"He Matapihi ki te Mana Raraunga" - Conceptualising Big Data through a Māori lens

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Introduction

Advances in computer technology and analytical processes create an environment where data becomes the raw material mined to create valuable information and insights. The idea of Big Data emerges from the collation of increasing vast amounts of data enabled by the shift towards an increasingly open data environment. How this changing context alters the relationship between Iwi/Māori collectives and their mātauranga, cultural information and data has yet to be fully explored. However, the concept of Māori Data Sovereignty, which anticipates Māori governance over Māori data, has a natural appeal. This chapter outlines some of the Māori concepts and presents a framework which may be used to inform how data and data use may be conceptualised through a Māori cultural lens.

Data and sovereignty

Ko te pūtake o te Māoritanga ko te Reo Māori, he taonga tuku iho nā Te Atua.[1]

Mana has always been a central component of Māori self-determination and since the signing of Te Tiriti o Waitangi in 1840 issues of sovereignty continue to be debated. The purpose of the agreement between Māori chiefs and the British Resident Governor William Hobson was to ensure Māori retained control over taonga (e.g., land and resources) and maintained rangatiratanga (rights of self-determination) across their communities (Belich, 2001; Orange, 2011; Walker, 2004). While the context has changed significantly over the past 177 years, the aspiration for self-determination remains and sovereignty as a concept continues to resonate with Iwi across the country albeit with a different focus.

The language of sovereignty as it relates to the world of data has a different way of being conceptualised. Data Sovereignty is a relatively new concept which generally refers to a spectrum of approaches adopted by different states to control data generated or passing through national internet infrastructure (Peterson, Gondree & Beverley, 2011; Polatin-Reuben & Wright, 2014). As data is subject to the laws of the nation within which it is stored, it has been necessary to establish data location with sufficient granularity for placing it within the borders of a particular nation-state (Peterson, et al., 2011). Data Sovereignty has become a significant issue globally with the growth of cloud computing services and concerns about securing sensitive national data from foreign surveillance.

Indigenous Data Sovereignty has also emerged as a significant issue for indigenous peoples as a means to exert control over their data resources. Indigenous Data Sovereignty perceives data as subject to the laws of the nation from which it is collected (Kukutai & Taylor, 2016). This establishes a frame of reference that expects Indigenous involvement

in the governance of data and raises questions regarding the proper locus of ownership and management of data that are about Indigenous peoples, their territories and ways of life (Harding, et al., 2012; Taylor & Kukutai, 2015). Indigenous Data Sovereignty brings together discourses on Indigenous research ethics, cultural and intellectual property rights, nation-building, and Indigenous governance, within a frame of tribal sovereignty and self-determination (Kukutai & Taylor, 2016). Many of the features of indigenous data sovereignty are evident in the First Nations' principles of ownership, control, access and possession (OCAP) in relation to research data in Canada (Schnarch, 2004; First Nations Information Governance Centre, 2014). Indigenous Data Sovereignty reflects a desire for protecting collective interests in data which centre on access to data for governance (e.g., to realise Indigenous community aspirations), and governance of data (e.g., to control access to and use of Indigenous data).

Māori Data Sovereignty recognises that Māori data should be subject to Māori governance and that Māori organisations should be able to access Māori data to support their development aspirations (Hudson, Farrar, & McLean, 2016). In New Zealand, Iwi and Māori organisations face a number of key challenges in accessing timely, relevant and accurate data in order to meet their development aspirations (Kukutai & Taylor, 2016). Māori data refers to data produced by Māori or that is about Māori and the environments we have relationships with. Māori Data includes but is not limited to:

- Data from organisations and businesses;
- Data about Māori that is used to describe or compare Māori collectives; and
- Data about Te Ao Māori that emerges from research.

Māori Data Sovereignty draws on discourse from Te Tiriti o Waitangi, Māori research ethics and cultural intellectual property to inform contemporary challenges around the use of data (Boulton, Hudson, Ahuriri-Driscoll & Stewart, 2014; Hudson, et al., 2016; Waitangi Tribunal, 2011). Collective interests may be constructed at different levels, leading to the use of the terms Indigenous Data Sovereignty, Māori Data Sovereignty and Iwi Data Sovereignty. Iwi Data Sovereignty reflects the operationalising of Indigenous Data Sovereignty and Māori Data Sovereignty principles within tribal data boundaries (Hudson, et al., 2016).

Data and the Waitangi Tribunal
Whaowhia te kete mātauranga.[2]

Māori interests in data have been expressed through a number of claims to the Waitangi Tribunal, a permanent commission of inquiry that looks into Crown actions that Māori feel have breached the principles of the Treaty of Waitangi. Its foundation is the Treaty of Waitangi Act 1975 and the Tribunal has made a number of important recommendations on issues relevant to data including te reo Māori (Waitangi Tribunal, 1986), the allocation of

radio frequencies (Waitangi Tribunal, 1990), and Law and Policy affecting Māori Culture and Identity (Waitangi Tribunal, 2011). While these claims have not been directly related to data they have a primary interest in mātauranga Māori, which is comprised of data. The latter report titled '*Ko Aotearoa Tēnei (This is Aotearoa)'*, is commonly known as the Wai262 claim or, the flora and fauna claim. The claim was lodged in 1991 and was based around concerns pertaining to the collection and use of Indigenous plants, and Māori being denied their tino rangatiratanga (absolute authority) over the use of these natural resources. The report included sections on genetic and biological resources of taonga species, intellectual property rights and bioprospecting (Waitangi Tribunal, 2011).

The key issue relating to data within a Treaty of Waitangi context is whether Māori data can be considered as taonga and therefore subject to treaty principles. Kahui Legal (2016) suggest that while the Waitangi Tribunal has not specifically considered whether Māori data is a taonga, it is clear from the Tribunal's reports that for something to be classified as taonga, it must be valued and treasured by Māori, and it must be significant and important to Māori. The issue of data is likely to be context specific and Māori data held by the Crown could be classified on a spectrum with a sliding scale of Crown obligations and Māori rights and interests. A common thread that emerges from the Tribunal Reports is that taonga are subject to Treaty principles and the Crown correspondingly has Treaty obligations and responsibilities. In particular, the Crown is obliged to actively protect taonga, consult with Māori in respect of taonga, give effect to the principle of partnership and recognise Māori rangatiratanga over taonga (Kahui Legal, 2016).

Data as a taonga

Not everything that can be counted counts, and not everything that counts can be counted.[3]

Dewes (2017) interviewed key informants as part of a pilot project that explored the question "Is data a taonga?" The informants identified that data is the way humans describe the world around them, that data is merely representative of a source of information, and that the context of the information determines whether or not the data should be regarded as taonga. As taonga varies between contexts, thought should be given to examples that have been previously considered or defined as taonga, such as airwaves and customary fisheries. How data is derived emerged as an important consideration for informants. Personal data, which relates to the individual, carries a high level of sensitivity and should therefore be considered as a taonga. Utility also influences perception when contemplating whether data is a taonga. The example of a tree was used to illustrate that both firewood, a canoe and a carving can come out of the same tree. The use can determine how the object is viewed and that "all data is potential taonga it is related to its utility, through technology or usefulness to the collective" (Dewes, 2017, p. 14).

The informants also discussed protections associated with taonga. In terms of data management, levels of protection are tied to levels of sensitivity. One of the key themes, which emerged from participant interviews, was the emphasis on the sensitivity

of data which carries information about an individual or their family. When discussing the assignment of protections to data, "information collected about individuals that identify the individuals, or their whānau, or their circumstances that might enable them to be identified, definitely needs to be protected" (Dewes, 2017, p. 15). The study identified provenance, opportunity, and utility as the three key aspects that determine whether data is or could be a taonga.

Data and tikanga

E koekoe te tūī, e ketekete te kākā, e kūkū te kererū[4]

While context determines the nature of the taonga, it also identifies tikanga to determine how to look after it. Tikanga are customary practices which are pertinent to a group and remain relevant to that group. Anderson (2017, p. 8) identified, through a pilot project, a range of Māori concepts relevant to discussions about the management of big data including *tapu/noa, mauri, pukenga, tika, pono, whakapapa, kaitiaki, wānanga,* and *mana*. As one of his informants stated, "if you don't understand the Tikanga, context and history then you cannot interpret the data or information". The relevance of Māori concepts guiding the management of data, was reiterated by Dewes (2017) and, reflected in 'Te Mana Raraunga Charter (2016)'.

Te Mana Raraunga (Māori Data Sovereignty Network) was established in 2016 to advocate for Māori rights and interests in relation to data, ensuring data for and about Māori is safeguarded and protected, and that data is utilised to advance Māori aspirations for collective and individual wellbeing. Through its charter, Te Mana Raraunga asserts that;

- Māori data is subject to the rights articulated in the Treaty of Waitangi and the UN's Declaration on the Rights of Indigenous Peoples;
- Data is a living taonga and is of strategic value to Māori; and
- Māori data refers to data produced by Māori or that describes Māori and the environments they have relationships with.

The Charter recognises the need to consider both governance and operational levels, and outlines guiding principles to support the realisation of Māori Data Sovereignty according to the 'Mana-Mahi Framework' based on Māori values (*Figure 1*).
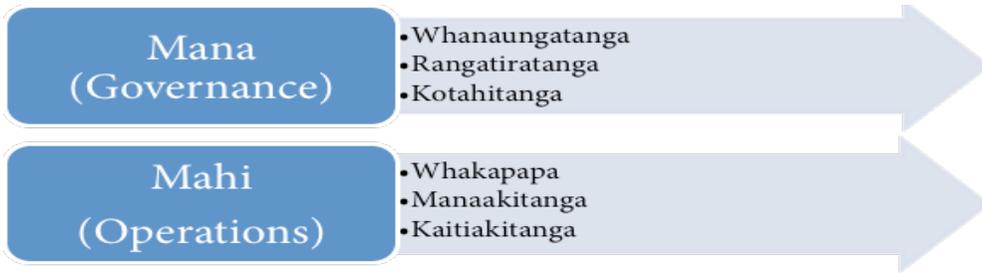
Figure 1: Mana-Mahi Framework

- **Whanaungatanga and Whakapapa:** Whanaungatanga refers to the philosophical relationships between man, Te Ao Tūroa (the natural world) and Te Taha Wairua (spirit world). Whakapapa establishes those linkages and identifies the nature of the relationships.
- **Rangatiratanga** speaks to the hapū, iwi/Māori aspiration to be in control of their own affairs and to influence those taking place within iwi boundaries.
- **Kotahitanga** relates to a collective vision and unity of purpose while balancing the mana of rangatira from hapū and iwi.
- **Manaakitanga** can be expressed through the responsibility to provide hospitality and protection to whānau, hapū, iwi, the community and the environment.
- **Kaitiakitanga** speaks to the hapū, iwi responsibility to be an effective steward or guardian and relates to actions that ensure a sustainable future for all people (Te Mana Raraunga, 2016).

Te Mana o te Raraunga Framework

The cultural concepts identified by Anderson (2017) have been used to create the 'Te Mana o te Raraunga Framework'. The framework resembles a takarangi, consisting of two independent interwoven spirals. As you track along either the tapu or noa spiral you pass through each of the four planes representing core Māori concepts relevant to the management of data. These concepts inform the questions that relate to an assessment of the data, an assessment of the data use, and an assessment of the data users.

The takarangi reflects the duality that informs a number of concepts in Te Ao Māori and supports an assessment of the secondary use of data. We consider the secondary use of data the key issue in the data use context, as most parties will have agreed to its collection for its primary purpose. Subsequent uses, without explicit permission, through data linkage, data sharing, or data aggregation, create the potential for *kaiātanga* or (mis)appropriation. Each plane has two cultural concepts, which provide the context for the questions that should be answered in relation to the secondary use of the dataset. The concepts have dynamic and often interdependent relationships. The concepts represented in the green planes reflect expectations around data use. The concepts represented in the red planes reflect expectations of data users.

The 'mana o te raraunga' relates to the inherent value or 'taonga' nature of the data. Dewes (2017) identified three key factors that relate to determining the taonga nature of any data set:

1. the Provenance of the data;
2. the Opportunity for the data, and;
3. the Utility of the data.

The POU assessment comprising three questions can be applied if there is debate about whether the dataset is a taonga:

1. Provenance of the data: Does the dataset come from a Māori source?
2. Opportunity for the data: Could the dataset support Māori aspirations for their people or their whenua?
3. Utility of the data: Does the dataset have multiple uses?

Any data set identified as being a taonga, through this POU assessment, has an inherent mana, which needs maintenance through its use and application.
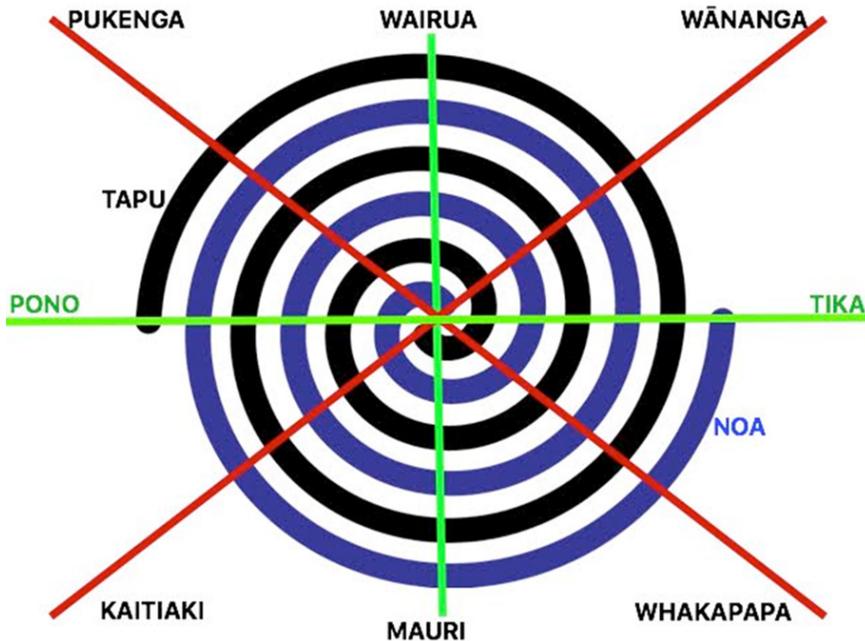

Diagram 1: *Te Mana o te Raraunga Framework*

Assessment of the data
Tapu / Noa
The two spirals represent the dynamic forces of tapu and noa. Tapu and Noa co-exist in relation to each other and therefore have a symbiotic relationship which is at times

wholly tapu or wholly noa but often with aspects of both. **Tapu**, the black spiral, reflects an assessment of the '**level of sensitivity**' associated with the data. This can be determined by asking the question "*How sensitive is the data?*" **Noa**, the blue spiral, reflects an assessment of the '**level of accessibility**' to the data. This can be determined by asking the question "*How accessible should this data be?*"

Assessment of the data use
Tika / Pono
The horizontal plane with Tika and Pono relates to the integrity associated with the use of the data. **Tika** refers to the '**level of value**' associated with the use of the data. Tika means correct and we relate correctness to the value and benefits that accrue to the community. This is assessed by asking the question "*How does the use of this data add value to the community?*" **Pono** refers to the '**level of trust**' associated with the use of the data. Pono relates to the trustworthiness of the process and outcomes of the using the data. It is assessed by asking the question "*Will the community support this use of the data?*"

Mauri / Wairua
The vertical plane with Mauri and Wairua relates to the authenticity associated with the use of the data. **Mauri** refers to the '**level of originality**' associated with the data. Mauri in this context is related to the source or origin of the data and is assessed by the question "*How unique is the data?*" Wairua refers to the '**nature of application**' associated with the use of the data. Wairua relates to the spirit in which the data is being used and can be assessed by the question "*Is the data being used in the same spirit as its origin use?*"

Assessment of the data users
Whakapapa / Pukenga
The angled plane with Whakapapa and Pukenga relates to the mandate to use the data. **Whakapapa** refers to the '**level of relationship**' associated with the data. Whakapapa in this context indicates a right of access and is assessed by the question "*Does the user have an existing relationship with the data?*" **Pukenga** refers to the '**level of expertise**' associated with using data. Pukenga in this context relates to the ability to use data in a culturally appropriate manner and is assessed by the question "*Does the user have the expertise and experience to use data in a culturally appropriate manner?*"

Kaitiaki / Wānanga
The angled plane with Kaitiaki and Wānanga relates to the stewardship of the data. **Kaitiaki** refers to the '**level of authority**' associated with stewardship of the data. Kaitiaki in this context relates to the cultural competency of the people with authority for protecting the data and can be assessed by the question "*How will the data be protected from inappropriate use?*" **Wānanga** refers to the '**level of responsibility**' associated with institutions that manage the data. Wānanga in this context relates to the infrastructure that supports the

stewardship of data and is assessed by the question "*Does the institution have the necessary infrastructure to ensure the use of the data in a culturally appropriate manner?*"

Table 1 summarises the assessment questions that help assess the level of sensitivity and taonga value (high, medium, low), which supports the identification of an appropriate level of data management.

Table 1: *Assessment Questions for Te Mana o te Raraunga Model*

Concept	Characteristic	Assessment Question
Tapu	Level of sensitivity	"*How sensitive is the data?*"
Noa	Level of accessibility	"*How accessible should this data be?*"
Tika	Level of value	"*How does the use of this data add value to the community?*"
Pono	Level of trust	"*Will the community support this use of the data?*"
Mauri	Level of originality	"*How unique is the data?*"
Wairua	Nature of the application	"*Is the data being used in the same spirit as its original use?*"
Whakapapa	Level of relationship	"*Does the user have an existing relationship with the data?*"
Pukenga	Level of expertise	"*Does the user have the expertise and experience to use data in a culturally appropriate manner?*"
Kaitiaki	Level of authority	"*Will the data be protected from inappropriate use?*"
Wānanga	Level of responsibility	"*Does the institution have the necessary infrastructure to ensure the use of the data in a culturally appropriate and ethical manner?*"

Levels of management

Māori data considered to be taonga by Iwi could utilise the Te Mana o te Raraunga Framework to assess the level of data governance required to ensure the trusted use of Māori data. High value or sensitive data would likely require a more active approach to data governance with Māori having control over data, or some kind of Māori partnership arrangement in relation to the data. Moderately valued or sensitive data might be more suited to a more passive approach to data governance consulting with Māori in respect of the use of Māori data and/or disclosing the use of Māori data to Māori (Kahui Legal, 2016). Data identified having low taonga value might be subject to a creative commons license or made available within the public domain. The next step in this programme of work is to identify specific tikanga able to be utilised in supporting these approaches to the

governance of indigenous data (Bruhn, 2014; Boulton et al., 2014).

Summary

The emerging open data environment and Big Data movement provides an interesting conceptual challenge for Iwi/Māori collectives to protect their rights and interests in data. Māori Data Sovereignty has a natural appeal for Iwi/Māori collectives as it calls for greater control over Māori data sets. However, it is important to ground Māori approaches to data in a Māori worldview and utilise Māori concepts and tikanga as the conceptual basis for data use activities. The Te Mana o te Raraunga Framework begins a process of aligning Māori concepts with their rights and interests to data and support Iwi/Māori collectives to articulate their expectations of appropriate data use.

Endnotes

1. Te Kapunga Dewes (2000).

2. Mead and Grove (2003, p. 424).

3. Albert Einstein.

4. Mead and Grove (2003, p. 30).

References

Anderson, T. (2017). *Tū te tapu, tā te tapu: How can Tikanga inform the use of Big Data.* Report submitted to the Heath Research Council for an Ethics Summer Studentship. Hamilton, New Zealand: FMIS, University of Waikato.

Belich, J. (2001). *Paradise reforged: A history of the New Zealanders from the 1880s to the year 2000.* Auckland, New Zealand: Penguin.

Boulton, A., Hudson, M., Ahuriri-Driscoll, A., & Stewart, A. (2014). Enacting Kaitiakitanga: Challenges and complexities in the governance and ownership of rongoā research information. *The International Indigenous Policy Journal, 5*(2). Retrieved from: http://ir.lib. uwo.ca/iipj/vol5/iss2/1

Bruhn, J. (2014). Identifying useful approaches to the governance of Indigenous data. *The International Indigenous Policy Journal, 5*(2). Retrieved from: http://ir.lib.uwo.ca/iipj/vol5/ iss2/5

Dewes, T.K. (2017). *He taonga ranei tēnei mea te raraunga.* How is data a taonga? Report submitted for Maor591 Directed Study. Hamilton, New Zealand: FMIS, University of Waikato.

First Nations Indigenous Governance Centre. (2014). Barriers and levers for the implementation of OCAP™. *The International Indigenous Policy Journal,* 5(2). Retrieved from: http://ir.lib.uwo.ca/ iipj/vol5/iss2/3

Harding, A., Harper, B., Stone, D., O'Neill, C., Berger, P., Harris, S., & Donatuto, J. (2012). Conducting research with tribal communities: Sovereignty, ethics & data-sharing issues. *Environmental Health Perspectives, 120*, 6-10.

Hudson, M., Farrar, D., & McLean, L. (2016). Tribal data sovereignty: Whakatōhea rights and interests. In T. Kukutai & J. Taylor (Eds.), *Indigenous data sovereignty: Toward an agenda*,

CAEPR Research Monograph Series (pp. 157-178) Canberra, Australia: ANU Press.

Kahui Legal. (2016). *Māori data sovereignty – Rights, interests & obligations analysis. Memorandum to the Independent Māori Statutory Board.* Wellington, New Zealand: Author.

Kukutai, K., & Taylor, J. (Eds.) (2016). *Indigenous Data Sovereignty: Toward an Agenda*, *CAEPR Research Monograph Series*. Canberra, Australia: ANU Press.

Mead, S. M. (2013). *Tikanga Māori: Living by Māori values*. Wellington, New Zealand: Huia Publishers.

Mead, S. M., & Grove, N. (2003). *Ngā pēpeha a ngā tīpuna*. Wellington, New Zealand: Victoria University Press.

Orange, C. (2011). *The Treaty of Waitangi.* Wellington, New Zealand: Bridget Williams Books.

Peterson, Z., Gondree, M., & Beverley, R. (2011). *A position paper on data sovereignty: The importance of geolocating data in the cloud.* Retrieved from https://www.usenix.org/event/hotcloud11/tech/final_files/Peterson.pdf

Polatin-Reuben, D., & Wright, J. (2014). *An internet with BRICS characteristics: Data sovereignty and the Balkanisation of the internet.* Retrieved from https://www.usenix.org/system/files/conference/foci14/foci14-polatin-reuben.pdf

Schnarch, B. (2004) Ownership, control, access, and possession (OCAP) or self-determination applied to research: A critical analysis of contemporary First Nations research and some options for First Nations communities. *Journal of Aboriginal Health, 1*, 80-97.

Taylor, J., & Kukutai, T. (2015). Report to the Academy of the Social Sciences in Australia on the Workshop *Data Sovereignty for Indigenous Peoples: Current Practice and Future Needs* (9th-10th July 2015).

Te Kapunga Matemoana Dewes. (2000, December 14). *Wai 272 Te Kapunga Dewes* [Affidavit]. In *Ngati Porou Settlement Bill, Dr Apirana Mahuika Supp5*. Retrieved from https://www.parliament.nz/resource/en-NZ/49SCMA_EVI_00DBHOH_BILL10537_1_A194212/626331073e67bde4f6207e4596667eead01da5c9

Te Mana Raraunga (2016). *Te Mana Raraunga Māori Data Sovereignty Network Chart*er. Retrieved from https://static1.squarespace.com/static/58e9b10f9de4bb8d1fb5ebbc/t/5913020d15cf7dde1df34482/1494417935052/Te+Mana+Raraunga+Charter+%28Final+%26+Approved%29.pdf

Waitangi Tribunal. (1986). *The Te Reo Māori Claim. Wai 11*. Wellington, New Zealand: Government Printer.

Waitangi Tribunal. (1990). *Report of the Waitangi Tribunal on claims concerning the allocation of radio frequencies. Wai 26 & 150.* Wellington, New Zealand: Brooker & Friend Ltd.

Waitangi Tribunal. (2011). *Ko Aotearoa tēnei: A report into claims concerning New Zealand law and policy affecting Māori culture and identity* (Vol. 1-2. Wai 262). Wellington, New Zealand: Government Printer.

Walker, R. (2004). *Ka whawhai tonu mātou: Struggle without end* (Rev. ed.). Auckland, New Zealand: Penguin.