Indigenous Data Sovereignty and Professional Planning Practice: A Cross-Disciplinary Review

by

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Author's Declaration

I hereby declare that I am the sole author of this major research paper. This is a true copy of the major research paper, including any required final revisions.

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Abstract

Despite growing recognition of Indigenous Data Sovereignty (IDS) and Indigenous Data Governance (IDG), significant gaps persist in their understanding and application within the planning profession. This gap in knowledge and integration of IDS and IDG in professional practice continues to perpetuate colonial, top-down planning models that undermine Indigenous self-determination and control over data. This master's research addresses these challenges by critically reviewing IDS and IDG principles and offering actionable recommendations for planners. Through comparative analysis of Indigenous-led and non-Indigenous data sovereignty and governance models, this research identifies six core IDS/IDG principles and examines them alongside the codes of ethics from the adjacent fields of architecture, archaeology, engineering and social work. This analysis produces a set of defined principles reflecting Indigenous priorities and interdisciplinary insights. The research concludes with guidance for planning bodies on integrating these principles to support Indigenous sovereignty, ethical data use, and is one step in the process of decolonizing planning.

Key Words: Indigenous Data Sovereignty, Indigenous Data Governance, Indigenous rights, Data Governance Frameworks, Urban and regional planning, Professional planning practice

Abbreviations

AFFECT – Authority and control, findability and reuse, fair access and possession, ethical responsibility, collective benefit and technological interoperability

AFNIGC – Alberta First Nations Information Governance Centre

CARE – Collective benefit, authority to control, responsibility, ethics

FAIR – Findability, accessibility, interoperability, reusability

FNIGC – First Nations Information Governance Centre

GIS – Geographic Information Systems

IDG – Indigenous data governance

IDS – Indigenous data sovereignty

OCAP – Ownership, control, access, possession

ODC – Open data charter

ODM – Open data movement

RDA – Research data alliance

TEK – Traditional ecological knowledge

TK – Traditional knowledge

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Chapter 1: Introduction

Indigenous peoples across the globe, and in Canada today, have and continue to be dispossessed of their lands, resources and have struggled to affirm their rights to govern, control and maintain their sovereignty as communities and Nations distinct from colonial settler-states. Professional planning today is inherently rooted in Western and settler-colonial practices. Due to this colonial history of planning and its practices, it continues to enable conditions in which Indigenous dispossession is present and persistent in most contemporary planning practices (Porter & Barry, 2016). Further research is needed to examine how planning, as a regulated profession in Canada, continues to dispossess and disenfranchise Indigenous communities and Nations. While political, professional and academic conversations are occurring, further research is needed to define, organize and plan for a future that contains reconciliation at the crux of planning and development. Since there is a current lack of research on how reconciliation can be approached from an implementation standpoint, this research is especially relevant in bridging the gap between academic research and practical implementation.

Planning is inherently land-based, and land is inseparable from the data and information that it holds. As such, understanding concepts like ownership, possession and sovereignty is essential for professional planners today. Planners rely on spatial and land-based data to guide decisions related to land use, infrastructure, environmental management and community development. This data is not neutral as it reflects histories, relationships and rights tied to the land and its resources. In Canada, where most land was colonized and acquired through treaties, many treaties which remain unfulfilled, planning practice must begin to confront the complex questions relating to authority, jurisdiction, and data stewardship.

Further, the rights to the control and management of data are critical to the sovereignty of Indigenous communities whose knowledge and resources have been and continue to be exploited and undermined through these colonial systems (Oguamanam, 2020). Indigenous communities require data and information to identify and solve problems, plan for the future and make strategic and informed decisions pertaining to their land, resources and communities (Caroll et al., 2017). Indigenous data sovereignty (IDS) and Indigenous data governance (IDG) act as a tool to further assert the rights of Indigenous peoples to directly manage and control their data

regarding their rights to data access and privacy (Rainie et al., 2019). The right to the control, access and privacy over data, especially that data relating to traditional Indigenous knowledge is critical to upholding the lifeways of Indigenous peoples across Canada and the world.

The Canadian government's current stance on advancing reconciliation across industries has helped to initiate many long-overdue systematic changes both within the planning profession and the institutional frameworks that support it. Reconciliation conversations are taking place and planners at the international, national, provincial, municipal and professional levels are looking for ways in which to uphold reconciliatory efforts in a meaningful way. Within the field of planning, reconciliation with Indigenous Peoples can take many forms. I argue that a critical step toward meaningful reconciliation involves acknowledging, adopting and committing to professional practices that embed Indigenous data sovereignty and Indigenous data governance into everyday planning work. While these shift in conversations signal progress, much more remains to be done to transform planning systems in a way that meaningfully respect Indigenous rights, knowledge systems and self-determination.

My personal experience as a member of the Metis Nation of Alberta led me initially down this research path as I am passionate about advocating for Indigenous perspectives and rights. When it comes to planning, I am particularly interested in Indigenous Data Sovereignty and Indigenous Data Governance, as I worked for an Indigenous-owned planning company in my undergraduate co-op terms. This professional experience was the catalyst to my interest and my firsthand view of the profession gap and need for more structured processes to protect Indigenous data and information in the planning profession. Indigenous peoples have the right to control the access, possession and distribution of data and information pertaining to their individual members, community, lands and resources that provide them sustenance and for their communities to thrive.

1.1 Research Questions

This masters research paper intends to answer the following three research questions:

(1) What are the core principles of Indigenous data sovereignty and Indigenous data governance, and how are these principles articulated and interpreted across both Indigenous-led and non-Indigenous data management frameworks?

(2) What intersecting and divergent themes emerge from adjacent professional fields that further refine and expand the understanding of core IDS and IDG principles?

(3) In what ways can professional planners operationalize key principles of IDS and IDG within planning practice to meaningfully support Indigenous sovereignty, self-determination, and ethical data stewardship?

1.2 Brief Background on the OCAP, CARE & FAIR Principles

Over the past two decades, the ethical governance and stewardship of data, particularly in relation to Indigenous people has gained increasing attention in research, data science and professional practice. Three major frameworks have emerged to guide data practices that are both technically relevant and socially responsible: FAIR (Findable, Accessible, Interoperable, and Reuseable), CARE (Collective Benefit, Authority to Control, Responsibility, Ethics) and OCAP (Ownership, Control, Access and Possession). Despite each of the above three frameworks offering distinct principles, developed for different application (data and sharing, health care data management and Indigenous data sovereignty) and developed either by Indigenous or non-Indigenous peoples, they offer important foundations for beginning to understand, discuss and implement ethical data management practices. The timeline below in Figure 1. explores the development and implementation of the FAIR, CARE and OCAP frameworks.

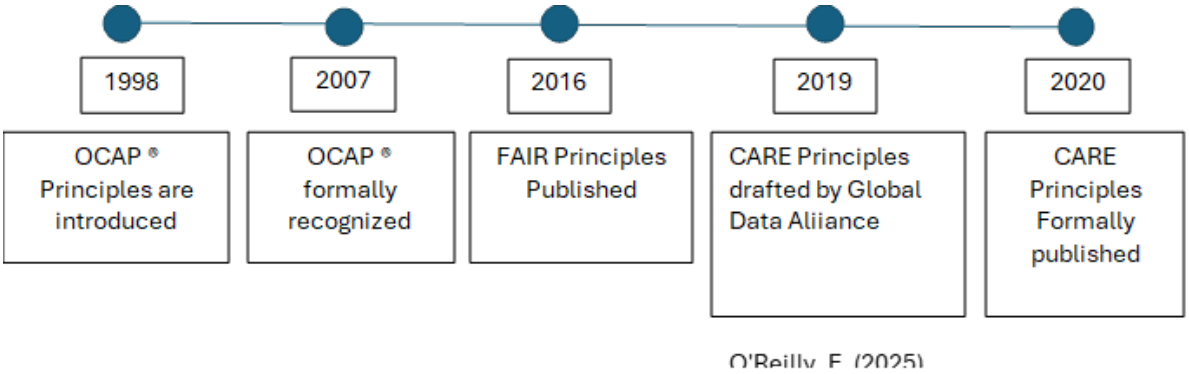

Figure 1. Timeline on the Three Key Frameworks. (O'Reilly, 2025).

Further background and information on the individual frameworks are explained in the subsequent sections. This timeline and brief background aims to set the general stage for the reader to understand the basics of the principles that will be expanded further on in the document.

1.3 Paper Structure & Research Approach

This research introduces some key theoretical concepts, including Indigenous knowledge systems, decolonizing planning and reviews the existing and widely accepted three frameworks of IDS and IDG (FAIR, CARE and OCAP). Phase one of this research approach involves a comparative analysis of existing IDS and IDG-related principles derived from these three frameworks. It should be noted that the background review and systematic review of literature led to the evidence-based conclusion that the FAIR, CARE and OCAP principles are the three most widely accepted and scholarly legitimate frameworks that exist at the time of this research. There may be other less well known or research frameworks that are not included in this research due to their lack of visibility.

Phase two of this research uses an inductive analytical approach to examine adjacent cross-disciplinary professions, including archaeology, engineering, architecture and social work, to assess whether and how Indigenous data sovereignty and data governance principles are being acknowledged or implemented within their codes of ethics. A detailed review of each the above professional codes of ethics reveals distinct gaps and/or possible opportunities that planning may learn from regarding the implementation of IDS and IDG practices. This phase also considers key ethical considerations, anticipated research outcomes and identifies some study limitations. The goal of this research is to provide practical recommendations for planning professionals, such as: recognizing professional responsibilities strengthening institutional capacities, and implementing protocol-based data sharing agreements that align with IDS and IDG principles. The research concludes by connecting the research's key insights and emphasizing the importance of integrating Indigenous-led data governance into planning practice to support data sovereignty, ethical data stewardship and decolonized decision making.

Chapter 2: Literature Review

Urban and regional planning in Canada has long been critiqued for its exclusion of Indigenous peoples due to its roots in settler-colonial ideologies and structures. The lack of Indigenous representation in urban planning documents and scholarship reveals how planning texts have historically limited the recognition of Indigenous rights in the settler states. Various articles examine the historical exclusion and marginalization of Indigenous voices in the planning scholarship and the broader planning profession (Walker et al., 2013; Porter & Barry, 2014). However, further work is needed to ensure inclusion of Indigenous voices, knowledges and worldviews are implemented and accepted into planning professional practice. Deep institutional and organizational changes will need to occur in order to begin the path towards meaningful reconciliation. Indigenous peoples are not passive 'by standards' in the planning processes, but have on the contrary been active participants in shaping their futures since time immemorial (Walker et al, 2013). Indigenous planning as a practice is a process and approach that links Indigenous communities to their "ancestral placed, environments, and resources" (Matunga, 2013, p.14). The challenge lies in the historic and ongoing inability of the settler-colonial states, like Canada, to be able to properly hold space, place and time for Indigenous planning to flourish.

Data management, Indigenous data sovereignty and data governance is not actively discussed in much of the planning or related literature. The culmination of the rise of the open data movement (ODM) (which prioritizes the international sharing of data and information), Canadian adoption of United Declaration on the Rights of Indigenous Peoples Act (UNDRIP Act), and federal and provincial Canadian planning institutes' commitments to reconciliation, has generated momentum and a drive for Indigenous peoples and professionals alike to unpack the complexities and nuances of ethical data management.

Several studies highlight that many planners lack adequate training and practical guidance on how to integrate IDS frameworks into their work (Kukutai & Taylor, 2016; Davis & Randsom, 2021). Moreover, current planning education and professional codes of ethics often do not explicitly address Indigenous data governance, leaving planners ill-equipped to respect Indigenous data rights and sovereignty (Lupton & Bruce, 2018). This gap contributes to the continued marginalization of Indigenous perspectives in the planning and risks further

perpetuation of colonial practices through data misuse or exclusion (Rambaldini & Vis, 2017). The time is now to analyze, educate, disseminate and rethink how data management frameworks and principles can be leveraged to facilitate and conduct meaningful, reconciliatory and Indigenous-led planning work. This literature review examines the existing literature on the topics of Indigenous data sovereignty (IDS), Indigenous data governance (IDG) and wider Indigenous representation in the planning profession with the goal to further understand the problem space and how this master's research will address these academic and professional gaps.

2.1 Historical Context: Indigenous Peoples in Canada, Data and Planning

Indigenous peoples regard their land and traditional territories as sacred and integral to their cultures, spirituality and identities (Borrows, 2005). Urban planning, as a profession in Canada and other settler-colonial states, has benefited and thrived off the dispossession of Indigenous peoples from their traditional land, resources and knowledge (Hibbard 2005, Fawcett et al. 2015, Porter 2016). Colonial land policies like the Indian Act, land surveys and reserve systems in Canada have contributed and enforced the ongoing spatial segregation and dispossession of Indigenous peoples from their land and resources. CANZUS states (Canada, Australia, New Zealand, United States) all faced colonization and the oppression of Indigenous peoples around similar times. However, Canadian Indigenous peoples alike many from the other colonized states, have faced extreme challenges associated with colonization, residential schools, and the dispossession of their lands.

Prior to European occupation in Canada, First Nations peoples and Inuit had the entire use of the land, water and resources (Wilson et al, 2018). Once Europeans arrived, there began to be contentions over who controlled or ‘owned’ these lands and resources. The policies, legislation and governmental processes rooted in this colonization have and continue today to contribute to the ongoing oppression of Indigenous peoples in Canada. One Canadian federally legislated document that continues to assimilate First Nations in Canada is the Indian Act. The Indian Act was first introduced in 1876 and “subsumed a number of colonial laws that aimed to eliminate First Nations culture in favor of assimilation into Euro-Canadian society” (The Canadian Encyclopedia, 2022, p. 1). The Indian Act is one of many examples of the racist legislation that has been in place in Canada to control Indigenous people's rights and in attempts to assimilate them in the ‘Euro-Canadian’ culture. Indigenous peoples have also been attempted

to be assimilated in Canada following the proof as seen in the extensive Residential school system. The Residential school system in Canada functioned to strip away the language, cultural, spiritual that First Nations, Inuit and Metis peoples had in connection to their communities, land and ways of living (Canadian Encyclopedia, 2022). This cultural genocide provides a stark example of how assimilation has been an avenue for the settler-colonial state to assert its ways of thinking, as the 'superior' and 'dominant' presence over the Indigenous perspectives and knowledge systems. The Indian Act also resulted in the creation of the reserve system which is the land 'set aside' by the government for the use of a First Nation. These reserves are still considered federal land and are located often outside of the traditional territory of the First Nation and do not include the land and associated resources that First Nations were accustomed to and relied on for sustenance prior to European colonization. This legacy of imposed control over land, culture and identity has deeply intrenched inequalities in Canada and the federal legislation continues to undermine Indigenous sovereignty, making it essential for planning professionals to critically confront and dismantle these colonial structures in support of true reconciliation and Indigenous self-determination.

With the effects of colonization in mind, it is no wonder that both regional and urban planning historically has enabled the growing settler control over land, infrastructure and economic development. Planning as a discipline has often ignored Indigenous presence and jurisdiction. In recent decades, Indigenous peoples' fight for their data, resources, land sovereignty and governance has posed considerable 'challenges' to settler-colonial states. Indigenous peoples' fight for self-governance and sovereignty, especially in the planning realm reflects the "centrality of land to their culture", sustenance, spirituality as well as their community's economic longevity (Hibbard, 2005, p.172). Since the 1970s there has been an increase in the academic and professional recognition and discourse regarding Indigenous knowledge systems, Indigenous rights and Indigenous identities in Canada. Globally, Indigenous peoples' rights were recognized and supported through the development of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (Carroll et al. 2020). In Canada, however, it took 14 years for the UNDRIP Act to become a Canadian federal law. The adoption of the UNDRIP Act into Canadian federal law shows an incredible shift in the country's willingness and continued work to recognize Indigenous rights. Despite this Act receiving royal assent in Canada, there has been an overall lack of implementation of the Truth and

Reconciliation Calls to Action (2015) or the United Nations Declaration on the Rights of Indigenous Peoples (2016) in the planning profession at the national and provincial levels (Rowe, Bull & Walker, 2021). While the implementation of UNDRIP and TRC is still struggling to gain traction in Canada, in the last few years there has been an uptake in the professional planning bodies across the country taking a more invested interest in the wellbeing, planning and futures of Indigenous communities. The Canadian Institute of Planners has come out with the *Policy on Planning Practice and Reconciliation* (2023), Ontario Professional Planning Institute created *Indigenous Planning Perspectives (2019).* While these are just two examples of professional planning institutes who represent planning at both the national and provincial scales, there is limited to no acknowledgement of the importance of data sovereignty or data governance for upholding Indigenous reconciliation within these reconciliatory guiding documents. Additionally, there are currently no Canadian federal or provincial regulatory instruments that address the need for further standards for Indigenous data management. This shows an intrinsic gap in professional practice and expresses why this research is so necessary.

2.2 UNDRIP & Its Challenges for Planning

The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) is understood in the literature to be the closest thing to a potential framework in which there is mention of Indigenous interests pertaining to data (Rose et al, 2023; Kukutai & Taylor, 2016). While UNDRIP does not directly address 'data' in the declaration, it does make reference to the general interests of data and information in Articles 31 and 32. Article 31 for example expresses the Indigenous peoples rights to "maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions" which includes "cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and visual and performing arts" (p.22). Article 32 (1) indirectly addresses the rights regarding determining and developing "priorities and strategies for the development or use of their lands or territories and other resources" (p.23). While UNDRIP Articles 31 and 32 touch on themes relevant to data sovereignty and governance the Declaration itself does not contain an explicit provision

addressing Indigenous data sovereignty (IDS) or Indigenous data governance (IDG) in a direct or comprehensive manner. As a result, these critical issues must be interpreted or inferred from broader data and information rights frameworks (like OCAP, CARE & FAIR), which is not something that the current professional planning bodies address. This gap showcases the current need for a planning framed IDS and IDG framework that addresses these current policy and legal gaps in Canada as well as the gaps in the current profession with regards to implementing IDS and IDG principles. If planning as a profession is truly committed to the decolonization of planning and reconciliation efforts, it should seek to address any areas within professional practice that may knowing or unknowingly continue to support the oppression, dispossession and assimilation of Indigenous peoples and communities through unethical data management practices.

While now is a great time to implement meaningful changes in professional planning (especially when it comes to Indigenous inclusion, supporting self-governance and sovereignty), many existing professional planning processes and frameworks directly contradict this effort as they continue to operate within the Western legal and property systems that openly marginalize Indigenous worldviews and governance systems. For example, Dorries (2022) argues that key planning concepts like ownership over property for example, is so deeply embedded in planning theory and completely fails to account to an Indigenous concept of land and land ownership or possession. In examples like this, these planning practices, mindsets and theories fail to support Indigenous worldviews and ways of thinking about the land, its ownership and the implications that this raises. Professional planning requires a deep deconstruction of its theories, and while that process is slow and complex, implementing policies, practices and theories that uphold Indigenous sovereignty, self-governance, autonomy, and knowledge systems can make a meaningful impact. Additionally, while planning over the last few decades has become more aware of its inherent injustices, some planning scholars have highlighted the need to dive deeper into examining how differing planning procedures might be improved or enhanced to accommodate and include more Indigenous voices, peoples and cultures (Dorries, 2022). One way to begin deconstructing the paternalist nature of planning as a profession and as a practice is to create inherent systems in which empowering Indigenous communities is embedded (Matunga, 2013).

Another factor is the process of assimilation that has tried time and time again to strip away Indigenous knowledge in an effort to favor more Western ideals. Efforts of assimilation by settler-colonial states, which includes the work done by the government, academics, professionals and citizens alike, has historically "denigrated the land-based facets of tribal cultures and denied the existence or value of traditional knowledge" (Harding and Harper, 2012, p.7). The Western and non-Western approaches to conceptualizing knowledge and ownership of data and information creates a distinct juxtaposition between the ideologies and worldviews of both Indigenous and non-Indigenous peoples today. As explained by Tsosie (2019), Harding and others (2012), is the common Western concept of free sharing of knowledge and information. This freedom to share information and data is supported by the Open Data Movement, and is helpful in cases where open-data serves to inform healthcare practitioners collecting individuals' data relating to illness (for example). When in contrast, some Indigenous communities may see knowledge and information sharing as a responsibility of someone who is highly respected in the community like a knowledge keeper or elder. Due to the history of colonization, dispossession of lands, and use of Indigenous knowledge/information/data used for western science profits (without Indigenous recognition or benefit sharing) it is clear why Indigenous information and knowledge protection is necessary and vital to the survival of communities.

2.3 Planning in Practice Today

In recent years, planning research and scholarship has begun to focus further on Indigenous planning approaches, Indigenous representation in planning, and examining planning's relationship in Canada to wider reconciliation efforts. One avenue is further defining professional planning's data management principles to uphold data sovereignty and governance objectives. The literature pertaining to the topics of Indigenous data sovereignty and Indigenous data governance are relatively recent in publication, most only being written and published in the last 25 years. Additionally, while Indigenous data sovereignty and governance is examined as a concept in the literature there is little practical application to implement and support these sovereignty and governance objectives from an ally perspective.

Current planning scholarship lacks recommendations or guided steps to professional implementation of IDS and IDG principles into practice. Even in attempts to include Indigenous voices and worldviews, efforts can fall short if they are not truly grounded in Indigenous

governance and cultural values. Walker, Jojola and Natcher (2013) explain how municipal planning efforts, such as in the City of Saskatoon, are often limited by institutional constraints and therefore can lead to tokenistic or surface level engagement rather than true co-governance. Planning practices emerged with settler-colonial control over land and resources as discussed above, and with this planning draws heavily on Western data systems and legal concepts of land, all while often disregarding Indigenous relational frameworks and governance traditions.

Early efforts to incorporate Indigenous knowledge and governance into Canadian planning practices, particularly in the spaces of land use planning and environmental assessment, represent an important shift in acknowledging the presence and rights of Indigenous peoples. However, these efforts are often limited or constrained by the institutional structures that limit the depth, autonomy and the effectiveness of Indigenous participation and knowledge structures. Provinces and territories in Canada began to include Indigenous communities through land use planning consultation processes, especially in the contexts that involve resource extraction, construction or development projects (Walker, Jojola & Natcher, 2013). This gave rise to the development of co-management boards in northern Canada created under modern treaties like the Nunavut Land Claims Agreement (Government of Canada,1993) which marked one of the first attempts to involve Indigenous governance in planning. While examples like this one reflect significant progress in Indigenous inclusion in the planning process, the inclusion is still bound by province/territorial-defined terms of reference and highly unrealistic regulatory timelines. These planning procedures and timelines constrain the ability of Indigenous communities to exercise full governance over their territories, lands and resources (Walker, Jojola & Natcher, 2013).

Alongside land use planning and associated consultation processes, the environmental assessment process also facilitated some early Indigenous consultation and engagement efforts at the international level. In theory, these processes provided opportunities for Indigenous peoples to express their direct concerns about development impacts on lands, resources, water and traditional practices. However, the Australian federal policy documents for example, began suggesting the inclusion of “traditional ecological knowledge” (TEK) in the EA process, but the integration of TEK was often superficial and treated as supplementary to Western scientific data rather than a legitimate knowledge system (Porter, 2016). Additionally, while EAs alone seem

‘inclusionary’, they rarely incorporate Indigenous governance frameworks let alone data sovereignty principles which reduces participation in the EA process to be more like feedback rather than shared decision making. Additionally, some ongoing limitations of these early efforts of Indigenous inclusion in the planning process is in the framing of Indigenous participation as a form of consultation rather than a recognition of inherent governance and authority. Indigenous knowledge has and continues to be extracted and translated into formats that are more ‘compatible’ with non-Indigenous decision-making processes and lose their place-based context (Nadasdy, 1999). The western and technocratic approach to data being separated from its context, reflects the wider colonial power dynamics that are directly embedded in the planning profession that tend to prioritize efficiency, following process and regulatory compliance over relationship building and sovereignty (Sandercock & Attili, 2021). The process of knowledge extraction from community with little to no regard for community-based protocols, control or autonomy over how knowledge is shared, stored or interpreted calls for immediate interventions. While the increase in Indigenous consultation and engagement practices in the planning profession signals a growing awareness for the importance of incorporating Indigenous perspectives into projects (Carroll et al., 2020), these consultation and engagement practices often fail to meaningfully support Indigenous data governance or sovereignty.

2.4 Key Issues in the Planning Profession

Planning strongly relies on data and information to inform planning processes and predict long-term planning outcomes. The planning profession especially leverages land-based (often spatial) data and information pertaining to natural resources like the locations of watercourses (rivers, streams, ponds, lakes), open spaces, parklands, building and housing locations, locations of pipes for sewer, water, electrical lines etc. This data and information is often public in nature for the purposes of data and information transparency between municipalities, residents, consultants and a variety of other professional and academic disciplines that use this spatial data for very relevant and useful purposes. The data and information planners use are often spatial in nature and all municipal planning departments and private planning consultants' communities in Canada leverage this data to make decisions, generate professional opinions and plan for future land use and development. An example of spatial data supporting Indigenous sovereignty is through the use of Geographic Information Systems (GIS) applications. GIS enables Indigenous

communities to govern their data, preserve their culture, capture traditional knowledge and manage lands. Through leveraging GIS applications, communities can further assert their control over spatial data while ensuring that it aligns with their cultural values and governance structures (Esri Canada, 2023).

While the Open Data Movement and unstructured data sharing may benefit municipalities, professional planners and citizens, there are currently a lack of defined, understood and maintained data sharing principles to specifically uphold Indigenous spatial data and information in this space (Kukutai & Taylor, 2016; Carroll et al., 2020). While municipalities currently play an important role with their open access data portals that share and allow for user export and downloads of spatial data and information for private use (Cowen, Alencar & McGarry, 2014), there is limited to no existing planning principles that aim to manage, maintain and create guidelines for the ethical collection use and sharing of Indigenous spatial data. This absence presents a significant gap in current planning practice and ultimately overlooks the rights of Indigenous communities to control data that pertains to their lands, resources and knowledge systems. Without specific protocols or culturally aligned frameworks, Indigenous data is at risk of being extracted, misrepresented or used without consent. As planning continues to evolve in the era of digital governance and open data it is imperative that professional planning integrates IDS and IDG principles that also incorporate the spatial data nuances.

2.5 IDS and IDG Explained

To further understand the problem space, it is helpful to understand the terminology. Snipp (2016) explains that data sovereignty is the management of data that is "consistent with the laws, practices and customs of the nation-state in which it is located" (p.29). While this definition provides a general understanding of how data sovereignty operates within state structures, it does not account for the unique rights and perspectives of Indigenous peoples whose governance systems and legal traditions often operate outside or in resistance to colonial nation-state frameworks. Therefore, it is essential to further distinguish and expand upon the specific concepts of Indigenous data sovereignty (IDS) and Indigenous data governance (IDG), which reflect Indigenous communities' inherent rights to govern the data that pertains to peoples, lands and culture. Rose et al. (2023) argues that the term 'Indigenous data sovereignty' has two

innate meanings that ultimately build upon each other. The first supports that Indigenous peoples/governments are free and independent from their settler-colonial states. Secondly, Indigenous peoples/governments have the right to assert their authority and make laws within their jurisdiction over their related data and information (Rose et. al, 2023). Indigenous data governance (IDS), on the other hand, focuses more on the "discrete existence of Indigenous data alongside data about other sections of a national population" indicating the unique place that Indigenous interests and data has in a wider national government (Rose et al, 2023, p.3).

There is limited existing academic literature that summarizes and takes a comparative approach to the existing IDS and IDG principles. While scholars may attempt to redefine and examine existing frameworks or principles on their own, there is limited to no existing research on compiling all the existing data management and/or IDS principles to determine any overlapping principles. Carroll et al. (2021), reviews the operationalization of the CARE and FAIR principles into general work with Indigenous data. Their work reveals that "a range of datasets are working towards being FAIR however many have not taken active steps towards adopting mechanisms that support CARE" (p.2). While the FAIR framework may consider some critical aspects of broader data management, alone it does not function to consider Indigenous perspectives. This is one reason why a more comprehensive approach to IDS and data management principles needs to be created to provide a more holistic approach to the existing principles, that individually do not support all facets of the complexity that is Indigenous data sovereignty.

Additionally, Jennings and others (2023), examine the CARE and principles in relation to IDS in ecology and biodiversity research. Jennings and others (2023), attempt to offer informed recommendations for applying the CARE principles to research. The authors also agree that one of the most "actionable first step(s) in implementing the CARE Principles remains" in educating and spreading awareness for "Indigenous Data Sovereignty concepts among all who contribute to these fields" (p.1548). Arguably, planners are directly responsible for the part that they play in contributing or a lack thereof to the IDS and IDG implementation. Therefore, education regarding the data management frameworks for all professionals who work with data and especially with Indigenous data is essential to rethinking how Indigenous data and information is stored, accessed, distributed and maintained.

Carroll and others (2020), examine both the CARE and FAIR principles, as well as the overlap between the principles and the Open Data Charter (n.d). The Open Data Charter is an international framework that outlines some principles for making government data open, accessible, and useable to promote transparency, and accountability. Launched in 2015, ODC provides governments with a shared set of standards and best practices for publishing data so it is open, public and accessible for use. This article highlights the need for further research to help identify the mechanisms that support the CARE principles while also aligning with the Open Data Charter principles, and explores how such policies could also help refine and strengthen those principles. This article expresses the direct need for further mechanisms in which support CARE principles and supports the development of policies and practices that enact the principles. Additionally, the article also concludes that the application of IDS and IDG principles across different contexts is imperative to extend its reach across disciplines and become a more widespread and understood process. Lastly, Carroll and others (2020), also argue that operationalization of both the CARE and FAIR principles will "result in data that reflects the realities of Indigenous peoples, be useful for Indigenous purposes, and remain under Indigenous control, while promoting knowledge discovery and innovation" (p. 8). Wilkinson and others (2016), examine the FAIR principles in relation to scientific data management and stewardship and explain how "good data management" is often "undefined" and "generally left as a decision for the data or repository owner" (p.1). While this article explores "the most basic levels of good Data Management and Stewardship practice" it does not address any applications to Indigenous data or information management. Nor does it address any shortcomings associated with the FAIR principles in regard to their actual level of 'stewardship' in practice. Various authors (Schnarch, 2004; Mecredy et al, 2018; Greene, 2005; Robson et al, 2017) examine the OCAP principles in various professional fields and contexts; however, there is currently no consolidated analysis research or analysis that reviews the CARE, FAIR and OCAP principles in relation to each other, let alone how these principles might be applied to the planning profession.

The rise in related literature and academia attention on this topic has begun to highlight the need for professional reform regarding current data management and sharing practices when it comes to Indigenous data. For example, OCAP as created by the First Nation Information Governance Centre addresses the need for principles to guide management of First Nations data

and information but does not address directly Metis or Inuit data. There needs to be a more complex data management framework that also accounts for Metis and Inuit data.

2.6 Identifying the Research Gap

While theoretical and rights-based frameworks like OCAP, CARE and FAIR provide high-level guidance on Indigenous data sovereignty and governance, there is a notable lack of practical, planning specific models that show how these principles can be implemented into the real-world planning process. Professional planners are often left without clear tools, protocols, or decision-making frameworks that translate and apply IDS/IDG into daily professional practice. This gap creates a significant barrier to operationalizing these principles. As mentioned in the above section, there is limited to no case studies or evaluative research articles that examine how or if planners are currently engaging with IDS and IDG in practice. This gap in the research limits the understanding of what approaches to IDS and IDG might be successful or what challenges still exist and how these principles are being adapted and implemented across different disciplines. Although Indigenous communities have developed governance models around data ownership, few of these are explicitly tailored to spatial planning contexts like GIS, mapping, zoning or development. Additionally, many of the frameworks that planners might use are primarily developed by non-Indigenous institutions or individuals. This can unintentionally lead to the repetition of colonial ideologies or completely omit any Indigenous epistemologies.

Chapter 3: Research Methods

3.1 Research Phases

This research is conducted in two phases. Phase One reviews Indigenous and non-Indigenous methodologies for data management and Phase Two is a qualitative document analysis of the professional codes of ethics, bylaws, constitutions and other relevant guiding documents from the four selected disciplines of architecture, archaeology, engineering and social work. The goal of Phase two is to critically examine how these documents align with, reflect, or fall short of the core principles identified in Phase one.

The first phase of this research involved a comprehensive review of existing IDS and IDG-related principles. The three key frameworks examined are the CARE Principles for Indigenous data governance (collective benefit, authority to control, responsibility, and ethics), the FAIR Principles (findable, accessible, interoperable, reusable), and the OCAP principles (ownership, control, access, and possession). This review was conducted through an in-depth document analysis of foundational reports; policy documents and peer-reviewed literature associated with each of the framework. The primary goal of Phase one of this research was to identify some of the shared ethical and governance principles across these diverse frameworks. Using a comparative analysis approach, overlapping values were identified, extracted, and synthesized into a consolidated set of guiding themes. Qualitative comparative analysis, as used in this research, uses the nomothetic method (Bolbakov et al., 2020) and is done by comparing "objects" (the individual framework principles) to each other and finding common (similar, related) phenomena. This involves systematically reviewing and coding the core documents associated with each framework and identifying recurring concepts, language, and normative positions related to data governance and ethics. Principles from each framework were first extracted individually, then organized into thematic categories based on conceptual similarity and alignment in an Excel spreadsheet. For instance, CARE's "authority to control" and OCAP's "control" were analyzed together to determine their shared emphasis on data sovereignty. This process led to the identification of six core principles that collectively represent a comprehensive approach to applying Indigenous Data Sovereignty (IDS) and Indigenous Data Governance (IDG) across the three guiding frameworks.

The second phase of this research paper includes a qualitative document analysis of existing adjacent professions such as social work, architecture, engineering, and archeology, with a specific focus on the presence or absence of Indigenous data sovereignty and Indigenous data governance principles within their professional codes of ethics, constitutions, or other relevant guiding documents. This phase involved collecting and examining publicly available materials from professional association websites, regulatory bodies, and practice boards to assess how these fields engage or fail to engage with the six core IDS and IDG principles founded in Phase one. Then the documents were analyzed thematically. While Braun and Clarke (2006) explain that there is "no one way to conduct thematic analysis", I developed an Excel spreadsheet to examine the differing codes of ethics and their relation to the AFFECT framework. This thematic analysis provides a flexible, yet in-depth method for uncovering patterns and meanings across qualitative data. By identifying themes within adjacent professional areas, this research aims to generate insights into how adjacent disciplines are or are not integrating Indigenous data principles into their standards, processes, and ethical frameworks. Further leveraging Braun and Clarke's (2006) framework helped to minimize bias and ensure that the thematic analysis was conducted systematically.

3.2 Ethical Considerations

Since this research uses only secondary data, it did not require an ethics review and therefore adheres to the University of Waterloo ethical guidelines for the collection, analysis, and presentation of data. Although this research did not require a formal review by the University of Waterloo Ethics Board, it is still needed to be mindful of the principles of ethical Indigenous research with care taken to respect Indigenous ways of knowing. By prioritizing Indigenous-authored documents wherever possible, this research made it a priority to be inclusive and in accordance with Chapter 9 *Research involving the First Nations, Inuit and Metis Peoples of Canada* of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (Government of Canada, 2022). I have also pursued additional avenues for learning about Indigenous data management by attending *From Theory to Respectful Practice: Wampum as a Living Embodiment of Indigenous Data Sovereignty (2025)* workshop held by the University of Waterloo and the *Cultural Data Sovereignty Workshop for Galleries, Libraries, Archives, and Museums in BC (2025)*.

3.3 Limitations

This research has a variety of limitations. Firstly, the research only examined the OCAP, CARE and FAIR principles. While these are the most widely recognized scholarly IDS/IDG frameworks at the time of this research, this approach might have excluded emerging or community-specific models that are in practice but not yet published or peer-reviewed. Because of the lack of policies or legislation that directly address IDS and IDG this requires interpretation and inferences of data-related rights from broader statements about self-determination and cultural protection. This approach may lead to variations in interpretation, particularly in policy and legislative discussions. Lastly, there may be a gap between theory and practice in regards to how realistically planners can integrate sovereignty and governance principles into their work, especially in institutions where colonial planning frameworks are still dominant. The overall planning field's readiness and capacity for change to adapt to these principles and recommendations may not be linear or even.

Chapter 4: Analysis

Three main Indigenous data management frameworks examined in this research are: OCAP (ownership, control, access, and possession) (First Nations Information Governance Centre, 2014), FAIR (findable, accessible, interoperable, reusable (Wilkinson et al., 2016), and CARE (collective benefit, authority to control, responsibility and ethics) (Global Indigenous Data Alliance, 2019). This approach ensures that the recommendations proposed in the final discussions section are grounded in both Indigenous and non-Indigenous values. Additionally, this approach examines previously and widely accepted and established frameworks (OCAP ®, FAIR, CARE) and adjacent professional implementation of Indigenous data sovereignty and governance principles across disciplines. *Figure 2.* below explores the breakdown of the three main data management frameworks, associated principles and whether they are a western or Indigneous-led approach.

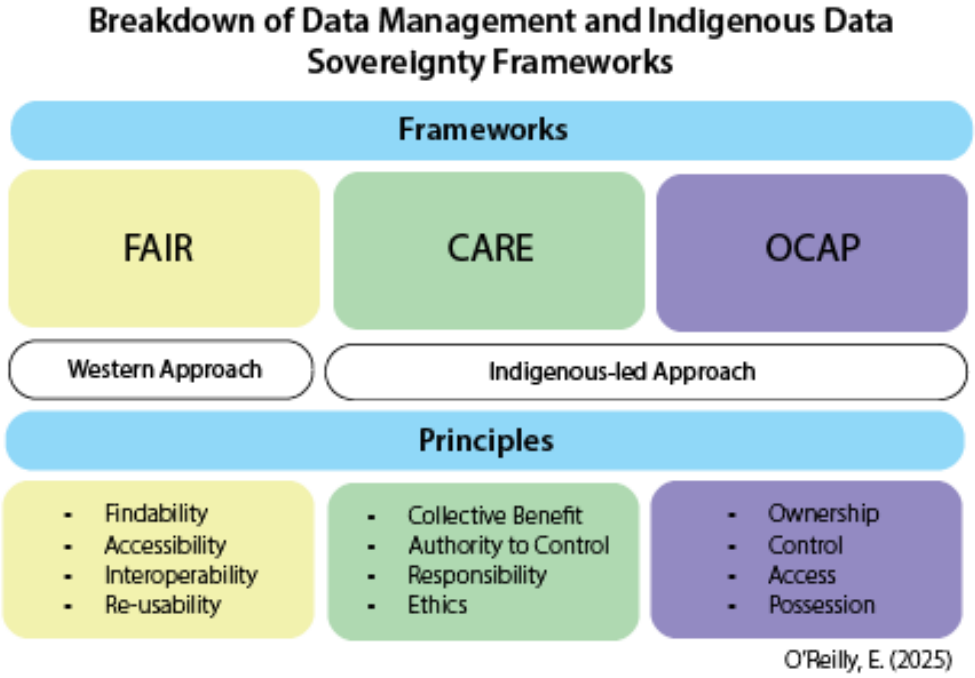

Figure 2: Breakdown of Data Management Frameworks. O'Reilly (2025).

4.1 Background on Frameworks

Developed by the Global Indigenous Data Alliance (GIDA) in early 2019 the CARE principles focus on Indigenous rights and interests in data governance. The CARE principles for IDS and IDG are explained as aimed at addressing the concerns related to collective benefit, authority to control, responsibility and ethics (Caroll et al, 2021). These principles work to provide benefit to the Indigenous communities through collective effort and outlines the expectations of ethical data management and stewardship. The CARE Principles were officially launched at the International Data Week in 2019, signaling a boarder call for professionals, researchers and governments to embed Indigenous values in data science and governance.

The First Nations Principles of OCAP were formally introduced in 2007 to address structural and administrative challenges associated with Indigenous data collection. Gaps in the data and information pertaining to Indigenous peoples, specifically people who lived on reserve was a growing challenge for the Canadian government (Rowe, Bull & Walker, 2021; FNIGC, 2016). In order to close the gap in data and information pertaining to those living on reserve, the federal government supported the creation of the First Nations and Inuit Regional Health Survey (RHS), designed specifically to collect data from people living on reserve. The original FAIR guiding principles were introduced in 2016 by Wilkinson and their colleagues, who highlighted the urgent need to improve the reusability of scholarly data and especially in the context of automated data discovery and use by machine learning models. Unlike earlier frameworks like OCAP and CARE, which emerged from Indigenous communities need to protect their data, the FAIR principles were developed to provide broad, international guidance for those who publish and preserve scholarly data, with a focus on making data Findable, Accessible, Interoperable and Reuseable (FAIR). In the context of this research, it is important to recognize the relevance of FAIR principles given that Indigenous data is often stored, shared and analyzed within academic and institutional settings, such as universities and research institutions. As the global Open Data Movement[1] (ODM) gains momentum, there is a growing need to ensure that such reuse is not only technically efficient but also ethically sound and socially responsible.

[1] The open data movement is a global initiative that advocates for making data freely available to everyone to use, reuse, and redistribute without restriction. Rooted in principles of transparency, innovation, and public accountability, the movement promotes the release of government, institutional, and scientific data in

Understanding the FAIR principles is critical to navigating the tension between the benefits of open data and the need to uphold Indigenous data sovereignty and governance. Balancing both priorities ensures that data sharing is both ethically conducted and in alignment with the rights and interests of Indigenous communities. This section of the research paper seeks to further understand and analyze how these FAIR principles can be further integrated or adapted to support both the open data movement initiatives and the ethical management of Indigenous data. With recognition and understanding that this framework must coexist in a globalized and interconnected research environment, while also being cognizant of ethical data management.

4.2 Synthesizing the Frameworks

This first phase approach identifies key shared principles from the three identified frameworks of the OCAP, CARE and FAIR principles. This method enables generalization across the varying epistemological traditions in which these three frameworks originate (data science, information sharing, Indigenous ways of knowing, control of health data., etc.). This method supports the development and foundation of this research as it provides a principle-based approach for the second phase of this research. Neither of the three frameworks is determined to be 'better than' another, but yet examined to determine the overlaps and practices of all three that aim to approach this subject matter from a multi-disciplinary lens and best-practice approach. The analysis led to the identification of 6 core themes from the three frameworks.

The first theme is Authority and Control, derived from both the principles within the CARE and OCAP frameworks. This theme emphasizes community-driven decision-making power and data sovereignty. These two principles center on the rights of communities to determine how data is governed, shared, and applied. The second theme is centered on Fair Access and Possession, again both derived from CARE, OCAP, and FAIR principles. This theme involves the rights to use, retrieve, and hold data physically or digitally. The emphasis in this case is on the community's access and control over their own data. The third theme is derived directly from the CARE principle of Ethical Responsibility, which highlights the duty to handle

accessible formats to support civic engagement, technological development, and evidence-based policy-making. Open data is typically non-proprietary, machine-readable, and free of cost, and is seen as a tool for democratizing information access and fostering collaboration across sectors (Open Knowledge Foundation, 2015).

data and information with care and respect. This theme encourages prioritizing Indigenous values and accountability. The fourth core theme identified is the Collective Benefit, derived directly from the CARE framework, which focuses on ensuring that data use and applications support the overall community's well-being. Furthermore, this ensures that any data-related activities benefit communities, not just individuals, professionals, or institutions. The fifth theme is Findability and Reuse, based on the principles of the FAIR framework. This theme promotes the accessibility of discovering data while supporting the ability to find, access, and reuse data responsibly and ethically. Lastly, the sixth and final theme is Technological Interoperability from the FAIR framework, which supports the integration and movement of data between systems and users when appropriate, ethical and supported by the above five themes. This phase of the research identifies six core themes foundational to IDS and IDG, as illustrated in *Table 1*. Using a comparative analysis of the CARE, OCAP and FAIR frameworks, these themes provide a comprehensive structure for further evaluating how data related to Indigenous peoples should be ethically and professionally managed.

Table 1: Resulting Shared Themes Table. O'Reilly (2025)

Theme		**Frameworks**			**Explanation**
		CARE	**FAIR**	**OCAP**	
1	Authority & Control	Authority to control		Control, Ownership	Emphasizes decision-making power and data sovereignty
2	Fair Access & Possession		Accessible	Access, Possession	Involves rights to retrieve, use and hold data physically or digitally
3	Ethical Responsibility	Responsibility, Ethics			Highlights the duty to handle data with care, respect and accountability
4	Collective Benefit	Collective Benefit			Focuses on ensuring data use and application supports community wellbeing
5	Findability & Reuse		Findable, Reuseable		Facilitates long term use and discovery of data for appropriate purposes

6	Technological Interoperability		Interoperable		Supports integration and overall compatibility across systems and contexts

Each theme highlights a different but highly interconnected aspect of Indigenous rights and responsibilities related to data directly derived from the well-known OCAP, FAIR and CARE frameworks. Collectively, these themes further reinforce that data involving Indigenous peoples and communities must be handled in a way that reflect community priorities, support self-determination, and are truly grounded in respect, accountability and equity. Lastly, these themes can serve as critical foundations for developing culturally appropriate data practices, policies, and professional standards across a range of disciplines. These six core themes derived from their respective frameworks can be re-thought of in the context of the Framework AFFECT as seen in *Figure 3*.

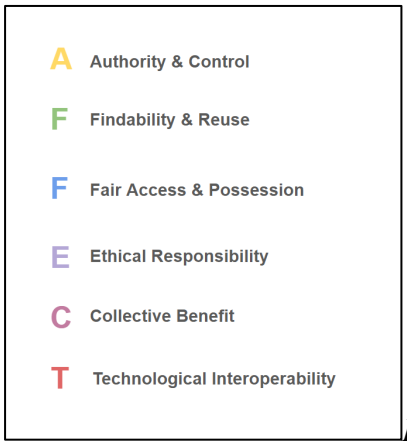

Figure 3: AFFECT Graphic. O'Reilly (2025).

4.3 Analysis of Codes of Ethics of Adjacent Professions

Phase two of this research is focused on the review and analysis of adjacent professions to planning to examine if there are any other professions that may stand as a best practice guide to implementing data management or sovereignty principles. This included reviewing the ethical standards of the following professions: architecture, archeology, engineering, and social work. Building on the six core principles of Indigenous Data Sovereignty and Indigenous Data Governance identified in Phase one (AFFECT), this analysis examined professional ethical codes and standards at the federal, provincial and territorial levels to determine whether they address

any of the following principles: authority & control, fair access & possession, ethical responsibility, collective benefit, findability & reuse and technological interoperability.

Using four identified professions of interest in this case, the research Phase two explores if these professional bodies have any mention or references to the above principles of IDS and IDG. As well, the examination of these professional standards will be examined in the context of strengths, what, if anything do these professional guiding documents currently provide in regards to IDS and IDG gaps, what do they currently lack and what do these gaps entail from an ethical standpoint and lastly the opportunities, what may these documents offer to the ongoing IDS and IDG conversations at the professional levels.

Much like planning, architecture has individual provincial/territorial regulating bodies (also known as Architectural Licensing Authorities (ALAs)) that oversee licensing, standards, discipline and continuing education for architects. The provinces and territories in Canada are regulated and each individually have their own Code of Ethics that dictates how professional architects are to operate in an ethical manner when working with clients. For example, the Royal Architectural Institute of Canada (RAIC) delivers the Canadian Handbook for Practice for Architects (2021) which provides guidance on the professionalism, accountability and commitment to professional architectural practice at the federal level through a supported national unified best-practice framework. Beneath the RAIC, each individual province and territory has codes of ethics which their licensed architects must follow based on their location of professional practice. In the case of British Columbia, First Nations are explicitly recognized by the Royal Architectural Institute of British Columbia (AIBC) as Authorities having jurisdiction (AHJs) in architectural practice (AIBC, 2020, p.87). This recognition places First Nations on an equal footing with other regulatory bodies like municipal governments, the Ministry of Transportation, the BC Building Code, and the Vancouver International Airport Authority. It affirms that First Nations possess legal and decision-making authority over land use, development and the professional accountability of architects working within their traditional territories. However, while the AIBC Code of Ethics includes First Nations in the context of Letters of Assurance, it makes no other mention of Indigenous peoples or their rights throughout the rest of the document. This omission is concerning. If First Nations are acknowledged as jurisdictions with authority, then architects in British Columbia must also respect that all aspects

of sovereignty, including data sovereignty. This means recognizing the rights of Indigenous communities to control their information, plans, cultural knowledge and spatial data on their own terms and in their own distinct ways.

In architecture, Letters of Assurance often involve sensitive materials such as site plans, architectural drawings, environmental assessments, and cultural site data. When these documents are created for or with Indigenous clients, they contain valuable and often culturally and community significant data and information about Indigenous lands, peoples, and resource. It is ethically inconsistent to acknowledge First Nations as legal authorities while also failing to explicitly protect their information rights. Without clear ethical guidelines, architects (like planners) may inadvertently share, archive or even profit from Indigenous data without consent which directly violates principles of trust, respect and sovereignty. Therefore, with this in mind, it is imperative the professional standards bodies explicitly address and uphold Indigenous data governance principles. This includes protecting cultural, spatial, and informational sovereignty. Ensuring that all these provincial and federal frameworks work together and work with Indigenous communities to guide the core principles of authority and control, findability and reuse, fair access and possession, ethical responsibility, collective benefit, and technological interoperability. Architecture highlights a similar gap to planning, with its lack of any mention of IDS or IDG practices in the codes of ethics reviewed. One way in which architecture in Canada is empowering communities is through the co-design process. Where communitie are engaged, Indigenous architects, builders and designers are hired to co-design spaces with cultural and community-based designs in mind. This co-design process, while not directly mentioned in the codes of ethics, is one way in which architrcture is employing Indigenous empowerment through the design process, and is a concept that planning is beginning to get behind and can also leverage.

An examination of archaeological codes of ethics across Canada including guidelines from the Canadian Archaeological Association (CAA, 2019, as well as provincial and territorial standards (e.g. British Columbia Association of Professional Archaeologists (BCAPA, 2022), Alberta Archaeological Society (AAS, 2021), Ontario Archaeological Society (OAS, 2020), Saskatchewan Association of Professional Archaeologists (SAPA, 2018), and the Yukon Government Heritage Resources Guidelines (YGHR, 2020). These guiding codes of ethics for

the profession of archaeology reveal that there are consistent and overlapping strengths, gaps and opportunities to determine the capacity for the archaeological community to lead by example when it comes to IDS and IDG principles. Some of their key commitments include respecting Indigenous rights to maintain, control, protect and develop cultural heritage (CAA, 2019). The CAA principles of stewardship offer a strong foundation for advocating for Indigenous data sovereignty at the professional level. It aligns with IDS by directly affirming and acknowledging that archeologists are caretakers or stewards and not owners of the archeological records. Another item listed under "Indigenous interests" is for archaeologists to encourage governments across Canada to amend policies and legislation for Indigenous peoples right to the control and protection of their archaeological/material heritage (CAA, 2019). This policy listed in the CAA Principles of Ethical Conduct showcases their partial compliance with the core principle of authority and control. While this statement touches on Indigenous peoples right to the control and protection of their physical heritage, it does not directly address any data or non-physical components related to archeological work.

Additionally, this document highlights how collection of archeological/material heritage should be consistent with the principles from the United Nations Declaration on the Rights of Indigenous Peoples and the Truth and Reconciliation Commission of Canada Calls to Action (2025). As touched on earlier in the literature review section of this research, neither UNDRIP nor the TRC Calls to Action address any data governance or sovereignty principles, frameworks, or implementation strategies directly. Therefore, it is apparent that further legislation and additional targeted policies are required in Canada to address data sovereignty directly for any kind of policy or legislative 'trickle-down' to take place at the industry levels. Interestingly, this document outlines the responsibility of professionals to receive free, prior and informed consent (FPIC) before the investigation of sites that may contain Indigenous components. This consent process is also related to the principle of authority and control of Indigenous peoples over their data, information and cultural artifacts. A code of ethics policy like this one (among other provincial archaeologists codes of ethics and bylaws like BCAPA, 2022) requiring free, prior and informed consent (FPIC) before investigating sites with Indigenous components is not just a procedural formality but rather represents a wider shift in the balance of power and responsibility in professional practice. This FPIC requirement acknowledges Indigenous peoples as rights-holders and not just interest holders, with inherent authority over their cultural heritage data and

knowledge. The Principles of Ethical Conduct and Statement Pertaining to Indigenous peoples also includes a section under professional responsibilities that states professional archaeologists must also comply with local Indigenous people's local protocols both inside and outside of Canada. This statement highlights the opportunity and further discussion for the implementation at the Indigenous community or organizational level to include principles or frameworks for the handling and distribution of community data to third parties also known as a Data Sharing Agreement.

The examination of engineering codes of ethics across Canada (Engineers Canada, 2016; PEO, 2020, EGBC, 2021, APEGA, 2019; Engineers Nova Scotia, 2022; OIQ, 2021, Yukon Engineering Society, 2018) reveals that all the above examined engineering codes emphasize a strong ethical responsibility to public safety. There are not many principles that are directly present within these guiding documents however more broadly speaking, one of the core reoccurring themes surrounding ethical responsibility supports the goal to reduce harm, especially when working with Indigenous communities (EGBC, 2021, PEO, 2020 and Engineering Canada, 2016). This commitment to ‘doing no harm’ is one in which planning could emulate to ensure that communities and individuals are prioritized and follow the principes of ethical responsibility as they recognize the importance of disclosure of any conflicts of interest and committing to competent practice.

Much like architecture, none of the engineering codes explicitly recognize Indigenous authority and control over data or decision making related to Indigenous lands and knowledge (OIQ, 2021; Yukon Engineering Society, 2018). This direct omission implies that Indigenous peoples are often positioned as passive interest holders rather than active decision-makers and data stewards which is in direct contradiction with IDS and IDG principles. Similarly, there is little to no guidance on Indigenous access and possession, including the rights to hold, store and control engineering-related data about Indigenous territories and cultural resources. The codes also lack specific standards to ensure the findability and reuse of data in ways that respect Indigenous knowledge systems. They also do not recognize the need for technological interoperability within data systems that can integrate Indigenous knowledge and governance requirements (Engineers Canada, 2016; PEO, 2020). Finally, while collective benefit is implicit

in most of the documents, none of the codes ensure Indigenous communities directly benefit through capacity building, co-leadership in engineering decisions, or sustained stewardship.

Engineering codes of ethics across Canada reflect strong ethical commitments to public safety and integrity. However, they lack explicit engagement with Indigenous data sovereignty principles related to authority, control, possession and stewardship of Indigenous knowledge. By incorporating Indigenous rights to data governance focusing on collective benefit and interoperability, engineering professional bodies can close these gaps to leverage existing strengths to then better align with Indigenous worldviews. Updating codes of ethics in this way could help to better support more respectful, collaborative engineering practices that honor Indigenous rights and interests in the data produced across their lands, waters and territories.

Both the Ontario (OCSWSSW) and National (CASW) codes of ethics for social work demonstrate a strong commitment towards ethical responsibility; however, there are notable limitations and significant future opportunities to better align with Indigenous data sovereignty and IDG principles. Neither code explicitly affirms Indigenous authority over data or decisions concerning Indigenous peoples. While both codes advocate respect for Indigenous worldviews (OCSWSSW, 2019; CASW, 2005), they do not recognize Indigenous communities as primary decision-makers over data generated through practice or research. This absence is critical because Indigenous authority and control is a cornerstone of IDS and IDG. Without explicit acknowledgement of Indigenous data authority, the existing codes risk perpetuating a colonial dynamic where data is stewarded by professionals or agencies without Indigenous oversight. Both codes highlight confidentiality and privacy obligations to clients and communities (OCSWSSW, 2019; CASW, 2005), which implicitly supports responsible data handling. However, they do not articulate Indigenous-specific data access or possession rights. Under IDS and IDG principles, Indigenous communities must have access to, and ownership of, information that pertains to them. Current social work ethics fail to make that connection explicit, nor do they describe procedures for ensuring Indigenous people possess and control their data beyond standard confidentiality protections. Both codes meet the IDS/IDG principle of ethical responsibility most effectively. They highlight anti-racism, anti-oppression, cultural humility, and a commitment to reconciliation, which align with Ethical Responsibility principle in AFFECT. They encourage social workers to respect Indigenous self-determination and

acknowledge historical injustices. However, these aspirations lack a concrete mechanism to embed Indigenous authority into practice, leaving Indigenous communities as consultees rather than as co-governors of their data.

Additionally, both codes endorse broad principles of social justice and the well-being of Indigenous peoples. However, they do not explicitly require data practices that produce collective benefit for Indigenous communities. IDS/IDG would require that data, knowledge, and practice support Indigenous capacity-building, cultural revitalization, and shared benefit. The absence of this directive means that Indigenous communities may experience only incidental benefits rather than intentional outcomes driven by their own priorities. Neither the OCSWSSW nor CASW ethics code addresses data stewardship practices that enable Indigenous communities to find, access, and reuse their data for their own purposes. Guidelines around data management, storage, and dissemination are not specified. This lack of focus on data findability and reuse restricts Indigenous communities' ability to leverage social work data for their self-determined goals, knowledge transfer, or policymaking. Finally, neither code discusses the technical interoperability of data across Indigenous and non-Indigenous systems. Indigenous Data Governance principles emphasize that Indigenous data must remain interoperable so that communities can share and integrate their information on their own terms. Without this commitment, social work data risks being locked into Western information systems, further alienating Indigenous people from controlling and making use of their own data.

Just because the professional codes of ethics lack any direct mention of IDS and IDG does not mean that individual professionals, consulting firms or municipal/federally employed architects, engineering, archaeologists and social workers are not following IDS and IDG principles to some extent, but rather, the lack of any guidance or mention of the rights of Indigenous peoples to govern their data and information from recognized regulating bodies is rather a national systematic weakness that should be addressed. Based on the above list of codes of ethics for most of the provinces and territories in Canada, there appears, based on this research to be no direct reference to Indigenous data or information sovereignty (such as the OCAP, FAIR or CARE frameworks). While some architecture organizations recognize Indigenous rights in other respects (like Indigenous co-design of spaces, 'do no harm' and data stewardship) formal policy language around data governance like ownership, control, access or the ethical use of

spatial and cultural information is currently lacking or missing all together across the four adjacent professions. This showcases the opportunity, much like the one planning is faced with, to further explore, educate and deeply consider the importance of the integration of IDS and IDG principles into professional practice.

Chapter 5: Conclusions & Recommendations

5.1 Research Conclusions

My findings from this research intended to answer the following questions: (1) What are the core principles of Indigenous Data Sovereignty and Indigenous Data Governance? (2) What intersecting and divergent themes emerge from adjacent professional fields that further refine and expand the understanding of core IDS and IDG principles? And; (3) In what ways can planners operationalize principles of IDS and IDG into practice?

The first question *What are the core principles of Indigenous Data Sovereignty and Indigenous Data Governance?* is addressed through the comparative analysis approach in Phase one of this research where the existing three frameworks most widely accepted in the IDS/IDG conversations (OCAP, FAIR and CARE) and synthesized into overlapping themes that produce the AFFECT frameworks. AFFECT stands as inter-disciplinary and multi-worldview (including Western and Indigenous-led worldviews) framework on the foundations of data management and sovereignty principles that professional planners can use in practice to evaluate their work with Indigenous communities' data and information. This frameworks stands as one that should be consistently evolving and changing to meet the needs of Indigenous peoples in Canada relating to data sovereignty, data governance, self-determination and Indigenous rights. The proposed framework is not intended to be a prescriptive approach to IDS or IDG, but rather one that paints that picture of the steps still needing to be taken by professionals across the country, regardless of the discipline.

Phase two addresses this question through analyzing the codes of ethics for the four adjacent professions and determining the level of general compliance with the AFFECT framework to examine adjacent professions' approach to IDS and IDG principles. As found in the research, none of the adjacent professions directly address IDS, IDG or any of the three existing data sovereignty frameworks (OCAP, FAIR, CARE) in their codes of ethics. While the adjacent professions do not address the principles/frameworks directly, indirectly there are practices and policies that are being implemented and ones which planning can use to better industry standards.

The second question *What intersecting and divergent themes emerge from adjacent professional fields that further refine and expand the understanding of core IDS and IDG principles?* Is answered through an in-depth document review and analysis of adjacent professions codes of ethics, and their respective consistency with the AFFECT principles. Through analyzing architecture, archaeology, engineering and social work, key themes emerged from those adjacent planning professions. Engineering's code of ethics focuses on public safety, integrity and accountability, which are values that align closely with some of the principles of IDS and IDG. Engineering is an example of a professional body that planning can emulate regarding the strong ethical foundations of 'do no harm'. Applying the 'do no harm' engineering perspective can look like actively mitigating against possible data exploitation through ensuring that data is not collected, used or shared without Indigenous consent. Harm can also arise from general omission or ethical oversights. When professional codes of ethics or guiding professional policies do not address key issues like data sovereignty and governance, professionals leave themselves vulnerable to enacting harm potentially without realizing it. Therefore, planning should directly address the gaps in professional policies and legislation to ensure that IDS and IDG principles are incorporated. Additionally, the respect towards decision-making authorities should include acknowledging Indigenous authority over decisions affecting their land and data. As ignoring or omitting Indigenous rights to sovereignty and self-governance in policy continues to perpetuate colonial dynamics.

Similarly, archaeology provides some examples of the professions long-standing approach to Indigenous data management as "we are caretakers, not owners" (CAA, 2019). Many of the Canadian archaeological codes of ethics emphasizes respect, stewardship, FPIC (free prior and informed consent) and compliance with Indigenous protocols. The professional stewardship approach is one that planning can emulate and implement as it showcases the shift from an ownership and entitlement perspective over data and information to a care and thoughtfulness perspective. Stewardship can be used to remind professional planners that they do not own Indigenous data or knowledge but rather may temporarily be entrusted with access to this data or information.

The third and final question *In what ways can planners operationalize principles of IDS and IDG into practice?* Is addressed and answered through the creation of the AFFECT

framework, as key principles that professional planners can implement to operationalize into practice. Further, through exploring additional avenues of implementation in ***Section 5.4 Avenues of Implementation & Further Research***, planners can use this research as a stepping-stone to further their knowledge of IDS and IDG principles and continue to challenge their professional approaches, to ensure a more accountable, and ethically responsible professional world.

5.2 Research Linkages to Literature

The problematic lack of implemented IDS and IDG principles in the planning profession, and other adjacent professions, shows the lagging nature of the Canadian professional fields, especially ones who frequently work with Indigenous communities, individuals and their associated data. The creation and examination of the various IDS and IDG principles is explored within the academic world and as mentioned in this research's literature review (Carroll et, al. 2020; First Nations Information Governance Centre, 2014; Gupta et, al. 2020; Jennings et, al. 2023) however, is rarely explored in the context of professional application or implementation (First Nations Information Governance Centre, 2014). Due to the three key frameworks OCAP, CARE & FAIR being created to meet varying objectives, there has not been a unified approach that considers both the Indigenous and non-Indigenous approaches to data sovereignty, governance and management in any of the research to date. While some authors determine the ability for the frameworks to work together (Carroll et al., 2021), the application of these principles to professional practices is limited to none. Due to the various subsectors of the planning professions (parks, transportation, development, social planning, etc.) relying directly on the land, cultural data, histories and Indigenous ways of knowing, planning as a profession should adopt an Indigenous-informed approach to data management. This research provides the background, analysis, and conglomerated themes from the key IDS and IDG frameworks to provide a practical, modern and informed approach to encompassing the complexity of IDS and IDG. Through the examination of adjacent professional fields, planning can take the best practices of 'do no harm', data stewardship, Indigenous co-design and respect towards Indigenous worldviews as a foundation to revamping the current legislative and policies that guide professional planners today.

5.3 Recommendations

Planners have a professional and ethical responsibility to handle Indigenous data with care, respect and accountability. While a large portion of academic literature examines and determines reasonable gaps within professional or academic spaces, there are often limited resources or further recommendations provided to the readers in order to put this research into practice. In the case of this research being produced with planners in mind, a recommendations section seems necessary to put this research to practical use.

Planners as professionals need to first understand Indigenous peoples, histories and Indigenous people's rights in Canada. There is an opportunity for professional planners to leverage this research and others like it to ensure the dissemination of knowledge pertaining to Indigenous data sovereignty and Indigenous data management to ensure that ethical principles are being taught at the foundational level prior to being implemented. Planners increasingly work with Indigenous clients and on all work conducted in Canada is on Indigenous lands, whether through public projects, private development or community-led designs. These projects often involve the creation, interpretation and handling of cultural site information, environmental assessments, spatial data and land use histories as well as plans that are rooted in Indigenous knowledge. In these types of contexts, data and information are not neutral and are instead deeply connected to sovereignty, self-determination, and cultural identity. Professional planners have an obligation and a duty to understand the Indigenous data sovereignty and governance principles like AFFECT to practice ethically sound and informed professional planning. From this research, planners can learn and understand the basis of the core principles of IDS and IDG, explore how adjacent professions are successful in implementing some of the principles of IDS and IDG into practice and provided with recommendations on how to implement this type of approach into professional work. Community-based and protocol-based data sharing agreements exist today and should be more widely adopted as protocol for when working with Indigenous communities' data and information. The Alberta First Nations Information Governance Centre in partnership with Krista Yao of Nadjiwan Law created a First Nation Data Sharing agreement (Yao, 2024). This draft data sharing agreement assists in helping “determine First Nation priorities in data governance while working in partnership with government, universities,

researchers, and other organizations." (p.1). This is one of many resources that professional planners can leverage to more ethically serve their Indigenous clients.

This research highlights a critical gap in the planning profession and while many academic studies identify issues related to Indigenous data sovereignty, few provide actionable steps for practitioners. To address this, this master's research emphasizes the importance of dedicated recommendations and applicable principles to help planners apply these insights into practice. Planners have the professional and ethical responsibilities to understand Indigenous history, rights, and knowledge systems. This research encourages planners to engage with Indigenous data sovereignty and data governance principles such as those captured in the AFFECT framework, and to learn from the adjacent professions of archaeology, social work, engineering and architecture, that have begun integrating some of these principles into practice (perhaps even without realizing it). By doing so, planners can begin to adopt more ethical, informed practices, including the use of community-and protocol-based data sharing agreements. Ultimately, this research brings to light the role that professional planners have in supporting Indigenous rights through their data management practices.

5.4 Avenues of Implementation & Further Research

As previously mentioned, there are alternative methods of ethical data management. For example, data sharing agreements (DSA) or model material and data sharing agreements (MDSA) which function to "build upon important ethical and legal principles" to "address challenges of trust, informed consent, data ownership, and sovereign rights" (Harding et al., 2012, p.7). These methods of data sharing protocols when working with Indigenous communities and Nations are understood in the literature to only be one piece of the puzzle in regard to ethical data stewardship and management. Arguably also, planning as a profession is one that relies a lot on research principles to conduct background analysis of sites for development, identifying sites suitability, lands historical use etc. Therefore, in the application of data management frameworks like MDSAs are one additional avenue that planners may take to enforce the IDS and IDG principles. I argue that while MDSAs and DSAs work to facilitate ethical data management, there is still an urgent gap to better educate and outline the core principles of IDS and IDG to provide professionals a better understanding to be able to effectively implement the DSAs and MDSAs into their practice. If planners understand the principles of IDS and IDG in a

more comprehensive way, they will be much more effective in implementing DSAs and MDSAs into their professional work.

While not directly examined within this analysis, it is important to note that the Inuit and Métis have additionally created principles and guidelines pertaining to working with their data and information and engaging with them for the purposes of research. Inuit Qaujimajatuqangit also known as IQ, is the research ethics framework in which Inuit traditional knowledge is translated to uphold core values. There are 8 core values, and every prospective research project engages with elders, knowledge keepers, and community representatives prior to initiation (Pavagadhi & Mashford-Pringle, 2020). Additionally, the principles on ethical Métis research speak directly to reciprocity, relationships, respect, diversity, safety, inclusivity and appropriate outcomes (Gabriel, M (2017); NAHO, 2017). These frameworks reflect distinct nation-specific approaches to data governance and ethics, reinforcing that any engagement with Indigenous communities and their associated data must be grounded in culturally specific principles and community-led processes. Acknowledging these differences is critical to advancing ethical research and planning practices that respect the sovereignty, diversity and self-determination of all Indigenous peoples.

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