIOs build, develop, and engage in building healthy collaboration with other peers (i.e., VP of Corporate Services, VP of Policy). • CIO build long term business and strategic relationships. • CIO build strong partnerships with other CXO peers: Digital Officer, Privacy Officer, Data Officer, to resolve together business challenges.
<p>CIO level of trust with CXO</p>	<ul style="list-style-type: none"> • CIO develops and maintain good partnership and business relationships.

	<ul style="list-style-type: none"> • CIO evolve, revise, and propose a new governance model, an enterprise model for all capital projects. • CIO collaborate, consult with all the groups of the organization and with the deputies, to increase the CIO credibility. • CIO collaborate with CXOs and peers. • CIO contributes for a revised governance structure; proposes governance models adopted across the organization, applicable to IT and capital investment projects. • CIO had the trust of the Business team. • CIO is well supported by the deputies (DM, and the ADMs (i.e., the CFO), as CIO’s best allies in the digital transformation endeavour. • CIO empower the deputes (DM, and the ADM) to become advocates, strong supporters of the IM/IT work within the organization, and outside the organization, across public sector and private sector.
<p>CIO implements new policies</p>	<ul style="list-style-type: none"> • Harmonization and amalgamation of a variety of policies • Launch and implementation of the Digital Policy across public sector. • Harmonization of Service Policy with the Digital Strategy. • Creation of Digital Offices across public to implement the Digital Policy.
<p>CIO supported by executive cadre</p>	<ul style="list-style-type: none"> • Commitment from the public service decision makers: "When the Clerk of the Public Service talk about MS Teams, that is a sign that Digital Government is in place." • Full support from deputies (ADM, DM) that CIO reports to.

	<ul style="list-style-type: none"> • Leadership’s understanding on the evidence-based decision-making process, support for CIO to take time to do it properly. • Deputies are the Digital Transformation Champions • Deputies offer highest level of visibility of CIO-led projects.
<p>Project Management methodology</p>	<ul style="list-style-type: none"> • Choose the project management methodology of choice, • Use an Agile approach for development and implementation of digital strategies.
<p>ADOPTION of Digital Technology and DIGITAL Transformation</p>	<ul style="list-style-type: none"> • Co-creation, co-design of the digital government well supported by groups of early adopters: "There is no need to talk about transformation, we are digital, this is the future". • CIO focus their efforts on the 80% of staff, the early adopters. • CIO’s pilot for a successful "formula" to implement digital transformation. • CIO and the Digital Champion, two new roles in the Digital Transformation area • The Digital Champion roles, at deputy level, a conscious decision of the department.
<p>CIO PORTFOLIO</p>	<ul style="list-style-type: none"> • The size and diversification of CIO portfolio is manageable. CIO's portfolio includes IM, IT, the Deputy Chief Security Officer role, the Chief Enterprise Architect role, along with involvement in Digital Transformation. • Despite the heavy workload and capacity issues, a broad portfolio exposes CIO role at all levels, create opportunities for demonstrating the value of the complex role of the CIO. • CIO encourage a horizontal informal structure within a bureaucratic environment, for a reduced red tape.

<p>CIO ROLE (PERSONAL PROFESSIONAL)</p>	<ul style="list-style-type: none"> • A successful CIO is a non – biased, agnostic CIO. • CIO aim, strive and desire success. • CIO is respected, builds own brand, build a reputation with CXO team, and with the entire organization. • CIO is a visionary. • CIO trust that the organization will be better after the transformation journey is completed. • CIO has strong technical and digital knowledge. • CIO has a deep level of knowledge of the organization, and the business model: "You can't do the CIO job if you don't understand the business of the Government of Canada." • CIO leverage opportunities (such as COVID) to promote the value and the work of CIO office; demonstrate the accountability of CIO and the office. • CIO's finance background, an important asset; CIO conducts all funding and resources conversations; produce, present financial reports, show ROI for all IT investments, demonstrate value. • CIO create a strong, unique relationship with the Finance team; CIO transform the relationship with the Finance team, become advocates and partners for CIO and all its projects. • CIO understand service delivery, clients' needs and challenges. • During the strategic financial planning exercise, CIO team conducts architectural assessments, bring evidence to the decision - making table; secure support in putting forward a united front for the strategic investment.
<p>ORGANIZATIONAL PROJECT</p>	<ul style="list-style-type: none"> • CIO support development and implementation of a PMO. • CIO train staff on project management. • CIO adopt agility.

<p>MANAGEMENT MATURITY LEVEL</p>	<ul style="list-style-type: none"> • CIO promotes a hybrid approach in the management of projects. • CIO advocated for planning. “Good planning is essential: CIO need to put in place a smart and through planning process.” • CIO develop a project management framework aligned to public service and central agencies requirements and approved strategies.
<p>ALIGNMENT</p>	<ul style="list-style-type: none"> • CIO’s agenda “aligned” to the DM’s agenda and organizational needs. • CIOs’ agenda to the CXO, and Deputies’ main agenda. • CIO ensure alignment of CIOs to organization’s urgencies. • CIO IM/IT planning process, aligned to organization’s mission and vision
<p>TRAIN, EDUCATE</p>	<ul style="list-style-type: none"> • CIO train all peers: communicate IM/IT in plain business language. • CIO present IM IT and digital transformation concepts in simple business concepts manner • CIO train using plain language, avoid technical terms, acronyms. • CIO train, make the audience part of the conversation rather than a static audience, advocate CIO agenda. • CIO train, advocate, present business value in all its projects, in all asks. • CIO carry a business conversation, not an IT conversation.
<p>UNDERSTAND, ASSESS, MITIGATE</p>	<ul style="list-style-type: none"> • CIO respect enterprise risk • CIO understand risk, assess risk, mitigate risk in all projects and initiatives. • CIO initiate risk conversation, engage CXOs and deputies in risk conversations.

	<ul style="list-style-type: none"> • CIO address the risk for the projects; present risks to CXO, to the business unit and other organization functions; CIO identify risk, and the business impact; assess project and organizational risk; track, monitor and report risks.
LEVEL of OVERSIGHT	<ul style="list-style-type: none"> • An oversight of IM/IT and capital investment projects ensures continued improvement, support project success. • A stringent, strict, very structured oversight impede most of the time the project progress; a level of flexibility over the oversight is needed.
ACCESS TO FUNDING	<ul style="list-style-type: none"> • Early Funding allocation is key to the success of the project. • Access to project funding, financial and human resources, should not constitute a problem, a constraint, or a limitation. • Periodical financial review of project funding is valuable; CIO to comply and initiate conducts periodical financial and budget meaningful conversation.
POLITICAL AGENDA	<ul style="list-style-type: none"> • Projects of CIO's agenda is fully aligned with the mandate letter of departments. • Projects of CIO's agenda are supported by deputies and the organization. • Projects of CIO's agenda have an impact at the enterprise level and a personal impact over the performances, progress, and progression, and advancement of CXO team.
GOVERNANCE	<ul style="list-style-type: none"> • A 360 - degree review of public sector governance, internally and externally to individual departments, would be beneficial to identify models used, best practices, processes for creation of knowledge management on governance across public sector, for continuous improvement. • Governance models across public sector should go through a periodical revision process, to allow for an increase

	<p>efficiency and effectiveness and for supporting the organizational changes.</p> <ul style="list-style-type: none"> • Governance challenges faced by individual organizations in public sector and across the government at large should be used in the process of policy reforms and policy revisions. • Governance success across public sector organization should be shared within the individual organization and among all public service organizations for supporting continuous improvement. • Open government, governance readiness presents the opportunity for governance reforms. • Outcomes and recommendations of internal and external oversight and control activities (i.e., audits) to be public, discussed and shared at the CIO community table-horizontal level, across public sector leadership teams.
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Table 66:CIO day-to-day challenges

Challenges	Details
ORGANIZATIONAL CULTURE	<ul style="list-style-type: none"> • The silos mode of working within the organization. • Obsolete recruitment and hiring processes. Inflexibility of human resources to adapt to the needs of new skills, develop flexible recruitment vehicles, adapt work descriptions. • Level of knowledge and desire to adopt transformation of staff, CIOs, and deputies. • Level of risk adoption; in public sector “risk taking is an atrophied muscle”; leadership fear to take decisions. Organizations are afraid o risk, not ready to use risk for their benefit.

	<ul style="list-style-type: none">• Ambiguity across leadership team on roles, responsibilities, accountabilities. Roles and responsibilities not always defined.• Employee refuse work, have personal preferences, impede implementation.• Refuse to ask or accept support from other public service organizations to solve issues, leverage know how rather than creating delays by developing own solutions.• Public servants with full career in various government organizations, have no private or non-for-profit experience.• Public service hires highly educated, professionals whose opinions are disregarded, disconcerted due to their position and authority, due to the “reality check” solutions they present, solutions that make the organization or its leaders feeling “uncomfortable”.• Some organization may decline to have an ADM responsible for Transformation to mobilize, advocate, access funding, hire “the best and the brightest”.• Organization struggles to embrace outside policies, guidelines, and best practices available across public service.
CHANGE MANAGEMENT	<ul style="list-style-type: none">• Organization resistance to change of staff, CXO peers.• Organization’s readiness for change, a common theme among all CIOs.• Leaders’ ability, knowledge, readiness to manage change.• Skills set of CIOs and CXOs to accept and manage change.• Culture of the organization for a smooth and fast adoption of change.• Challenges when CIO is the Change Management driver for the organization.

- Employee fear loss of control.
- Public servants not ready for change; learn by doing rather than formal learning.
- Pressure from the organization, staff, users, internal and external stakeholders to maintain status quo, resist to change.
- Adoption, and acceptance of the new technology
- Resistance to change of the organization from within, from peers, staff.
- Change journey from an archaic platform to a new technical solution.
- Staff fear of change; high level of anxiety, change impact.
- Lack of employee's engagement; keep employees motivated, patient, optimistic.
- Difficulties with the clients, resistance to change, hard to be convinced, slow adoption of the new work style, and the new work environment.
- Level of adoption of new concepts, technologies, business practices, social media, digital transformation, for various demographics of public servants.
- "Selling" the new technology to users, and to all staff.
- Changing the culture of some professions due to transformation projects.
- A continuous struggle for the CIO is that employee used the new digital solution; they don't seem to understand the business value that it brings; the biggest challenge is that mainly the senior level people don't see the true value of the collaboration, and the new ways of working, and as a result money are not made available to continue the project.

	<ul style="list-style-type: none"> • Extensive duration of time required to get things one in public service.
<p>ROLE of the CIO CIO AUTHORITY LEVEL</p>	<ul style="list-style-type: none"> • CIOs continue to be very operational, while digital transformation, cybersecurity, change of business models, adoption to cloud are urgencies and require development and implementation, • CIOs in the role for less than two years. • CIO coach employee. • CIOs in small organization (less than 100 or 1500 employee) are in director general roles versus CIOs in large organization (200 to 20,000 employee) are in deputy role. • Educational background: level of education and knowledge in executive roles, leadership, strategic, change management, transformation, digital acumen/ • Open collaboration among CIOs. “Every CIO can help as an individual, and CIOs as a community”.
<p>PERSONALITY of CIO</p>	<ul style="list-style-type: none"> • CIO personal work style impacts the team and the ability to deliver. • The impact of the CIO personality on project success, on the CIO team of the CIO’s personality and work style. • CIO personality type: Introverted personalities versus extroverted personality type of the CIO have a major impact on the workload of the team as well as the relationships CIO builds with peers and deputies. • CIO personality and the ability to create new relationships, maintain the existing ones, and “repair” the broken relationships inherited from the previous CIOs
<p>WORK LIFE balance, WORKLOAD,</p>	<ul style="list-style-type: none"> • Intense and heavy workload, large number of employees in the CIOs team, diverse and complex portfolio, changing

<p>MENTAL HEALTH</p>	<p>priorities, continues challenges, high demand, and expectations to maintain business continuity while managing strategic projects, and support Digital Transformation have a direct impact on CIO teams and on the CIO. High level of stress, tiresome of staff, inability to recover and take care of their health.</p> <ul style="list-style-type: none"> • Business continuity, support departmental functional teams, maintenance of hundreds of platforms, systems, software, tools require heavy workload, stress strenuous effort, while facing human resource efforts, and new priorities assigned. • CIO level of satisfaction in the role; impact on personal, professional life, tenure. • Special situations (such COVID): CIO and all staff are tired, they are asked to do more with less, people are impacted, are asked to increase their level of resilience. • Organization readiness to adopt hybrid work models to mitigate impact on staff. • Opportunities for CIOs outside public service, early leave of CIOs from public sector after a short tenure as CIOs.
<p>GOVERNANCE</p>	<ul style="list-style-type: none"> • Ad hoc or no project / program / portfolio governance in place. • Lack of flexibility of the governance model in place. • Lack of governance know how across public service. • Lack of knowledge and awareness of governance best practices. • Inability to report directly to the business owner due to the governance model. • Revising the governance model is a challenge due to resistance and organizational culture. Convincing peers across the organization, at all levels was a big challenge;

	<p>CIO cite Henry Ford: “If I had asked people what they wanted, they would have said faster horses.”</p> <ul style="list-style-type: none"> • Governance models for horizontal projects to be adapted to allow progress of the projects and ensure integration and prioritization of urgencies.
<p>ACCESS TO RESOURCES</p>	<ul style="list-style-type: none"> • Difficulties of CIOs to access funding. • IT is a costly endeavour: the need to acquire equipment for security, support and maintenance while implementing transformation and digital projects. • Reduced level of support of senior management support to continue project funding; at the senior/executive level, project value is not always received and well understood. • Access to qualified resources due the slow recruitment /hiring process. • Gaps in the skills set required; lack of skills required to develop and implement Digital Strategy. • Matrix teams with employee from the same organization or across public sector are volatile (short term assignments), don't usually function well given the initial set up of the model, and the performance evaluation system in place. • Effective management of resources across each organization. • Small organizations are faced with challenges and limitations of funding and access to resources.
<p>INFORMATION MANAGEMENT (IM)</p>	<ul style="list-style-type: none"> • Value of IM across public sector. Critical role of IM not understood. • No formal know - how and knowledge management framework in place within individual organizations and across public service. • IM is the “poor child” of corporate knowledge.

	<ul style="list-style-type: none"> • Lack of IM tools, systems, solutions. A 25 year long challenge still not addressed.
PROFESSIONAL SERVICES	<ul style="list-style-type: none"> • Access to professional services, dependant on procurement services; ability to respond timely. • Long - term presence of consultants, evolution of the role over time, level of influence; impact over the project. Situations when roles change from subject matters experts to executive roles.
DIGITAL LITERACY DIGITAL TRANSFORMATION	<ul style="list-style-type: none"> • Employee and leaders' level of digital knowledge. • IM/IT and digital literacy of senior leaders. • Digital Academy role across public sector; mis alignment with IM/IT employee. • Organizations' ability to keep up with policy reforms and implementation needs. • Engagement of CIO community, deputies, and digital leaders. • CIOs don't always have a direct line of report to their deputies to report progress, issues, and challenges of transformation and digital projects.
LEGISLATION	<ul style="list-style-type: none"> • National and Canadian legislation require to acquire and implement the new COTS systems; all new and existing systems needed to be integrated, while each is using various systems and platforms, and each might have individual users.
OVERSIGHT	<ul style="list-style-type: none"> • The oversight system is mandatory across public service for IM/IT Capital investment projects (https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32593&section=html). Periodical assessment, reporting, and acceptance of 3rd party audits are just some of the challenges given the level of work, and

	<p>the impact o CIO and their teams when managing a heavy portfolio of projects.</p> <ul style="list-style-type: none"> • All CIOs indicate the heaviness of the current oversight project and the impact it has on the delivery and successful completion of the project
<p>BUSINESS MODEL and REQUIREMENTS</p>	<ul style="list-style-type: none"> • Gather all business requirements and global location of all the offices involved. Major issue was encountered, related to requirements definition, as they were done individually by each group of users; rather the process was conducted ad-hoc, at various stages throughout the project. Requirements were developed on an exception rather than a rule basis. • Organizations focus on user support, customer service, face the pressure and expectations to respond immediately. • Organizations with geographically distributed teams, located across the globe face the technology and communication challenges to ensure business continuity.
<p>INTEGRATION, CENTRALIZATION vs DECENTRALIZATION</p>	<ul style="list-style-type: none"> • Impact of transforming a dispersed system to a centralized system for large infrastructure. • Effort made for a better system, without to due diligence (i.e. basic functionalities available to all clients). • Impact of the integration public sector department (SSC Shared Service Canada) to respond, align, and support the needs of individual organizations.
<p>POLITICAL CONTEXT</p>	<ul style="list-style-type: none"> • For politically sensitive projects, CIO's inability to schedule the project major releases, dependant on when the PM Prime Minister calls the elections; the need for an urgent submission for a funding request to central agencies when the funds were pre-approved. • Inability to access resources: to quickly re-allocate resources for when needed during the life cycle of the

	<p>project; access qualified resources; unexpectedly lost of specialized resources (in one case, half - way through the project the organization lost its main senior architecture specialists).</p> <ul style="list-style-type: none"> • Organization called in very short notice to support other public sector organizations; internally, to “reinvent itself”.
<p>RELATIONSHIP</p>	<ul style="list-style-type: none"> • Relationship with Chief Financial Officer CFO at personal and professional level, level of trust, understanding of challenges, work towards finding opportunities to support each other. • Level of collaboration and trust among teams. The collaboration, the relationship between the Business Director and the CIO, not well defined, not understood, and not agreed upon. Quality of the relationship between CIO and counterpart at the OGDs. Skepticism in the execution model suggested, and the success of the collaboration. Personality of the CIO was a big factor in this dynamic. Lack of trust in CIO team and its ability to deliver. Lack of understanding of what the team can do, can deliver. • Management of relationship with central agencies and public sector departments, level of diplomacy of CIOs. • Numerous layers involved in IM/IT, transformation projects; the balance between the needs and requirements of all parties involved and CIO role to protect IM/IT of the organization while delivering.
<p>CXO TEAM</p>	<ul style="list-style-type: none"> • CIO relationship with CXO peers. Bond and quality of relationships with CXO peers. • Seniority of the CIO with the organization. • Lack of trust in CIO ability to deliver.

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| | <ul style="list-style-type: none">• Turnover of deputies.• CIO efforts to educate CXO peers.• Resource gaps, skills set needs, business improvement.• CIO and CIO's agenda from CXO team, from Chief Information Officer Council and central agencies.• Authority level of CIO. Relationship with the deputy when CIO is not at the associate deputy level and needs deputy's support to advocate for CIO's agenda.• A challenge to have senior management attention on transformation projects, mainly for an enterprise or an IT project, given that 95 % of senior leadership time is on urgencies, policy, and strategic, sensitive projects; also, due to the short project life cycle. |
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