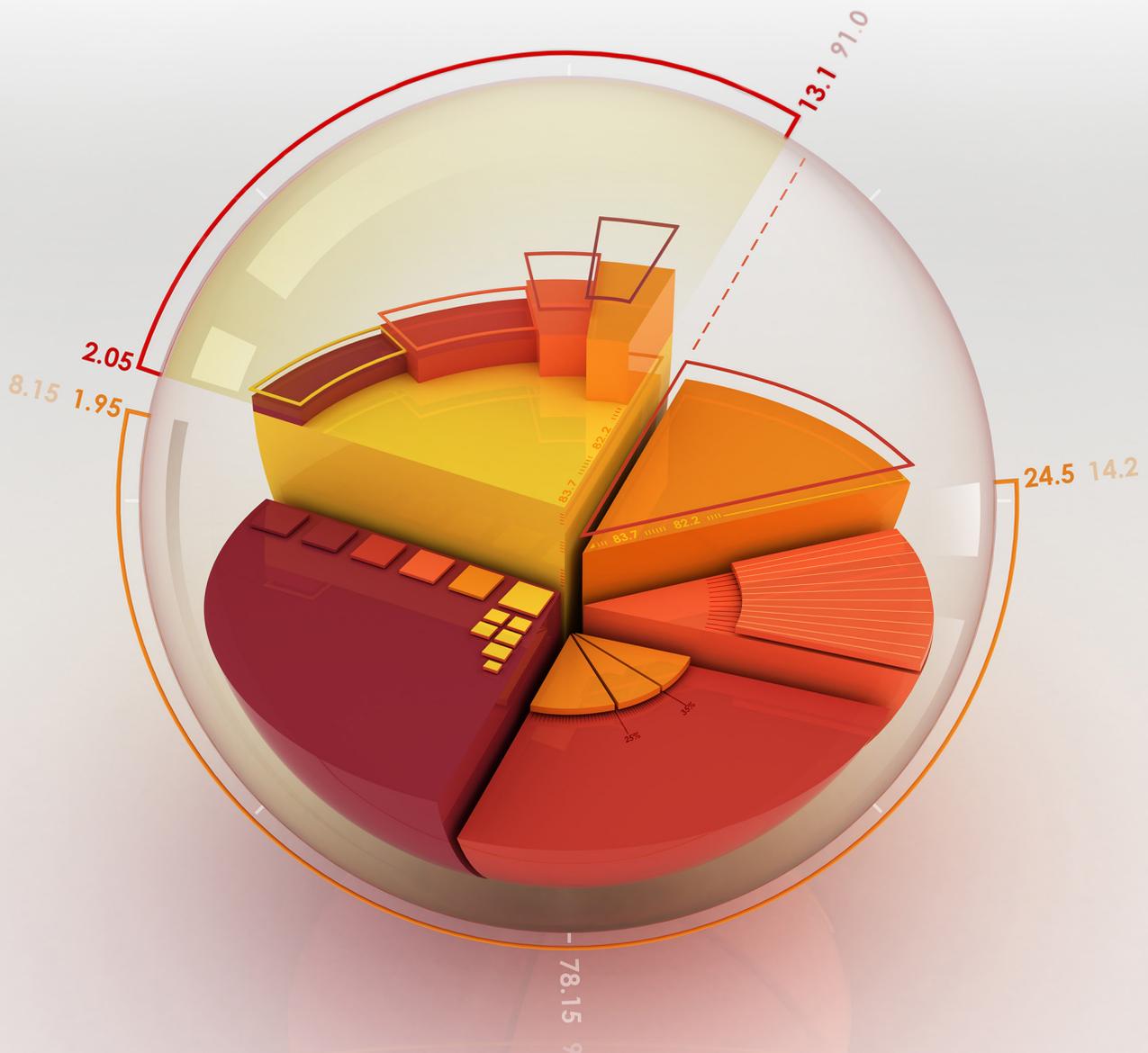


CIGI Papers No. 234 – December 2019

Indigenous Data Sovereignty Retooling Indigenous Resurgence for Development

Chidi Oguamanam



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Table of Contents

vi	About the Author
vii	About International Law
vii	Acronyms and Abbreviations
1	Executive Summary
1	Introduction
3	Data Sovereignty and Indigenous Data Sovereignty: Concepts and Imperatives
4	The Concept of Data Sovereignty
4	Indigenous Data and Research: A Site of Intense Distrust
6	Canada's First Nations and Indigenous Data Sovereignty
7	The Architecture for Indigenous Data Sovereignty at the United Nations
8	The Case for Indigenous Data Sovereignty
9	Indigenous Data Sovereignty in the Development Paradigm
10	Indigenous Data Sovereignty: Empowering UNDRIP
11	Traction for Indigenous Data Sovereignty in CANZUS: A Decolonization Agenda
15	Indigenous Data Sovereignty as a Strategic Tool of Decolonization
17	Indigenous Data Sovereignty and the Consultation Process
18	Conclusion

About the Author

Chidi Oguamanam is a CIGI senior fellow and an expert in global intellectual property (IP) law and policy frameworks. He is currently researching emerging policy and governance issues on the protection of traditional knowledge (TK) of Indigenous peoples and local communities, including the role of technology in the generation of and access to data, as well as the transformation of data governance into a crucial subject matter for TK and access and benefit sharing of genetic resources. He is also researching the legal and policy prospects of the novel notion of tiered and differentiated approaches to the protection of TK.

With Bar membership in Nigeria and Canada, and an IP and corporate law practice background, Chidi obtained his graduate degrees at the University of British Columbia and started his academic career at Dalhousie University. He is currently a professor at the University of Ottawa, where he is affiliated with the Centre for Law, Technology and Society, the Centre for Environmental Law and Global Sustainability, and the Centre for Health Law, Policy and Ethics. A dedicated interdisciplinary scholar, Chidi teaches and conducts research in areas that include IP law, global knowledge governance systems and their ramifications for Indigenous and Western knowledge productions in diverse contexts such as food and agriculture, biodiversity conservation, culture, entertainment and creativity, medicines and pharmaceuticals, and environmental sustainability as part of the international development law and policy narrative. In 2016, he was named to the Royal Society of Canada College of New Scholars, Artists and Scientists. He is a co-founder of the Open African Innovation Research project and leads a number of research initiatives such as the Access and Benefit Sharing Canada project.

Chidi is a speaker and public commentator on global affairs from African and development perspectives. He also provides technical and expert consulting and support services for states and sub-state actors, non-governmental organizations, intergovernmental bodies, and Indigenous and local communities in developed and newly industrializing countries and elsewhere. He is the author of *International Law and Indigenous Knowledge: Intellectual Property, Plant Biodiversity and Traditional Medicine* (University of Toronto

Press, 2006) and *Intellectual Property in Global Governance: A Development Question* (Routledge, 2011), and co-editor of *Innovation and Intellectual Property: Collaborative Dynamics in Africa* (University of Cape Town Press, 2014) and *Knowledge and Innovation in Africa: Scenario for the Future* (University of Cape Town Press, 2014). He is the editor of *Genetic Resources, Justice and Reconciliation* (Cambridge University Press, 2018).

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About International Law

CIGI strives to be a leader on international law research with recognized impact on significant global issues. Using an integrated multidisciplinary research approach, CIGI provides leading academics, government and private sector legal experts, as well as students from Canada and abroad with the opportunity to contribute to advancements in international law. The goal is to connect knowledge, policy and practice to build the international law framework — the globalized rule of law — to support international governance of the future.

Acronyms and Abbreviations

ABS	access and benefit sharing
CANZUS	Canada, Australia, New Zealand and the United States
ECOSOC	United Nations Economic and Social Council
EMRIP	Expert Mechanism on the Rights of Indigenous Peoples
FNIGC	First Nations Information Governance Centre
FPIC	free, prior and informed consent
GCRC	Geomatics and Cartographic Research Centre
ICT	information and communications technology
IDSIG	International Indigenous Data Sovereignty Interest Group
ILO	International Labour Organization
IP	intellectual property
MDGs	Millennium Development Goals
OCAP	Ownership, Control, Access and Possession
RHS	Regional Health Survey
SDGs	Sustainable Development Goals
TK	traditional knowledge
UNPFII	United Nations Permanent Forum on Indigenous Issues

Executive Summary

The focus of the last two decades (1994–2015) on the world’s Indigenous peoples has highlighted a number of critical issues that are central to Indigenous empowerment and resurgence in the quest for decolonization. The key issues include Indigenous peoples’ full and effective participation in decision making in matters that affect them, the pursuit of culturally sensitive development policies, or what is now termed self-determined development, and effective monitoring or stock-taking mechanisms and processes, not only for planning but also for measuring progress. A combination of factors, including access to information and communications technology (ICT) amid current Indigenous resurgence and rapidly intensifying Indigenous interest in data sovereignty, places Indigenous peoples in a strong position to further their ongoing investment not only in self-repositioning but also for practical realization of their rights to self-determination.

This paper focuses on the historical contexts, including the triggers and the processes, behind the growing relevance of Indigenous data sovereignty as a critical tool to advance the Indigenous vision of self-determined development as part of the logic of broader self-determination. The paper provides practical contexts for the application and realization of data sovereignty and conjectures on its potential to further the autonomous ability of Indigenous peoples to set their own research agenda, frame or design their own research questions, select their own research and development partners, and so forth. Indigenous data sovereignty includes the capability of Indigenous peoples to analyze and interpret research results and negotiate their application as a consequential and transformative exercise of self-determined development. The paper acknowledges that, as a theory and practice, Indigenous data sovereignty is a work in progress and draws attention to the tensions that assail the concept while not discounting its potential for optimum realization and overall benefits.

Introduction

In the last two decades (1994–2015), international attention has rightly focused on the world’s Indigenous peoples.¹ That interest revolves around a range of interconnected issues concerning Indigenous peoples, which are encapsulated in several concepts framed around advancing active Indigenous participation in development pursuits within culturally respectful frameworks. The overarching objectives of these endeavours are geared toward the realization of Indigenous self-determination and self-determined development, as well as the mechanisms for measuring progress in these regards. Admittedly, these are radical summations; they are not exhaustive. Each category of the aforementioned concepts is an omnibus in its own right and can easily be escalated, depending on the analytical orientation and emphasis. All of these issues in the manifesting order of Indigenous resurgence constitute aspects of Indigenous peoples’ right to self-determination as an all-encompassing idea. Despite its politically and historically contentious nature, self-determination is the nucleus of Indigenous peoples’ rights — it is the rallying cry for tackling the Indigenous question.² This explains colonial states’ reluctant reception of self-determination and their vested interest in turning it into a site for interminable interpretational somersaults and political hurdles.³

It is common to hinge Indigenous peoples’ right to self-determination on its jurisprudential and philosophical frame within the complex matrix of rights, and certainly human rights analysis

1 *International Decade of the World’s Indigenous People*, GA Res 48/163, UNGAOR, 48th Sess, Supp No 49, UN Doc A/RES/48/163 (1994). This resolution was on the heels of the UN General Assembly declaration of 1993 as the International Year of the World’s Indigenous Peoples. See also *Second International Decade of the World’s Indigenous People*, GA Res 59/174, UNGAOR, 59th Sess, Supp No 49, UN Doc A/RES/59/174 (2005).

2 For a discussion and characterization of the Indigenous question, see Chidi Oguamanam, “Indigenous Peoples and International Law: The Making of a Regime” (2004) 30 *Queen’s LJ* 348; see generally James Anaya, *Indigenous Peoples in International Law* (New York: Oxford University Press, 2004).

3 This is regarding historical foot-dragging over the meaning of self-determination, which many colonial states fear could lead to their disintegration under the theory of “end state,” despite other interpretations. See e.g. Jennifer E Dalton, “International Law and the Right of Indigenous Self-Determination: Should International Norms Be Replicated in the Canadian Context?” (2005) *Queen’s Institute for Intergovernmental Relations Working Paper No 1*, DOI: <10.2139/ssrn.932467>.

as an end in itself.⁴ For that reason, the pursuit of Indigenous peoples' rights, including their right to self-determination, grossly assumes a political tendency in ways that dangerously, even if not deliberately, delinks them at worst or virtually distances them at best from the direct pursuit of economic, social, cultural and cumulative development imperatives. Those imperatives animate Indigenous peoples' right to self-determination. Certainly, self-determination has a symbiotic relationship with Indigenous economic, social and cultural aspirations. A combination of factors, including access to ICT amid current Indigenous resurgence and the fairly novel Indigenous interest in data sovereignty, places Indigenous peoples in a strong position to further their ongoing investment, not only in self-repositioning but also for practical realization of their rights to self-determination. This paper focuses on the historical contexts, including the triggers and the process behind the increasing relevance of Indigenous data sovereignty as a critical tool to advance the Indigenous vision of self-determined development in diverse spheres pursuant to the decolonization agenda.

Data sovereignty is a tool for the advancement of Indigenous resurgence. Indigenous resurgence refers to Indigenous peoples' concerted and persistent struggles for decolonization, in response to thousands of years of attempts by dominant colonial cultures to assimilate or exterminate them.⁵ According to Rob McMahon, Tim LaHache and Tim Whiteduck, "[t]hese 'acts of survival' reflect lived experiences that take place across a variety of fields, encompassing the many ways Indigenous Peoples are connecting to their cultures, communities and homelands."⁶ The authors further argue that "decolonization and resurgence are expressed in everyday acts that resist the structures and effects of colonialism and support the political

and cultural renewal of Indigenous communities."⁷ Data sovereignty is one such act and a vital tool that (re)positions and enhances the sustainability of decolonization and Indigenous resurgence. Effective interfacing of Indigenous data sovereignty with self-determined development creates a powerful elixir for continuing decolonization and Indigenous resurgence. As noted below, the pioneering effort of the First Nations of Canada⁸ has, in no small measure, contributed to the practical translation of data sovereignty, for example, in the context of Aboriginal health. Through this effort, Aboriginal health is now recognized as a special category from conventional conceptions of health, well-being, health needs, health research and more.

This paper is divided into three parts. In the first part, entitled "Data Sovereignty and Indigenous Data Sovereignty: Concepts and Imperatives," the paper explores the concepts of data sovereignty and Indigenous data sovereignty, their drivers and underlying imperatives. This section highlights the prescience of the First Nations of Canada and their contribution toward setting the global stage for Indigenous data sovereignty. The second part, entitled "The Architecture for Indigenous Data Sovereignty at the United Nations," draws from the work of the United Nations Permanent Forum on Indigenous Issues (UNPFII) to chart the last two decades of international development work related to the world's Indigenous peoples and how that work has laid the foundation for Indigenous data sovereignty. The section also explores the contemporary coalescing of interests, concepts and contexts such as ICT, big and open data, and how they are implicated in the uptake of Indigenous data sovereignty as an evolutionary concept among Indigenous peoples, especially in Canada, Australia, New Zealand and the United States (the so-called CANZUS states). The third part, entitled "Indigenous Data Sovereignty as a Strategic Tool of Decolonization," identifies contexts for both the practical application and relevance of data sovereignty with the experience of two American tribal communities and with reference to Canadian jurisprudence on the constitutional duty to consult. The paper concludes

4 See Brian Asa Omwoyo, "A Critical Evaluation of the Regime for Protection of Indigenous Peoples' Rights Under International Human Rights Law" (2014), online: Academia <www.academia.edu/11648613/A_CRITICAL_EVALUATION_OF_THE_REGIME_OF_INDIGENOUS_PEOPLES_RIGHTS_UNDER_INTERNATIONAL_HUMAN_RIGHTS_LAW>.

5 For insights into Indigenous resurgence, see Taiaiake Alfred & Jeff Corntassel, "Being Indigenous: Resurgences against Contemporary Colonialism" (2005) 40:4 *Government & Opposition* 597; see also Rob McMahon, Tim LaHache & Tim Whiteduck, "Digital Data Management as Indigenous Resurgence in Kahnawà:ke" (2015) 6:3 *Intl Indigenous Policy J*, DOI: <10.18584/iipj.2015.6.3.6>.

6 McMahon, LaHache & Whiteduck, *supra* note 5 at 2.

7 *Ibid.*

8 The First Nations & Indigenous Studies program at the University of British Columbia provides insight into the nuances in the terminological designations of Indigenous peoples of Canada (First Nations, Inuit, Métis, Indian and so forth). See Indigenous Foundations, University of British Columbia, "Terminology", online: <<https://Indigenousfoundations.arts.ubc.ca/terminology/>>.

by linking Indigenous data sovereignty to self-determined development while highlighting some pulls and tensions that would shape the capacity of Indigenous peoples to optimally leverage data sovereignty and its promises.

Data Sovereignty and Indigenous Data Sovereignty: Concepts and Imperatives

Data, Information and Statistics

“Data,” “information” and “statistics” are often used interchangeably in ordinary contexts as distinct from the more specialized context of information quality analysis.⁹ Usually when these concepts are deployed, it is with reference to unspoken assumptions regarding the credibility, source, context, process and actors involved and the purpose for which data, information, or statistics are required and generated. Of those latter three and, certainly, other associated concepts or synonyms, “information” stands out as a more encompassing and overarching paradigm. Information is the domain of knowledge, and knowledge, as the cliché goes, is power. Whoever controls knowledge wields power in its various manifestations. The central nature of information as a core resource for wealth production in the twentieth and twenty-first centuries is epitomized in the designation of that period (beginning in the last quarter of the twentieth century) as the Information Age.¹⁰ The Information Age is also referred to as the Computer Age, the Digital Age or the Media Age, which are the catalysts for an unprecedented range of new

and interconnected technologies that characterize the so-called Fourth Industrial Revolution.¹¹

The emphasis on information is a reflection of the transition from the traditional economic model driven by the Industrial Revolution, which focused on bricks-and-mortar industries, to an economy driven by ICT. Information, as a non-rivalrous resource, constitutes the greatest factor of production and wealth creation. In this context, data is expressed in discrete units and is represented with the use of binary numbers. Therefore, the malleability in the modes of expression and application are critical to the transformation of information into data, or vice versa, in any specific context. This model of generation and deployment of data opens, perhaps, the greatest revolution yet in human innovation directed at incredible flexibility in the use of information at the core of unprecedented diversity of research, social networking momentum, biotechnology, artificial intelligence and service delivery. For example, the use of digital technology enables information to be personalized, contextualized, decontextualized, escalated, adapted and manipulated (randomly, selectively or deliberately in any constitution or composition). As well, digital technology enables microminiaturization of information and its simulation in unlimited ways for predictive analytics and scenario building, to mention a few. Additional benefits of ICT include the radical reduction in the cost of information, enhanced collaborative approaches to its production, democratization of its access, far-reaching disruption of existing social and technological applications and formations, and ease of its globalization. All of these features of the Information Age have created an information-driven global economic complex in which the multiple phenomena of big data, open data and data sovereignty shape the dynamics of the control of vital information.

9 See Ron S Kenett & Galit Shmueli, *Information Quality: The Potential of Data and Analytics to Generate Knowledge* (West Sussex, UK: John Wiley & Sons, 2017).

10 See Susan Crawford, “The Origin and Development of a Concept: The Information Society” (1983) 71:4 Bull Medical Library Association 380; see also Fritz Machlup, *The Production and Distribution of Knowledge in the United States* (Princeton, NJ: Princeton University Press, 1973); see generally Chidi Oguamanam, *Intellectual Property in Global Governance: A Development Question* (New York: Routledge, 2011) at 29–34.

11 Klaus Schwab, *The Fourth Industrial Revolution* (New York: Crown, 2016).

The Concept of Data Sovereignty

Data is the currency of the Information Age. Because of its ubiquity and its malleability in terms of functional application and conceptual or analytical invocation, understanding data as a phenomenon is not an exact science. With regard to that precautionary observation and terminological inconsistencies that assail the concept, data sovereignty in its simplest form refers to a state's interest in exercising sovereign authority and control through laws and regulations relating to the data it collects or the data collected within or relating to its jurisdiction.¹² Expressed differently, data sovereignty "designates the right of States in relation to other States or entities to govern the collection and ownership of data, including access and use of data that is domiciled within its jurisdiction."¹³ Data sovereignty, as an idea, is the assumption of responsibility to ensure that information is managed in ways "consistent with the laws, practices, and customs of the nation-state in which it is located."¹⁴ Taking into consideration the sophistication of technological intervention in data generation and storage, as well as the complex chain of data migration and data valorization, data sovereignty arguably extends to the interest of a state in the sanctity or integrity, including the security, of data and the cultural and other contextual sensitivity associated with data.

A state's interest in data sovereignty is an extension of its sovereignty and its custody of information as an instrument of power for domination and for shaping policy. For a Westphalian colonial state, the observation by Jennifer Lee Schultz and Stephanie Carroll Rainie that "[d]ata is intimately linked to the sovereignty and self-determination of all nations"¹⁵ goes without question. And to further

reinforce the point, the authors call attention to the fact that the root word of "statistics" (a synonym of data and information) is "[s]tate."¹⁶

Indigenous Data and Research: A Site of Intense Distrust

Indigenous peoples' deeply troubling colonial relations and history have been characterized by contestations around the status of their cultural and political formations in relation to the dominant culture and its Westphalian state structure. In addition to the historical denial of Indigenous peoples' personhood or "peopleness," the status of Indigenous political formations as states, or its parallel, or the fitness of the state, as a contraption, to Indigenous reality, has remained incipient and open to negotiations in specific colonial states, for example, across CANZUS and elsewhere. Throughout these countries, despite continuing progress, the status of Indigenous political formations as sovereigns, Indigenous peoples' rights to self-determination and the context of those rights remain in a state of flux in specific national contexts. But due recognition is given to the United States, where tribal sovereignty and acceptance of self-determination constitute the bedrock of progressive congressional statutory affirmations.¹⁷ Under the colonial framework, Indigenous peoples have had a troubled relationship with how data or information concerning them are generated, accessed, shared, applied and owned by the colonial states. This data is typically owned by the colonial state in which Indigenous peoples are embedded, or by agents or other non-Indigenous actors, in particular researchers and corporations. Perhaps there are not many sites that reinforce the asymmetry of colonial power relations and domination than in the generation and management of data or information. While colonial states are able to assert data sovereignty as a given, Indigenous peoples or their political entities are only recently staking their claims in the data space as latecomers, and as a result of their resurgence and part of the broader decolonization project.¹⁸

12 For more perspectives on data sovereignty, see Tahu Kukutai & John Taylor, "Data sovereignty for indigenous peoples: current practice and future needs" in Tahu Kukutai & John Taylor, eds, *Indigenous Data Sovereignty: Toward an Agenda* (Sydney: ANU Press, 2016) at 1–22 [Kukutai & Taylor, *Indigenous Data Sovereignty*]; see also C Matthew Snipp, "What does data sovereignty imply: what does it look like?" in Kukutai & Taylor, *Indigenous Data Sovereignty* (*ibid.*) at 39–55.

13 See Chidi Oguamanam, "ABS: Big Data, Data Sovereignty and Digitization: A New Indigenous Research Landscape" [Oguamanam, "ABS"] in Chidi Oguamanam, ed, *Genetic Resources, Justice and Reconciliation: Canada and Global Access and Benefits Sharing* (New York: Cambridge University Press, 2018) 196 at 207 [Oguamanam, *Genetic Resources*].

14 Snipp, *supra* note 12 at 39.

15 Jennifer Lee Schultz & Stephanie Carroll Rainie, "The Strategic Power of Data: A Key Aspect of Sovereignty" (2014) 5:4 *Intl Indigenous Policy J*, DOI: <10.18584/IIPJ.2014.5.4.1>.

16 *Ibid.*

17 See John Borrows, "Policy Paper: Implementing Indigenous Self-Determination Through Legislation in Canada", Assembly of First Nations (2017) at 2, online: <<https://bit.ly/2u067d6>>.

18 OpenNorth & British Columbia First Nations Data Governance Initiative, "Decolonizing Data: Indigenous Data Sovereignty Primer" (2017) Data Sovereignty Interest Paper (on file with author).

Across many colonial states, Indigenous peoples lament that they have been “researched to death,” resulting in an extensive trail of abuses and victimizations in research contexts.¹⁹ Those well-documented facts are outside the scope of this paper.²⁰ Research is a systemic exercise in gathering and using information to arrive at specific conclusions for the advancement of knowledge and making of policy. In essence, the colonial default is that Indigenous peoples are passive objects and subjects of research sponsored not only by the colonial states, but often conducted by academic researchers who may have complicit relationships with corporations and other institutional actors in the data-generating space. These entities are invariably non-Indigenous. In that context, Indigenous peoples do not set the research agenda, as those are predetermined without consultation or without their free, prior and informed consent (FPIC).²¹ As well, the undergirding development paradigm and framing of issues in research and data generation are often culturally insensitive, as they are delivered in a top-down, prescriptive module typical of the colonial experience.

In addition, knowledge arising from research is valorized as a capitalist proprietary enterprise because “[t]here is no law or concept in Western society that recognizes inherent community rights and interests in data and information.”²² Similarly, rarely does the importance of the interface of personal and collective or community privacy resonate in non-Indigenous research

paradigms. Furthermore, given the small size of many Native, Indigenous, Aboriginal or tribal populations (however they are called), statistics or data generated from these endeavours hardly get reflected in national surveys.²³ Few things better illustrate the problematic dynamic of data relating to Indigenous peoples, in both national and international contexts, than something as fundamental as who should be counted as an Indigenous person.²⁴

Indigenous peoples are unequivocal that colonial-rooted architecture for research and data generation in their territories is ill-suited to their development aspirations and risks being counterproductive to their desire for self-determination and self-governance.²⁵ States handle Indigenous-related data as part of Indigenous peoples’ claim to data sovereignty with limited, if any, consciousness of their claims to sovereignty or as co-sovereigns. The result is that research data, information, or statistics relating to Indigenous peoples constitute a source of intense mistrust and conflict among Indigenous peoples, the colonial state and sundry actors. Despite efforts to treat research involving Indigenous peoples²⁶ as a *sui generis* category, and the adjustment of conventional institutional review boards to this end, the issue of Indigenous data continues to be second-guessed and negotiated from non-Indigenous perspectives without tackling the question of cultural sensitivity or sovereignty.²⁷ This conflict has ramifications for the ability of Indigenous peoples to exercise their right to self-determination. Authentic data drives policy formulation, decision making and mapping of development aspirations, problem solving and other calculations critical to Indigenous resurgence in a range of fields. These include research, education, language, finance,

19 See e.g. American Indian Law Centre, *Model Tribal Research Code (with Materials for Tribal Regulation for Research and Checklist for Indian Health Boards)*, 3rd ed (Albuquerque: University of New Mexico, 1999); see also Noemi M Porro, Joaquim Shiraishi Neto & Roberto Porro, “Traditional Communities as ‘Subjects of Rights’ and the Commoditization of Knowledge in Brazil” (2015) 6:2 Intl Indigenous Policy J, DOI: <10.18584/iipj.2015.6.2.8>.

20 A contemporary example of Indigenous peoples’ troubled relationship with research can be seen in the context of the human genome diversity project. See Bitá Amani & Rosemary Coombe, “The Human Genome Diversity Project: The Politics of Patents at the Intersection of Race, Religion, and Research Ethics” (2005) 27:1 L & Policy 152.

21 For context of the abuse of Indigenous peoples in human genetic research, see Robyn L Sterling, “Genetic Research among the Havasupai: A Cautionary Tale” (2011) *American J Ethics* 113; LorrieAnn Santos, “Genetic Research in Native Communities” (2008) 2:4 *Progress in Community Health Partnerships* 321; Vicki Bower, “From human rights to the human genome – stopping biopiracy” (1997) 3:10 *Nature Medicine* 1056.

22 See First Nations Information Governance Centre (FNIGC), “Pathways to First Nations’ data and information sovereignty” in Kukutai & Taylor, *Indigenous Data Sovereignty*, supra note 12 at 139–55.

23 See Schultz & Rainie, supra note 15.

24 *Ibid.*

25 For a comprehensive literature review of Indigenous peoples’ troubled experience with the conduct of research, see Willie Ermine et al, *The Ethics of Research Involving Indigenous Peoples: Report of the Indigenous Peoples’ Health Research Centre to the Interagency Advisory Panel on Research Ethics* (Regina: Indigenous Peoples’ Health Research Centre, 2004), online: <http://iphrc.ca/pub/documents/ethics_review_iphrc.pdf>.

26 See Government of Canada, Panel on Research Ethics, *Tri-Council Policy Statement on Research Involving First Nations, Inuit and Métis of Canada – Chapter 9* (2018), (2019), online: <<https://bit.ly/36f032o>>.

27 Anna Harding et al, “Conducting Research with Tribal Communities: Sovereignty, Ethics, and Data-Sharing Issues” (2011) 120:1 *Environmental Health Perspectives* 6.

health, medicine, agriculture, environmental stewardship, membership of the community, lands, resources, artworks, rituals, ceremonies, expressive culture, and open-ended domains of creativity, innovation and cultural heritage.

Canada's First Nations and Indigenous Data Sovereignty

Canada is a pacesetter in the quest for Indigenous data sovereignty. The country attained this status courtesy of First Nations who capitalized on Canada's flawed and dubious research and data governance landscape and sought to close the gap to further their aspiration for self-determination. In 1994, the Government of Canada, through Health Canada and its then Medical Services Branch, launched three nationwide longitudinal health surveys. The initiative completely excluded First Nations (those living on reservations and in Northern Canadian First Nations communities). As much as the exclusion of First Nations from this important research project hallmarked the troubled relationship between Indigenous peoples and Canadian research, it also created an important space for translation, as well as an opportunity to crystallize decades of Indigenous aspiration for data sovereignty. In order to fix the gap, the Medical Services Branch extended an invitation to regional First Nations representatives, in 1995, to participate in a supplementary survey. In the words of the First Nations Information Governance Centre (FNIGC), which was the legacy of this dramatic state of affairs, the invitation was "to implement a national health survey on First Nations reserves."²⁸ According to the FNIGC, this was happening at a time when "the issue of First Nations jurisdiction over all matters including ownership of information was at the forefront of First Nations political thinking."²⁹ For example, in 1996, the report of the Royal Commission on Aboriginal Peoples lamented the political sensitivity of information gathering and the issue of how it is conducted without consideration of Aboriginal concerns and priorities.³⁰

The First Nations mobilized and grabbed the challenge with both hands in an initiative

characterized by analysts as "a political response to colonialism and the role of knowledge production in reproducing colonial relations."³¹ They constituted a committee that conducted and delivered in 1997 the first Regional Health Survey (RHS), which focused on addressing health and well-being matters that particularly affect First Nations and the Inuit.³² There is a lot of information on this singular initiative and its transformational and catalytic impact beyond Canada on the subject of Indigenous data sovereignty. But the survey's most authoritative rendition is captured by the FNIGC, which has since continued to drive the process: "Although the resulting data were invaluable, helping to generate program resources in several key public and community health areas, First Nations were acutely aware of the opportunity to utilize the RHS as a vehicle to move the benchmark ahead in favour of First Nations' data jurisdiction and ensure the continued forward momentum of sovereignty over data information, knowledge and stories. It was from the works of the RHS that the concepts inherent to data jurisdiction were articulated."³³

Through a committee and caucus model, First Nations took the RHS project seriously. They set a nationwide parameter in which First Nations seized control of the design, implementation and ownership of research involving them. They were able to do this through bottom-up and grassroots community participation in all critical elements of the research, including the enhancement of region-specific inquiries, development of a code of research ethics, an Indigenous-respectful cultural framework for doing research, and considerations for individual and community privacy in a research context as implicated in the Indigenous worldview of information. The RHS is premised on the understanding that First Nations are accountable primarily to the members of their community for the generation, use, management and governance of information relating to them. The legitimacy of First Nations in exercising jurisdiction over information governance "is based on inherent and treaty rights supported by international instruments such as the United Nations Declaration on the Rights of Indigenous Peoples."³⁴

28 FNIGC, *supra* note 22 at 146.

29 *Ibid.*

30 See generally the comprehensive Royal Commission on Aboriginal Peoples, *Report of the Royal Commission on Aboriginal Peoples* (Ottawa: Supply and Services Canada, 1996) at 498.

31 Kukutai & Taylor, *Indigenous Data Sovereignty*, *supra* note 12 at 9.

32 FNIGC, *supra* note 22 at 147.

33 *Ibid.*

34 *Ibid.* at 152.

The RHS is now undertaken every four years in Canada. It is backed by the well-known Ownership, Control, Access and Possession (OCAP) governance principle for the conduct and modelling of research and Indigenous data sovereignty for self-determination. OCAP represents the key pillars of Indigenous peoples' relationship with data. It transcends "the strict definition of each word in the acronym. It represents principles and values that are intertwined and reflective of First Nations' views of jurisdiction and collective rights."³⁵ OCAP is not only trademarked as a symbol of authentically sanctioned Indigenous data generation and a governance template, but it is institutionally administered by the FNIGC, a corporate entity and successor to the preceding caucus-and-committee model that implemented the first RHS in 1997. In terms of the survey's symbolism, the FNIGC describes the RHS as "the first national survey to be fully owned, controlled and stewarded by First Nations. Nothing like it had ever been successfully completed anywhere in the world. Concepts such as full ownership of data and intellectual property by First Nations, First Nations stewardship of data and government access through a limited licence to use were to become essential elements of the original RHS and form the backbone of OCAP principles as they exist today."³⁶

The First Nations experience in Canada with the RHS is aptly recognized as "a stunning illustration of how sovereignty can be realized in relation to data, information and knowledge as part of a broader goal of self-determination."³⁷ Since its first implementation in 1997, the RHS has inspired a Canada-wide and global Indigenous movement around data sovereignty, a concept that takes a new impetus on the backdrop of intensification of ICT. It is important that the First Nations revolution in data sovereignty, although ahead of the global curve, derives some of its momentum on the foreground of mostly under-reported tides on the international landscape within the last two International Decades of the World's Indigenous Peoples (1994–2015). The next section surveys the foundation and devolution of Indigenous data sovereignty over the last two International Decades of the World's Indigenous Peoples as spearheaded by the UNPFII.

35 *Ibid* at 149.

36 *Ibid* at 146.

37 Kukutai & Taylor, *Indigenous Data Sovereignty*, *supra* note 12.

The Architecture for Indigenous Data Sovereignty at the United Nations

The Role of the UNPFII and Others

One of the major milestones of the first two International Decades of the World's Indigenous Peoples is the establishment of the UNPFII in 2000.³⁸ The UNPFII is a high-level advisory body on Indigenous issues to the United Nations Economic and Social Council (ECOSOC). Through ECOSOC, the UNPFII's opinions and recommendations are channelled to specific programs, funds and agencies of the United Nations for implementation and translation into policy. The forum's work and mandates focus on six thematic areas, namely: economic and social development, culture, the environment, education, health and human rights. Clearly, the UNPFII, its mandate and its affiliation with ECOSOC reflect a concrete attempt at galvanizing decades of political struggles over the Indigenous question into transformational impact on Indigenous peoples through proactive policies.

In 2001, a year after the UNPFII was established, the UN Commission on Human Rights appointed a special rapporteur on the rights of Indigenous peoples.³⁹ Through this act, Indigenous peoples' rights became part of the system of thematic special procedure in the United Nations. Six years later, in 2007, the UN Human Rights Council established the Expert Mechanism on the Rights of Indigenous Peoples (EMRIP).⁴⁰ EMRIP was tasked with providing expertise and advice to the UN Human Rights Council on the rights of Indigenous peoples pursuant to the newly passed⁴¹ 2007 United

38 *Establishment of a Permanent Forum on Indigenous Issues*, ECOSOC Res 2000/22, UNECOSOCOR, 45th Sess, UN Doc E/RES/2000/22 (2000).

39 The first special rapporteur on the rights of Indigenous peoples was Mexico's Rodolfo Stavenhagen (1932–2016), appointed in 2001.

40 *Expert Mechanism on the Rights of Indigenous Peoples*, UNHRC Res 6/36, UNHRCOR, 6th Sess, UN Doc A/HRC/6/36 (2007).

41 The resolution backing UNDRIP was passed on September 3, 2007, while the EMRIP resolution was passed three months later, in December 2007.

Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)⁴² and to UN member states, on demand, on how best they could accomplish the aims of the declaration. The UNPFII, the UN special rapporteur and EMRIP are the three main bodies in the UN system with special mandates that directly focus on Indigenous issues. While the special rapporteur and EMRIP mandates are *prima facie*, even if not exclusively, political, the UNPFII's mandate is inherently linked to the economic, social and cultural aspects of Indigenous issues. Collectively, these organs and mechanisms function harmoniously to advance the aims of UNDRIP.

Notwithstanding that UNDRIP postdates the UNPFII, in principle the declaration reflects a consolidated outcome of the rights and aspirations of Indigenous peoples toward decolonization and self-determination as a global consensus. The UNPFII has served as a pathfinder and, when consolidated, its efforts give practical effect to the realization of UNDRIP. Within almost two decades of its existence, the UNPFII has continued to execute its mandate in an evolutionary manner, aligning and complementing its mandate with those of related bodies, entities and institutions, as well as in response to critical developments on Indigenous issues. This approach is consistent with one of the key mandates of the UNPFII, which is to raise awareness and promote integration and coordination of activities related to Indigenous issues within the UN system.⁴³

The Case for Indigenous Data Sovereignty

Even though the mandates of the UNPFII and UNDRIP did not make any direct reference to data sovereignty, the UNPFII invested a significant portion of its work toward the promotion of data sovereignty as part of its progressive policy approach to Indigenous issues, especially with regard to the realization of the right to self-determination as unequivocally affirmed in UNDRIP.⁴⁴ Perhaps, more importantly, as a

contemporary matter, the UNPFII has been able to sustain the consciousness over the importance of data as a critical tool for attaining Indigenous development aspirations. Remarkably, the UNPFII's interest in data derives directly from its mandate and as articulated in its enabling resolution. Specifically, under mandate 2(c), the UNPFII is required to “prepare and disseminate information on Indigenous issues.”⁴⁵ That mandate recognizes that in order to prepare and disseminate information, the UNPFII has to work with and task all relevant agencies of the United Nations, counting those of the states and variegated entities, including Indigenous groups and organs. Given the pervasive importance of data as an increasingly valuable resource in the Information Age — a contemporaneous era to the two International Decades of the World's Indigenous Peoples — the mandate of the UNPFII regarding information takes on great significance.

At the outset of its first session in 2004, the UNPFII convened an expert meeting that focused on developing a framework “for Data Collection and Data Aggregation for Indigenous Peoples.”⁴⁶ The outcome of that crucial meeting laid the foundation for continuing elaboration and uptake of principles regarding the application of data as a crucial policy and governance tool for tackling virtually every issue relating to Indigenous peoples. Jérémie Gilbert and Corinne Lennox highlight the effects of the UNPFII's continued work on calling attention to the importance of data or information as an invaluable tool for the advancement of the cardinal objectives and aspirations of Indigenous peoples, including the concept of self-determined development under UNDRIP. According to Gilbert and Lennox, the UNPFII initiatives established a number of core principles “such as: all data collection should follow the principles of FPIC; the principle of self-identification should be paramount in determining subjects/categories of data collection; participation of Indigenous peoples in the collection process is essential; and moreover, ‘data collection must respond to the priorities

42 *United Nations Declaration on the Rights of Indigenous Peoples*, GA Res 295, UNGAOR, 61st Sess, Supp No 49, UN Doc A/RES/61/295, 46 ILM 1013 (2007) [UNDRIP].

43 *Establishment of a Permanent Forum on Indigenous Issues*, *supra* note 38, cl 2(b).

44 UNDRIP, *supra* note 42. Article 3 of UNDRIP provides that “Indigenous Peoples have the right to self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development.”

45 *Establishment of a Permanent Forum on Indigenous Issues*, *supra* note 38, cl 2(c).

46 See Jérémie Gilbert & Corinne Lennox, “Towards new development paradigms: the United Nations Declaration on the Rights of Indigenous Peoples as a tool to support self-determined development” (2019) 23:1–2 Intl J Human Rights 9, n 38; see also *Report of the Workshop on Data Collection and Disaggregation for Indigenous Peoples*, UNPFIIOR, 3rd Sess, UN Doc E/C.19/2004/2 (2004).

and aims of the Indigenous communities.”⁴⁷ The UNPFII convened a second workshop in 2006 that further emphasized the particular worldviews of development for Indigenous peoples. Among the conference recommendations was a call that “[t]he United Nations should identify and adopt appropriate indicators of Indigenous identity, lands, ways of living, and Indigenous rights to, and perspectives on, development and well-being.”⁴⁸

Indigenous Data Sovereignty in the Development Paradigm

Over the years, since its first major initiative in 2004, and consistent with its mandate, the UNPFII has been unrelenting in placing Indigenous issues on the front burner of its program of work. The UNPFII has largely succeeded in mainstreaming data relating to Indigenous issues into the United Nations’ development planning and implementation across many specific UN programs, funds and agencies.⁴⁹ For example, development actors such as the World Bank, the International Finance Corporation, and transnational and national corporations, donors and agencies recognize that Indigenous-sanctioned information or data is a crucial resource for informed insights into Indigenous-sensitive development. Notably, the UNPFII holds and supports continuing workshops and awareness-raising endeavours on the relevance of data, modalities for data collection and applications of data toward the enhancement of UN development programs. For example, through these efforts, incorporation of Indigenous-related information or data became an integral part of impact evaluation of the *2030 Agenda on Sustainable Development*⁵⁰ and the 17 accompanying Sustainable Development Goals (SDGs), and certainly other development-oriented undertakings within and outside the UN framework.

An indication of the level of progress and international awareness regarding the value of data as an instrumental strategy to advance Indigenous resurgence and the realization of self-determination in its complex renditions — economic, social, cultural, political and so forth

— is captured in the outcome document of the 2014 high-level plenary meeting of the UN General Assembly, also known as the World Conference on Indigenous Peoples.⁵¹ Specifically, paragraph 10 of the outcome document provides that “[w]e commit ourselves to working with indigenous peoples to disaggregate data, as appropriate, or conduct surveys and to utilizing holistic indicators of indigenous peoples’ well-being to address the situation and needs of indigenous peoples and individuals, in particular older persons, women, youth, children and persons with disabilities.”⁵²

Data is thus a core thematic of international development and the policy framework for engaging with Indigenous peoples. Compared to the Millennium Development Goals (MDGs), the UNPFII effort on Indigenous information was entrenched in making Indigenous-related data “a key strand” of the SDGs.⁵³ For instance, the Indigenous Peoples Major Group for Sustainable Development is a strong champion for the use of Indigenous data in the SDG process. The group owes its existence to the joint coordination of the Indian Treaty Council and the Philippines-based Tebtebba Foundation.⁵⁴ It is one of the nine eligible participating major groups in the SDG process at the global level.⁵⁵ The group was proactive via the position paper it prepared for the proposed SDGs in which it canvassed for a monitoring and evaluation framework for gauging the impact of SDGs on Indigenous peoples and issues, especially the right to self-determination. The UNPFII’s recommendations have sparked current and developing initiatives for global Indigenous sustainability and a well-being indicator as a development component. Other initiatives include the Indigenous Navigator, described as “a tool adapted for SDGs’ existing indicators” and a “framework and set of tools for and by Indigenous

47 Gilbert & Lennox, *supra* note 46 at 9, n 40.

48 *Ibid* at 9, nn 43–45.

49 Gilbert & Lennox, *supra* note 46, provide an overview of this trend.

50 UN, “Transforming our world: the 2030 Agenda for Sustainable Development”, online: <<https://sustainabledevelopment.un.org/post2015/transformingourworld>>.

51 *Outcome document of the high-level plenary meeting of the General Assembly known as the World Conference on Indigenous Peoples*, GA Res 69/2, UNGAOR, 99th Sess, Supp No 49, UN Doc A/RES/69/2 (2014).

52 *Ibid*.

53 Gilbert & Lennox, *supra* note 46 at 10.

54 *Ibid*, n 47, citing the Indigenous Peoples Major Group for Sustainable Development, online: <www.indigenouspeoples-sdg.org/index.php/english/>.

55 *Ibid*.

Peoples to systematically monitor the level of recognition and implementation of their rights.”⁵⁶

Indigenous Data Sovereignty: Empowering UNDRIP

The mainstreaming of Indigenous information or data as a tool for Indigenous resurgence aims to ensure the realization of UNDRIP as the principal organizing target of Indigenous data sovereignty. In other words, an enduring objective of Indigenous data sovereignty is the advancement of the rights enunciated in UNDRIP. The significance of UNDRIP lies not only in its status as a crystallization of the historic struggles of Indigenous peoples over the millennia, but, perhaps more importantly, in its unequivocal stance on the right of Indigenous peoples to self-determination.⁵⁷ In addition, the instrument incorporates the fulcrum of human rights of Indigenous peoples. Further, UNDRIP integrates and melds the economic, social, cultural and political rights of Indigenous peoples as transformational ingredients of Indigenous peoples’ rights to self-determination.

A skim across the language of multiple international instruments relating to Indigenous peoples’ rights, including the International Labour Organization’s Indigenous and Tribal Peoples Convention, 1989 (No. 169),⁵⁸ the mandates of the UNPFII, EMRIP and UNDRIP, and the outcome document of the World Conference on Indigenous Peoples, to mention a few, reveals some consistent areas of emphasis. For example, in one way or another, these and similar instruments make reference to cooperation and consultation with Indigenous peoples, their representatives, and institutions to obtain FPIC regarding any issues that concern them. These instruments make mention of developing coordinated, systemic action to protect the rights of Indigenous peoples, empowering specific categories of Indigenous peoples (youth, women, children and people with disabilities); and partnering to improve social and economic conditions, with reference to developing targeted measures to improve education, health,

well-being, housing, sanitation, agriculture, the environment, food security and so forth. Others include the pursuit of Indigenous-driven visions of economic, social and cultural development and institutions; encouragement of traditional knowledge (TK), including traditional medicine, traditional ecological knowledge of flora and fauna, and the uses of genetic resources, land, territories and cultural practices; and, generally, traditional subsistence activities, economies and livelihood.

Specifically, article 31 of UNDRIP⁵⁹ takes an omnibus and summative approach to protection of Indigenous rights. That approach reflects the substantive content of multifarious instruments on the Indigenous issues to some degree or another. UNDRIP declares as follows: “Indigenous Peoples have the right to maintain, control, protect, and develop their cultural heritage, traditional knowledge, and traditional cultural expressions, as well as the manifestations of their sciences, technologies, seeds, medicines, knowledge of properties of flora and fauna, sports and traditional games, visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge and traditional cultural expressions.”⁶⁰

As a practical matter, the ability of Indigenous peoples to realize their rights to self-determination and leverage their development aspirations is anchored, to a large degree, in the issue of data sovereignty. The above enumerated instruments recognize Indigenous peoples as partners with states and other development actors. These instruments, especially UNDRIP, which represents the received wisdom on Indigenous peoples’ rights, enumerate a range of rights. But the capability of Indigenous peoples as true development partners is a factor of exercising the OCAP framework of data or information related to the gamut of rights now recognized and associated with Indigenous peoples. How each of the specific elements of OCAP is applied would vary from one national setting to another. However, courtesy of the First Nations of Canada and the maturing range of efforts at the international level, notably through the work of the UNPFII, the world’s Indigenous peoples have taken the issue of data sovereignty

56 See Gilbert & Lennox, *supra* note 46 at 10–11, n 51, for elaboration on the Indigenous Navigator and other anticipated programs at the national and international levels in the use of Indigenous data sovereignty to support Indigenous-focused development and self-determination.

57 See *supra* note 44 and accompanying text.

58 International Labour Organization (ILO), *Indigenous and Tribal Peoples Convention, 1989* (No 169), ILO Convention, 76th Sess (1989).

59 The scope of Indigenous rights pursuant to UNDRIP, *supra* note 42, is better appreciated when read in conjunction with articles 11 and 12.

60 UNDRIP, *supra* note 42, art 31.

as a crucial and fairly new frontier of the struggle for self-determination and decolonization.

Indigenous peoples' profound interest in data sovereignty demonstrates that they can no longer afford to be second-guessed from colonial prisms and their Eurocentrism. For so long, these perspectives constituted a surveillance lens and basis for value judgment of Indigenous peoples' cultural heritage, TK, traditional cultural expressions, manifestations of their sciences, technologies, seeds, medicines, knowledge of properties of flora and fauna, sports and traditional games, and visual and performing arts. Through Indigenous data sovereignty, Indigenous peoples take on the role of protagonist rather than a passive position regarding the governance of their knowledge, which has been framed for millennia from the Western IP prism. For Indigenous peoples, data sovereignty allows them to assume and become authentic sources and custodians of their data; it also means that they could be empowered partners and not mere appendages to researchers and government agents seeking information about them.

Traction for Indigenous Data Sovereignty in CANZUS: A Decolonization Agenda

In the non-literal way in which the term is deployed, Indigenous data sovereignty refers to the idea that Indigenous interest in data is analogous to or flows from their sovereign status, and as an extension of their right to self-determination. Put differently, data sovereignty supports the idea of Indigenous peoples or their sanctioned entities or agencies as the "proper locus of authority over the management of data about Indigenous Peoples, their territories and ways of life."⁶¹ This position complements a parallel conception of data sovereignty emphasizing the management of data in ways that are consistent with local rules,⁶² which include Indigenous legal traditions, protocols and practices. When Indigenous legal traditions or local rules guide the management of data, then there is a guarantee that Indigenous peoples and

their agencies are truly in charge, in accordance with undergirding principles of data sovereignty.⁶³

Without question, Indigenous data sovereignty is not a direct purposive equivalent of conventional or generic data sovereignty associated with colonial states and colonialism. For the colonial state, data sovereignty is an extension of Westphalian state sovereignty. That is the basis for exercising authority over information, including information relating to Indigenous peoples and other categories. State sovereignty has been a historic tool and symbol of colonialism and domination, carrying the burdens of its troubled relations with Indigenous peoples. Conversely, Indigenous data sovereignty is an enterprise of decolonization. However, Indigenous data sovereignty is premised on Indigenous peoples' claims as sovereigns or co-sovereigns in relation to the colonial state pursuant to treaty rights, for instance in CANZUS states. But for Indigenous peoples, sovereignty over their data symbolizes resistance against the assumptions of colonialism and the asymmetrical relations of power with which the state had dealt with Indigenous information. Under that framework, Indigenous peoples had no control over their information. They were — and are still — framed as passive recipients of the state-centric vision of development packages with either no sensitivity or a distorted sensitivity regarding the involvement of Indigenous peoples in generating crucial data underlying that top-down vision of development transmission.

Progress on Indigenous data sovereignty is happening by installment at national and international levels. As previously noted, increasingly, data sovereignty is now a component of the new national and international development model that seeks to take into account an Indigenous and culturally sensitive vision of development. The 1994 initiative of Canada's First Nations is a demonstrable example of early uptake and implementation of data sovereignty at the national level. The Canadian success story attracted significant international attention. It has since remained a model, a

61 Kukutai & Taylor, *Indigenous Data Sovereignty*, *supra* note 12 at 14.

62 See Snipp, *supra* note 12 at 39.

63 This raises the question of whether a case could be made for Indigenous data sovereignty in a situation where Indigenous data is managed by a non-Indigenous entity in strict adherence with Indigenous legal traditions, customs and practices. However, it recognizes that Indigenous legal traditions, customs and practices are the most authoritative determinant elements of data sovereignty. Indigenous management of Indigenous data is at the heart of Indigenous data sovereignty.

sort of “icebreaker” on the quest for what data sovereignty looks like in practice globally. Even though it was a national event, its international influence made the Canadian archetype of data sovereignty one of the under-reported feats of the two International Decades of the World’s Indigenous Peoples. Its influence percolated through the current of the UNPFII leadership that championed international and, certainly, global efforts at drawing attention to data sovereignty as a strategic policy tool to advance Indigenous self-determination at a time of Indigenous resurgence.

Lately, a convergence of factors has triggered an international Indigenous movement dedicated to the promotion of data sovereignty and its internalization at various national and local settings. These factors include the ubiquity of the applications of ICT in data harvesting and associated phenomena, such as big data and open data, not to mention amplified awareness generally over the importance of data. Open data and big data have “a nuanced relationship.”⁶⁴ Open data is part of the “openness or open access movement and its continuing metamorphosis as a malleable approach toward enhancing the flow of information, reducing the costs of its access and optimizing its public impact in contrast to a closed proprietary approach.”⁶⁵ Big data is a phenomenon as well as a process designating the availability of massive volume, high-velocity and high-variety information assets⁶⁶ on a scale beyond the capacity of conventional or isolated data processing applications, but they are convertible into diverse and far-reaching uses by powerfully endowed entities. Those entities, which include governments and mega-corporations, are capable of using a wide variety of high-tech advancements to exploit big data. Overall, big data refers to society’s improved capacity to interconnect, harness and apply an unprecedented scale of information in equally unprecedented ways.

Open and big data phenomena contribute significantly in reducing the cost of information and in promoting research in ways that could

be beneficial to Indigenous data sovereignty.⁶⁷ However, they “are constructive and modified forms of proprietary [i.e., exclusive and commercial] use of data in self-interested ways that strategically encourages targeted forms of sharing via licensing or related schemes to optimize value.”⁶⁸ Big and open data phenomena reflect the complex interests and divergent stakeholders that operate in the data space. Those interests are neither aligned with Indigenous peoples nor with the *raison d’être* of Indigenous data sovereignty. Clearly, “[t]he global data revolution and associated new technologies can be a double-edged sword for Indigenous peoples if the values and principles of Indigenous data sovereignty are not respected.”⁶⁹ This concept is as true for big data as it is for open data: it is necessary to ensure these principles are understood and applied by nation-states and other stakeholders as the case may be — in the words of Indigenous peoples, in a way that “does not further marginalize/reinforce structural oppression toward Indigenous Nations.”⁷⁰

In a similar vein, an analyst has counselled that the “open data [and certainly big data] community needs to critically reflect on its worldview and how it differs from that of Indigenous People.”⁷¹ This point is not lost on some big and open data players. For example, OpenNorth, one of the global big data entities, is now actively involved with First Nations in developing Indigenous data sovereignty in ways that critically appraise its relationship with open data and underlying parameters.⁷² As a related matter, Indigenous data sovereignty must account for what the author calls the IP or proprietary problem. Specifically, the question of how Indigenous data sovereignty, for example, the OCAP framework explored below, deals with non-Indigenous use of Indigenous data for whatever purpose is important. Related to that is the issue of how any such protocol

64 See Oguamanam, “ABS”, *supra* note 13 at 200.

65 *Ibid.*

66 See Thomas Lefèvre, “Big data in forensic science and medicine” (2018) 57 *J Forensic & Legal Medicine* 1–6, DOI: <10.1016/j.jflm.2017.08.001>; see also Marcelo Corrales, Mark Fenwick & Nikolaus Forgó, eds, *New Technology, Big Data and the Law* (Singapore: Springer, 2017).

67 For example, Indigenous peoples are able to engage in shared or collaborative uses of data across nations and communities.

68 Oguamanam, “ABS”, *supra* note 13 at 199–200 (footnotes omitted).

69 See OpenNorth & British Columbia First Nations Data Governance Initiative, *supra* note 18 at 7.

70 *Ibid.* at 6.

71 Chidi Oguamanam & Vipal Jain, “Access and Benefit Sharing, Canadian and Aboriginal Research Ethics Policy after the Nagoya Protocol: Digital DNA and Transformations in Biotechnology” (2017) 3:1 *J Environmental L & Practice* 79 at 96, quoting Tracey P Lauriault, n 60.

72 See OpenNorth & British Columbia First Nations Data Governance Initiative, *supra* note 18.

addresses Indigenous reservations over the abuses of Indigenous knowledge, information or data by the application of IP rights pursuant to the colonial or conventional information governance model.⁷³

In addition to the tension arising at the intersections of ICT and big and open data, other factors propelling the international Indigenous movement in the direction of data sovereignty include the continuing exploitation of Indigenous peoples and their interests in research contexts as evident in the cases of biopiracy and responses to it, such as the idea of access and benefit sharing (ABS) over the utilization of genetic resources in Indigenous territories and associated TK.⁷⁴ As a policy response and emerging jurisprudence, the evolution of ABS has resulted in the reinforcement of such principles as FPIC, disclosure of source and origin of genetic resources acquired for research and the resulting invention or innovation for which IP is sought.⁷⁵ Added to these is the idea of using databases of critical genetic resources endemic in Indigenous and local communities and associated TK to support a transparent and accountable IP system, especially the patent process. India's famous TK digital library is one major example of this trend.⁷⁶ ABS is now the traction point for underscoring how biotechnology and Indigenous ecological or so-called biocultural knowledge constitute an invaluable intersection and frontier of data sovereignty. In order to effectively participate in ABS, it is imperative that Indigenous peoples have control of their genetic resources and associated TK data implicated by the sophisticated channels of knowledge transfer in the diverse and complex applications of biotechnology and its relationship with Indigenous knowledge.

Documented accounts of the current wave of data sovereignty are credited to the initiative

of a network of tripartite Indigenous national organizations: Te Mana Raraunga (the Maori Data Sovereignty Network) in Aotearoa/New Zealand, the United States Indigenous Data Sovereignty Network, and the Maiam nayri Wingara Aboriginal and Torres Strait Islander Data Sovereignty Group in Australia.⁷⁷ In 2017, the group, which is now associated with the International Indigenous Data Sovereignty Interest Group (IDSIG), issued the now famous International Indigenous Data Sovereignty IG Charter Statement.⁷⁸ The three constitutive network members of the IDSIG operate at different national levels. Their ability to come together reflects a pull toward scaling specific national and local developments on Indigenous data sovereignty to enhance global momentum.

Currently, data sovereignty has gone far beyond proclamations. Not only has data sovereignty been embraced and internalized by a vast array of Indigenous peoples in specific local and national contexts, it is now an integral or component strategy of decolonization and Indigenous resurgence.⁷⁹ Indigenous data sovereignty is key to realizing the full and effective participation of Indigenous peoples in matters that affect them and the advancement of culturally sensitive development, also known as self-determined development.⁸⁰ Directly, Indigenous data sovereignty ensures accurate demography and enumeration for better aggregation of Indigenous information toward correct measuring and evaluation of progress or lack thereof regarding UNDRIP and other Indigenous development and policy programs. Indigenous data sovereignty, as an international initiative, is now under the aegis of the IDSIG and the Research Data Alliance.⁸¹ The key outline of the International Indigenous Data Sovereignty IG Charter Statement is one that resonates with all Indigenous peoples around the world, irrespective of their specific national contexts:

Like other nation states, Indigenous nations need data about their citizens and

73 In partnership with First Nations, the Geomatics and Cartographic Research Centre (GCRC) and Canadian Internet Policy and Public Interest Clinic have proposed an open licencing scheme for TK called *A Proposal: An Open Licencing Scheme for Traditional Knowledge* (2016). See GCRC, "About the GCRC", online: <<https://bit.ly/2O119Y3>>.

74 See Daniel F Robinson, *Biodiversity, Access and Benefit-Sharing: Global Case Studies* (New York: Routledge, 2015); Daniel F Robinson, *Confronting Biopiracy: Challenges, Cases and International Debates* (New York: Earthscan, 2010).

75 Daniel F Robinson, Ahmed Abdel-Latif & Pedro Roffe, eds, *Protecting Traditional Knowledge: The WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore* (New York: Routledge, 2017).

76 Council of Scientific & Industrial Research, "Traditional Knowledge Digital Library", online: <<https://bit.ly/2u1UPoz>>.

77 See Oguamanam, "ABS", *supra* note 13; see also Kukutai & Taylor, *Indigenous Data Sovereignty*, *supra* note 12.

78 See International Indigenous Data Sovereignty Interest Group (IDSIG), "International Indigenous Data Sovereignty IG Charter Statement" (16 June 2017), online: <<https://bit.ly/2HAhH6X>>.

79 See Gilbert & Lennox, *supra* note 46; see also FNIGC, *supra* note 22.

80 Gilbert & Lennox, *supra* note 46 at 8–10.

81 IDSIG, *supra* note 78.

communities to make informed decisions. However, the information that Indigenous nations have access to is often unreliable, inaccurate, and irrelevant. Federal, state, and local governments have primarily collected these data for their own use. Indigenous nations' reliance on external data that do not reflect the community's needs, priorities, and self-conceptions is a threat to self-determination. The demand for Indigenous data is increasing as Indigenous nations and communities engage in economic, social and cultural development on an unprecedented level. Given the billions of dollars in research funding spent each year and the increasing momentum of the international big data and open data movements, Indigenous nations and communities are uniquely positioned to claim a seat at the table to ensure Indigenous Peoples are directly involved in efforts to promote data equity in Indigenous communities.⁸²

Other evidence of continuing progress on data sovereignty, especially in the “group of Anglo-settler democracies — Canada, Australia, Aotearoa/ New Zealand and the United States,” was demonstrated by Australia.⁸³ In 2015, an assemblage of international scholars and representatives of both Indigenous organizations and government entities held a workshop titled “Data Sovereignty for Indigenous Peoples: Current Practice and Future Needs” in Canberra, Australia. The principal objective of the workshop “was to identify and develop an Indigenous data sovereignty agenda, leveraging international instruments such as the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).”⁸⁴ In 2018, the result of the workshop was published in an edited monograph, *Indigenous Data Sovereignty: Toward an Agenda*. According to the editors, Tahu Kukutai and John Taylor, “[t]his book is the first to engage with the topic of data sovereignty from an indigenous standpoint, drawing on papers and discussions from the Canberra workshop. Although it is focused on the CANZUS states, the intended audience is global and varied.”⁸⁵

⁸² *Ibid.*

⁸³ Kukutai & Taylor, *Indigenous Data Sovereignty*, *supra* note 12 at 1.

⁸⁴ *Ibid.*

⁸⁵ *Ibid* at 2.

The monograph contains research insights on historical and ongoing evolution and progress toward Indigenous data sovereignty, including the Indigenous experience of the concept and how it is increasingly assuming greater importance in the Indigenous quest for self-determination in specific local, national and international contexts.

Indigenous Data Sovereignty as a Strategic Tool of Decolonization

Indigenous Data Sovereignty in Practice

While conceptualization and theorization around Indigenous data sovereignty remain a work in progress, the practice and applications of data sovereignty are now a reality. Stephanie Carroll Rainie et al. have undertaken two case studies on the application and transformative effects of Indigenous data sovereignty in two tribal nations in the United States.⁸⁶ Both cases involve the use of demographic and socio-economic data to tackle pressing existential challenges in the two communities. The first deals with the Ysleta del Sur Pueblo tribal community near El Paso, Texas. One of the major gaps in the official US Census Bureau 2000 decennial data was its failure to capture the steep decline in the tribal economy owing to the closure by the state of Texas of the tribe's gaming operations. This inchoate census data was used as a planning tool for all levels of government, including the tribal authority itself.

In its bid for more accurate information to drive comprehensive community development strategies (to enhance job creation, diversify the community economy and secure improved standards of living), the Ysleta del Sur Pueblo set out to develop “demographic and socio-economic data to establish a baseline, monitor progress toward objectives, and implement changes as needed.”⁸⁷ It was a

⁸⁶ See Stephanie Carroll Rainie et al, “Data as a Strategic Resource: Self-determination, Governance, and the Data Challenge for Indigenous Nations in the United States” (2017) 8:2 Intl Indigenous Policy J.

⁸⁷ *Ibid* at 8.

project aimed at transforming the tribe into a data-driven nation.⁸⁸ The data sovereignty initiative was designed in partnership with the Institute for Policy and Economic Development at the University of Texas at El Paso. Among other things, the project involved a community-centred, grassroots socio-economic survey that blended “cultural and local knowledge with Western epistemologies.”⁸⁹ The survey was embedded in the annual tribal membership enrolment in which citizens were required to update their contact information within 10 days of their birthday. This became a component of the tribal census protocol.

The survey and all associated research components were negotiated, conceived and implemented through a combination of community engagement and education delivered by blending confidence and trust-building strategies, including focus groups, planning sessions and community meetings at various levels. Similarly, analysis of the ramifications of the data for the community’s economic repositioning was a community-driven, collaborative exercise. The Ysleta del Sur Pueblo tribal enrolment office was the principal data custodial or storage authority. Through this sense of ownership, the tribe was able to elicit a comprehensive range of information and an average response rate of 90 percent.⁹⁰ The exercise captured detailed information about the tribe’s economic reality and prospects in all critical sectors that were previously neither available to the tribal authority nor capable of ever being captured or obtained through the Census Bureau.

The second case study illustrating the application and transformative effect of Indigenous data sovereignty is the rural Cheyenne River Sioux Reservation in South Dakota. The tribal community suffered from chronic poverty. Census figures showed median annual income per household at barely above US\$20,000, with nearly 90 percent unemployment. The tribe was determined to address this dire poverty. With the support of a third party, the tribe established the Cheyenne River Sioux Tribal Ventures, with the mandate to undertake and implement poverty reduction through participatory, community-driven education

and mobilization strategies anchored in the Lakota worldview. The Cheyenne River Sioux Tribal Ventures launched the Voices Research Project. As in the case of the Ysleta del Sur Pueblo, the Cheyenne River Sioux forged a partnership with an institutional third party with research expertise in demography and survey systems.⁹¹ Through the Voices Research Project, Tribal Ventures embarked on survey and data collection from families in the reservation to garner detailed information about core demographics, including “community characteristics; land use; housing; education; work history and skills; family income and expenses; childcare; saving, borrowing, and credit; microenterprise businesses; shopping; transportation; technology and communication; natural resource consumption; and cultural resources.”⁹² These elements of baseline data are relevant not only for understanding poverty but are also capable of being supplemented by further surveys with a view to gauging the tribes’ potential to tackle the menace.

Again, similar to the Ysleta del Sur Pueblo, the Voices Research Project was a fully owned tribal venture undertaken as a participatory and educational program that raised consciousness among tribal members of the imperative for a culturally sensitive approach to Indigenous data as a tool for addressing a myriad of challenges. Through various strategies for community involvement and ownership of the project, including meetings, community members understood their individual and common interests in the project while acquiring skills on how to generate, analyze and translate data as a shared resource for community transformation and strategic planning. These are just symbolic illustrations of increasing practical applications of data sovereignty in specific nations.⁹³

According to the researchers, these two case studies highlighted some vital aspects of Indigenous data sovereignty. First, each of the initiatives was capable of expansion into other areas.⁹⁴ Both tribes also built on the research by conducting

88 *Ibid.* This initiative was known as *Tiguanomics*, inspired by the Pueblo word for people, *Tigua*. In this corrupted rendition, it stands for tribal economics based on the people.

89 *Ibid.*

90 *Ibid.*

91 The third party was Colorado State University.

92 Rainie et al, *supra* note 86 at 12.

93 See GCRC, *supra* note 73; McMahon, LaHache & Whiteduck, *supra* note 5.

94 Rainie et al, *supra* note 86 at 9.

additional surveys.⁹⁵ For example, the Ysleta del Sur Pueblo generated data on land use, including non-Indigenous land uses that advanced their comprehensive land use strategy.⁹⁶ In addition, they “gathered information about alternative and renewable energy, created small business profiles, and explored citizenship and blood quantum via surveys.”⁹⁷ The Cheyenne River Sioux conducted more detailed surveys of their members who lived in the reservation.⁹⁸ The effort was complemented by a workforce development survey,⁹⁹ which included a workforce assets audit, as well as a workforce needs and assessment strategy for improving tribal members’ employment and wealth creation.¹⁰⁰ Rainie et al report that the “survey findings informed the development of a reservation-wide strategy to increase the skills of individuals seeking permanent employment, while ensuring that employers build capacity to effectively hire and retain qualified employees.”¹⁰¹

Second, as for ramifications, these practical approaches to data sovereignty had both internal and external benefits for Indigenous peoples. On the one hand, as a process with multiple components of community self-awareness, these case studies help to consolidate the interrelated projects of resurgence, decolonization and self-determination, not to mention specific effects or outcomes of each case in tackling the problem at the root of its *raison d’être*. On the other hand, not only are the communities better positioned to engage with the colonial entities and force them to rethink flawed conventional research methodology and associated defective data, these illustrations of the practical applications of data sovereignty ensure the recognition of the value of cultural sensitivity and inclusion of critical variables. In a way, the communities became, and rightly so, the greatest authority and source of information that concerns them.

Third, successful application of data sovereignty can easily be scaled across various Indigenous

communities, generating baseline demographics and planning, while also making communities competitive in attracting external funding. Unlike other channels of conventional funding driven by external intermediaries and agencies, funding of Indigenous data sovereignty ventures is guaranteed to result in an outcome that equips Indigenous peoples to effectively participate in “everyday acts that continually resist the structures and effects of colonialism” and, by doing so, “support the[ir] political and cultural renewal.”¹⁰²

Indigenous Data Sovereignty and the Consultation Process

Aside from specific national examples or case studies of the operations of Indigenous data sovereignty, in Canada, jurisprudence at the highest level has continued to open up spaces that demonstrate, on appraisal, the practical relevance of Indigenous data sovereignty for self-determined development and enhancement of Aboriginal rights. For example, in a period of four years (2014–2018), the Supreme Court of Canada decided five major cases relevant to Indigenous data sovereignty: *Tsilhqot’in Nation v British Columbia*,¹⁰³ *Ktunaxa Nation v British Columbia*,¹⁰⁴ *Clyde River (Hamlet) v Petroleum Geo-Services Inc.*,¹⁰⁵ *Chippewas of the Thames First Nation v Enbridge Pipelines Inc.*¹⁰⁶ and *Mikisew Cree First Nation v Canada*.¹⁰⁷ These cases have shed some light on the duty to consult with regard to development projects impacting Indigenous peoples. Through these cases, the court has made proclamations on how the existence of Aboriginal rights pursuant to section 35(1) of the Constitution Act, 1982¹⁰⁸ can be explored, or even where such rights have yet to be resolved, and the degree of Aboriginal claims over such rights that could trigger the duty

95 *Ibid* at 9, 12.

96 *Ibid* at 9.

97 *Ibid*.

98 *Ibid* at 12.

99 *Ibid*.

100 *Ibid*.

101 *Ibid* at 12–13.

102 See McMahon, LaHache & Whiteduck, *supra* note 5 at 2.

103 *Tsilhqot’in Nation v British Columbia*, 2014 SCC 44.

104 *Ktunaxa Nation v British Columbia (Forests, Lands and Natural Resource Operations)*, 2017 SCC 54.

105 *Clyde River (Hamlet) v Petroleum Geo-Services Inc.*, 2017 SCC 40.

106 *Chippewas of the Thames First Nation v Enbridge Pipelines Inc.*, 2017 SCC 41.

107 *Mikisew Cree First Nation v Canada (Governor General in Council)*, 2018 SCC 40.

108 It provides: “The existing aboriginal and treaty rights of the aboriginal people in Canada are hereby recognized and affirmed.” See *Constitution Act, 1982*, being Schedule B to the *Canada Act 1982 (UK)*, 1982, c 11, s 35(1).

to consult. As well, through these cases, the court has delineated the scope of the responsibility of the Crown or its agents in undertaking the duty to consult as a process, but not necessarily with regard to a particular outcome. Also, through these cases, the court offered some direction on how to weigh, explore and justify superseding Aboriginal treaty or other rights in order to enable the development projects in question to proceed in consideration of the broader public good.

In deciding these cases, the Supreme Court of Canada enunciated an elaborate and permissive range of powers necessary for consultation. These include the power of the state or its agencies to conduct hearings, their discretion to make order, generate data or information, commission studies, conduct environmental impact assessments, impose preconditions for the approval process of development projects and so on. In addition, there is authoritative judicial clarification over the threshold of notice or notification required to inform Aboriginal peoples of a government action (or inaction) that may affect their rights and, perhaps more importantly, the court accommodates the need to provide funding and appropriate incentives to enable Aboriginal participation in the consultation process.

In all of these cases and, certainly, in all consultation processes, even when litigation is not involved, the integrity of the procedure depends on how effectively Indigenous peoples participate. Even though the court is not concerned with the outcome, effective Indigenous participation is the best guarantee for a fair and just outcome for Indigenous peoples. Effectual Indigenous participation is dependent on whether Indigenous peoples have a strong regime of data sovereignty. And this is how Indigenous participation can be strengthened: Indigenous data sovereignty ensures that Indigenous peoples are actively positioned as protagonists of their own research, pursuant to the OCAP framework and related principles. For example, Aboriginal-driven grassroots research is capable of providing ethnically aggregated data and culturally relevant indices to enable an inclusive consideration of what constitutes “broader public good” outside of the non-interrogated colonial default for appraising public good. As a practice, Indigenous data sovereignty equips Indigenous voices and insights, ensuring that they are constituted as equally authoritative and legitimate sources of credible information as

conventional sources. The outcome is that, with a strong culture of Indigenous data sovereignty, Indigenous peoples are able to participate in all dimensions of the consultation process, in particular generating culturally sensitive Aboriginal data and insights from a position of strength and not of weakness. Informed by the principles of data sovereignty, the consultation process would yield a development outlook and outcome that includes (rather than one that excludes) Aboriginal sensitivity in pursuit of self-determined development. Effective interfacing of Indigenous data sovereignty with self-determined development creates a powerful elixir for continuing decolonization and Indigenous resurgence.

Conclusion

From Indigenous Data Sovereignty to Self-determined Development

It is evident, so far, that Indigenous data sovereignty is not an end in and of itself. Increased consciousness over Indigenous data sovereignty makes it a relatively new and handy arsenal to power Indigenous peoples’ interests in realizing self-determined development, which is part of the logic of broader self-determination. For a number of reasons, Indigenous peoples have historically viewed with suspicion the notion of development as propagated through the agency of the colonial state and its multifarious institutional frameworks. Development is envisioned to render every other consideration, including those at the core of Indigenous values, subservient to economic growth and other market economic priorities. This neoclassical vision of development is delivered through a cultural hierarchy framework in which Indigenous peoples are located on the lowest step of the ladder. As such, they are permanent recipients of development dividends, which are delivered on the presumption that Indigenous peoples lack and are in dire need of development. Analysts refer to this as the “theory of lack,” which justifies acts of “development aggression” (the imposition of development decisions with little or no regard to

Indigenous agency).¹⁰⁹ Consequently, Indigenous peoples have been at the receiving end of the negative effects of development, such as forced displacements, land grabs, cultural appropriations, all manner of disruptions and development infamies that pose existential threats against Indigenous peoples too numerous to recount.¹¹⁰

Self-sustained development is the basis for Indigenous peoples' vision and worldview of development or self-realization. The decolonization and resurgence effort marks Indigenous peoples' own attempt to deconstruct and to plug gaps in the mainstream development narrative that marginalizes them at best or brazenly excludes them at worst. Beyond plugging the gaps, self-sustained development constitutes a wealth of insights on what Indigenous peoples can teach the rest of non-Indigenous peoples about development. Within the narrative of self-sustained development, Indigenous peoples recognize that development, like most Western or colonial constructs, may not have a precise parallel in Indigenous circles. The "development" in self-determined development was essentially retained as a pragmatic strategy. Consequently, self-determined development serves as "a useful advocacy tool to support Indigenous peoples' own vision of sustainable and locally based process of development."¹¹¹ A seminal compendium of Indigenous voices on the subject of self-determined development can be credited to the collaboration between the UNPFII and the Tebtebba Foundation. Published in 2010, *Towards an Alternative Development Paradigm: Indigenous People's Self-Determined Development*¹¹² was a timely effort. This project was complementary to the then newly released UNDRIP. As indicated earlier, even though the phrase "self-determined development" did not appear in the text of UNDRIP, from its preamble through its entire contents, and notwithstanding any associated reservations, UNDRIP is a charter of Indigenous self-determination through self-determined

development. In its letter and spirit, every word of UNDRIP is geared toward empowering Indigenous self-determined development.

On the foregoing basis, analysts accurately made the following observations on the dynamic between self-determined development and UNDRIP, pointing further to the origins and meaning of self-determined development. According to them, the concept "emerged as part of advocacy efforts led by Indigenous peoples to support the vision inscribed in UNDRIP. Also, referred to as development with culture and identity, the term is used to advocate for the respect of Indigenous people's own perspectives and approach to development, and to assert a new meaning of the right to development."¹¹³ In her summation of the concept of self-determined development, one of its principal proponents, Victoria Tauli-Corpuz, an Indigenous leader and the UN special rapporteur on the rights of Indigenous peoples, observed that "it is not a grand paradigmatic, generic alternative to mainstream development. It is simply part of our assertion of our right of self-determination and to remain as diverse and distinct cultures and communities. It captures the essence of our struggle since colonization to define our own development within the framework of our inherent rights and in consonance with the relationship we have with nature."¹¹⁴

At the core of Indigenous data sovereignty is the generation of ethnically disaggregated data and the mainstreaming of culturally, locally and contextually relevant variables over a one-size-fits-all approach to research and data generation. As noted by Canada's First Nations, the principal elements of Indigenous data sovereignty include ownership, control, access and possession of Indigenous data. So, Indigenous data sovereignty is a critical condition for self-determined development. For self-determined development to be of any consequence, it has to be rooted in data sovereignty. Put differently, the *sine qua non* for self-determined development is the unfettered ability of Indigenous peoples to set their own research agenda, frame or design their own research questions, and select their own partners. It also includes the capability of Indigenous peoples to analyze and interpret

109 See Cathal Doyle & Jérémie Gilbert, "Indigenous Peoples and Globalization: From 'Development Aggression' to 'Self-Determined Development'" (2011) 7 *European YB Minority Issues* 219.

110 These are some of the factors that have given rise to the Indigenous environmental justice movement.

111 See Gilbert & Lennox, *supra* note 46 at 4.

112 See Victoria Tauli-Corpuz, Leah Enkiwe-Abayao & Raymond De Chavez, eds, *Towards an Alternative Development Paradigm: Indigenous People's Self-Determined Development* (Baguio City, Philippines: Tebtebba Foundation, 2010).

113 Gilbert & Lennox, *supra* note 46 at 10.

114 See Tauli-Corpuz, Enkiwe-Abayao & De Chavez, *supra* note 112 at 4 (also cited in Gilbert & Lennox, *supra* note 46 at 10).

research results and negotiate its application or output as a consequential and transformative exercise of self-determined development. Without question, Indigenous data sovereignty as a theory and practice is a work in progress, with paradigmatic pulls and tensions surrounding it.

The first of the paradigmatic pulls and tensions of Indigenous data sovereignty is the paradoxical role of ICT. As a resource, phenomenon and practice, ICT is a critical driver of the digital or data age — without question, its defining feature. As with virtually all socio-economic sectors, ICT has redefined and emboldened Indigenous interest in data sovereignty. In a way, ICT enhanced the ease of sourcing and transferring information, resulting in the intensification of the asymmetrical power relations that characterize how colonial states and their agents dealt with Indigenous data. Yet, ICT has emboldened Indigenous peoples as one of the authentic tools of decolonization, one that is essential to further the advancement of the intertwined concepts of Indigenous data sovereignty, self-sustained development and Indigenous resurgence as works in progress.¹¹⁵ Examples of Indigenous peoples' embrace of e-community akin to e-governance and their customization of ICT tools and applications include digital data management systems to tackle a range of development challenges, such as education, health, finance, resource management, tourism, security, labour, entrepreneurship and so forth.¹¹⁶ Yet without a constructive approach to ICT or what analysts call good data practices, or without introspection or protocols on how ICT can better serve Indigenous peoples in their quest for data sovereignty, there is the potential that the uncritical embrace of ICT may lead to the slippery slope of technological determinism. As a theoretical matter, technological determinism is a reference to the reductionist approach to humankind and society's progress (social, cultural, economic and so forth) as a factor of the uptake

of technology as opposed to other variables.¹¹⁷ Such a situation could undermine the cultural and other contextual variables that are served and preserved by Indigenous data sovereignty.

The second tension or challenge of Indigenous data sovereignty can be framed as a hydra-headed category with several interrelated dimensions — only a few of them can be highlighted here, even if superficially. Indigenous research capacity building and capacity development in a variety of spheres are necessary for leveraging Indigenous data sovereignty. Areas of capacity building or capacity development,¹¹⁸ as the case may be, include needs assessment, data interpretation, storage, governance, ABS protocols, privacy and ethics in Indigenous contexts, arbitration, mediation and conflict resolution, IP, research grant preparation and administration, and so forth. Those needs can be met as an ongoing, dedicated educational and policy matter through, for example, strategic collaboration and partnerships. As is evident in the Yselta del Sur Pueblo and Cheyenne River Sioux case studies, Indigenous communities were able to cultivate collaborative and institutional partnerships on their own terms in practical pursuit of Indigenous data sovereignty. Suitable models of such partnerships may vary from nation to nation, as they may also be dependent on variegated factors while at all times undergirded by the principles of Indigenous data sovereignty.¹¹⁹ Continued negotiations of the above enumerated pulls and tensions, including those that arise at the interface of ICT, big data and open data, are critical for the present and future optimal

115 See McMahon, LaHache & Whiteduck, *supra* note 5.

116 *Ibid.* In this regard see, for example, the Mohawk community of Kahnawà:ke's use of digital management strategies to support community building for self-determination and self-governance in education and other sectors. The initiative's influence is now felt across First Nations in the province of Quebec as they deploy digital resources to facilitate First Nations programming and project collaboration with Aboriginal Affairs and Northern Development Canada.

117 See Leo Marx & Merritt Roe Smith, *Does Technology Drive History? The Dilemma of Technological Determinism* (Cambridge, MA: MIT Press, 1994).

118 Although capacity building and capacity development are often used interchangeably, Chidi Oguamanam and Roger Hunka emphasized that these are two different concepts: capacity building presupposed lack of capacity while capacity development assumed that existing capacity was not adequate. See Chidi Oguamanam & Roger Hunka, "Aboriginal Partnership, Capacity Building and Capacity Development on ABS: The Maritime Aboriginal Peoples Council (MAPC) and ABS Canada Experience" in Oguamanam, *Genetic Resources*, *supra* note 13 at 40.

119 For example, in Canada, northern Canadian and other Indigenous communities are partnering with the GCRC in building unique online interactive atlases populated by multifarious Aboriginal data. The atlases were developed through the application of carto-geographic processes and a blend of expert technical and management skills that have since transformed them into tools of analysis for a range of socio-economic issues of interest to Aboriginal peoples with local and international appeal. While this project may not be an ideal showcase of Indigenous data, it underscores the importance of critical partnerships required for its realization. See GCRC, *supra* note 73.

impact of Indigenous data sovereignty and its ability to deliver on Indigenous expectations.

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