ROYAL SOCIETY **TE APĀRANGI**

Mana Raraunga

Data Sovereignty

He aha tēnei, ā, he aha tōna pānga ki Aotearoa?

What is it and why does it matter in Aotearoa New Zealand?

Ngā ihirangi
Contents

The design is set against dark background noise from which emerges a contemporary woven pattern inspired by the concept of hono – connection, bringing together. The pattern represents strands of data from different individuals and groups that can be woven into a coherent and meaningful picture.

Kupu whakataki
Introduction

Kei ngā wāhi katoa te raraunga. Nā te tere o te whakatipu o ngā hangarau matihiko i auaha te horapa puta noa i te ao o te whakaputanga o te raraunga (1). I roto i tēnei ao e piki haere ana te matihikotanga, he nui ake ngā raraunga e kohikohia ana, e whakaputua ana, e tūhonotia ana, ā, e tuarihia ana. Engari, mā wai te raraunga e tautuhi ai? Nā wai ngā raraunga? Kei a wai te mana uru? Waihoki, mā wai e whiwhi ki ngā hua? I whakawhanaketia ngā ariā o te mana raraunga, te mana raraunga Iwi Taketake, me te mana raraunga Māori hei whakautu i aua pātai whīwhiwhi, kōhukihuki hoki.

E ai ki ngā Iwi Taketake, he waiwai te mana raraunga ki te matapaki matawhānui e pā ana ki te tino rangatiratanga me te mana motuhake. I raro i te mana raraunga Iwi Taketake kei ngā Iwi Taketake ngā matatika waiwai ki ō rātou ake raraunga (2).

Kei Aotearoa, nā te Tiriti o Waitangi i kī taurangihia ngā matatika Māori ki ngā raraunga e hāngai ana ki ngāi Māori (3). E piki haere ana te whakaaweawe a te mana raraunga Māori i te mana urungi mō ngā raraunga e hāngai ana ki ngāi Māori.

Ko te whāinga o tēnei pūrongo he whakapiki i te māramatanga tūmatanui ki te mana raraunga, te mana raraunga Iwi Taketake, me te mana raraunga Māori. Ina piki ai te māramatanga, tērā ētahi atu matapaki me ngā whakataunga pai ake e pā ana ki te tautuhi, te kohikohi, te whakaputu, me te whakahaumaru o ngā raraunga hei painga mō ngā hapori o Aotearoa.

Data, data everywhere. The rapid growth of digital technologies has created a global explosion in the generation of data (1). In this increasingly digitised world, more data than ever is[1] being collected, stored, linked, and shared. But who defines data? Who owns it? Who has access? And who benefits? The concepts of data sovereignty, Indigenous data sovereignty, and Māori data sovereignty were developed to help answer such complex and urgent questions.

For Indigenous Peoples, data sovereignty is integral to a wider discussion about autonomy and self-determination. Indigenous data sovereignty recognises that Indigenous Peoples have inherent rights to their own data (2).

In Aotearoa New Zealand,[2] te Tiriti o Waitangi guarantees Māori rights to data that relates to Māori (3). Māori data sovereignty is increasingly influencing how data about Māori is governed.

The aim of this report is to increase public understanding of data sovereignty, Indigenous data sovereignty, and Māori data sovereignty. Through better understanding, there can be more conversations and improved decisions about the way data is defined, collected, stored, used, and protected for the benefit of Aotearoa New Zealand communities.

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[1] In this report, data is used in the singular for accessibility to a general audience. Some quotes use the plural.

[2] Aotearoa New Zealand is used in this report, unless referring to laws or legal agreements.

Mana Raraunga

Data Sovereignty

> Data flows around the world, silently making decisions that affect all of us, all of the time.
>
> — ANDREW CHEN, 2020 (4)

He aha te raraunga?
What is data?

Data can be defined as information recorded in various forms (5). It is usually gathered for the purpose of being analysed (6). Data collected in Aotearoa New Zealand can be about people, land, water, and animals, for example. Indigenous Peoples and Māori have distinct definitions of data, which are described later in the report.

In the recent past, data collected about people was limited and commonly related to areas such as health, education, justice, and living situation – the Census, for example. Now, data has expanded alongside the internet and mobile phone technology (7). We use digital technology in almost everything we do (4) and, as our lives become more digitised, more information is being transmitted. This includes personal information about our social activities, interests, and shopping habits. Data also comes from devices embedded with sensors or software that connect to the internet – such as smart kitchen appliances, fitness-tracking watches, and home-security systems. In short, data is generated by everything we do.

He mea nui te raraunga – ā, ka piki ake tōna hiranga
Data matters – and it is going to matter more

All data is important because it can help us to understand the world and our impact on it, and to solve issues that affect our environment and wellbeing (9). Data contributes to research and decisions in various areas – from climate change and biodiversity to healthcare and roading.

We are living in an era where more and more information is online and internationally available. Today's wide-ranging digitised data is being called 'the new currency of knowledge' (10) and 'the world's most valuable resource': it is translating to money and power (11). Many of the biggest global companies – Amazon, Microsoft, Alphabet, Meta, and Apple, for example – deal in data (12). Data is increasingly influencing economies, policies, and politics, and how we interact and relate to each other (8,13). Social media algorithms, for example, affect what news and opinions we read, what memes and advertisements are shown to us, who we connect with, and more.

Why is data having such a transformative impact on our lives? The emergence of 'open data' and 'big data' helps explain. Advances in these two areas mean there is more access to large datasets compiled from different sources. Such datasets can drive innovation, improve services, and inform discoveries and decisions (14).

> Data are the single most significant asset shaping our present and future realities.
>
> — KIRI WEST ET AL, 2020 (8)

Open data

is digitised data that is held publicly and is free for anyone to access, use, and share.[3] It is able to be 'read' by both humans and machines (16,17). This might be online information about artworks in public galleries, government maps of regional land boundaries, or publicly funded scientific research findings.

Big data

is datasets characterised by the volume of data that is available, the velocity or speed at which it can be collected and processed, and the enormous variety of sources it comes from – including digital images, the internet, and mobile phones (18).

Big data is also defined as large datasets that require computer analysis to be understood. That is, it is beyond human abilities alone to search, aggregate, cross-reference, and make sense of big data (19).

To give an example of big data use: early in the Covid-19 pandemic, researchers monitored virus-related keywords like 'fever' across healthcare websites, social media, and news reports. This population-level big data helped them to predict the spread of the virus and informed public-health measures used to prevent case numbers rising (18).

Big data and open data are complex, and advanced technologies are needed to store, interpret, and communicate them. These include cloud computing, algorithms, and artificial intelligence (AI), explained below. The use of such techniques also allows for data from multiple sources to be aggregated[4] or combined.

This continual rise in the generation, storage, and exchange of huge amounts of data is having both positive and harmful effects. With data-driven technologies holding so much power and potential, questions of data sovereignty – who owns and controls our data – are key to an equitable data future for all (20).

[3] 'Increasingly, this occurs legally through the use of tools, policies, and licenses such as Public Domain and Creative Commons (15).

[4] When raw data is gathered and summarised.

He aha te mana raraunga?
What is data sovereignty?

> There is no one definition of data sovereignty, but issues of control and power over data at the individual, collective or nation level predominate.
>
> — KATHARINA RUCKSTUHL, 2023 (21)

Who benefits from your data? Who owns it? Where is it held? Who has a right to use it? Can someone change your data? Do you have access to your own data? What if you want that data to be forgotten ...?

Confusion has spread along with the avalanche of digitised data. **Changes in the world of digital data are so rapid that policies and regulations regarding rights to and governance of digital data have not kept up** (2). In addition, a small number of technology and social media companies have dramatically increased in size and dominance – becoming known as 'big tech'.[5] Big tech is resulting in vast amounts of data from billions of people being accumulated by just a handful of giant corporations. Because of these factors and others, how digital data is protected, owned, stored, controlled, and used has become a serious concern – at an individual level and for communities, governments, and global organisations (9,22).

Data sovereignty is a multidimensional term and there is a wide range of understanding of what it means (20). Typically, data sovereignty is the concept that if data is stored in a country, then the rules of that country apply to it (24). So, if some data originally came from Australia but is stored in Aotearoa New Zealand then it would be subject to New Zealand laws and regulations. More broadly, data sovereignty relates to individuals, particular groups, and nations having ownership over and the ability to control their own data as they see fit (20). This encompasses fundamental rights regarding privacy, collection, storage, protection, ethics, and other issues connected to data and data infrastructure (20,25).

The complex issue of data sovereignty is continuously evolving as laws are tested (26). It is also influenced by approaches to and concerns about data rights raised by the Indigenous data sovereignty movement (27). In Aotearoa New Zealand, many developments in how data is governed are being guided by the requirements of Māori data sovereignty (21,28), discussed later.

[5] 'Big tech' is a term used to describe the handful of companies that dominate the information technology industry, including Alphabet (Google), Amazon, Apple, Microsoft, and Meta (Facebook) (22).

A BRIEF BACKGROUND TO DATA SOVEREIGNTY

The term data sovereignty came about in the early 2000s in response to the way the internet was spreading information rapidly and widely across the globe (29). Countries recognised the need to be able to legally control the data resources within or passing through their own territories (30–32). Data localisation[6], and data security measures and laws, emerged to safeguard national security and economic and other interests (34). Up until the internet became pervasive, access to information could be nationally controlled by shutting off television, radio, and telephone services (7), while geographical borders limited data flows between countries (7,29).

Data sovereignty involves international cooperation[7] and multiple stakeholders – from individuals and consumers through to businesses and governments (30). It applies in contexts that include legislation, IT architecture, research, surveillance, commerce, and trade (20). Data sovereignty is realised through legislation such as laws that limit data flow across international borders, technical processes such as encryption, and **data governance** (20,31) – the ways a country or organisation decides and manages what can be done with data, how, and when (36).

Data policies of different countries vary because each country governs information in a way that reflects its own laws; social, political, and cultural values; and ways of life. Depending on the jurisdiction, data sovereignty could therefore be practised as supporting free speech and privacy, or as censoring online content and using surveillance (2,32). New Zealand belongs to Digital Nations – a group of the world's most digitally advanced nations (37).[8] Our government aspires to be a 'world leader in the trusted use of shared data' (38), and to develop best practice in data systems that are 'human-centred, innovative, and equitable' (22).

[6] 'Data localisation' refers to a requirement that data is stored or processed within a specific jurisdiction (33).

[7] This includes international agreements – for example, when New Zealand entered into the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), its data sovereignty and other commitments were tested before the Waitangi Tribunal (35).

[8] Estonia, Israel, Korea, New Zealand, United Kingdom, Canada, Uruguay, Mexico, Portugal, and Denmark (37).

He aha ngā take e pūtahi ai ki te mana raraunga? What issues intersect with data sovereignty?

Tūmataiti
Privacy

Privacy is widely considered essential to freedom and democracy, and the protection of privacy is anchored in human rights law (38). In Aotearoa New Zealand, the privacy of individuals, organisations, and businesses is protected by the Privacy Act 2020 and the Privacy Principles (39), and by international human rights law. Children and young people also have specific rights under the UN Convention on the Rights of the Child (40). The Privacy Act, however, has no provisions for the protection of the rights of groups or collectives, which is integral to Māori data sovereignty, discussed later.

Ngā raraunga matawhaiaro
Personal data

Buy a t-shirt online, join a video call, download an app – and information about you will be exchanged. We all have digital interactions all the time – making a digital payment at a supermarket, looking at our digital medical record at the doctor's (41), logging into email. You might use a fitness tracker or an app to monitor ovulation, with the data from each being aggregated by a service such as Apple Health (42).

In this digital and internet era, companies are easily collecting personal information about their users on a massive scale. Businesses, for example, view data as an economic asset, and use or sell it to develop products, create targeted advertisements, and make profits (43). As a result, some people are becoming increasingly aware of privacy, and questioning how user data is used, stored, and shared (44). In 2022, six out of 10 people living in Aotearoa New Zealand were concerned about the security of their personal information on the internet (45), with 65 percent deciding not to use an online service because of security or privacy concerns (46).

Regulations vary regarding whether approval is needed to collect or use data. For example, technologies including closed-circuit television (CCTV), the Global Positioning System (GPS), and social media can be used by governments and private corporations to monitor individuals and groups without requiring consent (13).

E ahatia ana: Tūmataiti
What's happening: Privacy

In response to the rise in digital data collection, new data privacy laws in Aotearoa New Zealand have been developed to protect personal data rights.

Under the Privacy Act 2020 (38), agencies have a duty to protect the personal information they collect and hold, and to respect it, to avoid causing harm to people. Organisations must have safeguards in place to prevent loss, misuse, or disclosure of personal information (47). Aotearoa New Zealand has an Office of the Privacy Commissioner that has several functions, including investigating complaints about breaches of privacy and making public statements about matters affecting individual privacy (47). In comparison to other jurisdictions, however, the Commissioner's powers are relatively weak (48). New Zealand is part of the Global Privacy Enforcement Network, and the Office of the Privacy Commissioner can work alongside overseas regulators to address data issues affecting New Zealanders (49).

Digital privacy issues in Aotearoa New Zealand have been highlighted recently with privacy breaches being picked up by the media. These include Accident Compensation Corporation (ACC) staff sharing sensitive client data on Snapchat, and police unlawfully photographing young people (38,50).

Overseas, data sovereignty has been central to various regulations and initiatives, including the European Cybersecurity Certification Scheme for Cloud Services and the European Union (EU) General Data Protection Regulation (GDPR) (51). The GDPR, which is influential worldwide (52), governs how personal data must be collected, processed, and erased. Under the GDPR, information collected from citizens of the EU must be stored in servers located in EU jurisdictions or in countries that have similarly rigorous protection laws. It includes the law known as 'the right to be forgotten', which gives individuals the right to ask organisations to delete their personal data (51).[9]

[9] https://gdpr.eu/right-to-be-forgotten/

Rokiroki
Storage

It would make sense for data to be kept in the same jurisdiction as the people it is about and who use it, but digitised information zips across borders and cannot always be contained within a nation under that nation's laws (13).

How and where data is stored relates to data sovereignty because it is challenging to assert control over data stored in a public, open data ecosystem, such as the computing 'cloud' (51). 'In the cloud' means information is stored on internet servers, instead of a computer's hard drive (53). The use of the cloud means it is difficult to pinpoint where servers are hosted, and whether data is being stored only in places where permission has been given (51). It is important to know where data is stored because it affects what privacy legislation applies (20). Techniques to enforce data sovereignty in cloud infrastructures are being advanced[10] but data security in the cloud cannot currently be guaranteed (26,51).

Legal rights to stored data vary. For example, the 2018 Access and Assistance Bill allows the Australian government access to data stored in Australia in a facility owned by an overseas company (13). The United States (US) government passed the Cloud Act in 2018 (54), which states that if data is stored by a US-owned company then, no matter where in the world it is, the US government is allowed access to that data. Examples show how complex storage law is in practice: if New Zealand data is stored by a US-owned company in a warehouse in Aotearoa New Zealand, the Cloud Act still applies. Or, if New Zealand data is stored by a US company in Australia, then Australian, US, and New Zealand laws apply to that data.

Data sovereignty also acknowledges the equity issues involved in data collection and storage. The ability to oversee data is limited by a country's access to technology, such as mobile phones and internet. Small, developing, or less-wealthy countries have more difficulty managing data than large powerful nations (7,33).

E ahatia ana: Rokiroki
What's happening: Storage

New Zealand government data is being stored in a variety of onshore and offshore locations. They may be:

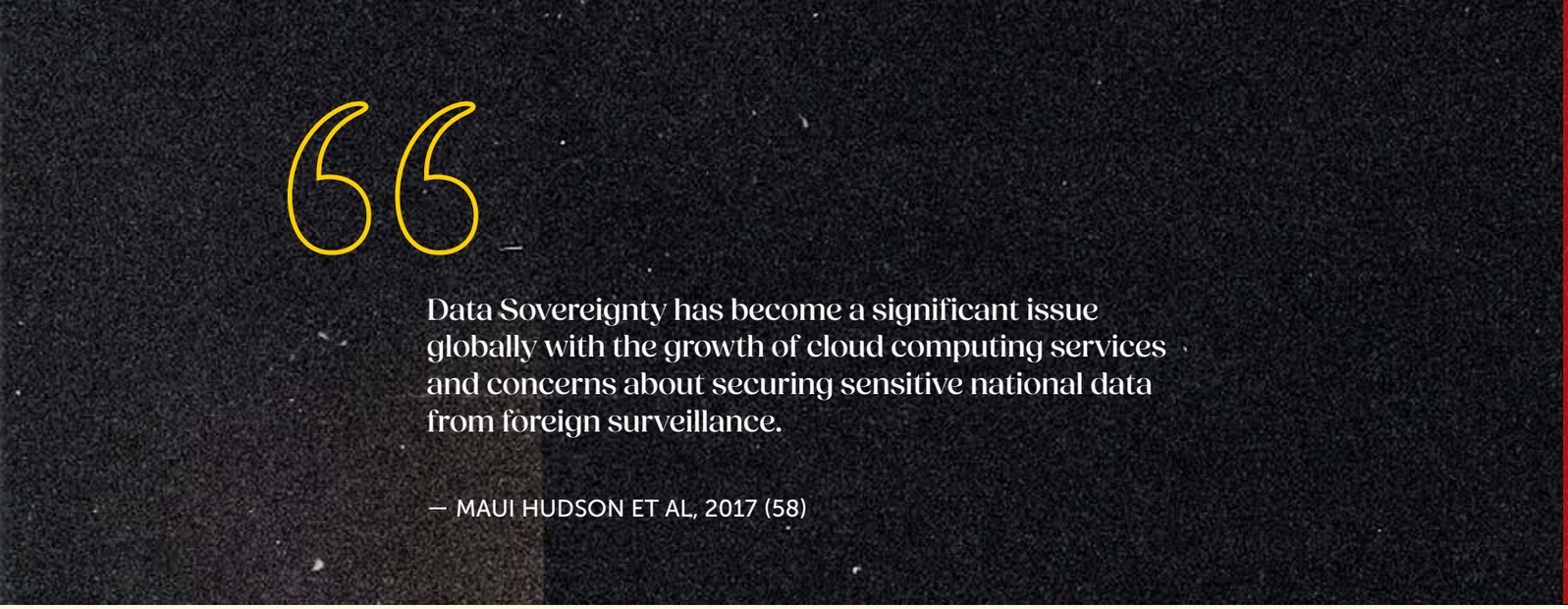
- offshore, in the public cloud
- onshore, but stored by foreign-owned companies
- onshore and stored by New Zealand-owned companies and organisations (55).

The government's 'Cloud First' policy prioritises using cloud services for data storage, with the arguable reasoning that they are generally more cost effective and secure (56). Locally owned and operated cloud providers include Catalyst, Datacom, and CCL (Revera) (55).
The government largely uses major multinational cloud services, including Amazon and Microsoft, which are offshore (56)[11]. The Ministry of Health's Covid-19 Immunisation Register – which has details including individuals' names, addresses, dates of birth, and ethnicities – is hosted on a cloud service in Sydney (56), along with information from My Covid Record and My Vaccine Pass (57).

The storage of significant amounts of sensitive New Zealand data on platforms that are not New Zealand-owned raises concerns about ownership, privacy, and security. There are also economic, cultural, and social risks when so much New Zealand data is tied to so few multinational corporations. From an infrastructure point of view, there are just five undersea cables that connect Aotearoa New Zealand internationally. The breakage of any of these cables (through natural disaster, for example) could mean loss of access to essential New Zealand data (56). There is an argument that a nationalised data storage facility in this country would both support security and align with the values of Māori data sovereignty (50). Māori data sovereignty, discussed later, is driving discussion about approaches to data storage, with a focus on using local storage and repatriating data. The kākāpō genome, for example, was stored in Sydney by Amazon Web Services, but in 2019 the Department of Conservation moved it to an Aotearoa New Zealand-based facility (57).

[10] Such as secure enclaves and encrypted virtual machine memory (51).

[11] The government has best-practice guidelines for choosing a provider: https://www.digital.govt.nz/dmsdocument/251~guidance-risk-discovery-tool-for-public-cloud/html



> 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.
>
> — MAUI HUDSON ET AL, 2017 (58)

Haumaru ā-motu
National security

There is no definitive agreement about the governing of data flow across international borders (59). Cyberspace is a shared space, therefore responsibility for national security needs to be shared between national and global stakeholders. Data sovereignty requirements are important to safeguarding both personal data and sensitive national data (34).

The storage of data in the cloud means that governments cannot fully ensure sovereignty over their nation's data – sensitive information could come under foreign laws or be shared with other governments (26,59). In Australia, for example, any encrypted data must be able to be unencrypted by the Australian government (60). New Zealand data stored in Australia could therefore legally be accessed.

There is an argument that the best way to protect citizens' data, while still encouraging data-driven development, is to store data in local servers, ensuring that information stays under the control and rules of the country from where it came (33,59).

The ability of countries to govern data is unequal. Big countries, such as the US and China, have more influence over big tech companies that monopolise data than countries with a smaller market (59).

E ahatia ana: Haumaru ā-motu
What's happening: National security

Like New Zealand, the digital policies of the US, United Kingdom, Canada, and Australia are prioritising cloud storage (56). In Canada, requirements for national security include storing only certain kinds of data in the cloud, encrypting data, and making contracts that allow only Canadian access to sensitive data (26). India, China, and Europe are also focused on data protection for national benefit (59). In Russia, cloud computing services must store Russian citizens' data in Russia, while China requires foreign companies operating in China to store their customers' data on servers in China (31).

The legal rules associated with data stored on platforms developed by overseas companies are relatively new and untested. Agreements have been reached between some cloud storage providers and governments. For example, both the US and China have legal rights over data stored by companies with headquarters in their countries (56). Australia's COVIDSafe data is stored on Amazon Web Services, a US-owned cloud based in Australia. But Amazon is still subject to US law and would currently have to disclose that data on US government orders. The same could happen to overseas storage platforms based in Aotearoa New Zealand but under the authority of their country of origin. Factors like these make it difficult to assess the risks of offshoring data. Replicating data locally and offshore has been a suggestion for increasing security (56).

Raraunga nui, raraunga tuwhera hoki
Big data and open data

There are positive aspirations behind the development of big data and open data. These include sharing knowledge in a way that is inclusive, transparent, and accessible to more people – to reduce wealth and power inequities (16). A driving force behind big data and open data is also the idea that large groups of data are more useful when they are shared, interlinked (joined or connected), and used with other datasets (59).

Insights from big data are used widely – to spot trends, target audiences, and more. They are applied in areas including government, business, security, crime, and health. Advantages include the personalisation of products, services, and healthcare, and faster advances in research (20). In our daily lives, big data and open data might affect decisions about the size of the school zone we live in, what buildings can be built around us, and whether our health issues can be funded. You benefit from big data when you check the traffic situation or weather forecast.

Big data and open data, however, involve issues of concern to us all. Legal concepts of privacy and ownership, for example, are difficult to apply to them (5). The use of big data can lead to invasions of privacy and increased control by governments and commercial corporations. Datasets have become easily accessible to anyone, whether or not they have the skills to reliably interpret them. Big data from unknown or internet sources may be low quality, and the way it is interpreted may not account for bias (19). Open data policies can unintentionally exclude minority groups, including Indigenous Peoples wishing to control Indigenous data (16). This is discussed further in the Indigenous data sovereignty section.

New Zealand, along with Canada, Australia, the US, and the Nordic states, is a member of the Open Government Partnership, which promotes transparent, participatory, inclusive, and accountable governance of data (61).

Ngā raraunga i kotuia
Interlinked data

Information from multiple databases and webpages can now more easily be aggregated or 'linked', creating new datasets (4) – another way that technologies and the digitisation of data is affecting privacy. A dataset that combines your location, grocery-shopping history, and fitness tracker data, for example, could enable an organisation to predict your lifestyle more easily than one of those datasets on its own.

Data sovereignty identifies concerns about how linking different sets of data relates to ethics, fairness, and equity. The New Zealand Government, for example, has a research database called the Integrated Data Infrastructure (IDI). The IDI allows de-identified data about a person to be combined from various sources, such as government services, including on health, education, and tax and income (62). The positive intention behind the IDI is that gathering data from different agencies should lead to more effective policies and research for the public good (44). However, there are consent and equity issues. For example, to access government services you need to provide information about yourself, which could then be shared with the IDI without you being aware of it (63). And, if you have more contact with government services because you are on a low-income or experience social disadvantage, then the IDI will know much more about you than about your neighbour who is in another social group (44). The IDI is discussed further in the Māori data sovereignty section.

An example of controversial data-linking took place in the 2010s, when the consulting firm Cambridge Analytica collected the personal data of millions of Facebook users and created psychological profiles. This profile data was then used to target voters, benefiting the 2016 US presidential campaigns of Ted Cruz and Donald Trump. This was done without informed consent from Facebook users but with the knowledge of Facebook (64).

When data can be accessed from different sources and merged, it also allows for identity theft –someone stealing your personal information and pretending to be you. Your credit card or passport details might be stolen, for example, and sold to people who may use them for financial benefit. Acting as you, someone might take out a loan or accumulate speeding tickets. Identity theft can cause serious damage to people's reputations and finances, and it is estimated that thousands of New Zealanders are affected each year (65,66).

Ngā hātepe me te atamai hangahanga
Algorithms and artificial intelligence

New technologies are being developed that 'harvest', use, manage, and interpret big data. Often people may not be aware of, or consent to, what's happening to their data. Also, we might assume that the operating systems of the digital products and services are neutral, but they are developed by humans with certain biases and values (41).

Artificial intelligence (AI) is a collection of technologies that combine data, algorithms, and computing power. They perform tasks that would require intelligence if they were done by a human (67). The autocorrect checking your document is AI, the map apps helping you travel in the right direction are AI, and so are algorithms that match internet search results with your interests, virtual assistants like Siri, and chatbots that pop up to help you on service websites.

Generative artificial intelligence (GAI) transforms datasets from a multitude of sources into texts, pictures, audio, and video that appear to have been created by a human being (68). ChatGPT, for example, can quickly analyse huge amounts of information to help you brainstorm ideas, answer questions, and compose essays, emails, and code – and more (69).

Algorithms are used to efficiently process multiple sets of data to find trends or inform decisions. For example, an algorithm might be used to order a priority list for elective surgeries, identify youth at risk of long-term unemployment, or process visa applications (70). Algorithms can 'crunch' large, diverse sets of data much faster than a human can, but they are not failproof. Data sovereignty applies to algorithms because they rely on data that already exists. If data is lacking or low quality then the results of an algorithm will be unreliable. Similarly, if the data being processed is biased, the results of an algorithm will reflect that bias. Algorithms themselves are developed by humans and can be designed poorly or with inherent biases (70). For example, Amazon's automated hiring programme learned to discriminate against women, often in technical roles (38). Algorithms also lack human oversight – if a human makes a decision, we can challenge that decision and ask them to explain their decision process. If an algorithm is used, that decision is difficult to unpack and challenge – even with specialised digital knowledge (70).

Facial recognition technology (FRT) is a powerful and controversial surveillance tool that involves using AI to map a person's facial features and create a 'faceprint'. This is then added to a database, which may be used to verify and compare faceprints and find matches (50,71). The use of FRT in society is increasing. It can unlock our phones or identify us in a crowd or at international borders (52). When you enter some shops, your face may be scanned to make sure your faceprint doesn't match that of an alleged shoplifter (72). FRT is a threat to human rights and privacy because it can collect data that identifies people – in real time and without them knowing or giving consent. People have no data sovereignty over their faceprint being gathered, stored, and used (50). There is debate about which of FRT's uses are appropriate, and concerns about unregulated over-surveillance, accuracy, and potential racial bias (50). These are discussed further in the Māori data sovereignty section.

E ahatia ana: Ngā hātepe me te atamai hangahanga
What's happening: Algorithms and artificial intelligence

There is recognition in Aotearoa New Zealand that the algorithms and AI we use need to be embedded with values that are important to the people who live here, such as te Tiriti obligations, data sovereignty, fairness, and sustainability. Otherwise, we will continue to use technologies developed by countries with values that do not necessarily align with ours (67).

The Algorithm Charter for Aotearoa New Zealand 2020 (73) was developed with the aim of agencies using algorithms in a fair, transparent, ethical way that is in alignment with the principles of te Tiriti (70). The Charter sets standards for public sector agencies that use algorithms to guide decisions (52), and includes a risk score for negative outcomes of algorithm use (70). However, its principles are not currently enforceable (52), and they are proving inadequate when people try to apply them (70). The Charter currently applies only to algorithm use by the government and not by other parties (52), such as private companies. It is discussed further in the Māori data sovereignty section.

The Privacy Commissioner has issued guidance on privacy and AI (74). Regarding facial recognition technology (FRT), the Privacy Commissioner is considering options for privacy protection of biometric information, including a biometrics code of practice under the Privacy Act 2020 (75). Across government, data and analytics good practice principles (76) and the Algorithm Charter apply to the use of AI, and there is interim generative artificial intelligence guidance (77).

Worldwide, discussions about AI's rapid advancement and the urgent need for regulation are taking place (78). The EU is developing the AI Act – one of the world's first laws governing artificial intelligence (79). Canada has proposed an AI and Data Act (80). The EU has draft regulations for 'remote biometric ID technologies', including FRT, which are described as aggressive and intrusive to people's rights and freedoms (52).

There are different understandings of data sovereignty and no agreed framework for data sovereignty, within countries or internationally (20). The focus of data sovereignty is largely on individuals and jurisdictions, and there are concerns that the potential positives of the data revolution may not equally benefit Indigenous Peoples as collectives (81). Indigenous data sovereignty, discussed next, addresses data sovereignty through the lens of Indigenous worldviews.

Mana Raraunga Iwi Taketake

Indigenous Data Sovereignty

The rapidly changing data landscape is opening up discussions about the way Indigenous Peoples think about and aspire to care for Indigenous data, in all its forms (82). The rise of digitised data is leading to new opportunities for Indigenous Peoples to define, access, and control Indigenous data (1). Alongside this is concern that there is a lack of consideration for Indigenous rights, worldviews, and issues in both existing and emerging data infrastructures (81).

He aha te raraunga Iwi Taketake? What is Indigenous data?

Indigenous data refers to information or knowledge, in digital and any other format, that is about Indigenous Peoples and individuals, and that impacts Indigenous lives (10). This includes:

- data about the environment – for example, land, water, plants, animals
- data about Indigenous Peoples as individuals – for example, health, legal, education
- data about Indigenous Peoples as groups – for example, demographics and cultural information such as ancestral knowledge, community stories, and belongings (10,83).

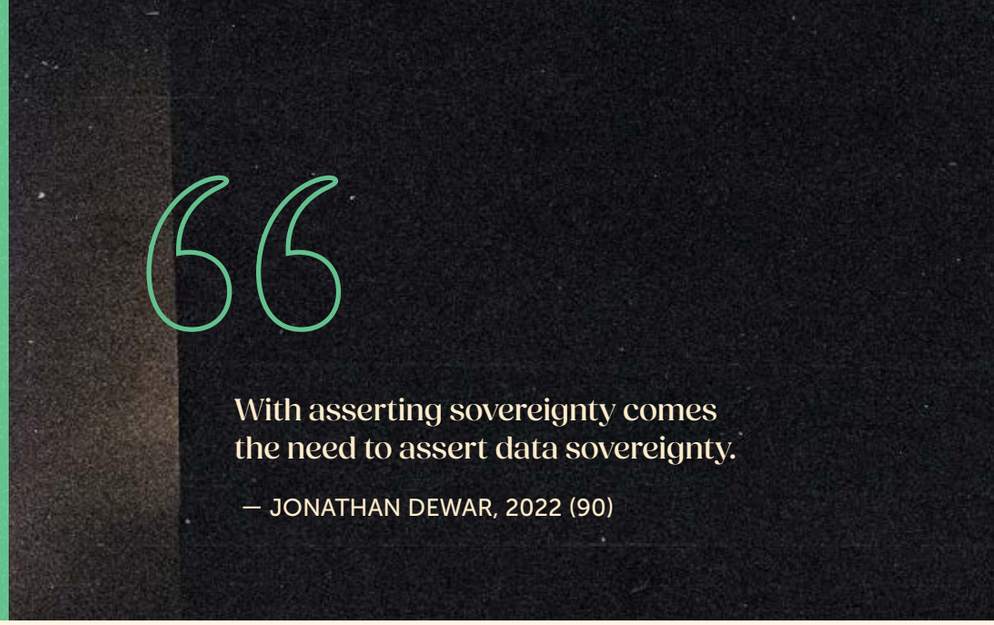
The United Nations Special Rapporteur on the Right to Privacy stated that **'data is a cultural, strategic, and economic resource for Indigenous Peoples' (21).**

He aha te mana raraunga Iwi Taketake? What is Indigenous data sovereignty?

In short, Indigenous data sovereignty is the concept that data is subject to the laws of the nation from **which it is collected** (24). 'Nation' in this context extends beyond the traditional notion of the sovereign nation state to recognise the authority of iwi, tribes, mobs, and other kinship-based groups (82,4). Indigenous data sovereignty differs from data sovereignty, which is the notion that data is subject to the laws of the nation **in which it is stored** (86).

The vision of Indigenous data sovereignty is that Indigenous control over Indigenous data benefits the people the data is for and about – culturally, spiritually, socially, and economically. Positive outcomes include the passing on of more knowledge and a greater sense of identity to younger generations (2,87).

> At the heart of Indigenous Data Sovereignty is the simple goal of putting Indigenous data in Indigenous hands for Indigenous benefits.
>
> — STEPHANIE RUSSO CARROLL, 2022 (84)



In practice, Indigenous data sovereignty means Indigenous Peoples having the right to own and control data related to themselves, their ways of life and customs, knowledge systems, genealogy, land, and resources. It applies to how this data is:

- defined
- collected
- accessed
- analysed
- interpreted
- managed
- shared
- reused
- stored (1,2,10,23,88).

Three important points to understand about Indigenous data sovereignty are that it:

- is integral to Indigenous sovereignty and balanced power relationships (23)
- focuses on collective – rather than individual – rights and privacy (1)
- provides a framework for data practices and systems that recognise Indigenous worldviews and advance Indigenous wellbeing and self-determination (1,89).

Closely connected to Indigenous data sovereignty is **Indigenous data governance:** data practices and policies developed by and with Indigenous Peoples that reflect Indigenous values, rights, and interests (1).

Ngā mana raraunga Iwi Taketake me ngā matatika ki te mana motuhake

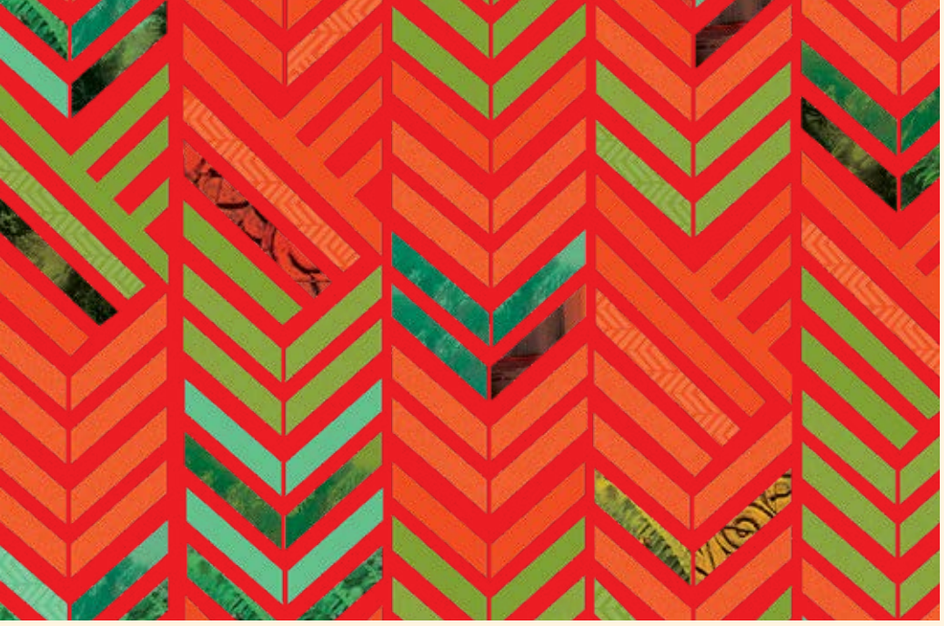
Indigenous data sovereignty and rights to self-determination

The Indigenous data sovereignty movement is founded on **recognition of the autonomy of Indigenous Peoples** (2,87) **and rights of self-determination and sovereignty.**

Article 3 of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)[12] defines self-determination as Indigenous Peoples' 'right to determine their political status and to pursue freely their economic, social and cultural development' (89,92).

Rights to Indigenous data are seen as necessary to realising UNDRIP rights, to claiming sovereignty over land and other resources, and to gaining political autonomy (11). There have long been debates about how sovereignty relates to land, but conversations about how sovereignty relates to data are much more recent (89).

[12] UNDRIP established a universal framework of minimum standards for the survival, dignity, and wellbeing of the Indigenous Peoples of the world (91).



He urupare ki te kiritōpū te mana raraunga Iwi Taketake

Indigenous data sovereignty is responsive to the collective

Many settler colonial states have organisations and networks that advocate for the governing of Indigenous data by Indigenous Peoples (23), including:

- Te Mana Raraunga, Māori Data Sovereignty Network in Aotearoa New Zealand (24)
- Maiam Nayri Wingara, Aboriginal Indigenous Data Sovereignty Collective in Australia (93)
- the US Indigenous Data Sovereignty Network in the US (94)
- the First Nations Indigenous Governance Centre in Canada (95)
- the GIDA-Sápmi Network in Nordic countries (90,91).

These coordinate through the Global Indigenous Data Alliance (GIDA) (16). Another international data sovereignty initiative is Local Contexts, which supports Indigenous communities in the management of their digitised intellectual property and cultural heritage (86,98).

For Indigenous Peoples, collective, as well as individual, Indigenous privacy laws, regulations, and standards are important and necessary (1).

In many Indigenous worldviews, knowledge belongs to the collective and responsibility is shared for passing on Indigenous ways of being, knowing, and doing through the generations. Interconnectedness and community underpin Indigenous social systems. Collective rights and reciprocal obligations are therefore fundamental to Indigenous knowledge systems and data sovereignty (11,23). The UNDRIP specifically addresses the collective rights of Indigenous Peoples in the context of Indigenous data (99).

As the use of digital technology evolves, a collective approach to data sovereignty is particularly relevant (11). Indigenous and other marginalised peoples are more likely to be profiled using big data, algorithms, and predictive modelling. Algorithms often group individuals according to characteristics and behaviours, and then make – usually biased – decisions that affect that group. Regarding invasion-of-privacy issues, under Indigenous data sovereignty, both collective and individual privacy laws and Indigenous rights should apply (38). Data privacy legislation for groups that identify as collectives is minimal, however, and new frameworks are needed to uphold collective rights (38). First Nations communities in Canada who have adopted the First Nations Information Governance Centre OCAP® principles[13] are showing leadership in this space by passing their own privacy laws (11).

[13] Ownership, Control, Access, Possession. OCAP® is a registered trademark of the First Nations Information Governance Centre (FNIGC). See https://www.fnigc.ca/ocap-training/

> Before contact with imperial powers, indigenous peoples had their own vibrant, meaningful bodies of data, over which they had Data Sovereignty.
>
> — IAN POOL, 2016 (89)

He urupare ki inamata te mana raraunga Iwi Taketake he wawata hoki mō te anamata

Indigenous data sovereignty is a response to the past and a vision for the future

Customarily, Indigenous knowledge was recorded and passed on intergenerationally through song, oratory, weaving, carving, dance, and many other practices (1,89). The transfer of knowledge was governed and restricted – by gender or status, for example – recognising diversity in a collective group (100). Indigenous Peoples had, and continue to have, protocols to ensure information is shared in safe, respectful ways (11).

Ngā urupare tātāmi ki ngā raraunga Iwi Taketake

Colonial responses to Indigenous data

When settlers arrived, Indigenous methods of collecting, organising, and communicating knowledge did not fit with the colonial worldview and were either not acknowledged or dismissed as unsophisticated, mythical, and archaic (23,89). Colonial knowledge and scientific approaches were promoted as more credible than Indigenous knowledge systems (101).

But, when it was convenient, Indigenous knowledge could still be repackaged as 'scientific discoveries' (101). Information acquired from Indigenous Peoples, along with artefacts, plants, and animals, was used for colonial benefit – often economic (23,85). Joseph Banks, the botanist on explorer James Cook's ship *Endeavour* in the 1700s, became famous for his plant collection at Kew Gardens, London – based on Indigenous knowledge (102).

> As Indigenous peoples we have frequently had data collected from us, but have rarely drawn value from our own data.
>
> — INDIGENOUS DATA SOVEREIGNTY SUMMIT, 2018 (10)

For colonialists, Indigenous Peoples were often a source of data, and research was typically done not with or for but *on* them (16). Samples and data were taken from Indigenous Peoples and environments without consent, incorrectly attributed, misused, interpreted without cultural context, and freely distributed (16). As a consequence, research often continues to be perceived by Indigenous Peoples as painful and lacking in benefits for the people that data is about (23).

Ngā pūnaha raraunga me ngā Iwi Taketake

Data systems and Indigenous Peoples

At face value, data might seem neutral – a collection of numbers. But data unavoidably reflects what questions are being asked, why, how, and by whom. In most cases, the people making the decisions about the definition, collection, ownership, and processing of Indigenous data are not Indigenous (10).

Data systems implemented by former colonial powers have little relevance to Indigenous worldviews and are often seen by Indigenous Peoples as serving the majority culture's own ambitions (29,89,102). This legacy of data ecosystems is contributing to a big data infrastructure that neither recognises Indigenous worldviews nor considers Indigenous data needs (1).

> Data are not neutral.
>
> — REBECCA TSOSIE, 2022 (2)

He arotahi ki te takarepatanga me te taumahatanga
A focus on deficit and disadvantage

A review identified five critical problems with the majority of data for and about Indigenous Peoples. That data is often: inconsistent, irrelevant, poor quality, produced and used within an environment of mistrust, and controlled by those external to Native nations (103).

Data about Indigenous Peoples often:

- reflects government interests, rather than being culturally relevant to Indigenous Peoples and their aspirations (1,102)
- is lacking – in Aotearoa New Zealand, for example, Māori have historically been undercounted in vital statistics, such as birth and death registrations and the population census (101)
- focuses on disadvantage – in the health, education, or justice systems, for example. This 'deficit data', as it is called,[14] is then used to inform policies and approaches to correcting 'Indigenous problems' (2). This reinforces stereotypes (2,62) because when only deficit data about Indigenous Peoples is being processed, then only data reflecting Indigenous people as a problem is produced (10).

The model of collecting deficit data also leads to an imbalance of accumulated data about the lives and behaviours of certain groups. For example, because of socio-economic inequities, Māori and Pacific communities require more government assistance and interaction and are consequently over-represented in government datasets compared with other ethnic groups (44). This becomes a particular problem when data is linked from multiple sources. Big data and algorithms that draw together Indigenous-related datasets are likely to reinforce the disadvantage and deficiency story (1).

[14] Data focused on deficit is known as 5D data: Indigenous difference, disparity, disadvantage, dysfunction, and deprivation (10). Also refer to BADDR Data (blameworthy, aggregate, decontextualised, deficit, and restricted), described by palawa scholar Maggie Walter (22).

Kāore te nuinga o ngā raraunga e noho ana i raro i te whakahaere Iwi Taketake
Most data is not under Indigenous control

Indigenous access to Indigenous data is important for achieving Indigenous aims of wellbeing, equity, and the deconstruction of institutionalised racism (104). But currently, most data about Indigenous Peoples is not under Indigenous control. This data spans from research data about genetic materials (microorganism, plant, animal, or human), to cultural knowledge, to data about artefacts in storehouses, such as museums and libraries (85,96).

Indigenous artefacts in museums provide a good example of the effects of lack of Indigenous control. Records kept about Indigenous items – if they are kept at all – are often missing key information about where an object comes from and its maker, or they may simply contain incorrect information. There are issues around access to sacred items and cultural safety protocols not being followed. Longstanding questions regarding intellectual property continue (85,105,106). Copyright, for example, most often belongs to the person who took a photograph or recording of an Indigenous person or group, leaving those Indigenous Peoples without permission rights (85). To give another example, traditional knowledge might be used to identify a plant that protects against malaria. After scientific tests on that plant, a company may be able to develop a product and make a profit without having to acknowledge the Indigenous source of data (85).

> There is an abundance of [Indigenous] data that are buried in larger collections that are hard to find, mislabelled, and controlled by others.
>
> — STEPHANIE RUSSO CARROLL ET AL, 2021 (14)

In response to this lack of control, Indigenous data sovereignty calls for Indigenous data governance (1). Major research-funding councils in Canada, for example, have policies stating that data and samples collected from Indigenous communities must be managed in accordance with mutually agreed terms (16). The Global Indigenous Data Alliance (GIDA) has issued guidance on Indigenous data governance to universities, which typically create, use, and hold huge amounts of Indigenous data.[15]

Te mana raraunga Iwi Taketake me ngā raraunga tuwhera

Indigenous data sovereignty and open data

Open data is about increasing the sharing of and access to data so that data can improve people's quality of life (107). This can have positives for Indigenous Peoples, including access to data that supports Indigenous aims and development (99).

The benefits of the rise in open data, however, are not equitably benefitting Indigenous Peoples (81). Open data approaches are usually based on the worldview of the dominant culture, and can result in *less* protection of Indigenous data (16,81), whereas the focus of Indigenous data sovereignty is on *more* protection and authority over data sharing and use (1).

An example of open data or open science[16] is in the field of genomics.[17] 'Open genomic data' is genomic sequence information that is freely available to use, copy, or distribute (16). Cataloguing, and openly sharing, genomic sequences can be globally beneficial. Throughout the Covid-19 pandemic, the open sharing of SARS-CoV-2 viral genome sequences has helped to monitor the virus's evolution and inform the development of vaccines (16). Genomic sequencing of plant and animal species is helping to increase understanding of the effects of climate change on biodiversity, and to guide conservation efforts to save threatened plants and animals (16). Current genomic data-sharing practices, however, are overriding Indigenous Peoples' rights under the UN Convention on Biological Diversity and UNDRIP to determine how Indigenous data is used (16).

Indigenous data sovereignty offers alternative data-sharing frameworks that aim to maximise the benefit of open data for Indigenous Peoples and guide the positive use of Indigenous data by others (99).

[15] https://www.gida-global.org/gidacommunique

[16] 'Open science is a set of principles and practices that aims to make scientific research from all fields accessible to everyone for the benefit of scientists and society as a whole' (108).

[17] A genome is all the genetic material in an organism (109).

Ngā mātāpono me ngā anga mana raraunga Iwi Taketake Indigenous data sovereignty principles and frameworks

> Many Indigenous Peoples ... have a powerful and nuanced understanding of how to transmit knowledge in a way that is safe and sustainable ... [This] can serve as a model of leadership for data sovereignty.
>
> — REBECCA TSOSIE, 2022 (2)

While Indigenous data sovereignty refers to data rights, **Indigenous data governance** refers to how data sovereignty is enacted; that is, through principles, structures, legal instruments, accountability mechanisms, and policies that apply Indigenous ways of knowing and doing to the management and control of Indigenous data (22,110).

Indigenous Peoples are developing new techniques for data collection and analysis that are culturally based and support Indigenous goals of self-determination (29,89). Key to realising Indigenous data sovereignty is the building of Indigenous Peoples' skills in defining, producing, interpreting, and using data (2,111).

He arotahi ki te tangata me te take
A focus on people and purpose

Indigenous data sovereignty is being advanced through a range of approaches that focus on:

- where the data comes from
- what the data is being used for, including questions of permission for future use
- how the data is being accessed
- how and where the data is being stored (97).

Examples of Indigenous data sovereignty-related principles and frameworks include:

- the OCAP® principles of ownership, control, access, and possession, which originated from the First Nations Indigenous Governance Centre in Canada (FNIGC) (58)[18]. These principles are a step towards First Nations being able to protect collective privacy (38).
- the international CARE principles, which promote collective benefit, authority to control, responsibility, and ethics. These principles are complementary to the FAIR principles[19] for scientific data management: Findable, accessible, interoperable, reusable (1). Used alongside each other, the FAIR and CARE principles set out guidelines for producing, managing, and using data appropriately (85). Key to this approach is that people who interact with Indigenous data should seek guidance from and maintain respectful relationships with Indigenous local communities. UNESCO's Recommendations for Open Science include the CARE principles. They encourage tools and methods for managing data so that as much data as possible can be shared, *as appropriate* – 'sometimes access may need to be restricted, for example to protect human rights ... and sacred ... indigenous knowledge' (112).
- the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) Code of Ethics for Aboriginal and Torres Strait Islander Research, which states that researchers must adhere to the FAIR and CARE principles (113).
- the Global Indigenous Data Alliance (GIDA) set of Indigenous Peoples' rights in data, which include the right to consent, the right to refuse, and the right to reclaim (27).
- the Te Mana Raraunga principles developed by the Māori Data Sovereignty Network (114), discussed further in the Māori data sovereignty section.
- Te Kāhui Raraunga Māori Data Governance Model (22), discussed further in the Māori data sovereignty section.

[18] FNIGC was the first organisation focused on the concept of Indigenous data sovereignty. It was a forerunner to Indigenous data sovereignty being defined as a theory and field of research through the 2015 book *Indigenous Data Sovereignty: Toward an Agenda.*

[19] https://www.go-fair.org/fair-principles/

E ahatia ana: Te mana raraunga Iwi Taketake me te mana urungi
What's happening: Indigenous data sovereignty and governance

> Nothing about us, as Pacific peoples, can be done without us.
>
> — IVAN TAVA, 2022 (115)

Indigenous data sovereignty is being realised through various data governance actions across the world. In the US, many Tribal Nations have their own laws and policies that guide Indigenous data governance protocols – in research, for example (116). In Canada, the Canadian Federal Government allocated $73 million to the First Nations Information Governance Centre to develop a national First Nations data governance strategy (22). In Aotearoa New Zealand, partnerships have been signed by the Pacific Data Sovereignty Network[20] (117), Stats NZ, and the Ministry for Pacific Peoples, committing to collaborative research programmes with Pacific peoples (115,118).

There are movements to create Indigenous biobanks[21] or to repatriate biocultural collections, such as ancestral bones (85). In specimen collections, museums, and other repositories of data and objects, the CARE principles are being applied to the digital space, where a set of metadata tags[22] has been developed by Local Contexts (16,85). These Labels and Notices can be attached to digitised records about Indigenous collection items. Traditional Knowledge (TK) and Biocultural (BC) Labels inform people looking to use data about what can or can't be shared, and how – for example, for non-commercial use only. Notices can be used by institutions to signal that more Indigenous information is needed – about where items originated from or permissions to access, for example.

These Labels and Notices help to identify and protect Indigenous rights to data, and to recognise Indigenous protocols around how knowledge is shared appropriately (16). For example:

- Aotearoa New Zealand's Plant & Food Research assembled the first bilberry genome and applied a Biocultural (BC) Notice. This recognises that the samples came from the Sámi region of Finland, and that Sámi Indigenous rights apply (119).
- through the use of Traditional Knowledge (TK) Labels, the Passamaquoddy Tribe was able to fill in gaps in sparse records about recordings of a Passamaquoddy war song held at the US Library of Congress (86,120).
- the European Reference Genome Atlas is working with Local Contexts to implement the TK and BC Labels, so the database's metadata collection infrastructure promotes and safeguards the interests and knowledge of Indigenous Peoples (121).

Indigenous data is also being protected through the creation of local or national repositories that document knowledge, and store and manage it. Examples include Alaska Traditional Knowledge and Native Foods; National Indigenous Knowledge Management System, South Africa; and Traditional Knowledge Digital Library, India (122).

An Indigenous data sovereignty initiative took place at Toi o Tāmaki, Auckland Art Gallery, when a group from 13 Pacific nations visited the collections and reviewed the gallery's records about the 'Moana Oceania' drawings by John Webber (1751–93), an artist on the explorer James Cook's third Pacific voyage, 1776–80. Elders corrected or added information and gave cultural context, embedding Indigenous narratives and knowledge in the gallery records about these artworks for the first time (123). Another step in realising Indigenous data sovereignty is a grassroots platform such as the open-source Mukurtu, which communities can use to determine levels of access to digitised heritage materials themselves (124).

[20] The Pacific Data Sovereignty Network 'aims to establish a unified voice and collective guardianship and advocacy of data and information about Pacific peoples living in New Zealand' (110).

[21] Biobanking is the storage of biological taonga from humans, animals, and plants, and so on (for example, tissue, fluids, blood, and cells) (109).

[22] Metadata is a set of data that describes and gives information about other data. Metadata tags are keywords or terms attached to information that help describe it or allow it to be found by a digital search.

Te Mana Raraunga Māori

Māori Data Sovereignty

He aha te raraunga Māori?

E whakamāramahia ana te raraunga Māori e Te Mana Raraunga, te Tūhononga Mana Raraunga Māori, hei ‘mōhiohio, mātauranga matihiko rānei, e taea ai rānei te whakamatihiko, mō te iwi Māori, nō te iwi Māori, tō tātou reo, ahurea, rauemi, taiao rānei’. Tāpiri atu ki tēnei ko ngā raraunga e whakaputaina ana e ngāi Māori me te tūhononga ki ngā whānau Māori, ngā hapū me ngā iwi (62,125,126). Hei tauira, ka kapi ngā raraunga tauanga mō te taupori me te wāhi, ā, e kapi ana hoki ngā mōhiohio e whakawaeheretia ki ngā ritenga pērā i te karaki, te waiata me te pūrākau (127). He taonga koiora te raraunga Māori, ā, he mea hira ā-aurongo, ā-wairua, ā-ohaoha, ā-tukunga ihotanga hoki. He whakapapa, he wairua, he mauri hoki tōna, ā, nā reira, he tapu (126,128).

What is Māori data?

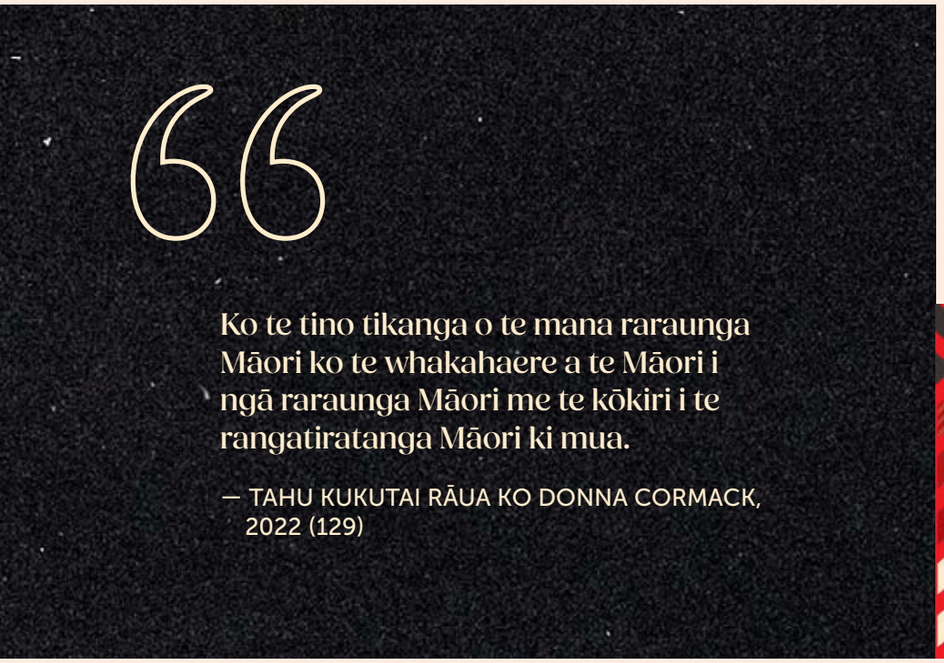
Māori data is defined by Te Mana Raraunga, the Māori Data Sovereignty Network, as ‘digital or digitisable information or knowledge that is about or from Māori people, our language, culture, resources or environments’. This includes data produced by Māori and connected to Māori whānau, families, hapū, sub-tribes, and iwi, tribes (62,125,126). It encompasses statistical data about population and place, for example, through to information encoded in practices such as karakia, prayer, waiata, song, and pūrākau, ancient stories (127). **Māori data is a living taonga, treasure,** and is significant emotionally, spiritually, economically, and intergenerationally. It has a whakapapa, interconnectedness, wairua, spirit, and mauri, lifeforce, making it tapu, sacred (126,128).

> He raraunga Māori kei ngā ringaringa Māori.
>
> — TAHU KUKUTAI RĀUA KO DONNA CORMACK, 2020 (11)

He aha te mana raraunga Māori?

Ko te tikanga o te mana raraunga Māori ko ngā matatika o ngāi Māori ki ngā raraunga e pā ana ki ngāi Māori, ā, he pēhea e kohikohia ana, e uruhia ana, e whakamāramatia ana, e whakamahia ana anō hoki(128). Ko te wawata o te mana raraunga Māori he anamata e noho ana te tikanga hei tūāpapa mō te hangarau me te raraunga (13,102). E rārangi ngātahitia ana me te wawata whānui o te tino rangatiratanga me te mana motuhake, ka taea te whakatau i ō ake whakataunga i roto i ō ake rohe (13,82).

Kei te iho o te mana raraunga Māori ko te whakaute i te raraunga Māori me te rangatiratanga o te Māori o te whakamahi raraunga (62). I roto i te mana raraunga Māori te mana o te whānau, o te hapū, o ngā raraunga iwi anō hoki. Ko te mana raraunga iwi he whakatinanatanga o ngā tikanga mana raraunga Māori, Iwi Taketake hoki ki te raraunga ā-iwi (58). Kāore he anga ture inānei e tino whakamana ana i ngā matatika Māori e pā ana ki te raraunga (38). E wero ana te mana raraunga Māori i te whakapae ka noho ngā matatika ture ki ngā raraunga katoa (56). Ka kī **me noho ngā raraunga Māori katoa i raro i te mana urungi raraunga Māori** (24) – ngā tikanga, ngā anga, me ngā kaupapahere e whakahaeretia ai e ngāi Māori te whakahaere o ngā raraunga Māori (22). He waiwai ki te mana raraunga Māori ko ngāi Māori hei kaiwhakaputa raraunga, hei kaiwhakamahi raraunga, waihoki hei kaihoahoa, hei kaikohikohi raraunga anō hoki (127).



> Ko te tino tikanga o te mana raraunga Māori ko te whakahaere a te Māori i ngā raraunga Māori me te kōkiri i te rangatiratanga Māori ki mua.
>
> — TAHU KUKUTAI RĀUA KO DONNA CORMACK, 2022 (129)

> Māori data in Māori hands
>
> — TAHU KUKUTAI AND DONNA CORMACK, 2020 (11)

What is Māori data sovereignty?

Māori data sovereignty refers to the rights Māori have to data that relates to Māori, and how it is defined, collected, accessed, interpreted, and used (128). The vision of Māori data sovereignty is a technological and data future underpinned by tikanga, protocols (13,102). It is interwoven with the broader vision of tino rangatiratanga, Māori sovereignty and self-determination, and mana motuhake, the freedom to make one's own decisions in one's own lands (13,82).

Central to Māori data sovereignty is respect for Māori data and Māori ownership over data use (62). Within Māori data sovereignty, there is sovereignty of whānau, hapū, and iwi data. Iwi data sovereignty is the application of Indigenous and Māori data sovereignty principles to tribal data (58). A legal framework that properly recognises Māori rights in relation to data does not currently exist (38). Māori data sovereignty challenges the assumption that the government should have legal rights over all data (56). It states that **Māori data should be subject to Māori data governance** (24) – the principles, structures, and policies through which Māori exercise control over Māori data (22). Essential to Māori data sovereignty is Māori being not only data producers and consumers but data designers and collectors (127).

> Māori data sovereignty is fundamentally about Māori control of Māori data to advance Māori self-determination.
>
> — TAHU KUKUTAI AND DONNA CORMACK, 2022 (129)

Te Tiriti o Waitangi me ngā matatika raraunga Māori

Ko te Tiriti o Waitangi te tuhinga taketake matua o tēnei motu, he mea waitohu e ngāi Māori me te Karauna i te tau 1840 (3). E whakatūturu ana te atikara 2 i ngā matatika me te mana Māori i runga i te raraunga Māori (62) mā te kī taurangi e whakahaeretia ai e ngāi Māori ngā whenua, ngā rauemi, me ngā taonga katoa. He taonga te raraunga Māori nā te mea he mea waiwai ki te mātauranga Māori, he taonga Māori anō hoki (128). I raro i te atikara 3 o te Tiriti (130) e herea ana te kāwanatanga kia whakahaumaru i ngā taonga me te rangatiratanga Māori o aua taonga (125). Nā ngā takahanga o te Tiriti, e haere tonu ana, i hōhonu ai ngā tautika-kore o te mana urungi raraunga (104).

Nā te pūrongo whakahirahira a te Rōpu Whakamana i te Tiriti o Waitangi mō te kerēme Wai 262[23] (132) nō te tau 2011 i tūtohu i ngā whakahounga whānui o te kaupapahere me te ture kia whakahaumaru i ngā matatika ki ngā takiwā pērā i te mātauranga Māori, te tukunga ihotanga ahurea, me ngā rauemi iranga (122). E haere ana tētahi hōtaka ināianei, Te Pae Tawhiti, e aro atu ana ki te mahi a te kāwanatanga e pā ana ki te mātauranga Māori me ngā raraunga hāngai (131).

E ai ki te pūrongo a te Rōpū Whakamana i te Tiriti i te tau 2021 mō te kerēme Wai 2522 ka pā te waeture i ngā raraunga matihiko ki te mātauranga Māori. E tūtohu ana te pūrongo kia whakawhanaketia ngā anga raraunga me ngā kaupapahere e whakahaumaru ana i te mātauranga Māori. Ka whakawhānuitia hoki te haepapa o te Karauna kia whakahaumaru i ngā matatika raraunga Māori i tua atu i te horopaki o Aotearoa, arā, ki ngā whakaaetanga hokohoko ā-ao (21,35,38).[24] E ai ki te tirohanga Tiriti he mea nui mā te Māori te whakahaere anō o te auaha, te kohikohi, te whakaputu, me te uru ki ngā raraunga Māori (127).

Ngā kawenata ā-ao

E tīaroaro ana te mana raraunga Māori ki ngā uara me ngā wawata o te mana raraunga Iwi Taketake (62), me te whakaata i ngā matatika Iwi Taketake e whakatinanahia ana ki Whakapuakitanga o te Rūnanga Whakakotahi i ngā Iwi o te Ao mō ngā Tika o ngā Iwi Taketake (UNDRIP) (92). E whakatūturuhia te atikara 3 o UNDRIP i Aotearoa mā ngā tuhinga me ngā tiriti pērā i He Whakaputanga, te Whakapuakitanga o te Rangatiratanga o 1835 (133), me te Tiriti o Waitangi. I waitohu a Aotearoa i UNDRIP i te tau 2010 (1,11,13,104) waihoki, nā te mea i waitohu ai, e noho haepapa ana te kāwanatanga kia whakarite i te hononga o ngā matatika Māori me ngā whaipānga ki ngā raraunga (56). Ko ētahi kawenata ā-ao e tautoko ana i ngā kawatau Māori e pā ana ki te whakahaumaru raraunga me ngā painga ko te Convention of Biological Diversity, 1992, me te Nagoya Protocol on Access and Benefit Sharing, 2010 (122).

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[23] 'Ko te kerēme Wai 262 onāianei tētahi o ngā mea tino whīwhiwhi, matawhānui hoki i te hītori o te Taraipiunara. Koinei te tuatahi o ngā whakatewhatewha e kapi ana i te 'katoa-o-te-kāwanatanga', ā, neke atu i te 20 ngā tari kāwanatanga e tirotirohia ana' (131).

[24] 'Ka kitea e te Taraipiunara kāore te kāwanatanga i "mārama ki ngā matatika o ngāi Māori i raro i te Tiriti me te āta whakahaumaru i aua matatika, ā-hātepe, ā-kiko hoki" me te whakaiti i "ngā tūraru ki ngā matatika Māori e puta ai i ngā wāhanga hokohoko ā-ipurangi, otirā ngā mea e pā ana ki ngā rerenga raraunga whakawhiti rohe, te takiwā raraunga, me te puna waehere"' (21,35).

Te Tiriti o Waitangi and Māori data rights

Te Tiriti o Waitangi, the major founding document of this country, was signed by Māori and the Crown in 1840 (3). Article 2 affirms Māori rights and authority over Māori data (62) through its promise of Māori control over land, resources, and taonga katoa – all treasured things. Māori data is a taonga because it is integral to mātauranga Māori, Māori knowledge, which is also a taonga (128). Article 3 of te Tiriti (130) requires the government to protect taonga and Māori rangatiratanga, sovereignty, over taonga (125). Ongoing breaches of te Tiriti, however, have led to deep inequities in data governance (104).

The pivotal 2011 report from the Waitangi Tribunal into the Wai 262 claim[25] (132) recommended extensive policy and legislation reforms to protect rights in areas such as mātauranga Māori, cultural heritage, and genetic resources (122). There is a current work programme, Te Pae Tawhiti, that addresses the government's role in relation to mātauranga Māori and related data (131).

The 2021 Waitangi Tribunal report into the Wai 2522 claim recognises that how digital data is regulated impacts mātauranga Māori. The report recommends the development of data structures and policies that protect mātauranga Māori. It also extends Crown responsibility to protect Māori data rights beyond the context of Aotearoa New Zealand and into global trade agreements (21,35,38).[26] A te Tiriti perspective emphasises the need for Māori to reclaim control over the design, collection, storage of, and access to Māori data (127).

International conventions

Māori data sovereignty aligns with the values and aspirations of Indigenous data sovereignty (62), and reflects the Indigenous rights set out in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (92). Article 3 of UNDRIP is affirmed in Aotearoa New Zealand by documents and treaties such as He Whakaputanga, 1835 Declaration of Independence (133), and te Tiriti o Waitangi. New Zealand signed UNDRIP in 2010 (1,11,13,104) and, as a signatory, the government is responsible for addressing the relationship of Māori rights and interests to data (56). Other international conventions that support Māori expectations of data protection and benefit are the Convention of Biological Diversity, 1992, and the Nagoya Protocol on Access and Benefit Sharing, 2010 (122)

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[25] 'The contemporary Wai 262 claim is one of the most complex and far-reaching in the Tribunal's history. It was the Waitangi Tribunal's first 'whole-of-government' inquiry, examining the policy areas of more than 20 government agencies' (131).

[26] 'The Tribunal found that the government had failed to "understand and actively protect te Tiriti/the Treaty interests of Māori, both procedurally and substantively" downplaying "the risks to Māori interests arising from the e-commerce provisions, particularly those concerning cross-border data flows, data localisation, and source code"' (21,35).

He aha ngā take e pūtahi ai ki te mana raraunga Māori?

Ka haria mai e ngā hangarau matihiko ngā kōwhiringa huhua mā te Māori, tae atu ki te āhei nui ake kia tuari i te mātauranga ki ngā whakatipuranga e heke mai nei. He tūraru, he anipā hoki mā ēnei pūnaha e whakaū ai te kaikiri, e whakapūmau ai hoki i te kino. E whakawhirinaki ana ngā putanga pai ki te whakatinanatanga o te mana raraunga Māori (135).

E urupare ana te mana raraunga Māori:

- te kaikiri ā-hītori kua tāmaua ki te tautuhinga me te kohikohinga o ngā tauanga ōkawa kata, e pā kino tonu ana ki ngāi Māori ināianei
- te āta titiro ki ngā raraunga takarepatanga e pā ana ki ngāi Māori
- te iti o te hāngai me ngā painga ki te whakawhanaketanga Māori o te nui o ngā raraunga e pā ana ki te Māori e kohikohia ana e te kāwanatanga (8,114).

Nā reira, kia whakapūmau i te mana raraunga Māori me tīaroaro ngā mahi raraunga kāwanatanga ki ngā mātāpono o te mana raraunga Māori e noho ana te Tiriti hei tūāpapa.

Tūmataiti kiritōpū

I roto i te ao Māori, kua roa te tikanga e whakatūturu ana i ngā pāhekoheko tika, hangarite hoki. E whakanuia ngā whaipānga o te pāpori kiritōpū, kaua ko ngā whaipānga o ngā tāngata takitahi. Nā reira, ki tā te Māori titiro, kei te iho o te matatika tūmataiti ko ngā matatika tūmataiti kiritōpū (38).

Kāore he wāhanga Tiriti i roto i te Ture Tūmataiti o Aotearoa, nā reira he uaua mā ngāi Māori kia whakanonoi i ngā matatika me ngā whaipānga e hāngai ana ki te whakahaumaru tūmataiti raraunga. He ngoikore te Ture e pā ana ki te ‘rangatiratanga kiritōpū’ me te ‘tūmataiti kiritōpū’. Hei tauira, ina whakamanahia ēnei e taea ai e ngā whānau me ngā hapū te whakahaere, te whakatau hoki te kohikohi, te whakamahi, te tuari hoki i ngā raraunga (38). I te tau 2021, ka whakaarohia e te Kōti Matua te āhei ki te whāki i ngā raraunga Māori ki ngā kiritōpū Māori. E ai ki te mana Mātāpono Matatapu mā te matapaki a te Kōti i te Tiriti o Waitangi, ngā tikanga Māori, me te mana raraunga Māori e āwhina te mahi a taua Tari ki te whakarite i te hāngai ki te tūmataiti (136,137).

> Kei ngāi Māori ngā pūnaha me ngā tikanga nō tua iho e pā ana ki te whakahaumaru me te tuari i ngā mātauranga kiritōpū, ā, e tau ana kia waihanga anō i te tikanga mō te hangarau i te wā matihiko.
>
> — TAHU KUKUTAI ET AL, 2020 (134)

E hiahiatia ana ngā ahunga hou, ā, e whakawhanaketia ana te Anga Tūmataiti Raraunga Māori. Kei Te Mana Raraunga, te Tūhononga Mana Raraunga Māori, ngā uara hei ārahi i ngā āhuatanga tūmataiti (38). Kei roto i te Pou 4 o te tauira Mana Urungi Raraunga Māori te arotahi ki te tūmataiti (22).

What issues intersect with Māori data sovereignty?

Digital technologies bring with them many opportunities for Māori, including greater ability to share mātauranga with future generations. There are also risks and apprehension that these systems could reinforce racism and perpetuate harm. Any positive outcomes depend on Māori data sovereignty being realised (135).

Māori data sovereignty responds to:

- the historic racism embedded in the defining and gathering of official statistics, which continues to negatively impact Māori today
- the emphasis on deficit data when it comes to Māori
- the lack of relevance and benefit to Māori development of much of the data collected about Māori by the state (8,114).

Securing Māori data sovereignty therefore requires government data practices to align with te Tiriti-based principles of Māori data sovereignty (101).

Collective privacy

In te ao Māori, tikanga has long ensured correct, balanced interactions. Protecting the interests of collective society is emphasised over those of individuals. Therefore for Māori, the right to privacy centres on collective privacy rights (38).

New Zealand's Privacy Act 2020 has no te Tiriti clause, which makes it difficult for Māori to assert rights and interests related to data privacy protection. The Act is lacking when it comes to 'collective ownership' and 'collective privacy'. Recognition of these would enable, for example, whānau and hapū to control and make decisions about the collection, use, and sharing of data (38). In 2021, the High Court considered government discretion to disclose Māori data to Māori collectives. The Office of the Privacy Commissioner has said that the Court's discussion of te Tiriti o Waitangi, tikanga Māori, and Māori data sovereignty will help to inform the Office's approach to how these apply to privacy (136,137).

> Māori have age-old systems and protocols around the protection and sharing of collective knowledge and are well positioned to reimagine tikanga for technology in a digital age.
>
> — TAHU KUKUTAI ET AL, 2020 (134)

Further new approaches are needed, and a Māori Data Privacy Framework is in development. Te Mana Raraunga, the Māori Data Sovereignty Network, has values that give guidance for collective privacy considerations (38). Pou 4 of the Māori Data Governance Model includes a focus on privacy (22).

Rokiroki

E tautoko ana ngā mātāpono o te mana raraunga Māori i te whakaaro me noho tata rawa te raraunga ki te taiao me ngā tāngata e tino hāngai ana. Waihoki, mā te hunga e mōhio ana, e whakaaroaro ana hoki ki aua raraunga e tiaki. I raro i ngā mātāpono mana raraunga Māori, me 'whakapai ake mā ngā whakatipuranga onāianei, e heke mai nei hoki' ngā whakataunga e pā ana ki te rokiroki raraunga Māori me te whakakaha i te kaitiakitanga a te Māori o ngā raraunga (28).

Kua marohitia i Aotearoa te whakaputu i ngā raraunga kāwanatanga katoa ki tāwāhi, tae atu ki ngā raraunga Māori katoa (11). Ko te whakapae, ki te pēnā ka iti iho te utu, ā, ka haumaru ake ngā raraunga (56). Engari kāore anō kia whakatinanahia te mana urungi raraunga Māori (11), ā, ina whakawhitia ana te raraunga ki te rokiroki kapua ka unuhia te raraunga Māori i te whakahaere ā-rohe kia noho i raro i ngā ture ā-ao (138).

Kia whakatutukihia te mana raraunga Māori, e whakapono ana ngā kaitaunaki me whakahaere ngā tūāhanga raraunga e hāngai ana ki ngāi Māori e te Māori (11), ā, me noho te rokiroki raraunga Māori i raro i te ture o Aotearoa (13). Ko te tikanga ia me rokiroki anake ngā raraunga ki ngā tūmau i Aotearoa (11). Nā reira, he āwangawanga nui ina rokiroki ai ngā tari kāwanatanga i ngā raraunga katoa ki tāwāhi (134). E hiahiatia ana e te mana raraunga Māori kia whakaarohia ngā tūraru o te rokiroki ki tāwāhi mā ngā arotahi o te Tiriti, te tuku ihotanga me te toitūtanga.

Ki tā te tirohanga mana raraunga Māori me ngā oati o te Tiriti mō tino rangatiratanga me te haepapa ki te mātāpono o te rangapū hei tūāpapa, ko te ara ahu whakamua tika ko te rokiroki i ngā raraunga Māori ki Aotearoa ina āhei ana, me te whai wāhi atu a ngāi Māori ki ngā whakataunga rokiroki. He taunakitanga kaha mō te pūrokiroki mō ngā raraunga Māori e noho ana ki Aotearoa, ā, e pupuritia ana, e whakahaeretia ana hoki e ngāi Māori (56). I te tau 2021, i tūtohu te pūrongo i kirimanatia e Tatauranga Aotearoa mā ngāi Māori me te kāwanatanga e waihanga ngātahi te anga hei whakarite whakataunga mō te rokiroki rokiroki (55). I whakahoungia te kaupapahere Cloud First i te tau 2023, ā, ināianei e herea ana ngā tari kāwanatanga kia whaiwhakaaro ki ngā kawatau me ngā whaipānga a ngāi Māori ina whakarite ana i ngā ratonga kapua[27]. Kua mahi ngātahi te Āpiha Matihiko Mātāmua o te Kāwanatanga (i roto i te Tari Taiwhenua) me Te Kāhui Raraunga[28] me Tatauranga Aotearoa ki te whakawhanake ārahi e pā ana ki te rokiroki kapua mō ngā raraunga Māori.[29]

Raraunga tuwhera

He tikanga, he kawa hoki i roto i te ao Māori hei whāinga ina whakamahi ai ngā mōhiohio rerekē i roto i te ao kikokiko. Waiohoki, tērā te whakaaro me whakarite he tikanga hei whakamahi i ngā tūmomo raraunga Māori rerekē i roto i te ao matihiko (55). I tēnei ao matihiko, ka noho tonu te tikanga hei tūāpapa kia whakahaumaru i ngā raraunga Māori hei taonga. Mā te whakamahi i ngā uara mana raraunga Māori e whakahaumaru ngā raraunga me te whakatūturu e whakamahia ai me te whakaute, me te aha, ka karohia te kino torohū, ā, ka whakamanahia (28). E ai ki ngā mātanga, 'i roto i te horopaki matihiko, mā te Māori e tautuhi mēnā ka tuwheratia, ka katia rānei te raraunga Māori i tētahi wā' (38). I raro i te kaupapahere rangahau tuwhera a Hīkina Whakatutuki (MBIE) me tuwhera ngā raraunga rangahau, engari he awere kei roto mō ngā raraunga o ngā Iwi Taketake me ētahi atu raraunga rahirahi (139).

Heoi anō, mā te whakamatihiko e tūhono ana ngā raraunga Māori ki ngā horopaki ā-ao kāore i te whakahaeretia e ngāi Māori me te kore whakahaumaru ā-ture. Kei roto i ēnei horopaki ko te ako ā-pūrere, te AI, me te Chat GPT. Hei tauira kāore i te tika te whakamahi a ngā hoahoa Māori, he kore e whiwhi i te whakaaetanga, i te whakaingoatanga rānei (122) – i roto i te pūeru, te whakatairanga otinga, me ētahi atu wāhi. Hei tauira, e taea ana e te tauira AI Whisper, mātāpuna tuwhera, te tuhi i ngā reo huhua, tae atu ki te reo Māori, me te whakapākehā. I ahu mai ōna raraunga i hea? Kāore e kore i whakangunguhia tēnei hangarau e ngā raraunga i tangohia i te ipurangi, ahakoa kāore he matatika uru, he whakaū kounga (140).

[27] https://www.digital.govt.nz/standards-and-guidance/technology-and-architecture/cloud-services/about/cabinet-requirement/

[28] Te wāhanga mahi o te Rōpū Hautūtanga Iwi Raraunga (Data Iwi Leaders Group)

[29] https://www.digital.govt.nz/standards-and-guidance/technology-and-architecture/cloud-services/help/maori-interests/

Storage

The principles of Māori data sovereignty support a view that data should live as close as possible to the environment and people the data is about. Also, the people who know and care about that data should be the ones to look after it. Under Te mana Raraunga Māori data sovereignty principles, decisions about the storage of Māori data should 'enhance control for current and future generations' and reinforce Māori kaitiakitanga, guardianship, of data (28).

In Aotearoa New Zealand, there has been a proposal to store all government data offshore, including Māori data (11). The reasoning for this is that, arguably, costs would be reduced and data would be more secure (56). But Māori data governance is not yet in place (11), and transferring data to cloud storage removes Māori data from local control, bringing it under international laws (138).

For Māori data sovereignty to be achieved, advocates believe that infrastructures for data relating to Māori must be controlled by Māori (11), and the storage of Māori data must be within the direct jurisdiction of Aotearoa New Zealand (13). This means storing data only on locally owned servers in Aotearoa New Zealand (11). State agencies storing all data offshore is therefore a major concern (134). Māori data sovereignty requires that the risks of offshore storage are considered through te Tiriti, intergenerational, and sustainability lenses.

From a Māori data sovereignty perspective, and based on te Tiriti guarantees of tino rangatiratanga and commitment to the principle of partnership, storing Māori data onshore whenever possible, along with Māori involvement in storage decisions, is the appropriate way forward. There is strong advocacy for an onshore, Māori owned and hosted repository for Māori data (56). In 2021, a report commissioned by Stats NZ recommended the co-creation of a framework by Māori and government for making decisions about data storage (55). The Cloud First policy was refreshed in 2023 and agencies are now required to consider Māori expectations and interests when adopting cloud service.[30] The Government Chief Digital Officer (within the Department of Internal Affairs) has worked with Te Kāhui Raraunga[31] and Stats NZ to develop guidance for cloud storage of Māori data.[32]

[30] https://www.digital.govt.nz/standards-and-guidance/technology-and-architecture/cloud-services/about/cabinet-requirement/

[31] The operational arm of the Data Iwi Leaders Group.

[32] https://www.digital.govt.nz/standards-and-guidance/technology-and-architecture/cloud-services/help/maori-interests/

Open data

In te ao Māori, there are tikanga and kawa, protocols, and mātauranga to be followed when different kinds of information are engaged with in the physical world. Following on from this is the perspective that there should be certain protocols for engaging with different kinds of Māori data in the digital world (55). In this digital era, tikanga still provides foundations for protecting Māori data as taonga. Applying the values of Māori data sovereignty protects data and ensures it is engaged with respectfully, avoiding potential harm and upholding the mana of Māori communities and individuals (28). Experts have said that, 'in a digital context, it should be up to Māori to define whether Māori data is open or closed at any given time' (38). The Ministry of Business, Innovation, and Employment's (MBIE) Kaupapahere Rangahau Tuwhera Open Research policy strongly recommends that research data be made openly available, but includes exceptions for Indigenous and other sensitive data (139).

Through digitisation, however, more Māori data is becoming linked to international contexts out of Māori control and without legal protection. These contexts include machine learning, AI, and ChatGPT. Māori designs, for example, are being used inappropriately and without permission or attribution (122) – in fashion, product marketing, and other areas. The open-source AI Whisper model, for example, can recognise and transcribe multiple languages, including te reo Māori, and translate them into English. Where did it get its data? It is likely that this technology was trained using data scraped from the web, without access rights or quality assurance (140).

Ngā raraunga i kōtuia

Ka ahu mai ngā raraunga i ngā wāhi rerekē maha, ā, me whakatōpū ngā raraunga ki ngā huinga raraunga kia āhei te whakatau me te whakamātau i ngā whakapae. Ka tautoko ngā mātāpono mana raraunga Māori i ngā tikanga e whakamahia haumarutia ai tēnei hātepe me te whakaae a te hunga whai wāhi (22).

Pērā i ngā kōrero i te whārangi 13, kua whakawhanaketia e te kāwanatanga te Integrated Data Infrastructure (IDI), he pātengi raraunga whakahanumi o ngā raraunga i roto i ngā huinga raraunga kāwanatanga, ā, e wātea ana anake ki ngā kairangahau e whakatutuki ana i ngā paearu tauwhāiti mō kia uru atu (97). Mā te tūhono i ngā mōhiohio, e unu ai te IDI i ngā huinga raraunga i te horopaki me te take tuatahi. Kua ara ake te taupatupatu mō te tūhononga raraunga me te whakamahi anō (58,125). I te nuinga o te wā kāore ngāi Māori i te whai wāhi atu ki te tautuhi, te kohikohi, me te tātari i ngā raraunga Māori. I aua wā, kāore i te tīaroaro te whakamahi o ngā huinga raraunga IDI i ngā mātāpono mana i raro i te Tiriti me ngā whāinga mana raraunga Iwi Taketake ki whakapiki i te mana taurite (62). Ki ētahi mātanga kāore te IDI i whaiwhakaaro ki ngā uara raraunga me ngā mātāpono o te ao Māori, ā, he iti rawa te kauawhi me te akoako. Waihoki, ko te whakapae mā te rokiroki i ngā raraunga IDI ki tāwāhi e whakaitia ana ngā matatika ki te tino rangatiratanga (50).

Ngā hātepe me ngā whakataunga aunoa

Nā ngā whatinga o te Tiriti, te tāmitanga, me ētahi atu āhuatanga whakakino i kore ai e whakapono ngā whakatipuranga whakaheke Māori ki te kāwanatanga. Ka pā tēnei whakapono kore ki ngā hangarau. Kua roa a Aotearoa e whakamahi ana i te tūtei me te aroturuki momo ā-iwi ki whakahaere me te whakarōpū i ngāi Māori, ā, i ngā wā maha hei 'whakamōrea' (50,129).

Ina whakamahi ana i ngā hangarau hātepe me ngā whakataunga aunoa (ADM) me whakapono ngā tāngata ki ngā pūnaha ā-kāwanatanga, ā-matihiko, ā-raraunga hoki. Kei te piki haere te whakamahinga o ngā hangarau ADM i Aotearoa. E whakaarohia ana ko te ADM he taputapu whakataunga whāomo, tere hoki mēnā he nui rawa ngā raraunga hei hātepe. Hei tauira, e whakamahia ana ki tēnei motu, ki te aromatawai i te tūraru o te taihara anō a te hunga taihara, mā ACC ki te hātepe i ngā kerēme ngāwari, mā te pūnaha hauora hoki ki te whakapiki i te taumata o ngā tūroro mō te poka (8).

Ka whakakino pea ngā hangarau ADM me te kore e whakaponohia ana nā te mea:

- kāore i te mārama, kāore i te kitea hoki ngā āhua whakahaere o ngā hātepe
- kāore i te pai ngā raraunga e whakawhirinakihia ana e ēnei hangarau e pā ana ki ngāi Māori (8)
- e mōhiotia ana he toihara i roto i ngā raraunga, me ngā hātepe e whakawhirinaki ana ki aua raraunga, (tirohia whārangi 10).

Hei tauira, i kitea te toihara i roto i te ADM i tātai i te tūraru mō te taihara anō, i kōrerotia i runga ake. Ko tētahi o ngā matapae mō te taihara anō i roto i te tauira mēnā he Māori te tangata (8).

Hangarau āhukahuka kanohi (FRT) he āwangawanga ki te mana raraunga Māori nā te mea mā tēnei e rokiroki, e kohikohi, hātepe, e whakamahi hoki i ngā raraunga i roto i ngā whakataunga – ā, kei roto pea te toihara kaikiri (38,100). Kua hē pea ngā pūnaha hātepe FRT mēnā he iti te kanorau mātāwaka i roto i ngā huinga raraunga e whakawhirinakihia ana. E ai ki te rangahau he iti iho te tika o te FRT mō ngā tāngata me ngā kiri parauri me ngā tāngata nō ngā mātāwaka rerekē, mō ngā wāhine hoki – waihoki ko ngā wāhine kiri parauri te hunga ka tino pāngia e te toihara. Nā tēnei i mauheretia hētia ētahi (50,52). Ahakoa e piki ana te pai o te hangarau FRT, mā ēnei take he nui te tūponotanga e whakaputaina ngā hapa e pā ana ki ngā kanohi Māori e te FRT (48).

Interlinking data

Data comes from many different places, and combining data into new datasets may be necessary to make decisions and test hypotheses. Māori data sovereignty principles support practices where this process is done in a safe way with the consent of those involved (22).

As described on page 13, the government has developed the Integrated Data Infrastructure (IDI), a database of data merged from different government datasets, available only to researchers who meet specific criteria for access (97). By linking information, the IDI removes datasets from their context and original purpose. This has sparked debate about data linkage and reuse (58,125). Māori are often not involved in the definition, collection, and analysis of Māori data. In these instances, the use of IDI datasets does not align with te Tiriti sovereignty principles and Indigenous data sovereignty aims of improving equity (62). Some experts consider that the IDI has neglected to consider te ao Māori data values and principles, and there has been a lack of Māori inclusion and consultation. Also, continuing to store IDI data offshore is seen as diminishing rights to tino rangatiratanga (50).

Algorithms and automated decision-making

Breaches of te Tiriti, colonisation, and other harmful factors have caused intergenerational mistrust of the government among Māori. This mistrust extends to technologies. Aotearoa New Zealand has a long history of the state using intrusive racial surveillance and monitoring to control and categorise Māori, often as a 'threat' (50,129).

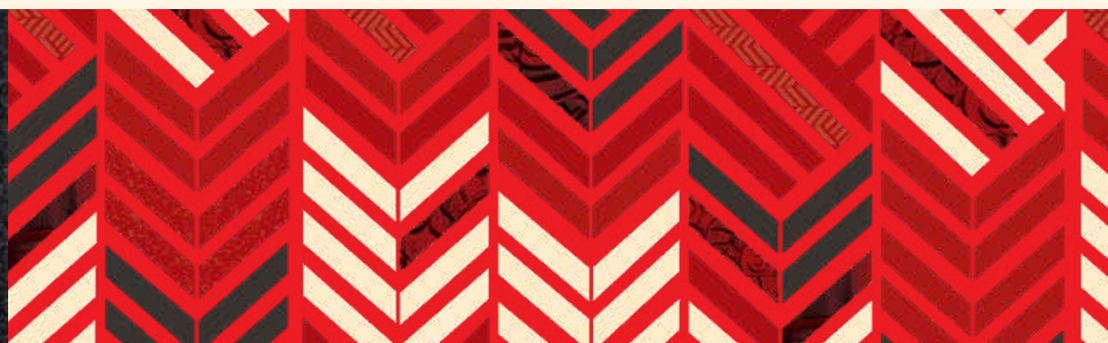
The use of algorithms and automated decision-making (ADM) technologies relies on people trusting governmental, digital, and data systems. In Aotearoa New Zealand, the application of ADM technologies is increasing. ADM is seen as an efficient and fast decision-making tool when there is a large volume of data to process. It is used in this country, for example, to assess the risk of criminals reoffending, by ACC to process straightforward claims, and by the healthcare system to prioritise patients for surgery (8).

ADM technologies can be seen as potentially harmful and untrustworthy because:

- the processes of algorithms are not understood or visible
- the data these technologies rely on may not be good quality when it relates to Māori (8)
- data, and the algorithms that draw on that data, are known to include bias (see page 10).

Discrimination was seen, for example, in the ADM that calculated risk for criminal reoffence, mentioned above. The model included Māori ethnicity as one of the predictors for reoffending (8).

Facial recognition technology (FRT) is also a concern of Māori data sovereignty because it stores, collects, processes, and uses data to make decisions – which may have a racial bias (38,100). FRT algorithmic systems can be flawed if the datasets they rely on lack ethnic diversity. Research shows that FRT has a lower accuracy on people with darker skin tones and from different ethnicities, and on women – with darker-skinned women being the most likely to suffer bias. This has resulted in wrongful arrests (50,52). Although FRT technology is rapidly improving, given these issues, it is likely that FRT may produce errors regarding Māori faces (48).



E tipu ana te whakamahi o te FRT e te kāwanatanga me ngā rōpū whakahaere tūmataiti, engari he iti rawa te kōrerorero me ngāi Māori mō te kaupapa nei (38). I raro i ngā mātāpono o te Tiriti he herenga kia akoako (141). Ki ētahi Māori ko te tūtei me te FRT he ārai i ngā matatika Māori me ngā haepapa o te Tiriti (129). Kua kōrero ngā mātanga Māori mō te āwangawanga e pā ana ki te mana raraunga Māori i te horopaki o te FRT, otirā e noho ana ngā kamupene e whakarato ana i te hangarau ki tāwāhi (35,48).

Ko te whāinga o te Tūtohinga Hātepe mō Aotearoa, e matapakihia ana ki te whārangi 15, kia tāmau i ngā tirohanga ao Māori me te tīaroaro Tiriti i roto i te whakamahi o ngā hātepe. Heoi anō, tērā ētahi atu whakaaro kāore te Tūtohinga i te āta whakahaumaru i ngā matatika me ngā whaipānga a ngāi Māori (70).

E hīkina ana e te hangarau atamai horihori māpua (GAI) e puta mai ana ngā take mana raraunga Māori. He tūraru ina whakamahia ana ngā raraunga e te GAI me te kore whakaaetanga, ā, ina ngaro ai i ngāi Māori te mana o aua raraunga. Hei tauira, ko te āhua nei kua tango pokanoatia e ngā pūnaha GAI pērā i te ChatGPT ngā raraunga reo Māori rahi i te ipurangi, ā, i tino tangohia i ngā pae tukutuku pāpāho pāpori. Ahakoa he āhua pai te kounga o te reo Māori e whakaputaina ana, kua kore e noho te mana me te whakahaere o te reo Māori ki ngāi Māori, ā, e pupurihia ana e ngā kaiwhaipānga nō tāwāhi ngā painga ā-ohaoha. Ko tētahi āwangawanga mā tēnei e horapa whānuitia ai tētahi momo reo ChatGPT, me te tūraru ka hūnuku pea te reo. Ka whakaitia ēnei tūraru mēnā ka whai wāhi atu ngāi Māori ki te whakawhanake i te AI reo Māori me te pūmau i te mana o te raraunga whakangungu reo Māori (142).

The use of FRT by government and private organisations is growing, but there has so far been little or no engagement with Māori (38). Under te Tiriti principles, there is a duty to consult (141). Surveillance using FRT is seen by some Māori as dismissive of Māori rights and te Tiriti obligations (129). Māori experts have expressed concern over Māori data sovereignty in the context of FRT, particularly when those companies supplying the technology are based overseas (35,48).

The Algorithm Charter for Aotearoa New Zealand, discussed on page 15, aims for the embedding of te ao Māori perspectives and te Tiriti alignment in the use of algorithms. There are views, however, that the Charter is not doing enough to protect Māori rights and interests (70).

The emerging technology of generative artificial intelligence (GAI) raises Māori data sovereignty issues. There are risks of GAI using data without permission and of Māori losing sovereignty over that data. For example, GAI systems like ChatGPT appear to have appropriated significant amounts of Māori language data from the web, and in particular social media sites. While the generative Māori language seems to be good quality, the sovereignty and control of the Māori language no longer rests with Māori, and all economic benefits derived from the Māori language data are retained by overseas interests. There are concerns this may cause a ChatGPT version of te reo to become widespread, with the risk that language shift could occur. These risks could be lessened if Māori were involved in developing reo Māori AI and had sovereignty over reo Māori training data (142).

Ngā mātāpono me ngā anga mana raraunga Māori

Kia whakatutuki i te wawata o te mana raraunga Māori, ngā anga raraunga me ngā hātepe e hāpai ai i ngā matatika Māori hei rangapū Tiriti (13). E hiahiatia ana:

- te panoni o ngā mahinga raraunga onāianei (13)
- te auaha a te Māori i ngā pūnaha me ngā anga raraunga hou – e noho te tikanga, te mātauranga, me ngā kawatau mō te whakawhanaketanga hei tūāpapa (11)
- te whakawhanaketanga o te raukaha me te mātau i roto i te mana raraunga Māori (28).

I tāwāhi, kua tino whai wāhi atu te hunga mātauranga Māori ki te whakawhanaketanga o ngā mātāpono CARE, me ētahi atu whakaputanga, me te Kotahitanga Raraunga Iwi Taketake ā-Ao (GIDA). Nā rātou hoki i āwhina ki te whakawhanake i ngā Tapanga Ahurea Koiora (BC) Horopaki ā-Rohe, e matapakihia ana i runga i te whārangi 27 (97).

I Aotearoa nei, ko te ahunga matua ki te whakatinana i te mana raraunga Māori ko te whakatakoto i ngā mātāpono mana raraunga Māori i auahatia e Te Mana Raraunga, te tūhononga mana raraunga Māori, i whakatūria i te tau 2015. I tuku ngā mātāpono i te ārahi mō te whakamahi matatika o ngā raraunga Māori. Ka whakanui ēnei i te oranga Māori me te rangatiratanga, te whakapapa, te whanaungatanga, ngā haepapa, te kotahitanga, te painga kiritōpū, me te manaakitanga (13,62). Ko ēnei mātāpono te tūāpapa o te Anga mana-Mahi a Te mana Raraunga: e hāngai ana te mana ki te mana urungi me te mahi ki ngā mahi whakahaere (114).[33] Ka hāngai hoki te anga ki ngā hātepe me te ADM (8).

I te tau 2023, i pānuitia te tauira Mana Urungi Raraunga Māori a Te Kāhui Raraunga, he mea whakawhanake i raro i te Whakaaetanga Hononga mana Ōrite (i tautuhia ki te whārangi e whai ake nei). Ko te tauira he ārahi mahi, kia mahia tonutia mō te pūnaha ratonga tūmatanui me te tautoko a Tatauranga Aotearoa hei ārahi pūnaha ratonga tūmatanui mō te raraunga. Ko te whāinga ko te panoni i te pūnaha raraunga, e ārahina ana e ngā uara o:

- e poipoi ana i te raraunga hei taonga – he koha nā ngā tīpuna kaua ko te taongahoko kakapi
- te tuku i ngā raraunga iwi-Māori ki ngā ringaring a ngā iwi-Māori
- te whakamahi i ngā raraunga hei painga mā te iwi
- te noho haepapa – ki ngā whanaungatanga e tūhonotia ana ki ngā raraunga
- te wetetāmi i ngā pūnaha raraunga – te whakaoti i ngā mahi e whakakino nei i ngā ao o te hunga Iwi Taketake (22).

> Ko te whāinga o te 'ahunga tūāpapa tikanga' mō te hoahoa i ngā anga, ngā mātāpono, me ngā tikanga tūmataiti raraunga kia whakahaumaru i ngā tuakiri rōpū me te tūmataiti kiritōpū, te waihanga pono, me te whakaheke i te whakakino ā-rōpū.
>
> — TAHU KUKUTAI RĀUA KO DONNA CORMACK, 2020 (11)

[33] E pā ana ki tēnei anga, ka noho haepapa mana Te mana Raraunga mō te mana, ka noho haepapa Te Kāhui Raraunga mō te mahi.

Māori data sovereignty principles and frameworks

To realise the vision of Māori data sovereignty, data structures and processes that uphold Māori rights as a te Tiriti partner are needed (13). This requires:

- a transformation of current data practices (13)
- Māori-led creation of new data systems and frameworks – based on tikanga, mātauranga, and Māori priorities for development (11)
- the development of capacity and capability in the Māori workforce for Māori data sovereignty (28).

Internationally, Māori scholars have been closely involved in the development of the CARE principles, and other outputs, with the Global Indigenous Data Alliance (GIDA). They also helped develop Local Contexts' Biocultural (BC) Labels, discussed on page 27 (97).

Locally, a key approach to realising Māori data sovereignty is through applying the Māori data sovereignty principles created by Te mana Raraunga, the Māori Data Sovereignty Network, founded in 2015. The principles give guidance for the ethical use of Māori data. They emphasise Māori wellbeing, rangatiratanga, authority, whakapapa, relationships, whanaungatanga, obligations, kotahitanga, collective benefit, and manaakitanga, reciprocity (13,62). The principles are the foundation of Te mana Raraunga's mana-Mahi Framework: mana relating to governance and mahi to operations (114).[34] The framework also applies to algorithms and ADM (8).

In 2023, the Te Kāhui Raraunga Māori Data Governance Model was released, developed under the mana Ōrite Relationship Agreement (described on the following page). The Model is an operational guide, specifically for use across the public service system with the support of Stats NZ as the public service system lead for data. It aims to transform the data system, guided by the values of:

- nurturing data as a taonga – an ancestral gift rather than a commodity
- putting iwi-Māori data in iwi-Māori hands
- using data for good
- being accountable – to the relationships interlinked with data
- decolonising data systems – ending practices that are detrimental to Indigenous lives (22).

> The aim of a 'tikanga-centred approach' to creating collective data privacy frameworks, principles, and protocols is to protect group identities and collective privacy, build trust, and reduce group harm.
>
> — TAHU KUKUTAI AND DONNA CORMACK, 2020 (11)

[34] As applicable to this framework, mana is the responsibility of Te Mana Raraunga and mahi is the responsibility of Te Kāhui Raraunga.

E tāpirihia ana i roto i ētahi atu anga, aratohu hoki e arahina ana e ngāi Māori:

- Ngā Aratohu o Te Mata Ira mō te Rangahau Ira me ngāi Māori[35] (143) me He Tangata Kei Tua Guidelines for Biobanking with Māori (144).[36] E tāpae ana ēnei aratohu i te anga mā ngāi Māori me ngā kairangahau ira ki te whakawhanake ngātahi i te māramatanga kotahi o te whanonga pai ā-ahurea, ā-matatika hoki. Koinei ngā aratohu tuatahi ā-ao kua arahina e ngā Iwi Taketake mō te rangahau ira me te whakaputu koiora (109).
- He anga mō Ngā Tikanga Paihere. E hāngai ana tēnei ki te IDI me te whakamahi i te huinga pātai e kite ai he aha te taumata whakahaere e hiahiatia ana kia whakamahia ngā huinga raraunga rerekē i ngā huarahi tika ā-ahurea, ā-matatika hoki. Ka pātai he aha ngā raraunga, he pēhea te whakamahi, ā, ko wai e whakamahi ana. Ka tīmata ngā taumata whakahaere ki te taumata iti, e noho ana te raraunga ki te huinga raraunga tuwhera, ā, ka piki ake, ka tae ki te raraunga e taea te uru mā te tono anake (97).
- Te anga o Te Kete Tū Ātea He tauira tēnei o te Māori e huri ana mai i ngā kaiwhakarato raraunga ki ngā kaihoahoa raraunga. I whakawhanake ngātahi te Kiritōpū o ngā Iwi o Rangitīkei (Ngāti Whitikaupeka, Ngāti Tamakōpiri, Ngāti Apa, Ngāti Hauiti, me Ngāi Te Ohuake) i tēnei anga me ētahi atu i muri iho i te kite e hiahiatia ana ngā mōhiohio kounga mō ngā taupori ā-iwi ki te tautoko i ngā whakataunga. Nā te anga i whakauru ai te kāwanatanga i te Kiritōpū Iwi o Rangitīkei ki te rārangi hononga ā-iwi i te Tatauranga 2018 (145).
- Te raihana kaitiakitanga i whakawhanaketia e Te Reo Irirangi o te Hiku o te Ika, Te Hiku Media. I raro i tēnei raihana, e whakahaeretia ana ngā raraunga me ngā taputapu i auahatia ai i ngā raraunga Māori i raro i ngā tikanga Māori, ā, e pupuritia ana i raro i te mātāpono o te kaitiakitanga, kaua ko te pupuritanga (146).

Other frameworks and guidelines led by Māori include:

- Te Mata Ira Guidelines for Genomic Research with Māori[37] (143) and He Tangata Kei Tua Guidelines for Biobanking with Māori (144).[38] These guidelines offer a framework for Māori and genomic researchers to develop together a shared understanding of cultural and ethical good behaviour. They are the world's first Indigenous-led guidelines for genomic research and biobanking (109).
- Ngā Tikanga Paihere framework. This applies to the IDI and uses a set of questions to find out what level of management is needed so that different datasets are used in culturally appropriate and ethical ways. Its asks what the data is, how it is being used, and who is using it. Management levels range from low, where the data could sit in an open dataset, up to high, where the data may only be accessible on request (97).
- Te Kete Tū Ātea framework. This is an example of Māori moving from being data suppliers to being data designers. The Rangitīkei Iwi Collective (Ngāti Whitikaupeka, Ngāti Tamakōpiri, Ngāti Apa, Ngāti Hauiti, and Ngāi Te Ohuake) developed this framework with others after seeing a need for quality information about iwi populations to support decision-making. The framework led to the government including Rangitīkei Iwi Collective tribes in the iwi affiliation list in the 2018 Census (145).
- Kaitiakitanga license developed by Te Reo Irirangi o te Hiku o te Ika, Te Hiku Media. Under this license, data and tools created from Māori data are managed according to tikanga Māori and held under the principle of kaitiakitanga, guardianship, rather than ownership (146).

[35] Te Mata Ira: He Ārahi mō te Rangahau ā-Ira me te Māori (waikato.ac.nz).

[36] He Tangata Kei Tua: Guidelines for Biobanking with Māori Tissue (waikato.ac.nz).

[37] Te Mata Ira: Guidelines for Genomic Research with Māori (waikato.ac.nz).

[38] He Tangata Kei Tua: Guidelines for Biobanking with Māori Tissue (waikato.ac.nz).

E ahatia ana: Te mana raraunga Māori me te mana urungi

He rerekē ngā ahunga ki te mahi i te mana raraunga Māori. Ka noho ki tētahi tūāwhiorangi, mai i te panoni paku i roto i ngā pūnaha onāianei ki ngā rōpū whakahaere Māori motuhake e auaha i te panoni.

Kāwanatanga

E whakapau kaha ana ngā tari kāwanatanga me ngā rāngai tūmatanui ki te whakatutuki i ngā haepapa o te Tiriti me te whakapai ake i ngā pūnaha raraunga mā te pāhekoheko i ngā uara mana raraunga Māori me te auaha i ngā tauira mō te mana urungi raraunga Māori (125,36). Kei roto i te Ture Data and Statistics 2022 tētahi wāhanga Tiriti e here ai te Kaitatau a te Kāwanatanga ki te whakapāpā ki ngāi Māori me te aro atu ki ngā whaipānga a te Māori mēnā e kohikohi ana me te whakamahi i ngā raraunga rangahau ki te whakaputa i ngā tauanga ōkawa – hei tauira, mō te Tatauranga (38). Kei te Manatū Hauora ētahi tikanga raraunga e aro ana ki 'ana haepapa me ana kawenga e pā ana ki te mana raraunga Māori me te kāwanatanga' (21).

He tino hira te Whakaaetanga Hononga Mana Ōrite, i waitohua e Tatauranga Aotearoa me te Rōpū Hautūtanga Iwi Raraunga i te tau 2019 (147). E mahi ngātahi ana a Tatauranga Aotearoa me te Rōpū Hautūtanga Iwi Raraunga i raro i te rangapū kia arotahi ki te mana taurite o ngā putanga mō ngā raraunga o te iwi, o ngāi Māori hoki, e tāmau ana i te arotahi ao Māori ki ngā whakataunga me ngā kōwhiringa mā ngāi Māori ki te auaha ngātahi i ngā raraunga (10,13,147). I te tau 2021, i waitohua hoki te Whakaaetanga Hononga Mana Ōrite i waenganui i te Rōpū Hautūtanga Raraunga ā-Iwi me te Tari Taiwhenua, te kaiārahi matihiko a te kāwanatanga.[39]

Rangahau

Ko te whāinga a te Pūrokiroki Raraunga ā-Ira o Aotearoa kia tautuku te pūranga raraunga mō ngā momo o Aotearoa. He urunga aukati, he rerekē ki ngā pūrokiroki ā-ao mō ngā raraunga ā-ira taketake, hātepe hoki, e tuwhera ana kia uru atu (148). E tāparehia ana te ahunga e ngā uara Māori, ā, ka tāpirihia he hātepe whakaaetanga kaitiaki mō te tuari raraunga me te urunga atu (149).

E whakaritea ana ngā Tapanga Ahurea Koiora ā-Rohe (BC) ki te Hinonga Ira Moana (150), e whakawhanake ana i te pātengi raraunga e taea ai te kimi o ngā raraunga ira, huinga ira hoki mō ngā koiora moana o Aotearoa (148). E arotahi ana te tapanga ki te wāhi nōna ngā raraunga (tātai takenga), me pēhea te whakamahi (tikanga), ā, ka taea te whakamahi e wai (whakaaetanga) (97). Ka tohu te Tapanga BC ki ngā tāngata katoa e whakamahi ana i te pātengi raraunga he matatika ahurea Iwi Taketake e hāngai ana ki te uru me te whakamahi o ngā raraunga tauwhāiti. E whai ana te pātengi raraunga Ira Moana kia horotahi me ngā paerewa raraungameta mana raraunga Iwi Taketake (148,151). He pūnahanaha te whakarite a Manaaki Whenua i ngā Tapanga BC ki ōna Raraunga Kohikohinga Pūnahanaha. E whaimōhiotia ana e te iwi, ka whakaatu ngā Tapanga BC ki ngā kaiwhakamahi mēnā e taea ai ngā mōhiohio mō ngā tipu me ngā kararehe te whakamahi ki te rangahau, mēnā e rata ana te iwi ki te mahi tahi, ā, mēnā ka taea ngā mōhiohio, hei tauira, te whakamahi ā-ohaoha (152,153).

[39] https://dns.govt.nz/digital-government/leadership/mana-orite-relationship-agreement/

What's happening: Māori data sovereignty and governance

There are various approaches to practising Māori data sovereignty. These sit on a spectrum, from incremental change within existing systems to independent Māori organisations creating change.

Government

In government and public-sector agencies, efforts are being made to fulfil te Tiriti obligations and improve data systems by integrating Māori data sovereignty values and creating models for Māori data governance (125,36). The Data and Statistics Act 2022 includes a te Tiriti clause that requires the Government Statistician to engage with Māori and recognise Māori interests when collecting and using research data to produce official statistics – for example, the Census (38). The Ministry of Health has data protocols that recognise its 'obligations and responsibilities with respect to Māori data sovereignty and government' (21).

The Mana Ōrite Relationship Agreement, signed by Stats NZ and the Data Iwi Leaders Group in 2019, is particularly significant (147). Stats NZ and the Data Iwi Leaders Group are working in partnership to focus on equity of outcomes for iwi and Māori data, embedding a te ao Māori lens into decision-making and Māori opportunities to co-create data (10,13,147). In 2021, a Mana Ōrite Relationship Agreement was also signed between the Data Iwi Leaders Group and The Department of Internal Affairs, the government digital lead.[40]

Research

The Genomics Aotearoa Data Repository aims to be a te Tiriti-compliant data archive for Aotearoa New Zealand species. It is restricted access, differing from international repositories for raw and processed genomic data, which are open access (148). Its approach is framed by Māori values and includes a kaitiaki approval process for data sharing and access (149).

Local Contexts' Biocultural (BC) Labels are being applied to the Ira Moana – Genes of the Sea – Project (150), which is developing a searchable database of genetic and genomic data for Aotearoa New Zealand's marine organisms (148). The Labels focus on where data comes from (provenance), how it can be used (protocol), and who by (permission) (97). A BC Label signals to anyone using a database that there are Indigenous cultural rights associated with access to and use of particular data. The Ira Moana database aims to be compatible with Indigenous data sovereignty metadata standards (148,151). Manaaki Whenua are also applying BC Labels to their Systematics Collections Data. Informed by iwi, BC Labels tell users whether information about plant and animal specimens can be used for research, whether an iwi is open to collaboration, and whether the information may be used commercially, for example (152,153).

[40] https://dns.govt.nz/digital-government/leadership/mana-orite-relationship-agreement/

Rokiroki

E whakaatu ana te Rautaki mō te Ratonga Tūmatanui Matihiko 2020 i te herenga ki te panoni matihiko ratonga-tūmatanui kauawhi me ngā haepapa o te Tiriti o Waitangi. E hiahiatia ana e ngā mātāpono Tiriti mō te rangapū ngā whakataunga mō te rokiroki raraunga Māori kia mahia tahitia me ngāi Māori (56). He mea waiwai hoki ngā tirohanga a te Māori ki ngā whakataunga rokiroki mō ngā rawa ahurea. Kua whakawhanake Te Rua Mahara o te Kāwanatanga me Te Puna Mātauranga o Aotearoa i ngā ahunga mō te rokiroki ukakua wā roa e whaimōhio ana ki ngā mātāpono a Te Mana Raraunga. I kōwhiri Whakaata Māori kia whakamahi i te ratonga rokiroki ā-rohe o Catalyst Cloud ki te whakahaumaru i ana ihirangi pae tukutuku (55).

E tipu ana te hiahia ki te torohū o ngā whakatika rokiroki raraunga Māori i arahina e te Māori. He tauira a Āhau o te atamira raraunga ā-whānau e āwhina ana i ngā hapori ki te pupuri me te whakahaere i ngā raraunga mō te whakapapa me ngā mauhanga ahurea (57,154).

Pakiaka harakeke

Ko te Atamira o Te Whata he taputapu matihiko i whakawhanaketia e ngā iwi mā ngā iwi e hoahoa ana, e whakamahi ana hoki i ngā raraunga. Ka kohikohi Te Whata i ngā raraunga ā-iwi i ngā mātāpuna huhua ki te wāhi kotahi. Ka taea e ngā iwi te whakamahi i aua raraunga kia tirohia whānuitia ngā mōhiohio matua e pā ana ki ngā take kei te aroaro o ngā iwi, me te aha, ka whaimōhio ki ngā whakataunga a ngā iwi (155). Hei tauira, i te wā o te mate urutā, Kowheori-19, i whakamahia te raraunga i runga i Te Whata e ngā iwi kia whakatau ko ēhea ngā tiriti whare noho hei arotahi i ā rātou mahi whātoro āraimate (22).

E mahia ana hoki ngā kaupapa mana raraunga Māori ki te taumata pakiaka harakeke. Hei tauira, i whakawhanaketia e te hapū o Ngāti Tiipa te pātengi raraunga whakapapa o ngā tīpuna nō ngā rautau 1700 me 1800, e whakamahi ana i ngā pūrokiroki raraunga pērā i ngā tuhinga a ngā mihinare, ngā mauhanga Kōti Whenua, me ngā kōhatu urupā. Ka whakamanahia te iwi e pā ana ki ngā mōhiohio ā-hītori e hāngai ana ki ngā iwi (156). E whakarato ana te Whare Hauora i ngā keteparaha e ine ana i te paemahana me te pārūrū i roto i ngā kāinga, e āwhina ana ki te whakapai ake i ngā putanga hauora me te whakarauora i te tangata. Ka rokiroki te Whare Hauora i ngā raraunga o ngā kaiwhakamahi me te noho hei kaitiaki, engari e mau tonu ana te whānau ki te rangatiratanga me te whakahaere o aua raraunga (157).

Storage

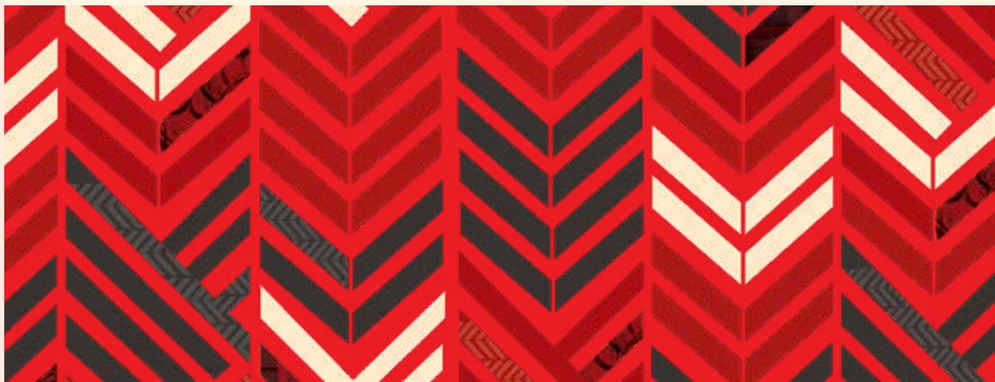
The Strategy for a Digital Public Service 2020 states a commitment to an inclusive public-service digital transformation and to te Tiriti o Waitangi obligations. Te Tiriti principles of partnership require decisions about Māori data storage to be made in collaboration with Māori (56). Māori perspectives are also integral to storage decisions about cultural materials. Archives New Zealand Te Rua Mahara o te Kāwanatanga and National Library of New Zealand Te Puna Mātauranga o Aotearoa have developed approaches for long-term preservation storage that are informed by Te Mana Raraunga principles. Māori Television chose to use the Catalyst Cloud local storage service to protect its website content (55).

There is growing interest in the potential for Māori-led Māori data storage solutions. Āhau is an example of a whānau data platform that helps communities own and control data about whakapapa and cultural records (57,154).

Flax roots

Te Whata Platform is a digital tool developed by iwi for iwi designing and using data. Te Whata gathers iwi data from multiple sources into one place. Iwi can then use that data to gain an overview of key information on issues facing iwi, which then informs iwi decision-making (155). During the Covid-19 pandemic, for example, data from Te Whata was used by iwi to make decisions about the residential streets on which to focus their vaccination outreach efforts (22).

Māori data sovereignty initiatives are also happening at a flax-roots level. Ngāti Tiipa hapū, for example, have developed a genealogical database of tīpuna, ancestors, from the 1700s and 1800s, drawing on data repositories such as documentation from missionaries, Land Court records, and headstones. This gives iwi authority over iwi-related historical information (156). Whare Hauora provides kits that measure temperature and humidity in homes, helping improve health outcomes and save lives. Whare Hauora store and are kaitiaki of users' data, and ownership and full control is retained by whānau (157).



Whakakapi
Conclusion

He whīwhiwhi te ao raraunga matihiko, ā, he tere te kuneroa (2). He maha ngā mea kāore i te mōhiotia. Engari, ko te mea e mōhiotia ana, kāore e taea te whakapae i tō mana raraunga mēnā kāore koe i te pupuri ki ō raraunga, kāore rānei i te mōhio kei hea ō raraunga. Ko te nuinga o te kōrero mō te tūmataiti, te waeture, me te haumaru o te raraunga he kōrero mō ngā kaporeihana nui me ngā kāwanatanga, engari he mea nui kia maumahara kei te iho o te raraunga te tangata. E aro ana ngā ariā o te mana raraunga, te mana raraunga Iwi Taketake, me te mana raraunga Māori ki tēnei āhuatanga.

He mārama ngā painga o te hangarau me ana mahi. Me haere ngātahi te ture, te waeture, me te kaupapahere i te wā e panoni ana te horanuku matihiko (52). E whakakinohia ana te tangata takitahi me ngā rōpū i te iti rawa o te mana urungi o ngā hangarau matihiko (2). Ina piki te matihikotanga o ngā mōhiohio, e tāpae ana te mana raraunga i te ārahi mō te hangarite i waenga i ngā rerenga mōhiohio ahu whakamua me te hiahia mō te pūataata me te whakahaere. I tēnei wā o ngā raraunga tuwhera me ngā raraunga nunui, e whakarato ana ngā mana raraunga Iwi Taketake me ngā mana raraunga Māori i ngā pūnaha me ngā anga raraunga kē hei whawhai ki ngā wero raraunga kei mua i te aroaro o ngā hapori katoa (2,87,97).

He ara i roto i te mana raraunga, te mana raraunga Iwi Taketake, me te mana raraunga Māori kia whakamahia te raraunga mō ngā kaupapa pai, te painga mā te tangata takitahi me te kiritōpū hoki, ā, mō te panoni pūnaha pai. Kāore anō kia ū te anamata o te raraunga: mā ā mātou whakataungaināianei e āwhina kia whakaahua i te anamata matihiko tautika e noho ana te tangata kei te iho.

The world of digital data is complex and rapidly evolving (2). There are many unknowns. What is known, though, is that you cannot assert data sovereignty if you do not own your data or know where it is. Much of the talk about data privacy, regulation, and security often involves large corporations and governments, but it is important to remember that people are at the heart of data. The concepts of data sovereignty, Indigenous data sovereignty, and Māori data sovereignty recognise this.

Technology and its uses have clear benefits. Law, regulation, and policy, however, must keep pace with the changing digital landscape (52). Harms are being caused to individuals and groups by insufficient governance of digital technology (2). As more information becomes digitised, data sovereignty offers guidance for a balance between progressive information flows and the need for transparency and control. In this era of open data and big data, Indigenous data sovereignty and Māori data sovereignty are providing alternative data systems and structures that confront the data challenges facing all communities (2,87,97).

Data sovereignty, Indigenous data sovereignty, and Māori data sovereignty offer pathways to data being used for good, for individual and collective benefit, and for positive system change. The data future is not fixed: the decisions we make now will help shape an equitable, people-centred digital future.

Ngā tohutoro

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