

NEW ZEALAND
DATA FUTURES FORUM



Harnessing the economic and social power of data

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Foreword

We think there are huge economic, social, environmental and personal opportunities for New Zealand and New Zealanders if we can strengthen trust, control and inclusion in the data-use ecosystem.

The New Zealand Data Futures Forum was established in December 2013, by the Ministers of Finance and Statistics to explore the potential benefits and risks for New Zealand of sharing, linking and using data. Our earlier papers provided an overview of the potential benefits and risks related to the data future, and proposed four guiding principles. In this paper, we set out an agenda we think will significantly advance New Zealand's ability to unlock the latent value of our data assets and position us as a world leader in the trusted and inclusive use of shared data to deliver a prosperous society.

Over the past six months we have been talking to New Zealanders to better understand a range of perspectives – businesses, government, NGOs, Māori, the general public – and these conversations have helped us develop our thinking. We are grateful to all those who provided input to our work and have picked up a range of the ideas canvassed in our recommendations. Engagement was inevitably limited by the concentrated timeframe and any errors and omissions are therefore ours.

I'd like to thank my fellow Forum members for their ideas, their intellect and their commitment to getting this work across the line. We also could not have done this without the valuable assistance of the Secretariat, and others that have helped out along the way.

We see our recommendations as the springboard for wider conversation and action. Some may find this report pushes the boundaries. This is deliberate – we want to stimulate thinking and action.

We are excited by the potential of our country to unlock the value of data-driven innovation, built on strong foundations of inclusion, trust and control.

I look forward to your responses to this paper and to a time when New Zealand is getting maximum value from our data assets.



John Whitehead

Chair, NZ Data Futures Forum

Executive summary

The vision of the New Zealand Data Futures Forum (NZDFF) is to create a competitive advantage by positioning New Zealand as a high-value, strongly inclusive, high trust and control, data-sharing ecosystem. Our four principles set out in paper two – value, inclusion, trust and control – work together and drive a positive feedback loop of which New Zealand is well placed to take advantage. In this paper we set out an agenda that will significantly advance New Zealand's ability to unlock the latent value of our data assets. We propose action in three broad areas.

1. Get the rules of the game right

We need to develop a robust data-use ecosystem, with agile, responsive institutions and effective rules of the game, to support data use. We recommend:

- establishing an independent data council to act as guardians of the system, advising government and data users, developing best practice guidance to implement the principles, and promoting data use
- a broad review of information legislation to achieve a more coherent and responsive data-use ecosystem
- specific changes to legislation in the short term to provide for mandatory proactive release, extension of information-sharing beyond central government, better definition of personal data and protections against re-identification of anonymised data.

2. Create value by doing

We need to treat our data as national strategic assets, and use them to tackle immediate and real problems. We make some suggestions for strategies and projects that will enable New Zealand to derive value safely from our treasure trove of data in key sectors – primary industries, social and health sectors, our natural and built environment. Others need to take up the challenge to develop and deliver strategies that define the vision for particular sectors. We propose:

- government and sectors develop a set of clearly defined collaborative catalyst projects that create value by tackling real problems
- government, with business and communities, develop a set of strategies to ensure that New Zealand is best placed to use, and benefit from, our data-use ecosystem.

3. Embed effective foundations to support value, inclusion, trust and control

We recommend a wide variety of initiatives and approaches that will support each of the four principles for a trusted data-use ecosystem. Key recommendations include the following.

Value creation through:

- appointing a champion to drive innovation and data-sharing, charged with leading an open data agenda for New Zealand and promoting mechanisms for more trusted and safe sharing of personal data, including greater sharing across and between government and non-government sectors
- measures to incentivise an innovation culture, including government procurement practice, use of standards and open source tools to encourage competition, a prize-based data innovation fund, and expectations for greater risk tolerance in the public sector
- initiatives to grow skilled data scientists and innovators, including mid-career courses, seed funding for multi-disciplinary research and teaching in data science, immigration criteria, and building demand by educating senior leaders about the potential benefits of data use
- promoting New Zealand's data-use ecosystem overseas and active participation in international discussions and agreements around data use rules and regulations.

Supporting inclusion by:

- raising public awareness by continuing the conversation, generating debate and building consensus on the way forward for New Zealand
- building public capability to understand and use data by promoting data visualisation and supporting 'data brokers'
- supporting Māori efforts to thrive in the new data environment.

Building and maintaining trust by:

- ensuring privacy and security tools are applied at all stages of a data-use initiative
- avoiding identification of individuals where possible
- maximising transparency of purpose, security and access arrangements, particularly where data will identify individuals or decisions on data use are made collectively
- developing 'trustworthiness' rankings or certification.

Enabling control by:

- educating the public on the management of data about them, including privacy settings
- adopting digital personal information management systems in online relationships
- developing a standard set of terms and conditions when supplying personal information, to support genuine informed consent
- providing more strongly for data correction and opting out, through changes to legislation and complaints procedures.

Throughout the paper, a number of data-use scenarios provide context to our thinking. There are important differences in the way we should treat data that is used to target individuals versus data that is not used to target. There are also differences for data management if the collective has decision-rights versus if decision-rights sit with individuals. The different data-use scenarios imply different rules of the game. Ideally, wherever realistic, we would like to see organisations minimising the mandatory use of personal data to target individuals and moving to an arrangement where individuals have more control over the use of personal data, or to an arrangement where data is anonymised or de-identified and used in a non-personal way.

Introduction

We think New Zealand can achieve the vision of being a world leader in the trusted use of shared data to deliver a prosperous, inclusive society by implementing the four principles of value, inclusion, trust and control, and by focusing strongly on how data is used.

- We need to develop a robust data-use ecosystem, with agile, responsive institutions and effective rules of the game, to support data use. We suggest an independent data council be established to focus on promoting data use and the implementation of our principles. We also recommend some changes to legislation to ensure we have effective rules of the game.
- We need to treat our data as important strategic assets, and use them to tackle immediate and real problems. Let's build on the great data projects already happening in New Zealand and get more underway. We make some suggestions for strategies and projects that will enable New Zealand to derive value safely from our treasure trove of data.
- We can support this by laying further foundations for a trusted data-use ecosystem. We recommend a wide variety of initiatives and approaches that will support each of the four principles.

In what follows, we present some of the thinking that led to our recommendations, including some suggestions about different types of data use that are possible. This thinking and our conversations with others helped us to develop our vision and our recommendations for an environment where New Zealand businesses, government, researchers, Māori and the public collaborate to share, link and use data to promote innovation, while protecting the rights of individuals.

FOUR GUIDING PRINCIPLES

Value:

New Zealand should use data to drive economic and social value and create a competitive advantage. To achieve this we should:

- treat data as a strategic asset
- encourage collaboration and sharing
- support creativity and innovation
- promote our unique data-use ecosystem in New Zealand and overseas.

Inclusion:

All parts of New Zealand society should have the opportunity to benefit from data use.

- We should support all New Zealanders, communities and businesses to adapt and thrive in the new data environment.

Trust:

Data management in New Zealand should build trust and confidence in our institutions.

- Transparency and openness should form key foundations on which we build trust and enhance understanding about what data is held, and how data is managed and used.
- Privacy and security are fundamental values that should be built into data frameworks and the full data life cycle.
- Data collectors, custodians and users should be accountable for responsible stewardship and should exercise a duty of care.

Control:

Individuals should have greater control over the use of data about them.

- Individuals should be better able to determine the level of privacy they desire based on improved insight into how their personal data is processed and used.
- Informed consent should be simple and easy to understand.
- Individuals should have enhanced rights to correction and the right to opt out.

Section one: Our vision

Mahia he kai mō te tau, mo te pae tawhiti.

Anei nga mea o muri, nga mea nunui, ko kaitiakitanga, hei manaaki ki a tatou, hei kotahitanga, ka puta he tumamaako.

Preparing to sustain our focus on the future. Things valued, of the past, important things. We can manage for the future by supporting and sustaining each other, and working together to build trust and create value.

In our first discussion paper, we explored the benefits and risks related to the data revolution that is taking place, and the ways in which New Zealand could position itself in the rapidly developing data environment and shape our country's data future. We identified the enormous opportunities for New Zealand if we could maximise the benefits of data use and, at the same time, minimise the risks.

In our second discussion paper, we proposed four guiding principles to guide New Zealand in developing an environment where the benefits of data use and sharing can be realised safely: **value**, **inclusion**, **trust** and **control**. We also recommended that New Zealand should adopt an approach that emphasises data **use** rather than data **ownership**, as it would be better suited to dealing with these new, innovative developments and some of the identified complex challenges.

Based on the supportive feedback we received from New Zealanders, our view that we are on the right pathway to our future was confirmed. This feedback helped us revise the principles to ensure they provide the best guide.

Together, the revised four guiding principles should be our navigation tool, our compass, for guiding New Zealand's data future. In our view, they will help us create the right data-use ecosystem for our country. And not only that: by building on New Zealand's unique characteristics and various supporting initiatives that are already happening in our country, we believe there is a huge opportunity for New Zealand to become a world leader in the trusted use of shared data. In this third and final paper, we will explain further how, in our view, we will be able to achieve this.

Our conversations

The input we received from others has been critical in forming our recommendations.

We engaged with many people and organisations about the issues raised in our first two documents and got a very good reception. In general, there was a lot of excitement about the value-creation opportunities for New Zealand. People from a variety of backgrounds (e.g. business, government, NGOs, Māori) emphasised the critical need for New Zealand to treat data as a strategic asset. They saw the huge potential of open, trusted, safe and inclusive data-sharing for this country, with many good initiatives already underway.

We also heard some concerns:

- People wondered whether it was possible to capture the benefits and manage the risks of the new data environment, given data crosses borders.
- Access to data and access to capability were highlighted as barriers to activity and benefit realisation.
- People were concerned about what is being done with information about them, without their knowledge or consent, and how they can be sure that quality is maintained and interpretations are correct.
- Many agreed that there was a risk that not everyone would benefit from data use. This was of particular concern to Māori who emphasised that benefits would not be achieved without trust. To achieve this, Māori would need to be involved in decision-making, and fundamental values such as kaitiakitanga and manaakitanga would need to be respected.

A more detailed overview of the feedback we received can be found at www.nzdatafutures.org.nz.

Our vision:

New Zealand is a world leader in the trusted, inclusive and protected use of shared data to deliver a prosperous society

The NZDFF has come to the conclusion that the best solution for any country in navigating the data revolution is to use data *at the same time* to derive economic, social and personal value, to make sure that all parts of society, not just business or government, have the opportunity to benefit from data use, to build trust and confidence in institutions through appropriate data use and management, and to meet individuals' privacy concerns by providing them with greater control over the use of personal data.

In other words, if we can implement all of our guiding principles together, we can gain an international competitive advantage and realise the vision we have set. The four principles work together. Value is *increased* by trust, inclusion and control.

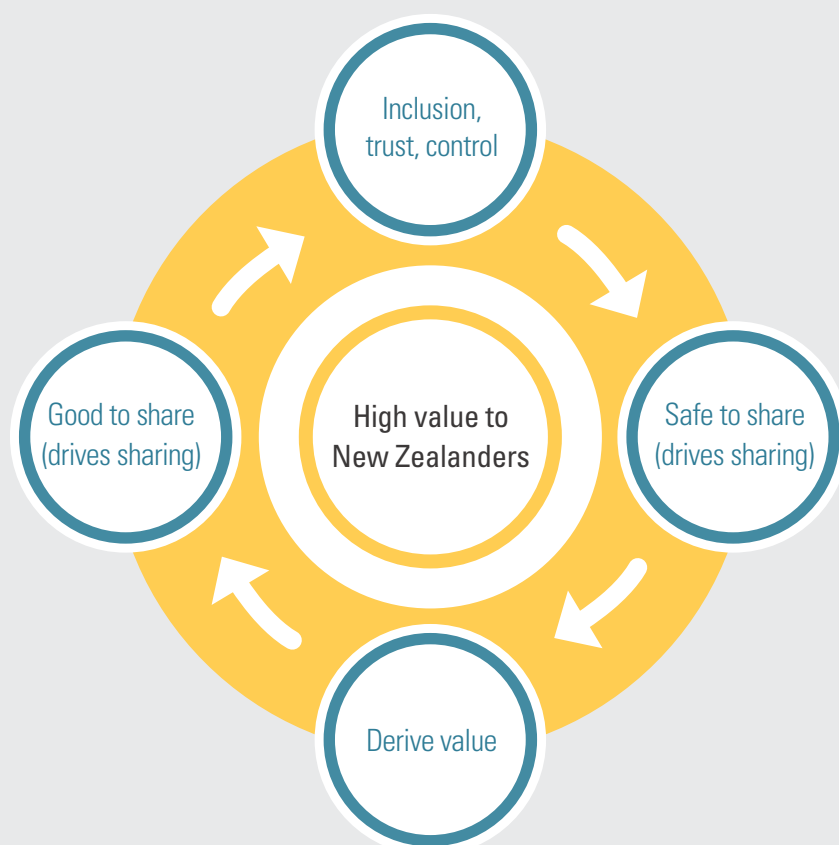
Overarching objective

Create a competitive advantage by positioning New Zealand as a high-value, strongly inclusive, high trust and control data-sharing ecosystem.

The way this data-use ecosystem works is relatively simple. If people trust how institutions manage data, see benefits for themselves derived from data-sharing, and feel they have some control over how personal data is used, they are likely to support and actively contribute to collaborative data-sharing initiatives. The latent value of data is unlocked.

Far from being trade-offs with achieving desired benefits, high trust, high inclusion and greater control are critical enablers for value creation through collaborative data-sharing. High trust in how institutions manage and use data, confidence that all parts of society will benefit from data-sharing, and greater control over personal data use in a time where personal data is becoming a critical 'currency' for many digital transactions will all contribute to the willingness of organisations and individuals to support data-sharing initiatives and actively participate in the data-use ecosystem. And if more data is shared and used in trusted, protected and inclusive ways, this then will drive even more value, which can create more trust, inclusion and control. In other words, under such conditions, the following positive feedback loop will emerge:

A positive feedback loop in a trusted data-use ecosystem



This feedback loop is self-sustaining for a country that implements our four guiding principles well and does not chase short-term opportunities by trading off either trust, inclusion or control for small and unevenly distributed gains.

If we compare the conditions and characteristics of New Zealand with our four guiding principles for the best data-use ecosystem, we come to the conclusion that New Zealand is very well positioned to have an international competitive advantage in this emerging data future and become a world leader in this space.

For instance, New Zealanders have high trust in their institutions to protect and manage data well, especially if compared with other countries. We score at the top of international transparency and integrity [rankings](#), such as Transparency International's Corruptions Perception Index. We are culturally diverse, but well-integrated, seeing inclusion and equitable treatment of all New Zealanders as critical values of our society, built into our country's foundations in the Treaty of Waitangi. We strongly value, and want to protect, our privacy. In addition, we are the only country in the Asia-Pacific region with privacy legislation that is judged by the European Union as being 'adequate' in the protection of personal data. These factors come together to mean that New Zealanders are likely to be willing to share data, and have confidence in the protections in place.

With the right data-use ecosystem, we will attract talent, expertise and resources from elsewhere to undertake collaborative data-driven projects, driving more value for New Zealand. If data can be safely shared in a high trust and control environment, others will want to do business here, further reinforcing our positive feedback loop.

Our guiding principle of giving people even greater control over personal data use in the digital age may perhaps sound a little counter-intuitive: people often think that increased data-sharing automatically means less privacy. What many people don't realise, and what New Zealand is already doing in several initiatives, is that increased data-sharing and privacy protection can go hand-in-hand. We can have it both ways: increased data-sharing that is protected, safe and, as a result, trusted. In many cases, there is actually no need to use personal data to facilitate the transaction in digital exchanges. Personal data can be used in anonymised, de-identified, 'non-personal' ways.

In New Zealand, we have several initiatives where privacy-enhanced ways of personal data-sharing have been put into practice. Some of them have been described in this or other discussion papers, such as RealMe and MyWave (in this paper), and MyInfoSafe and the Integrated Data Infrastructure (paper two). They are exemplars of our privacy-friendly culture in New Zealand. We are internationally acknowledged as leading the way in finding privacy-enhancing solutions to these emerging digital challenges.

But there is also a huge opportunity for New Zealand to create value from other types of data, as data collected by machines is growing at a faster rate than personal data. 'Datafication', or quantifying things that might never before have been stored as data, has enormous potential for creating and driving value. As we described in our first discussion paper, sensors built into the new infrastructure of Christchurch create a unique opportunity for collaborative data-sharing to become the catalyst for innovation and growth in the region: by tracking all sorts

of things but not people, smart technology will allow for making truly informed decisions, ranging from building owners measuring and increasing the energy efficiency of their buildings, to individuals measuring and acting upon the water quality in their neighbourhood. The value of this collaborative 'living lab' – a partnership between the people of Christchurch, business, government and academia – is further enhanced through the opportunity to export the learnings to other cities in the world.

Geospatial data, road transport data, economic data, government-held data and other types of non-personal data are opened up and made publicly available for use, re-use and sharing. Open datasets made available through data commons create huge potential for driving economic, social and personal value through the development of new innovative services and apps, the creation of jobs and enhanced forms of public engagement. Value creation through collaborative open data-sharing is already happening in New Zealand, for instance as a result of the Land Information New Zealand (LINZ) Data Service, the Open Government Information and Data Work Programme and Auckland's recent first ever civic hackathon. However, much more can be done, in closer collaboration between the public and private sectors, to drive value and truly reap the benefits from open data use.



Visualising fishing harvest data

A new tool that uses LINZ online maps means tangata kaitaki and iwi now have an easier way of monitoring fishing levels in their rohe moana (coastal and marine areas).

The eFish PLUS fisheries management tool, developed in partnership by Waka Digital (an IT firm based in Tauranga) and Te Ohu Kaimoana (The Maori Fisheries Trust), captures, records and tracks information on customary fishing authorisations, overlaying it onto LINZ topographic maps. Being able to analyse harvest data collected within the system, and overlay it onto maps sourced from LINZ Data Service gives iwi the ability to identify possible reefs that could be closed due to high harvest gathering levels within a specific location.



● www.linz.govt.nz

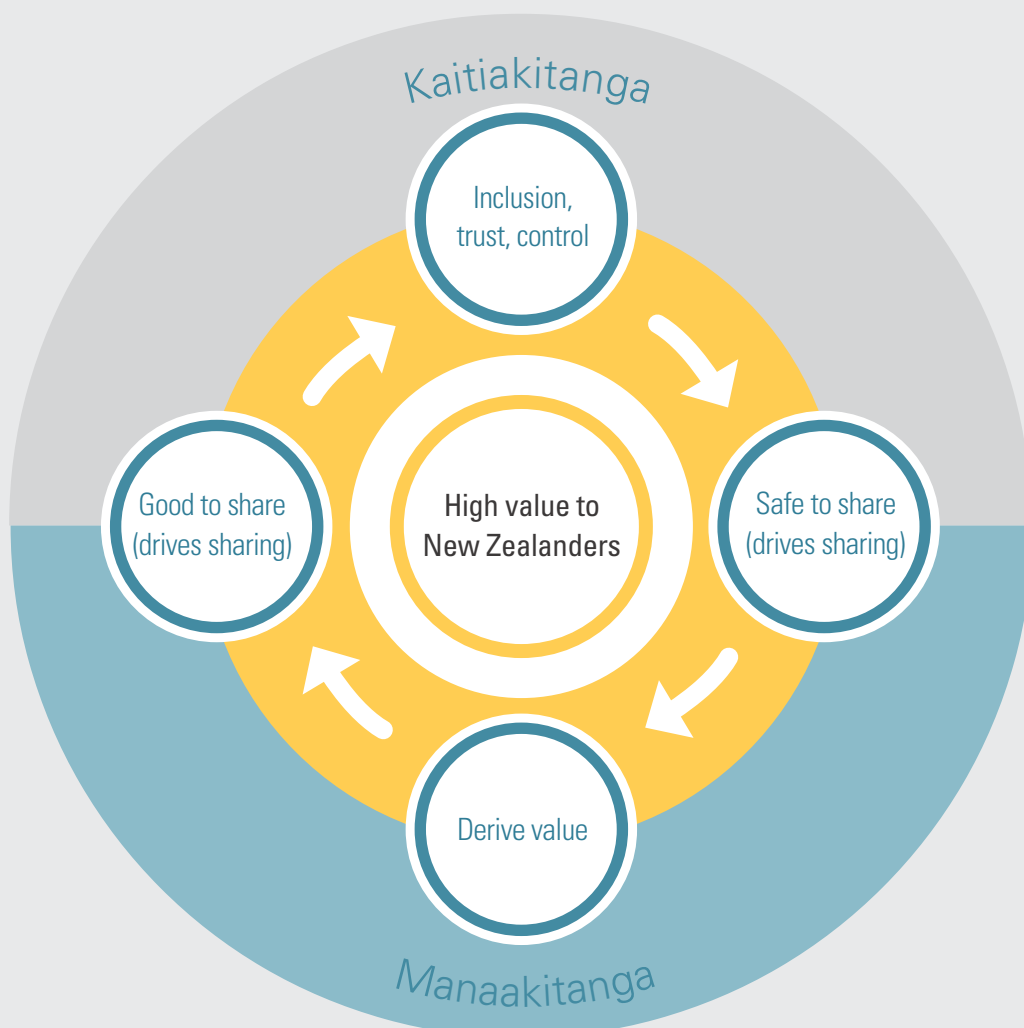
Our data is our taonga: a unique and highly valuable strategic asset of this country which can be used to improve the lives of all New Zealanders. We need to treasure it and unlock its latent value, not only promoting increased data-sharing between various stakeholders, but also by demonstrating manaakitanga and kaitiakitanga in all data-use processes.

Manaakitanga and kaitiakitanga – key Māori values that support a trusted data-use ecosystem

Manaakitanga: data users show mutual respect. Through the exercise of reciprocal rights and responsibilities, access and use of data is for the benefit and well-being of all New Zealanders. These reciprocal obligations need to be embedded in our data-use ecosystem

Kaitiakitanga: All New Zealanders become the guardians of our taonga by making sure that all data uses are managed in a highly trusted, inclusive and protected way. If we want to unlock and enhance the value of our data, we need to protect it by making sure that our guiding principles of high trust, inclusion and high control are met.

Kaitiakitanga and Manaakitanga support a trusted data-use ecosystem



A more collaborative, open and protected data future

We can derive more value from our strategic data assets by promoting collaborative data-sharing between various stakeholders (e.g. businesses, government, iwi, NGOs and individuals), creating more data points and datafication, and opening up more data for wider use by people and organisations. As we demonstrated with our feedback loop, we see strong protections as a *sine qua non* for more collaborative and more open forms of data-sharing: high trust, high control and inclusion will drive more value. This means that clarity about the rules of the game for all stakeholders will be critically important for achieving the NZDFF's vision.

For example, from a business perspective, collaborative data-sharing can only be promoted if intellectual property rights and commercially sensitive information are protected: without that protection, businesses are unlikely to take any risks in data-driven innovation projects and will therefore not want to participate. Strong privacy protection is critically important for individuals, but also for businesses, government and NGOs: privacy or security breaches can lead to lower trust in institutions and feelings of low control, which subsequently can have the effect of less support or even withdrawal from collaborative data-sharing initiatives. Strong protections are also needed against any other form of data misuse, including any negative form of preferential treatment targeted at individuals or businesses.

While strong protections are needed to promote collaborative data-sharing and more sharing and use of open data, clarity about the rules of the game in the new data future also means that some existing protections, especially those based on protecting data ownership, will need to be removed and current rules may need to be changed. For example, we heard that a lack of clarity about how copyright applies to data and data-enabled services means many lack the confidence to make valuable datasets publicly available for re-use. Inconsistency between Crown copyright and "standard" copyright, and between copyright law in different jurisdictions adds to the uncertainty. A further review of the Copyright Act is therefore needed in our view. In section two, we will provide more detailed insight into our recommendations for providing more clarity and coherence around the rules of the game in the new data-use ecosystem.

In our view, strong protections not only need to come from legislation, but can also be facilitated by a clever positioning of organisations in the new data-use ecosystem. We will illustrate this by focusing on the strong protection of privacy we see necessary in the data future, and pointing out four possible scenarios for the use of personal data.

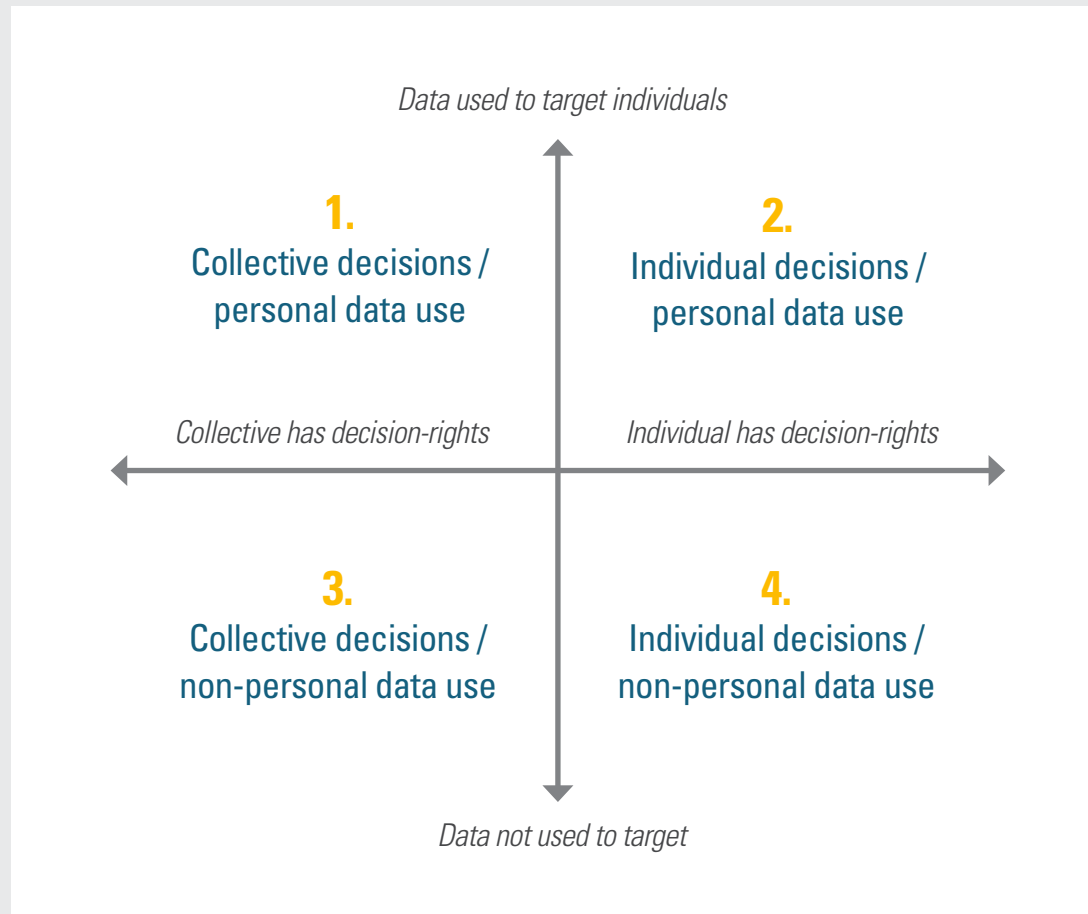
Different data-use scenarios for protecting privacy

One of the challenges we face is that not all data use is done on the same basis or for the same purpose. Rather than thinking only in black and white terms about the sharing OR protection of various types of 'personal data', we should be thinking about the actual use of data and how it facilitates both data-sharing AND protection. This creates the opportunity to make a firm distinction between data use where an individual is directly targeted, and non-personal forms of data use.

We also need to make a distinction among different purposes for data use: data can be used for the purpose of achieving a public good, such as social services, public health or public safety. It can also be used for the purpose of achieving a private good, such as buying a product, downloading movies, using a health sensor or consuming a community service. These situations imply different decision-rights over data use from an individual's point of view. In the case of a public good, the decision-rights about personal data use or non-personal forms of data use sometimes need to be with the government, as the executive of political decisions.

A clever strategic positioning also requires organisations to understand how the NZDFF's principles of **value**, **inclusion**, **trust** and **control** apply to each of these scenarios, so that collaborative data-sharing and use can be further supported. These scenarios are illustrative, and are not in any way comprehensive, do not necessarily help us to understand how best to use community data or business data, when other issues such as commercial sensitivity are relevant. However, we find these scenarios helpful, as they emphasise that privacy is context specific, and remind us that we can have different data-use solutions, which require different rules of the game.

Different data-use scenarios for protecting privacy



Scenario 1: Collective decisions, personal data use

In this scenario, data is used for the purpose of targeting specific individuals in order to achieve a public good, such as the protection of public safety or protection of the vulnerable (e.g. state-sanctioned intervention aimed at reducing crime, preventing child abuse and protecting people who are unconscious). The purpose of the data being linked and analysed is to generate insights at the level of the identified individual. The collective interest in achieving a public good or protecting the vulnerable overrides an individual's rights to privacy, so that individuals are not given a choice about their personal details being accessed. We suggest the following rules for this kind of use:

- Deployment of this approach should be restricted to where there is a transparent and widely accepted **value** proposition for a public good or protection of the vulnerable that would override the right to privacy.
- This kind of use should be the outcome of a democratically based decision-making process, including representation in particular by highly targeted groups (**inclusion**).
- There should be strong accountability for safe and protected management and use of personal data, including audit (**trust**).
- **Control** is at the executive level through strong oversight.

Scenario 2: Individual decisions, personal data use

A different purpose for personal data use is where people themselves share their personal data voluntarily to create value. Value-creation can involve achieving a particular private good, such as consuming a commercial service, using personal sensing data to receive a service, buying a product or participating in social networking. The benefits may not always be purely personal – people may wish to donate personal data to help family, friends or even the wider community to achieve a public good. Creating a high-value, highly trusted, high control data-use environment will require secure shared data infrastructure, where people and organisations make their data available in a safe and protected way.



Making individual decisions about sharing health data

Health sensing is a good example, where personal health data can be linked to wearable sensors and a person's genome, and then crowd-sourced together with the health outcomes of millions of other individuals. This can provide huge personal health benefits to a person, if the results of the data re-use and analysis can then be fed back directly to the individual or their doctor, i.e. how well am I doing on my exercise regime given my profile and that of hundreds of other similar people? Am I at an increased risk of heart attack in the next few weeks? Deeply personal health data can be shared in a high trust shared data infrastructure where the decision-rights over personal data use stay with the individual.

We suggest the following rules and conditions for this kind of data use:

- To maintain **trust**, there must be high transparency of purpose and high personal **value** from sharing data.
- Individuals have the ability to opt in and opt out at any time, including removal of data (**inclusion, control**).
- Individuals have quite specific **control** on the re-use of data about them.
- Consent is real and informed, being easy to understand and not too broadly permissive, and there is a realistic alternative option (other than consenting) (**control**).
- On-selling or providing shared data to third parties requires the consent of data providers (**control, trust**).
- Data providers are responsible for the quality of their data, while data users are accountable for data misuse (**trust**).



MyWave

MyWave is a New Zealand example of a data-use arrangement, where a secure shared data infrastructure is being created that is giving people control over the use of their own personal data.

MyWave flips the old 'customer relationship management' model on its head by taking control out of the hands of the business and placing this back in the hands of the customer to create, what MyWave refers to as '*customer managed relationships*'. As MyWave chief executive and founder Geraldine McBride suggests:

"The MyWave CMR platform is constructed so that the customer has greater controls over data about them. This removes privacy concerns and allows mutual value in each exchange."

In doing so, it is an example of a company occupying the new data environment in alignment with the NZDFF's guiding principles.

MyWave is of high personal value for customers and partner agencies, inclusive and a high trust and control system, just because the customer has fine-grained control over their own profile and who may see it and the ability to manage their profile with businesses to achieve what they personally want. Everything is done with informed consent and in control by, and with high transparency to, the customer.

Compare this with the current model where well-known internet businesses sit uncomfortably in the gap between consent-based acquisitions of people's personal data in exchange for free online services, and often also indulge in collecting individuals' data from other sources at the





same time, often without consent of the individuals concerned. Even in cases where consent is granted, the level of transparency and control, and therefore trust, is low. Many online privacy statements are opaque and require a magnifying glass and a legal background to be able to read and understand them.

MyWave™ 

Scenario 3: Collective decisions, non-personal data use

A third data-use scenario is where data is used to generate broader insights of value to the wider community in order to achieve a public good, without targeting any individuals. Personal data can be de-identified so that the actual use of the data happens in a non-personal and therefore more protected way. An example is Statistics New Zealand's Integrated Data Infrastructure (IDI), which is a linked longitudinal dataset that covers an extended range of pathways, and transitions information used for policy evaluation and research (see discussion paper two). Although there are low risks involved, robust, secure, shared infrastructure and governance are needed for this data-use scenario to protect individuals from accidental or malicious re-identification.

What counts as personal data?

Scenarios 1 and 2 use both data about you and data about the things you engage with, with the express purpose of targeting you in order to take action or provide a service. This may consist of **data on the personal details** of a person such as your name and height. It also includes other data that can be joined to traditionally **non-personal data** such as the building you are in, website being visited, car you are driving or house you live in.

For scenarios 3 and 4, that same data can be for **non-personal data use**, where nobody will identify you because they are not interested in targeting specific individuals. Personal data can be anonymised so that the actual use of the data happens in a non-personal way. Business use of data and analytics, outside sales and marketing, is already typically carried out in a manner where personal information is not used. Methods of de-identification, anonymisation and sampling can be used to protect you from accidental or malicious re-identification.

The rules for this kind of data use should be:

- Use is explicitly for achieving a public, research or commercial good but without the ability or licence to target individuals (specific people or businesses) (**value, trust**).
- Robust governance and accountability exist to deal with possible data misuse, such as accidental or malicious re-identification (**trust**).

- There should be heavy sanctions for organisations or people that use data to try to re-identify individual people or organisations (**trust**).
- **Control** is at executive level and includes how the data re-use arrangements are set up and managed.
- Confidentiality should be maintained (e.g. data is published in a de-identified and anonymous fashion) (**trust**).
- Privacy and security by design should be built in throughout the data life cycle (**trust**).

Scenario 4: Individual decisions, non-personal data use

The fourth data-use scenario involves a privacy-friendly way for an individual to share their personal data in collaborative data-sharing arrangements to achieve non-personal value such as research. This is our traditional source of data used in research. Data is gathered with your consent and not for personal use. In this scenario, individuals' personal data is not being used to target them individually and consents are usually highly limited. Depending on the individual's personal preference, data-sharing with a researcher can be done in fully anonymised, non-personal ways. Although there are low risks involved, robust, secure, shared infrastructure and governance are needed for this data-use scenario to protect individuals from accidental or malicious re-identification.

We suggest the following rules for this scenario:

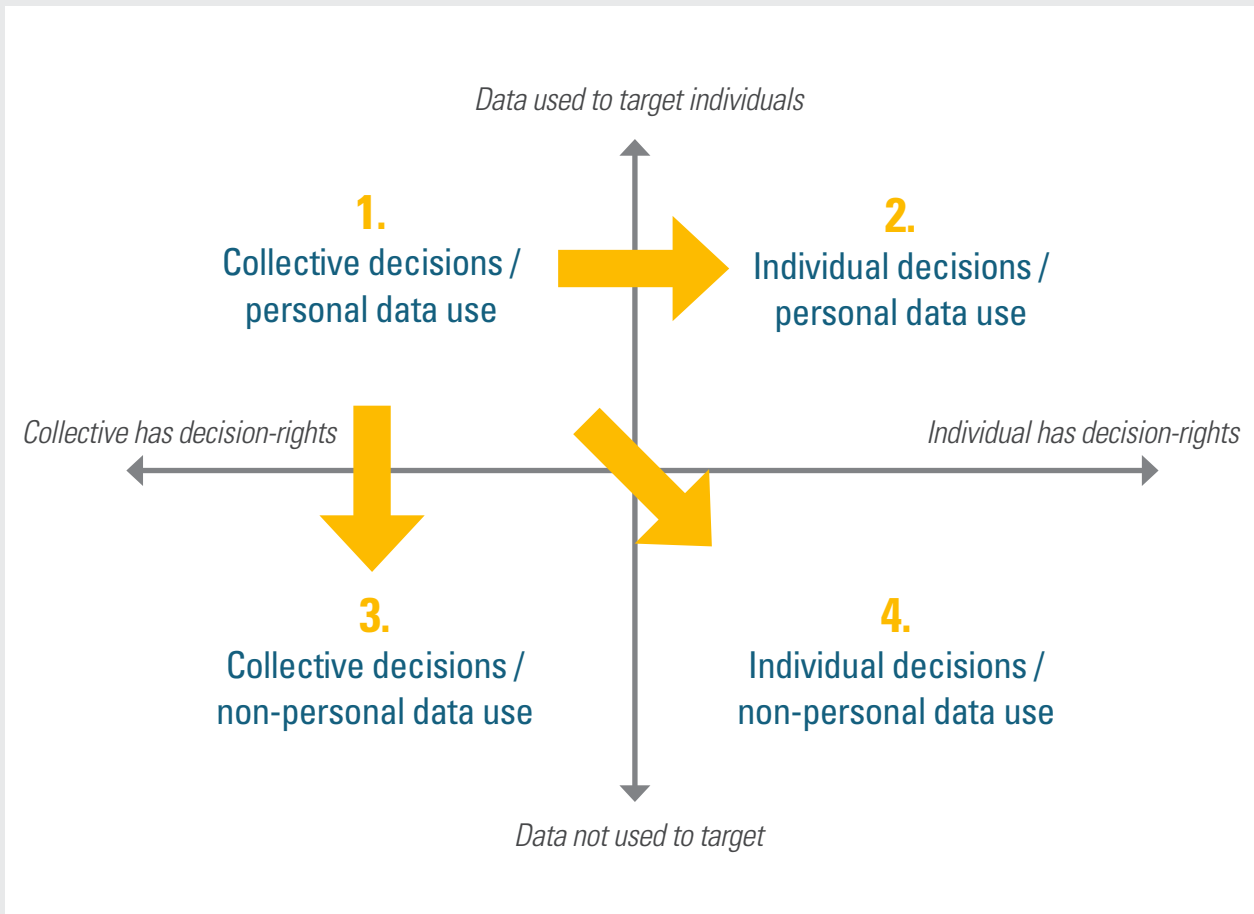
- Use is for deriving non-personal **value** from privacy-enhanced data-sharing.
- **Control** is at the individual level, as the individual decides on how to share and use their personal data.
- Consent should be user-friendly, transparent and easy to understand for the individual concerned (**inclusion, trust**).
- Individuals have the ability to opt in and opt out at any time (**inclusion, control**).
- There should be heavy sanctions for organisations or people that use data to try to re-identify individuals (**trust**).

Different data uses, different rules of the game

As you can see, the rules of the game are slightly different for each of these four data-use scenarios. We would like to see organisations and individuals in New Zealand using data in accordance with the rules of the game for a particular data-use scenario they are following. In other words, an unexpected shift from one data-use scenario to another, without taking into account the decision-rights of those involved, especially when *non-personal data use* suddenly changes into *personal data use* (e.g. when re-identification and targeting of individuals happens), should be considered as data misuse. Such possible developments in the New Zealand data-use ecosystem need to be very carefully managed and strict stewardship of what data can be interrogated for what purposes to provide trust and confidence to businesses and individuals involved is needed.

Consequently, in the new data environment, particular data-sharing arrangements need to position themselves strategically under one of these four data-use scenarios and stick to the relevant rules of the game. Ideally, we would like to see organisations minimising the mandatory (i.e. through permissive or monopolistic (coerced) consent) use of personal data to target individuals and, wherever possible, move either to an arrangement where individuals have more say over the use of personal data or to one where data is anonymised or de-identified and used in a non-personal way. In other words, we would strongly encourage organisations to consider moving from a data-use scenario 1 situation to one of the other three scenarios in order to better protect the privacy of individuals. Moreover, we think that the New Zealand Government and other providers of public goods in New Zealand, such as private health institutions and security companies, should minimise the use of personal data to target individuals, unless there are appropriate controls and protections. Compare these possible data futures with our current situation, where we see most sensitive data uses effectively happening without individual decisions (and even without appropriate collective oversight). This includes the likes of Facebook and LinkedIn, where people don't have much say over the use of personal data once they have opted to make use of these social networking services. Very often they will be totally unaware of the data uses concerned.

Minimising mandatory use of personal data



Section two: Rules of the game

We would like to emphasise how important it is to see our data future in New Zealand as one coherent data-use ecosystem where multiple interests, perspectives, rules, regulations, responsibilities and obligations need to be acknowledged in a systematic and consistent way. At the same time, we need to factor in that we are dealing with a rapidly changing environment, which is already starting to challenge our existing institutions and regulatory frameworks, and puts restrictions on the extent to which we will be able to foresee our data future.

The legislation, programmes and activities in our country's data space are also fragmented and often inconsistent. Some very interesting innovation projects are happening, but are not always connected with each other. This is perhaps best illustrated if we look at what is happening in government in the emerging data environment.

New Zealand Government initiatives to support data and innovation

Government ICT Strategy and Action Plan to 2017

- Information as an asset
- Digital services – includes RealMe

Data integration and analytics

- Central Agencies Analytics and Insights team established
- Integrated Data Infrastructure – controlled access to data
- Families Commission Social Policy Evaluation and Research Unit

Open Government Data Programme

- Improved supply – release of publicly-funded, non-personal, unrestricted data in open formats
- Based on what users define as “high value”
- Listed on data.govt.nz to increase visibility
- Increased re-use of open data

Shared data for operational purpose

- Information sharing agreements – multi-agency
- Using data to understand clients in order to better target services and learn what works – Ministry of Social Development

Governance, legislation, rules

- Privacy Commission, Office of the Auditor-General, Ombudsmen
- Official Information, Privacy, Statistics, Public Records, Clean Slate and other Acts
- Health Information Privacy Code Unit

Improving research capability

- Centres of Research Excellence (CoREs)
- Karen Network
- Prime Minister's Science Advisor
- Crown Research Institutes

Better public services

- Data-driven decision-making
- Key results, measurements

Government support for innovation

- Research and Development tax break

Sector initiatives

- Health
- Primary industry
- Transport
- Electricity Authority
- New Zealand Cyber Security Strategy

The rapid technological and social change surrounding the data revolution means that solutions should be adaptive and able to evolve. We think it highly likely that a heavy regulatory approach, with many prescriptive provisions enshrined in legislation, would rapidly get out of date, at best becoming irrelevant and at worst stultifying innovation and strangling development. This leads us to favour a light-handed approach, at least initially. Light regulation is not about encouraging a Wild West, but about enabling an environment where innovation and agility are guided by the four principles.

To establish the rules of the game for our data-use ecosystem, we propose the creation of an independent data council, the review of all legislation in this space and some specific legislative changes that can be made more quickly to support the implementation of the principles.

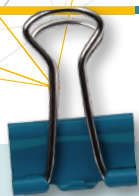
An independent data council – guardians of the system

A data council would represent the range of interests and perspectives across New Zealand society to lead us as we develop a social consensus on data use. We have been struck by the huge potential ethical and social implications of the data revolution, and the fact that so much is uncertain and changing. The group needs to reflect the pulse of New Zealand society as we try to navigate this uncharted territory.

The data council would provide oversight and guidance on trusted and ethical practice, but should also have a promotion role, encouraging New Zealanders to get involved in data-driven collaborative initiatives and leading and supporting others in projects that set the platform and foundations for a trusted data-use ecosystem. The data council would play an important role in leading New Zealand to undertake trusted sharing and use of data – we think oversight is key to make sure that we all implement the four principles and get the benefits this will provide.

The data council needs to include a variety of different perspectives to ensure it is agile and responsive and does not create unnecessary red tape. We want to build adaptive, transparent, trusted solutions. It should include strong representation from the business and the innovation sector, as well as groups including Māori and the research community. It could bring together those who already have responsibility for considering issues around data, innovation and new technologies – such as the Privacy Commissioner, the Government Chief Information Officer, the Government Statistician and the role (proposed on page 47) of champion/driver of innovation and data-sharing.

Working together will give the data council the ability to see the whole picture and provide credible and useful guidance and advice. It will also help develop capability among existing watchdogs to ensure they can respond to the data revolution. The existing regulatory and ethical landscape in this area is already somewhat crowded and there will be overlap with the existing bodies, roles and functions. In the medium term, the hard work should be done to simplify and reshape the current regulatory and ethics landscape to accommodate the data revolution. The work underway by the National Ethics Advisory Committee to analyse the ethics committee framework in New Zealand and propose changes is relevant here.



There may be a case for a 'data council' – a view from John Edwards, New Zealand's Privacy Commissioner

The time may have come for an independent body to promote the ethical and safe use of data. While I play a role in setting limits on what can be done with personal information, my role is limited to personal information, and does not include a mandate to promote the wider use of data. Promotion of the more effective use of data raises a range of questions about infrastructure and capability that are not as yet part of any organisation's mandate. There is also an important distinction between privacy and ethics in data use, and there is no body charged with providing advice on what constitutes ethical practice outside of NEAC's role in the health sector.

In the short term, the data council's functions could be mainly exploratory and advisory:

- *Advice to government* – what types of data uses should be encouraged, and what types should be discouraged or possibly outlawed as unethical, including both public and private sector uses.
- *Advice to potential data users* – users might apply to the data council for a specific judgement or advice about the appropriateness of certain data uses, including ethical considerations. The data council could act as a 'route to resolution', directing users to existing accountability channels as appropriate (e.g. Privacy Commissioner, courts).
- *Develop rules and principles* – help define and encourage best practice around data collection and storage, informed consent and other matters. This could include development of a (data use) professional code of ethics, technical solutions to provide privacy or security by design, data-use impact assessments, and rewards and recognition for good practice.
- *Promote value-creating data use* – promote principles-based solutions, encouraging New Zealanders to get involved in data-driven collaborative initiatives and leading and supporting others in projects that set the platform and foundations for a trusted data-use ecosystem.

In the medium term, as the data landscape becomes better understood, the data council's functions might become stronger, for example:

- *it could initiate inquiries and investigate complaints* – particularly around ethical issues (e.g. discrimination)
- *it could provide industry accreditation and audits* – companies could be licensed for various data activities (on either a voluntary or possibly compulsory basis), resulting in a system or grading of 'trusted users' to facilitate acceptance by people of data use (and access) proposals, and where sanctions for poor audit results could include loss of licence

- *it could take an enforcement role* – with the power to impose sanctions on inappropriate or unethical use of data, refer malicious use to the police or the Serious Fraud Office, etc.

The data council should be supported in its operations by a government agency with relevant expertise, such as Statistics New Zealand; the Ministry of Business, Innovation and Employment; or the Department of Internal Affairs. The data council would report to the public of New Zealand via an annual report (perhaps tabled in Parliament). We suggest it be convened by a respected independent chair, drawn from outside government.

Recommendation 1 – An independent data council

To enable guardianship and responsible stewardship for New Zealand and New Zealanders in the new data environment we recommend:

- the establishment of an independent data council with ongoing responsibility for continuing the thinking, advising government and data users, and developing best practice guidance
- a review, in two years, to ensure we have a coherent and streamlined governance system – this will include review of the potential functions of the data council, along with the roles of existing watchdogs and regulators, the sanctions for misuse and in the context of proposals for legislative change.

Legislative review and key legislative amendments

New Zealand has a number of existing pieces of legislation of relevance in the new data environment – including the Privacy Act, Copyright Act, Official Information Act, Public Records Act, Statistics Act, consumer law and intellectual property law. The legislation needs to be reviewed in combination to ensure consistency and coherence of regulation across the New Zealand data-use ecosystem. This is opportune, given that the Privacy Act and consumer law reforms are underway and the Statistics Act is due for review.

In addition to a review of the relevant legislation, we suggest a number of key legislation changes that can be made quickly, to support a data-use ecosystem where the four principles are implemented. Some of these are already being considered as part of the Privacy Act reforms. The particular areas we know demand attention are the following.

Mandate for government data openness: We think legislation is required to get traction within government. The 2011 Declaration on Open and Transparent Government mandates government departments to release their high value public data in open formats for legal re-use by third parties. They must release the non-personal and unrestricted data that their users are asking for and work with these users to understand the economic and/or social

impact this re-use has had and what data sharing efficiencies it has created. Cabinet also encouraged or invited all other government agencies to adopt the Declaration. Although open data is supported by government, progress would be speeded up by introducing legislation that has a set date by which open data release must be in place. This includes reviewing and removing barriers to the opening of key government data (health, education, tax, energy), such as regulation and contractual arrangements. We also think that a further review of the Copyright Act is needed to enable government entities and businesses to be confident they are acting lawfully in releasing and re-using data, while maintaining appropriate protection for intellectual property. We want to create an environment where New Zealanders benefit more from the re-use of open government data.

The Law Commission has recently recommended legislation for proactive release. We support this.



The public's right to know

A legislative obligation would provide a legislative push and a statutory mandate for the open government agenda to ensure that it reaches its potential. A civil servant interviewed for a study of the UK open data experiences said:

“There’s no legal obligation to publish open data, and until then it’s not going to happen uniformly or successfully. Until that happens, we won’t see the real benefits. That’s where we should be focussing.”



• [The Law Commission's Review of the Official Information Legislation, 2012](#)

Clarity around ‘personal information’: The review of the Privacy Act should include revisiting and clarifying what counts as personal information in the current technological and social climate. This will make it easier for people to protect personal data, and make it easier to share non-personal data, and so optimise the mix of data-use scenarios. Security and privacy protections should be enforced for personal data types.

Extend the information sharing provisions under the Privacy Act: They should include local government, NGOs and the private sector, providing mechanisms for privacy-friendly, trusted and safe collaborative sharing of personal data.

Introduce stronger protections against the re-identification of anonymised or pseudonymised data: An explicit prohibition in the Privacy Act could usefully reassure people that they have a means of redress if they suffered harm due to them being successfully re-identified from supposedly anonymous data.

Recommendation 2 – Legislative review and key legislative amendments

In order to provide clarity and coherence around the new data-use ecosystem, we recommend the following:

- 2.1. A broad review of information legislation be undertaken, including (but not limited to) the Copyright Act and other intellectual property legislation, Official Information Act, Privacy Act, Public Records Act, Statistics Act, and consumer law, with the purpose of achieving better, faster, trusted and more collaborative use of data and a more coherent and responsive data-use ecosystem.
- 2.2. We also recommend the following legislative changes and reviews be put in place in the short term:
 - Legislate for proactive release of government's open data
 - Conduct a further review of the Copyright Act, to enhance its clarity and coherence in relation to data
 - Amend the Privacy Act to:
 - update the definition of personal data
 - extend the information sharing provisions beyond central government
 - include protections against the re-identification of anonymised data.

Section three:

Value through doing



Value:

New Zealand should use data to drive economic and social value and create a competitive advantage.

To achieve this we should:

- treat data as a strategic asset.

Treat data as a strategic asset

Key to our vision is the use of data to create value. Ultimately, this is about the doing – taking data and using it to drive value, with the principles of value, inclusion, trust and control as guides to maintain a sustainable data-use ecosystem.

To do this, we need to treat data as a strategic asset. We need to **unlock** our data to allow value-creation. We need to **protect** and **maintain** our data assets to make sure they remain available and we can continue to draw value from them, and we need to **build** those assets for future use. This is similar to the way that we manage and maintain other strategic assets, like water.

To make best use of our data assets we can:

- open up data, by creating data commons, where everyone has access to non-personal data for value creation in collaborative ways
- build on the achievements under the Open Government Data and Information Work Programme and extend these to other parts of New Zealand society
- develop and use protected shared data infrastructures, which provide safe and trusted access to sensitive data, such as data about identifiable people, or commercially sensitive data – this is about implementing all the principles, to support the positive feedback loop we described earlier

- create and use new data through datafication, which is about quantifying things that might never before have been stored as data, such as using social media to understand trends and attitudes (we are already seeing lots of datafication – two great local examples are the Sensing Cities project, and the dairy industry’s introduction of sensor technologies)
- make more use of existing data in collaborative ways, thinking beyond traditional or obvious uses to collaboratively tackle real problems.

In our discussions we’ve talked a lot about different strategies and projects that could be implemented to put the vision into practice. We present some of our thinking as thoughts and prompts to others, a seeding of ideas.

This is not intended to provide complete coverage or to be the only or best suggestion, but to spark ideas and activity. Others need to take up the challenge to develop and deliver strategies that define the vision for particular sectors and to develop projects that build momentum and catalyse further action.

We need catalyst projects and longer term strategies.

We recommend that government, with sectors, and indeed New Zealand as a whole, should come up with clearly defined catalyst projects quickly, say within six months. These should build on what is happening, and get more underway.

These projects could build on our suggestions below and should centre on using data to solve real problems and thorny issues. Working across boundaries to create mutual value, the projects should be driven by partnership and collaboration – involving, as appropriate, government, business, academia, NGOs, Māori and communities. To ensure value for all, the group of projects should cover all the major sectors. The principles of value, inclusion, trust and control need to frame the work strongly. Our suggestions for catalyst projects are just that: suggestions. The important thing is to find projects which help catalyse further appetite, knowledge gathering and action, either by developing further the ideas below, or by coming up with better ones.

We know a lot of sectors are already working with data, but we suggest that new transformational projects can be identified, and existing work accelerated. The learnings and developments from the projects should feed into longer term strategies that look across sectors to make the best use of data in the longer term. Through the catalyst projects, we will identify pressure points, and find effective ways of doing things, helping us to develop future plans and directions. This will enable government and sectors collectively to identify common enablers, especially at an infrastructure level, and prioritise the delivery of key system-level components.

We have included some exploratory thoughts on strategic directions in particular areas. In some areas we see that data use is not always done in ways that promote trust or control. In other areas we see potential for more sharing and collaborative use of data to drive value, via openness or protected sharing, and datafication presents real opportunities for some sectors. As with the catalyst projects, the strategies need to be developed collaboratively to deliver value for all New Zealanders.

Recommendation 3 – Treat data as a strategic asset

In order to get value from the data we hold collectively, now and into the future, we recommend that:

- 3.1. government and sectors come up with a set of clearly defined collaborative catalyst projects that create value by tackling real problems via trusted sharing and use of data
- 3.2. in conjunction with businesses and communities, government develop a set of strategies to ensure that all New Zealand is best placed to use and benefit from our data-use ecosystem. These strategies could:
 - build information industries based on the primary sector
 - support trusted use of social sector data by coordinating social data-sharing for targeted purposes, increasing trusted sharing for non-targeted uses and working with others to make best use of the data to understand social challenges
 - build an environment for trusted sharing of health data between patients, health professionals, researchers and health innovators
 - open up data about the built and natural environment
 - increase efforts to collaborate with Māori on data projects
 - find ways to enable safe sharing of business transactional data to benefit business and the economy as a whole
 - mandate and enable the sharing of publicly funded research data.

An information industry that produces cows

There are high-value opportunities for New Zealand to position key industries strategically in the emerging data future: dairy, meat, wood, horticulture, fishing, wine, forestry, wool and tourism. 'Datafying' these industries, and creating strategic data assets to underpin innovation and decision-making, can give us a competitive advantage.

We've heard that both government and industry are working on this: there is lots of work in train that supports productivity, growth and value uplift, such as the [Red Meat Profit Partnership](#), a \$64 million joint government/industry project that will change the way that information and best practice knowledge is developed and delivered within the red meat sector. Dairy metrics, supporting farm performance analysis and dairy industry financial systems, are also well established. The [Primary Growth Partnership](#) includes other projects that support data-driven innovation and collaboration in the primary sector.

This kind of work builds on New Zealand's history of agtech innovation (freezer ships, the herringbone milking shed and the electric fence), and it is also in line with what is happening internationally. Smart agriculture, along with 'smart cities', is seen as one of the primary

near-term opportunities for Internet of Things technologies. China and Europe have been investing in the space through public/private partnerships. Silicon Valley is starting initiatives also, using some of the recent technological advances like cloud computing, drones, self-driving vehicles, wireless sensing, GPS and imaging technologies.

We would emphasise the opportunity to look beyond enhancing production and increasing the value of our primary products to something more transformative. We could transform our primary industries into information industries. By generating accessible data through the value and supply chain, the industry can create new software and data products for export. So, the point is to move away from having a cow-producing industry that happens to generate data and, instead, to have an information industry that happens to produce cows. The short-term benefit of the new information products will be additional revenue sources, which is great. In the medium to long term, this work will create higher-paying and more productive work for New Zealanders, will ensure that a greater proportion of our exports are price setting rather than price taking and will position our country for the rapidly appearing future.

Build information industries based on the primary sector

In order to seize this opportunity, we recommend national strategies for capitalising on data and new technologies in our primary industries and building information industries over our primary industries. This means looking beyond any given industry to take a value chain approach, and also building in collaboration and partnership, including with Māori, who are critical players in the primary sector.

These strategies should address the potential of datafication and the collection of new data, and also the value that could be derived from strategic data assets that can be used by industry participants and consumers. Given the importance of intellectual property in this area, these strategic data assets may need to be protected, shared data infrastructures rather than data commons. By following the principles we have set out, the necessary data-sharing should be beneficial and successful, and can also be done in such a way that protects commercial interests and addresses concerns that data might be used to target individual businesses. It can be inclusive, by allowing entry for small to medium sized businesses to innovate and add value.



Catalyst project: **paddock to plate**

As an exporting nation, New Zealand has an opportunity to improve its brand and the prices it can charge for its products through real-time international market knowledge and provision of services that provide transparency to consumers on quality and authenticity. This is about food traceability, or 'paddock to plate' tracking. Data-driven systems to support traceability will enhance productivity and generate more value. They could also foster the development of an information industry based on the primary sectors.





As a potential catalyst project for primary industry, we suggest the creation of a government/industry collaboration that builds on current industry datafication projects, includes logistics and consumer/retail data, and links to the certification regimes that the Ministry for Primary Industries currently operates, and that enable the international recognition of New Zealand's food quality. This is about connecting up farm management with logistics management, consumer priorities, and government oversight and certification.

Trusted data use for the social sector

Linked data is already helping government's social sector agencies to understand pathways and develop more effective programmes that support social development, but we think these agencies need to do more to ensure that trust, inclusion and control underpin the use of social sector data. This sector needs to put strategies in place to ensure sustainable, trusted and safe data use.

Coordinate sharing of social data for operational purposes

The government agencies responsible for delivery of social services (Justice, Health, Education, Social Development) should better coordinate their operational data-sharing to avoid duplication, improve safety and coordinate expertise. Operational sharing is about targeting individuals for services or support. This kind of sharing needs to be strongly guided by the four principles. Agencies need to ensure that operational sharing is done with appropriate collective oversight and protections, such as by making use of the proposed data council, or find ways to enable greater individual control over the uses of the data.

Make anonymised personal social data available for non-targeted use

The state sector's operational data should be made available in anonymous form via Statistics New Zealand's Integrated Data Infrastructure (IDI), or some other form of trusted, safe data-sharing mechanism, to improve transparency and the ability for researchers, communities, iwi and others to analyse data for themselves. This is already partly underway with agencies beginning to add data to the IDI.

Work together to use data to understand social challenges

Government should form partnerships with NGOs, academia and the private sector to link data to better understand social challenges, and this should be done in safe and trusted ways – not for individual targeting purposes, but to learn and measure needs and outcomes. This builds on our previous recommendation to require government service providers to hand data back, but is also about working together to share expertise. It enables co-production of insights, and has the potential to increase accuracy and relevance, create reciprocal solutions, as well as support inclusion and trust.



Catalyst project: **getting government help to transient families**

We know that transience, or residential mobility, has a big impact on children's education achievements, as it results in children frequently changing schools. Understanding transience and finding ways to support transient families will help us to provide opportunities for children who otherwise might be left behind.

We want to look for solutions that are high value, i.e. improve outcomes for transient children and families, but to do this we need to support inclusion, trust and control. In particular, because part of the issue here is lack of trust, the solution has to involve an approach which builds trust – anything else would be ineffective. The approach we are proposing is intended to help overcome both the distrust many of these folks hold in government and government agencies such as Child, Youth and Family and fears that information about them might be used by institutions such as credit agencies. This may not be so much about formal data-sharing, but about creating an environment where people feel safe sharing information about themselves.

Greater individual control and higher trust can be maintained and perhaps increased by using trusted community groups and NGOs (like The Salvation Army or the Citizens Advice Bureau) as intermediaries or brokers to find and build responses to such families. If trusted brokers use their own contacts and data to find and engage with such families to encourage them to receive government entitlements, we are more likely to both find such families and engage constructively with them. It might also be possible for schools or government agencies to share data on transient families with the broker agencies. Families could then receive advice on what might be available, even perhaps get in principle pre-approval before making the decision to reveal their location or other details to the government agency. They would, of course, retain the right to deal directly with government at any time.

A health innovation pool

In the health sector, we see real potential for New Zealand to use its high trust data-sharing environment to enable consent-based re-use of data to support personalised health services.

New Zealand is already investing heavily in health data management to make it safer and of higher value to patients and clinicians, and to enable research use of health data. We are particularly impressed with the National Health IT Board's use of a guided market approach that reflects some of the NZDFF's core principles. The guided market approach provides a good foundation for managing the existing health industry to drive improvements in patient outcomes. This approach ensures:

- inclusivity and control through "co-production and co-design of health care information solutions or eHealth solutions" by consumers and health care providers
- inclusivity through "direct access for health consumers, including the development of patient portal and ultimately consumer apps that use all or part of their health information record"

- high trust: "Privacy considerations and information-sharing provisions are designed into these new systems from the ground up"
- high value to health consumers: consumers can be confident that information is shared safely to support the delivery of high quality health care.

We're interested in how developments in health data management can work with changes in health data technology, particularly sensing technologies, and how we can put into practice what we know about health innovation and data-driven innovation.



Prize money for sensing technology

Using the XPrize Foundation, [Nokia](#) has put up \$2.25 million in prize money for innovative sensing technologies that capture meaningful data about a consumer's health and the surrounding environment. In 2013 the major prize went to a Boston Company, Nanobiosym Health RADAR, which developed a way of detecting disease pathogens using a nanochip and a mobile phone, a technology that doesn't need running water or electricity and so has great potential for use in developing countries.

Nokia is not the only communications company developing sensor technology. [Google](#) has developed a smart contact lens that can warn of high or low blood sugar by tiny flashing lights. Diabetics prick their fingers several times a day to check glucose levels. Given the inconvenience of this, less invasive methods are very attractive. For the communications companies, there is also the potential to combine this kind of data with other data to create marketable, personalised products.

New Zealand is unlikely to have that kind of research money to throw around at miniaturisation and that level of R&D into sensing technology. However, there is another kind of opportunity that may uniquely be New Zealand's if the principles in this paper are adopted and some kick-starter work undertaken in the health sector.

Building one sensor and having one stream of data is likely to be of high value in solving a specific problem. However, when you can join up different sources of data then you get 'economies-of-scope'. The real value proposition is not in racing to find a way to measure glucose levels in the blood. It will be in developing solutions on the basis of joining that data to other data, such as your existing health records; your other personal, miniaturised, low-cost health sensing data; your personal genome; your family's history and health profile; and the histories and crowd-sourced health profiles and outcomes of several million other people.

Linking health (and other) data together and combining this with mobile communication, networking and a new breed of low-cost personal health sensors is going to usher in a watershed in understanding and personal management of health to help those who are

interested in doing things like managing sleep, exercise, diets, depression, risk of stroke; predicting health risks; or better managing existing conditions such as diabetes.

Companies that offer only a health monitor and do not share data will be overtaken by companies that can innovate by sharing a wider range of data to build an even better health solution.

There is another limitation in the likes of Apple or Google taking over your personalised health service. Innovation is great, but quackery will abound too. The new snake oil salesperson will be an app designer. Part of the emerging challenge will be how to integrate this powerful new personalised health technology into your care pathway. The country that best integrates this innovation and emerging capability into its health services infrastructure and its health research community, and keeps your GP in the loop in understanding how to use this well, will also provide a firmer foundation for improving health.

The country that has a high trust data-sharing environment and platform that enables consent-based sharing and re-use of health data will attract investment and expertise and provide the highest value personalised health services, providing health and economic benefits. We recommend that New Zealand sets up a safe health data initiative that enables greater consent-based sharing of personal health data from health providers, and sensing technologies, and involves individuals, health professionals and the research community. This would need to:

- allow people consent-based access to link their own health sensing data together in a safe environment to answer more complex and high-value health questions
- work closely with the medical profession and wider health research community to improve safety and work out how to integrate these kinds of solutions into pathways of care
- provide the ability for innovators and researchers to pool and link new and existing patient data with patient consent, e.g. genomics researchers pooling genomic data to leverage greater value from the cost of research
- be not-for-profit and appropriately governed (governance should come from doctors, patients, researchers and health innovators, citizens, and (potentially) government, not from insurance companies or large monopolistic companies – the test for governance is on the level of alignment of the interests of those governing the system).

If we can create the high trust, high control, inclusive and high-value environment for health innovation then some of the spill-over effects will be to kick start New Zealand innovation in the burgeoning personal health market by growing and attracting talent, investment and expertise in what some pundits are saying will be a multi-billion dollar emerging market. We will be able to integrate the new personalised health technology into patients' care pathways, avoiding potential quack health apps. New Zealand is one of the few places we can imagine this happening in a manner that leverages close cooperation between the medical, technology, innovation and government sectors, based around a high trust data re-use commons.



Catalyst project: **Obesity and diabetes**

There are already many New Zealanders suffering from obesity (three out of ten adults (31%) were obese in 2012/13¹, up from 29% in 2011/12; a further 34% of adults are classed as overweight) and diabetes (15% of the adult population), and the indications are that numbers will continue to rise unless we can find ways to reverse the epidemic. This isn't only a problem for New Zealand. Many countries face increases in these conditions, with the Pacific particularly hard hit. The effects are felt strongly by individuals and families; there is a long list of complications arising from diabetes and obesity. Governments face not only the costs directly associated with managing the conditions (it is estimated that the annual direct cost of care for a diabetes patient is between \$5,000 and \$13,000), but must also manage the wider health, social and economic impacts. If we can find ways to reduce the number of people suffering from these diseases, there are huge benefits for New Zealand and New Zealanders, and indeed for countries all around the world.

We think we can use data to understand more about how we can shape our environment to reduce obesity and diabetes rates, and then to develop effective communication and interventions. This can be done safely, and in a trusted manner, by using de-identified data for what is a public good, i.e. the management of critical health problems.

We recommend government provide innovation or seed funding for a collaborative project involving business, health and government. The project would combine de-identified supermarket and food retailer consumption data with weight and health information, most likely the data collected by primary health organisations, Plunket or longitudinal studies like Growing Up in New Zealand. The data linking can be done in a privacy compliant way to derive a dataset that ties what households are purchasing to their weight and health outcomes over time. Health intervention programmes like Waikato's Project Energise could also be involved to assess the effectiveness of interventions. Findings from that study should then be used to develop information and policy for government, to enable businesses to support consumers to make healthy decisions, and give health providers new tools for working with patients.

For this to work, the project will need partnership and collaboration between businesses, parts of the health sector and the policy community. There will be some issues to work through to make this happen, but we think de-identifying data and a well-articulated problem definition will be a great start to managing concerns from businesses and patients and maintain trust. It is a way for businesses and other stakeholders to get involved in tackling a critical health issue, create value for all New Zealand by re-using privately held data in a safe way and prove the capability of what is achievable with data. Through this kind of project, we can learn by doing, potentially extending the partnership and collaboration model to tackle other big problems, such as educational achievement, cancer or alcohol consumption.

¹ New Zealand Health Survey 2012/13, Ministry of Health

Using data collected from our natural and built environment

It is possible to do really innovative, useful and valuable things with data about our infrastructure and our environment, like linking GPS-enabled medicine dispensers with air-quality measurement to improve health outcomes; or providing water and soil quality data to farmers to inform fertilisation needs, effluent management and irrigation decisions. Sharing under the right conditions the substantially large amounts of data available or becoming available could also inform and help the development of a national transport model to help better allocate the \$4 billion per annum currently invested in our road system. These kinds of initiatives are about *deploying* data to understand and solve critical problems: that is, making good use of the data to create value.

Opening up data about the built and natural environment

The NZDFF recommends that New Zealand create a long-term data openness initiative for data about the built and natural environment. The goal would be to generate an increasing number of *standards-driven, real-time* data feeds coming out of our cities, communities and nature. This data could then be re-used in all kinds of applications. The extremely wide range of applications and services that build off these data streams can be largely generated by the private sector, and we believe that this initiative will unleash an enormous amount of creativity and value for New Zealand.

This strategy would build on, learn from and extend the work done in Christchurch as part of the Sensing Cities project. The Sensing Cities project is a catalyst for this wider initiative, and we think it should be strongly supported by government.

Collaboration between central and local government, businesses, the research community and private citizens will be needed, especially to agree on the standards. Standards are vital since they will make it possible for the data to be used by lots of different applications and services. The initiative should embrace open source storage, data management and analytical tools to enable participation, innovation and collaboration. New digital infrastructure and capabilities might be needed to support sharing – learning from Sensing Cities which will create a city-wide data service platform and data unification model to integrate and provide access to a range of city datasets from multiple sources.

The strategy should also look for ways to build the asset. Datafication is likely to be part of the picture, as using automated sensors outputting machine-readable data as much as possible is likely to be an economic and scaleable approach over time. Opt-in inclusion of citizen data, perhaps through smart phones or via active self-report, could also be included.

Care should be taken to ensure that the published data streams do not inadvertently reveal personal-identifiers, and there should be an ongoing audit mechanism to review this. The data needs to be available for research and innovation, as well as commercialisation, with appropriate value attribution to contributors and protection of rights if required.

We believe that this level of data openness around our built and natural environment, and the applications that will distil it and make it useful, will extend New Zealand's international competitive advantage in quality of life, supporting our lead as one of the best places to live and work in the world.



All sorts of things could be developed

Here is a non-exhaustive list of the sort of applications and services that could be enabled by this initiative. Some of these things are already being implemented in New Zealand.

Cities/towns

- Smart parking: monitoring parking space availability in the city.
- Structural health: monitoring vibrations in and material conditions of buildings, bridges and historical monuments.
- Noise urban maps: sound monitoring in bar areas and other zones where people congregate in real time.
- Traffic congestion: monitoring vehicle and pedestrian levels to optimise driving and walking routes.
- Public transport tracking: monitoring public transport options, statuses and routes.
- Smart lighting: intelligent and weather-adaptive lighting in street lights.
- Waste management: detection of rubbish levels in containers to optimise the trash collection routes.
- Intelligent transportation systems: smart roads and intelligent highways with warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.
- Public opinion trends and alerts: data on where is nice/fun right now, opinions on different topics of local significance.

Energy and environment

- Forest fire detection: monitoring combustion gases and pre-emptive fire conditions to define alert zones.
- Air pollution: monitoring CO2 emissions of factories, pollution emitted by cars and toxic gases generated in farms.
- Landslide and avalanche prevention: monitoring soil moisture, vibrations and earth density to detect dangerous patterns in land conditions.





- Earthquake early detection: distributed control in specific places of tremors.
- Water quality: studying water suitability in rivers and the sea for fauna and eligibility for drinkable use.
- Water leakages: detecting liquid presence outside tanks and pressure variations along pipes.
- River floods: monitoring water level variations in rivers, dams and reservoirs.
- Smart grid: energy consumption monitoring and management.
- Tank level: monitoring water, oil and gas levels in storage tanks and cisterns.
- Renewable energy installations: monitoring and optimising performance of solar energy/ wind energy etc. plants.
- Water flow: measuring water pressure in water transportation systems.
- Meteorological station network: studying weather conditions in fields to forecast ice formation, rain, drought, snow or wind changes.
- Energy and water use: energy and water supply consumption monitoring to obtain advice on how to save cost and resources.
- Ultraviolet radiation: measuring UV sun rays to warn people not to be exposed in certain hours.

This list is partially adapted from Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, edited by Ovidiu Vermesan and Peter Friess which is available at www.internet-of-things-research.eu.



Catalyst project: **Increase the use of data and technology to support efficient transport in Auckland**

Transport is a critical problem for Auckland, with bottlenecks and delays limiting Auckland's productivity and putting a brake on New Zealand's economic growth. Infrastructure solutions to tackle congestion issues are likely to be increasingly expensive, and we need to look to data and technology to help provide solutions. Already a lot of transport data and technology is out there, which is being used to operate and plan the wider Auckland road, rail and public transport system, and to provide information to the users of that system. However, we think there may be scope to explore new technologies and new investment in data collection to accelerate the benefits that technology can bring in improving transport efficiency and safety.



The government has recently launched its four-year Intelligent Transport System Action Plan that will help to increase the benefits from transport technologies (see www.transport.govt.nz). This action plan looks not just at the opportunities offered by data and technology, but also at the safeguards that will be needed (such as privacy and data protection).

This catalyst project could focus specifically on accelerating the benefits from technology and data in Auckland. 'Smart' data (collected, for example, on vehicle and people movements, and wider network conditions) can have a number of applications, for example:

- real/near time applications – using information about network flow and congestion conditions to:
 - inform network managers who can then intervene (e.g. adjusting signal phases) to help remedy congestion/manage safety risks
 - provide automated versions of this – e.g. green wave technology, cooperative ITS, autonomous vehicles
 - inform travellers so they can adapt their travel choices and behaviours – time of day, route, where there are parking spaces, crash ahead, etc.
- intelligence about transport network usage over time to inform modelling and network planning
- using data on/produced by specific individuals or vehicles to allow electronic charging (for public transport use, tolling, electronic road user charges) and open the door for differential charging in the future.

More generally, and learning from the experience of Christchurch and elsewhere, smart roads would use information and communication technologies (ICT) to support intelligent and efficient transport, resulting in cost and energy savings, improved service delivery and quality of life, and a reduced environmental footprint. Smart roads would require datafication, or the creation of new data collection points, including the use of sensor technology. Datafication on roads isn't brand new – there are already interesting projects underway, such as parking sensors on Dominion Road. Such a project would need to be based on a good understanding of what data will best support efficient and effective transport in Auckland, and be supported by appropriate data services platforms for use of the data.

Sharing data to empower Māori

During our discussions with Māori, we heard many of the same themes as we heard elsewhere. However, we heard strongly that Māori want to be involved in the use of the data about them.

- Māori use and control of Māori data are important to support Māori goals. This is about Māori business. It's also about whanau, iwi, urban Māori, whakapapa and the ability to exercise tikanga, such as manaakitanga and kaitiakitanga.

- Many Māori do not perceive themselves as having benefitted much from the collection and use of data.
- They perceive a real and immediate risk of greater data availability being used for ethnic profiling to their detriment.
 - Despite widespread demands on them for data in the past, the data seems to be rarely used in ways that might benefit them.
 - There is a vicious circle in which negative statistics reinforce poor outcomes and negative perceptions, which in turn yield more negative statistics.
 - Māori are often denied access to data they have provided and data about them, or it is collected or used in ways that do not meet their needs.
 - Collection, storage and use of data often occur in ways that do not respect Māori tikanga.

Government's data about Māori should not be hidden away in various state sector silos, especially as there is enormous potential to use the data to identify and respond to opportunities and support Māori development. Examples of projects that would deliver value for Māori communities include understanding preventable mortality in the Auckland region, building on the Sensing Cities work and sustainable land-use data for development of Māori enterprise. There are undoubtedly many other examples. We recommend a much stronger effort to work with Māori to ensure data for and about Māori is used in collaborative projects that create value for Māori communities.



Catalyst project: **Data for and about Māori**

We see there is enormous potential to support manaakitanga and Māori development by enabling collaboration and co-production based on sharing government (and private) data with Māori groups.

It will be important to work with Māori to develop appropriate ways to share and use data for and about Māori that suit Māori, their needs and their vision for development. After all, Māori data is part of the Māori story, but is too often only analysed and interpreted by providers of services to Māori for their own purposes, not to answer questions put to those agencies by Māori.

We see several possible options to underpin co-production and collaborative projects:

- Support greater use of the Integrated Data Infrastructure to support Māori researchers and analysts to obtain direct access to data to answer questions Māori have about their own people and development. Plans to add better ethnicity data to the IDI would support this.





- Support existing initiatives by Māori, such as the many iwi databases that are supporting iwi decisions about resources, well-being and development, investigating the potential for collaborative projects.
- Coordinate and work via established relationships between government and Māori that include information sharing, such as the Te Hiku Accord or Whānau Ora.

A data-driven economy

Data has long underpinned our understanding of the economy, but what the data revolution offers is more data about the micro-economy, which can be used by businesses to drive profitability and productivity. Here we are talking about the rich data that lies in transactional databases.

Data about market activity can be used generally to inform firms' decision-making, such as where potential markets lie, and for benchmarking, including understanding how cost structures and profitability compare with other businesses. Accounting software companies are already using the information they collate to provide customers with useful business intelligence. The evidence suggests that firms that use data to inform decisions have a competitive edge, and also that many firms could increase their use of data.

Transactional data can also be used by economists and policymakers to get a much better understanding of economic change, and the drivers and levers for change. For example, more detailed data could enable economists to develop predictive models impossible with smaller samples, or to produce more timely or new economic measures. In our first discussion document, we highlighted the work undertaken by Shaun Hendy, using open patent data to understand New Zealand's innovation networks, and to identify policy settings that would encourage more innovation.

We suggest that New Zealand finds a way for businesses and policymakers to get value from the safe and trusted sharing of transactional data. Increased productivity delivers value back to firms, as well as the economy as a whole, so there is huge potential for widespread benefit.

Clearly, we would need to find a way to manage commercial sensitivity through a protected data-sharing infrastructure – perhaps using a model similar to that developed by Qrious, a New Zealand business focused on helping organisations gain more value from information. A number of New Zealand companies already provide analysis based on transactional data. Any work needs to be focused on the wider public good, and support and enhance business opportunities.



Catalyst project: **Micro to macro**

There is a great opportunity to understand the New Zealand economy by building a dataset that joins up data, such as telco network data, tax data, patent data and business transactional data, to support firms to operate more effectively and profitably. This data would also help us to understand New Zealand's macro-economy, through transactions and activities happening in the micro-economy. New Zealand is a country where it should be possible to get a very micro-level view of economic activity and then be able to understand in a high level of detail how these micro-level details translate into macro-economic effects. In fact, it is hard to imagine another country being able to do this as well. Yet the advantages would be that we would have a much more detailed understanding and be able to inform policy and business practice in ways that revved up the economy, merely by being better informed and making better decisions. Rather than investing more money or adding more regulation, we could figure out how to target innovation much more effectively. This would provide New Zealand with a competitive economic advantage that would be the envy of other nations.

A public/private partnership could be established to investigate the feasibility of undertaking this kind of research, involving business, private sector innovators such as Qrious and Xero, and others such as the Reserve Bank and Treasury, the Productivity Commission and research groups including Te Punaha Matatini Centre of Research Excellence.

Making the most of research data

A lot of data is produced by New Zealand academics in research activities, but hardly re-used or shared with others. Valuable datasets produced in these research activities are commonly locked away for a few years and finally deleted, once the research project has been completed. However, in countries like the UK and USA, research grants sponsored by government may include the obligation for the research grant holder to deposit their dataset in a particular format into a shared data infrastructure accessible to other academics and researchers at the end of their research project. These shared data infrastructures not only enable opportunities for more collaborative data-sharing and re-use but also can promote efficiencies across the academic and wider research sector by preventing duplication of research efforts.

The NZDFF sees this area as having great potential for driving value in the near future, with possible benefits for all of New Zealand. Similar to the UK and US experience, academic research data created on the basis of taxpayers' money should be treated as a strategic asset and made as widely available as possible for data re-use. Besides the creation of two shared data infrastructures for the sharing and re-use of research data, i.e. one open data infrastructure for non-personal data use and a more protected and secured shared data infrastructure for personal or anonymised data use, the NZDFF strongly recommends the application of data portability and interoperability standards so that data from these two academic shared data infrastructures can also be used in combination with data from other data-sharing initiatives (e.g. with data from the open data programme).



Catalyst project: **Just share it**

In the research community, we suggest we can just get on with it by mandating and enabling sharing.

All academic research data created on the basis of government funding, either through sponsored research programmes (e.g. CoRE) and projects (e.g. Marsden Fund) or through commissioned research should be made available for data re-use after completion of the research activity and as part of the research contractual arrangements.

Research data should be made available in a re-useable format which can be used in combination with datasets from other data-sharing initiatives, such as the open data programme.

Two shared data infrastructures for the sharing and re-use of research data should be created and maintained. These might be held by an organisation such as the Royal Society of New Zealand, or could build on similar existing initiatives, such as the New Zealand Social Science Data Archive:

- one open data infrastructure for low-risk non-personal data use, which could be made accessible for all New Zealanders under the NZGOAL licensing framework, and
- a more protected and secured shared data infrastructure for personal or anonymised data use, which could be made accessible for people and institutions with a solid research background or expertise.

Section four: Foundations for value creation



Value:

New Zealand should use data to drive economic and social value and create a competitive advantage.

To achieve this we should:

- encourage collaboration and sharing
- support creativity and innovation
- promote our unique data-use ecosystem in New Zealand and overseas.

While value is about using data, there are other things that we can do to move us towards an environment where we have the necessary resources, conditions and mechanisms to support sharing and use of data. To set the foundations for value creation, we recommend:

- Appoint a champion to drive innovation and data-sharing
- Incentivise an innovation culture
- Grow skilled data scientists and innovators
- Promote New Zealand's data-use ecosystem overseas.

Appoint a champion to drive innovation and data-sharing

Appointing someone to act as an advocate, visionary, catalyst and driver for openness, sharing and innovation would accelerate our efforts as a nation, supporting us to move faster with data use and sharing, and linking between government, the private sector, Māori, NGOs and academia.

The champion's job would be to identify opportunities and get work underway, thus making sure our data is used as a strategic asset. Their remit would include brokering the use of open data and connecting private and public data to create benefits for all partners.

This proposal is similar to Rod Drury's suggestion that New Zealand needs a chief technology officer, but is more strongly focused on data and data-driven value. It could be modelled on the role Sir Tim Berners-Lee plays in the UK, as an advocate for open data and open data technologies. The champion will need some of the qualities of a private sector CTO – being a technical visionary, an innovator and a connector, working with partners and customers. The champion would likely come from the private sector, work closely with a senior minister and sit on the proposed data council.



A chief technology officer for the country could identify big issues and own a national strategy, writes Xero chief executive Rod Drury



The traditional engagement model between the public and private sectors only really allows technology businesses to work reactively on government initiatives. We can only deliver incremental improvements, and often solutions implemented are down the laggard end of the innovation curve.

Yet the technology industry in New Zealand is full of passionate, globally experienced people. Our industry has resources and is comfortable with investment and risk.

The opportunity to harness that experience and investment from the technology industry is huge. To design our technology environment for the good of New Zealand, in a time of unprecedented technological change, is one of the true game-changing opportunities available to our small but perfectly formed country.

But how does the Government, without deep technology expertise, engage in sorting out the vested interests and overwhelming information flow, in order to come up with a step-change plan to transform our place in the world?

I believe the answer is to appoint a chief technology officer of New Zealand. A respected, senior, international, technology leader at a point in their career where they want to give back. That person can identify and determine the big issues of the day, own a New Zealand technology strategy and be the interface between the private sector and the Government. They would be able to coordinate and encourage the investments that global technology companies will make in New Zealand.

Extracted from the [NZ Herald](#)

An open data agenda for all New Zealand

We recommend that the open data agenda be extended beyond government, and be pursued much more aggressively under the leadership of an influential champion.

The champion will have an important role to play in making sure that the opening up of government data accelerates and becomes integrated into the way government works and interacts with citizens. Four years ago the Government adopted the Declaration on Open and Transparent Government. As in so many other areas, public sector progress in opening up data is useful, but very incremental. We've already suggested legislation is needed to push government along more quickly, and need to support this with other tactics. Government should be more proactive in managing 'its' data on behalf of all New Zealanders.

Also needed is support for those outside government to open up data. The private sector holds data of significant value to society – data that can both support innovation and decision-making, as well as transparency and effectiveness. Collaborative projects can provide direct benefits to those involved. Data philanthropy, or opening up socially useful data, can be a relatively low-cost way for businesses, NGOs and research organisations to help the country. We have suggested earlier that publically funded research data should be made available for re-use. Similarly, government service providers, including education and health providers, should be required to handover publicly funded operational data.

The open data agenda needs to be strongly focused on making use of data, so the champion should broker projects using open data. We think New Zealand's open data programme would deliver more value if it was underpinned by greater collaboration across government, business, the research community and NGOs. We could learn from the UK, where open data has been tackled by a public/private partnership the Open Data Institute, led by Sir Tim Berners-Lee and Sir Nigel Shadbolt.

To support the opening up of non-government data, we need adequate licensing arrangements. This might require promoting Creative Commons or extending the NZGOAL framework so that it can be used by stakeholders outside government. Issues of intellectual property and commercial sensitivity need to be considered.



Government should be seeking to maximise value derived from data – a view from the Privacy Commissioner



The wider use and re-use of data by business and government is inevitable. Many companies have already demonstrated the commercial benefits that can be obtained from the examination of information they can collect and hold about customers and potential customers.

For the public sector, the potential to design better policies and target resources more efficiently means that the re-use of data is in some sense a responsibility as much as an opportunity – taxpayers have paid for the collection of their own information, and the government should be seeking to maximise the return of value to New Zealanders from it.

Enable more trusted and safe sharing of personal data

A culture shift towards open data is not enough, as we also need to enable the protected sharing of personal or sensitive data. It is helpful to think about degrees of openness. This recognises that public discussion is often based on generalised terms such as 'personal data', but this is not well defined, and often includes data which is much less sensitive than other forms and may be both interesting and useful for research and other forms of data use. Given the sensitivity of some personal or commercial information, we do need to ensure it is shared in safe ways, and we recommend that the champion explores what data needs protection. The champion should work with others on the proposed data council to develop frameworks for degrees of openness, building on the proposed changes to the Privacy Act that clarify the definition of personal information.

Other non-legislative barriers to sharing need to be identified by the champion and, where possible, worked around. We have suggested above that government should require the handover of publicly funded data, such as the data collected by government service providers. Appropriate data management, rights, openness and sharing provisions should be compulsory in contracts for publicly funded service delivery, as well as research.

Finding win-win projects that deliver value to all parties will help to support more sharing of data between the government, businesses, NGOs and others. So will strong brokering and support for partnership and collaboration from the champion (and others). The champion could support government to actively explore with non-government stakeholders the practical possibilities for mutual data-sharing, such as finding ways to enable access and use of telco data, or ways to make use of suitably anonymised data from social service agencies, such as The Salvation Army, to support the development of effective social interventions.

Mechanisms to support data-sharing and use

Standards, tools and infrastructure need to be in place to support the opening up, sharing, linking and re-use of data, and the champion would also have a role to play in developing and promoting the adoption of these. For example, data sources that are available need to be catalogued and searchable to enable people to find and use the data. Standards and infrastructure required for interoperability and data portability should be useable across New Zealand society, building on what has already been developed, such as data.govt.nz. New government systems can build in openness and protected sharing by design. It is important to take an agile, user-needs approach to this, to ensure that standards, tools and infrastructure support the actual re-use of data, and that data exchange, access and sharing are low-cost transactions.

Recommendation 4 – A champion to drive innovation and data-sharing

4.1. In order to accelerate our efforts to use and share data, we recommend the appointment of a champion to drive innovation and data-sharing. The champion would:

- support the sharing, release and use of government and non-government data
- lead an Open Data Agenda for all New Zealand

An Open Data Agenda for all New Zealand will include data and people outside government, looking to the UK's Open Data Institute as a possible model. The Open Data Agenda should be resourced to:

- encourage, broker and support the use of open data to drive value – working with government, entrepreneurs, communities, enterprise and citizens
 - explore which data types need to be protected, and build a framework for degrees of openness, taking into account intellectual property and commercial sensitivity
 - lead development and adoption of tools, standards and processes for open data to ensure interoperability and accessibility – this includes exploring mechanisms to enable the release and exchange of the private sector's open data
 - update, if required, current licensing arrangements for data-sharing, such as NZGOAL
- broker and support protected data-sharing via a programme of collaborative projects based on sharing of data to deliver value
 - develop and promote the standards and infrastructure needed to support openness and sharing, building on what is already in place.

4.2. We also recommend exploring whether the provisions that govern the availability of data collected by government agencies could be extended to include government service providers such as contractors and schools.

Incentivise an innovation culture

The government should use its critical mass as a 'launching customer' to discourage monopolies, kindle new enterprise and support an open innovative market. Government can explicitly seed the market in order to stimulate innovative data-based activity in the following ways.

Smart government procurement: Innovation can be supported by avoiding automatic insourcing of data analytics and visualisation, and considering outsourcing in light of building

the data industry. Government procurement should also maximise value by supporting providers who work collaboratively across multiple stakeholders (e.g. private, public, Māori) and should ensure that procedures and specifications are not structured in ways that inadvertently or otherwise favour established large players at the expense of emergent New Zealand-based businesses in data-related technology, R&D and services.

Open standards, tools and platforms: Adopting open standards, tools and platforms will support competition and avoid vendor capture. For example, 'R' is an open source data and statistical system which could be used more widely to support a range of players providing data analytical services.

Prizes for innovation: Prize-based funding can stimulate solutions to a specific problem. For example, companies of all sizes have used [Kaggle](#) as a vehicle to offer prizes for the best solution to complex data problems. We think there is merit in establishing a 'prize-based' data innovation fund to solve intractable problems and design innovative solutions.

Create safe sandpits: Innovation feeds off the exchange of ideas, where people with problems that need solving team up with smart people with new insights. Using universities more proactively as neutral places to bring diverse thinkers together to play and experiment will help us to develop projects that deliver value to many. Universities should be involved in the proposed catalyst projects, and the champion for data-driven innovation should make sure researchers and academics are involved in conversations about collaborative projects.

Greater risk tolerance: We know the public sector can be held back from innovative approaches by a risk averse culture. The sector should not be trying to achieve zero failure. Rather we need to be more explicit about the risks and their management, learn and adapt quickly when things go wrong, and share the lessons broadly. Elected political and appointed public sector leaders have a critical role to play in how risk is managed and public sector failure is communicated. A greater tolerance for risk needs to be converted from rhetoric to reality, and should be built into expectations for data-driven projects.

These approaches should be used for any new catalyst projects, such as those we have suggested.

Recommendation 5 – Incentivise an innovation culture

In order to incentivise and support an innovation culture we recommend:

- 5.1. using the critical mass of government as a customer to discourage monopolies, kindle new enterprise and encourage innovation through outsourcing and supporting collaboration
- 5.2. greater use of standards and open source tools to encourage competition and innovation
- 5.3. government establish a 'prize-based' data innovation fund to solve specific problems and design innovative solutions





- 5.4. using universities more proactively as neutral places to bring diverse thinkers together to play and experiment
- 5.5. government showing greater tolerance for risk by building a greater risk tolerance into the expectations for data-driven projects, including those brokered by the champion, accompanied by explicit strategies to manage risk, including stop/go provisions.

Grow skilled data scientists and innovators

Innovation is an art as much as a science. Some of the critical data science skills have nothing to do with IT or statistics, and people come to the industry from a wide diversity of backgrounds. There is no single formula and this is a good thing. The following components are key:

- Future data scientists need to be smart thinkers first, analytics geeks second. A curiosity to answer a question in one discipline can be extended into other areas.
- It will be important to focus on career shifts for more mature, experienced thinkers with promising talent, rather than rely solely on bright young specialist graduates.
- Data-driven innovation and research are best carried out by multi-disciplinary teams and the capability focus should be as much on how teams are brought together as on the individual components.
- It's not just about analysts. About 80% of the work is in wrangling the data to make and keep it useful – i.e. data management, standards and infrastructure are critical.

There is some debate about whether any intervention is needed to develop greater workforce capability, or whether it is needed in only specific areas (e.g. engineering, Māori research) rather than across the board. Stakeholders have told us that, although there are plenty of smart, data-savvy graduates, there is a lack of coordination across the courses on offer, and that courses may be too narrowly focused, when it is multi-disciplinary approaches that are most important. We suggest seed or prize funding to enable this. Also, we have been told that government should make provision for appropriate skills to be imported when needed.

We think one gap is in education for decision-makers and their advisors, to help increase the demand and uptake for data-driven innovation and research. When business and community leaders, senior officials, and ministers see the opportunities in data, they begin to expect data-enabled services, to require broad evidence-based policy thinking and make space for data-driven innovation.

Much of the learning comes through doing, and getting projects underway is a great way to grow talent and skills and attract international expertise.

Recommendation 6 – Grow skilled data scientists and innovators

In order to grow the technical capability New Zealand needs to drive value, we recommend:

- 6.1. support for post-graduate or mid-career courses to allow data-smart diverse thinkers to refine their skill set in modern data analytics and data management
- 6.2. seed or prize funding to encourage sharing of resources across universities and to encourage collaborative multi-disciplinary research and teaching in data science
- 6.3. data analytics, data science and data management be included in the relevant immigration skills criteria
- 6.4. promoting data analysis and management as a career, by, for example, information dissemination to secondary schools and universities, scholarships and prizes
- 6.5. targeting managers and influencers, though executive courses for leaders, to raise awareness of the scope of data science to bring insights to the problems they are grappling with.

Promote New Zealand's data-use ecosystem overseas

The data revolution is global and many players are multinational companies. There is a limit to what we can domestically control and it will often be neither feasible nor desirable to stop data flowing across national borders.

The NZDFF thinks government will need to put a real focus on engaging internationally, both to protect our citizens in accordance with the New Zealand data-use ecosystem rules and responsibilities and to negotiate opportunities to realise value for New Zealand. In our view, it is likely that there will be considerable growth over time in international standards, regulation and agreements covering data use and transfer, as well as attempts by some at extra-territorial legislation. At the same time, many countries are struggling with low trust, inclusion and control (e.g. privacy issues). We recommend that New Zealand takes a proactive leadership role in this arena to promote its unique data-use ecosystem based on the four principles, and thus ensure our best interests as a nation are taken into account, rather than passively accepting what others decide.

The international market also provides opportunities for New Zealand to explore. We are already a high export nation and, in some ways at least, have high international connectedness for a small population – with an open economy, an internationally mobile population and a large diaspora. We can build on this to look at opportunities both to attract data-driven business and research to our shores, and also to look for ways to trade in innovative data solutions, particularly privacy-enhancing solutions, developed by New Zealanders. For example, if New Zealand develops a rating system (companies could have a star system for their informed consent status, for example), we could export that to rate US and other consent agreements, leveraging New Zealand's international reputation for trust, transparency, privacy and integrity.

More immediately, New Zealand Trade and Enterprise could be tasked with urgently developing proposals for actively marketing New Zealand as a home for trusted data management, including the possibility of establishing foreign-based secure conduits for sharing and using data from the New Zealand data-use ecosystem.



Data embassies

There may be all sorts of novel and innovative ways New Zealand can craft opportunities in the data industry. What about creating offshore ‘data embassies’ – places that are located close to markets, avoiding data traffic costs and congestion, but are legally New Zealand territory, attracting business and investment through our reputation as a trusted data broker with world-best transparency and robustness, and EU-adequate privacy regulation? While these sorts of arrangements may not be possible under current international laws and conventions, this idea illustrates the scope for exploring the international landscape to reap opportunities as well as protect our citizens.

Recommendation 7 – Promote New Zealand’s data-use ecosystem overseas

To support the interests of New Zealanders in the global data environment we recommend:

- 7.1. New Zealand takes an active role in promoting our unique data-use ecosystem overseas and continues to actively participate in international discussions and agreements around data-use rules and regulations
- 7.2. New Zealand Trade and Enterprise and other relevant organisations explore opportunities to capitalise on and exploit our principles-based data-use ecosystem, to create value.

Section five:

Supporting inclusion



Inclusion:

All parts of New Zealand society should have the opportunity to benefit from data use.

- We should support all New Zealanders, communities and businesses to adapt and thrive in the new data environment.

We make some specific recommendations to support public awareness and Māori ability to participate and use data in this section, but inclusion is wider than this. Our recommendations in other sections also support inclusion. For example, we have recommended that the proposed data council has representation from groups such as business, NGOs and Māori. Recommendations in the value section to support innovation and participation will support communities and small to medium sized enterprises to be co-producers of insights, build data assets, and contribute products and expertise, reaping benefits from data use. Under the control section, we will also recommend that there be more effort to educate individuals about how to control data about them.

Our recommendations to achieve inclusion are to:

- raise public awareness and capability
- support Māori to thrive.

Raise public awareness and capability

Although there are groups of well-informed and highly engaged individuals, during stakeholder engagement the NZDFF was struck by the low level of general awareness of what is currently occurring and the opportunities potentially available.

If the benefits of the data revolution are to be truly inclusive, we need to ensure not only that data is widely available but that New Zealanders have the awareness and 'data literacy' to participate in the new data environment. There could be value spin-offs from this; as we encourage demand, supply and use of data will follow. There are a number of elements to this:

- *The ability to find and use the data that is out there* – this includes affordable broadband access, simple user-friendly tools and search engines, and data which is formatted and standardised in a way that allows for easy manipulation and application. Existing work to expand broadband access in New Zealand, as well as our recommendations around open data, will support this element.
- *The ability to understand the data when they find it* – open data is of limited value to New Zealanders if they need a degree in statistics to be able to interpret it. Data is increasingly available but not accessible, that is, it is not always packaged to make it easy for people to understand. To be useful to the general public, data needs to be ‘translated’. Data visualisation (including ‘self-service’ data visualisation tools), data analytics brokers and data journalism are keys to unlocking the sense of data. There is some activity in the market, but it is an area in which New Zealand could be a lot more proactive.
- *Making sure people understand the data-use ecosystem*, and ways in which they can safely share information in return for economic, social and personal benefits. We think there needs to be more activity to educate New Zealanders about safe sharing.
- *Awareness of the potential for data to transform our lives* – data could be as powerful as money for empowering communities and enabling community-led development decisions. It might help to have ‘brokers’ who can help communities unlock the potential – by connecting the dots, suggesting what would be helpful and communicating the potential. These brokers could support the proposed champion for data-driven innovation.
- *Active support for those who may fail to thrive* – lack of trust or lack of resources can be barriers to inclusion. Senior citizens, beneficiaries and youth are some who may struggle to thrive in the new environment. Many New Zealanders and recently settled immigrants may come from backgrounds that have a very different view of trusting government or institutions, but we know that ethnic communities value access to data, and there are opportunities to share more data with them, building on the work of the Office of Ethnic Affairs. We encourage brokers and advocacy groups to consider the impact of the new data environment and find ways to share data with affected groups.

Recommendation 8 – Raise public awareness and capability

In order to raise public awareness and capability and ensure data is used inclusively, we recommend:

- 8.1. continuing the conversation – broadening the discussion that the NZDFF has started, raising the debate across the country and building a consensus on the way forward for New Zealand (this conversation could be led by the proposed data council and/or the champion for data-driven innovation)
- 8.2. promoting data visualisation – modelling excellence in data communication when presenting government information and, in doing so, demonstrating the possibilities, stimulating demand and enhancing transparency for New Zealanders – businesses should see data visualisation as a market opportunity, in New Zealand and beyond
- 8.3. supporting ‘data brokers’ – government support for organisations that advise communities and connect them to data and data users.

We all win when everyone can make evidence-based decisions

(Lillian Grace, [CEO of Wiki New Zealand](#))

There are hundreds of valuable and relevant datasets freely available to us right now but most people don't use them. I used to think this meant people didn't care about being informed, but I've come to see that I was wrong. Almost everyone wants to be informed about issues that matter – to them, to their families, to their communities, to their businesses and to their country. But there's a big difference between availability and accessibility of information.

Data is spread across hundreds of sites and is held within databases and spreadsheets that require both time and skill to engage with. To use data in decision-making you have to know what specific question to ask, identify a source that has collected the data, and manipulate complex tools to extract and then visualise the information within the dataset.

Wiki New Zealand is working to make data truly accessible to all. We are doing that by collaborating with people throughout New Zealand's data ecosystem to bring the data together in one place and to make it visually explorable. Making the data visual lowers the barriers and transaction costs of engagement, and speeds up the process of generating insight.

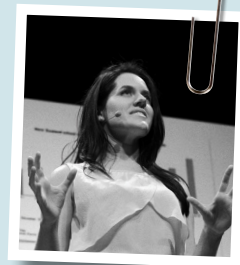
Big data will provide us with insights and innovation we can't yet imagine. Big organisations are already using it in powerful ways. But we must not forget there are other important datasets, and other important audiences. There are individuals and small organisations that are grappling with critical decisions but don't know how or where to learn more so that those decisions can be evidence based.

- It's the tourism operator in Greymouth wanting to know how many German speakers visit each year, and how much they spend.
- It's the community organisation wanting to understand how many of their local youth are unemployed, and what job roles are most in demand.
- It's the student who wants 30 years of measurement, not just real-time snapshots, to put the current debate about pollution in her local river into context.

The data these people need often exists but is very hard to find, and difficult to interpret. Wiki New Zealand is making it accessible to them.

New Zealand is perfectly placed to be the first – and maybe even the only – country that can enable all of its citizens and businesses to make evidence-based decisions across all key areas. We are sophisticated enough to collect and disseminate critical data, but not so large as to make a national-scale initiative implausible. So while I am motivated to enable every individual to make evidence-based decisions to drive great outcomes, I am also inspired by the idea of making Wiki New Zealand a competitive advantage for the country I love.

wiki NEW ZEALAND



Supporting Māori in the new data environment

For New Zealand as a whole to flourish, Māori have to flourish as well, consistent with Māori aspirations. Making sure that Māori thrive means ensuring that value is delivered for Māori. By supporting the development of general awareness of the possibilities of data, nurturing the specific skills needed to use data, fostering collaboration and sharing expertise, as well as increasing access to data, we can cooperate to support mutual development.

Building and maintaining trust with Māori are needed. High trust, safe data-sharing will prevent situations where data is used to target Māori, either as individuals or communities, without Māori involvement or appropriate controls and transparency. Recommendations under the trust and control principles support this, as does the recommendation for oversight by an independent data council. In many cases, other minority communities will have similar concerns and needs.

Recommendation 9 – Support Māori in the new data environment

To support mutual development, we recommend that government:

- 9.1. continue and broaden a constructive discussion with a wide range of Māori stakeholders on Māori opportunities, requirements and strategies in the new data environment
- 9.2. consider the appropriate Māori role in governance and advisory bodies in the data arena, including ensuring Māori representation on the proposed data council
- 9.3. build programmes to develop capability among Māori to engage with and use data, working in partnership with stakeholders such as Te Puni Kōkiri, Te Wānanga and Statistics New Zealand, building on existing programmes as appropriate.

Section six: Building and maintaining trust



Trust:

Data management in New Zealand should build trust and confidence in our institutions.

- Transparency and openness should form key foundations on which we build trust and enhance understanding about what data is held, and how data is managed and used.
- Privacy and security are fundamental values that should be built into data frameworks and the full data life cycle.
- Data collectors, custodians and users should be accountable for responsible stewardship and should exercise a duty of care.

Trust is the oil that can make the data-use machinery really work. Given the increasingly ubiquitous and rapidly changing nature of data use in contemporary society, we see the proposed data council as a key way to build and maintain trust through a credible body that can provide guidance or make decisions on behalf of New Zealanders – among other things, in many ways a high level peer review organisation. A coherent set of legislation is also key if people are to have confidence that there are clear rules around data access and use, consistently applied.

In addition to the recommendations we made earlier around legislation, a data council and improving trust in specific communities, further measures to enhance trust include:

- best practice which incorporates privacy and security ‘by design’
- consideration of context in regulating data use and re-use
- tools to enhance transparency.

Our high trust and integrity are assets – Transparency International

Integrity and good governance are important in that they underpin government legitimacy and the freedoms, civil liberties and ability to participate in a democratic state. When people trust their institutions, they are more likely to pay their taxes and to comply with laws and regulations.

New Zealand's public sector is consistently ranked among the least corrupt in the world. This reputation is not a coincidence. New Zealand has a long tradition of being first with legislation aimed at promoting human rights. Milestones include the Public Service Act 1912 and the Official Information Act 1982.

New Zealand's high trust society is both a national treasure and an economic asset. Forbes magazine ranks New Zealand first on its 2012 list of the Best Countries for Business thanks to a transparent and stable business climate.

Trading partners recognise cost savings for dealing with New Zealand through less need for due diligence, lower contracting costs and a culture intolerant of corrupt middle men with whom to transact business.



• www.transparency.org.nz



Suzanne Snively,
Co-Director of Transparency
International



Privacy and security 'by design'

The security of the information systems supporting our critical national infrastructure is vital if we are to realise the benefits that can be derived from the data revolution. There are trends on the security side which point to an increasingly hostile environment. This malicious activity can undermine both privacy and the benefits that we can achieve through the use of data. The positive side of the ledger is that New Zealand not only has a thriving data sector but also a thriving information security sector. The NZDFF strongly supports the view that big data and big privacy can go hand-in-hand, in line with international experts like Ann Cavoukian. However, this requires that the privacy of individuals is proactively and systematically respected throughout the full data life cycle of data collection, storage, processing, use and re-use. By applying privacy-by-design solutions, and therefore systematically embedding privacy in the design specifications of the full data life cycle of any data use initiative, the potential harm of (re-)identifying individuals is strongly reduced while enabling increased sharing and use of good quality data.



Big privacy in a big data world

According to Ann Cavoukian, an international privacy expert, the idea that privacy must be sacrificed in favour of health research and analysis is a false dichotomy.

“We can harness big data to gain valuable insights into the health system and health of populations, to improve clinical outcomes, and achieve cost efficiencies **without** intruding on privacy. One of the most important ways to address the privacy issues associated with big data is to routinely de-identify health information prior to its use or disclosure for research purposes. Strong tools have been developed to de-identify health information in a manner that preserves the quality of the information while strongly protecting privacy. Health information may be linked across multiple databases using encrypted identifiers, without revealing any identifying information.”



• www.privacybydesign.ca

In order to support organisations in their analysis of the possible privacy impacts of a data-use initiative on individuals, and how these impacts can be minimised and best managed, the NZDFF also recommends conducting a Privacy Impact Assessment as part of the preparation of a data-use initiative.

Strong privacy protection can only be guaranteed if there is adequate security protection at all stages of a data-use initiative. Security-by-design solutions should be applied in all data-use initiatives.

Recommendation 10 – Privacy and security ‘by design’

In order to protect privacy and security, we recommend:

- 10.1. the application of privacy-by-design and security-by-design tools and solutions at all stages of a data-use initiative
- 10.2. the use of a Privacy Impact Assessment as part of the preparation of a data-use initiative.

Consideration of context in regulating data use and re-use

In our earlier discussion, we used some scenarios to illustrate the varying implications that different contexts might have for applying our principles for data use. While any models are by definition a simplification of reality, we do think they provide a useful way to consider what 'rules of the game' should be applied by data users. In other words, what are the best ways to manage data-sharing and use and implement the four principles in different contexts? We have already suggested some rules to apply under the four different scenarios we presented earlier.

The underlying aim should be to maintain and strengthen trust, and therefore to unlock the value that the data use can provide. The same analysis suggests that, where there is a degree of choice about the context in which to work, some contexts are likely to be more consistent than others in promoting trust. For example:

- where it is possible to achieve the same result without needing to identify individuals, it is more likely to build trust if you don't
- where it is possible to seek informed consent from individuals (or other subjects), then it is generally preferable in terms of building trust to do so, especially if individuals are potentially identifiable
- nevertheless, there will be times when the nature of the public good data use requires both individual identification and decision-making at the collective level. In those cases, trust can be strengthened in other ways, for example by being transparent about the general purposes of the data collection (what it will and what it will not be used for, the security measures applying) and the access boundaries around the data (who will, and who will not, be entitled to see it).

A further consideration is that the data use context may change or be deliberately changed for undesirable purposes. We have already suggested legislative change that prohibits the re-identification of anonymised data. This will help protect against unsanctioned uses of data. We also think there is a need to strengthen compliance with the 'rules of the game' through social pressure to put things right, consequences mitigated and redress potentially considered.

Recommendation 11 – Regulate data use and re-use

We recommend that in considering the rules for any data use, trust be promoted by:

- 11.1. applying the 'rules' that are consistent with the level of collective, or individual decision rights and accountability for each data use or re-use
- 11.2. not identifying individuals when the purpose of use does not require it
- 11.3. using informed consent, unless it is not possible or reasonably practical to do so
- 11.4. being transparent about the purposes and maximising the security and access arrangements to be consistent with the purpose of data use.

Other tools to enhance transparency

Transparency is a key contributor to, and foundation of, trust. Trust will be supported if individuals can see what data is held about them and what it is being used for. They will be more likely to trust data users that they know have consistently demonstrated trust in the past.

In brief, therefore, tools that facilitate the ability for people to see what data is held on them, identify who holds that data and who is using it for what purposes, and tools that help people to determine how trustworthy a particular organisation requesting data from them is, are all likely to strengthen the foundations for trust.

There are already a number of products being developed that give enhanced transparency of this sort – Clear Button being a case in point (see our paper two). These tools typically rely on voluntary enrolment by the organisations holding the data, and would be candidates for encouraging best practice behaviour, perhaps through the proposed data council, and/or for incorporation into professional codes of ethics. Government agencies could consider whether they should be part of such arrangements, either publicly or privately provided.

Many professional organisations and industry bodies provide certification as a means of identifying providers of good reputation that can be relied upon to meet prescribed standards – the Registered Master Builders Federation is one such example. Another is the star system for rating the quality of hotels. We think consideration could be given to establishing similar arrangements to assist people in deciding who they can trust with their personal data. This could possibly be undertaken by the proposed data council.

Recommendation 12 – Tools for transparency

In order to enable transparency, we recommend:

- 12.1. developing and using good practice arrangements that enable people to see what data is held on them and being used by whom and for what purpose – government agencies could consider providing a lead in this respect
- 12.2. encouraging the development of ‘trustworthiness’ rankings or certifications.

Section seven: Enabling control



Control:

Individuals should have greater control over the use of data about them.

- Individuals should be better able to determine the level of privacy they desire based on improved insight into how their personal data is processed and used.
- Informed consent should be simple and easy to understand.
- Individuals should have enhanced rights to correction and the right to opt out.

Control of one form or another is one of several building blocks which can build trust and help to underpin all value-add from data innovation – others being inclusion, transparency, genuine choice, knowing the data uses, having clear rules and accountability, and ensuring well designed management of data (privacy and security by design). The two concepts of control and trust are therefore closely interconnected.

We heard many people say they were concerned that organisations were able to use data about them without consent. We think individuals should be empowered to exercise greater control over the availability of information about them, unless there are compelling and overriding public good considerations such as the safety of vulnerable individuals. Genuine control also requires real choice – an ability by an individual to determine their preferred level of privacy based on improved understanding of what is going on.

We think greater individual control in a manner which would enhance trust and unlock value opportunities can be obtained through:

- giving individuals greater ability to determine their preferred levels and pattern of privacy
- creating the conditions for genuine informed consent, and
- providing more strongly for correction and opting out.

Determining levels of privacy

Personal identity management (PIM) services provide individuals with finely grained control of their personal identity information by allowing them to see what information is held about them, authorise who sees and uses the information, and request correction. This

is happening across the public and private sector with products such as reputation.com, My Info Safe, RealMe, My Dashboard and the eHealth portal. These user-centric, privacy-enhancing solutions provide real value-add opportunities for New Zealand businesses in our view. Qrious is providing a similar platform for businesses to control the sharing of their data in a secure and trusted way.

We would like to see more New Zealand organisations allowing their customers to use PIM services. So far, there appears to be limited uptake by both organisations and individuals. It would be interesting to know more about what is driving this, whether apathy, lack of knowledge of services, lack of ease of use, simply that it is a new solution, or that for some other reason people have actively chosen not to use them. Government can take the lead here, by continuing to adopt PIMs in their online relationships.



RealMe – verifies the real you



RealMe is a personal information management system, developed in New Zealand by the Department of Internal Affairs in partnership with New Zealand Post. Using RealMe, people can access services online, providing a secure, consent-based way to access and share minimal personal information, including in anonymised ways.

Like other PIMs, it is a high trust, high control way of managing personal information, giving the individual control over what information they share, how they share it and when they share it. RealMe is not a database full of comprehensive information about you. It holds only the information needed to manage the account, accessing information held in official databases (such as births, deaths or immigration) only when permitted by an individual. Security-by-design and privacy-by-design features are built in to the system, with PIA made publicly available.

RealMe currently offers two services:

- **Login** allows you to access lots of services with just one username and password to remember.
- **Verification** means you can officially prove who you are without having to front up in person with a load of documentation.

At present about 40,000 new RealMe logins are created each month. Businesses and government are starting to use the service – TSB Bank uses RealMe to allow customers to verify their identity from a mobile phone and New Zealanders can enrol to vote online, using a RealMe account. By 2017, the aim is for 70% of New Zealanders' transactions with government to be completed digitally.

Recommendation 13 – Equip individuals to determine levels of privacy

To achieve enhanced individual control we recommend:

- 13.1. educating the public on the management of data about them
- 13.2. ongoing adoption of digital personal information management systems in online relationships between government and individuals (and, increasingly, businesses and individuals).



Raising awareness

“Internet and mobile technology exposes children to a range of risks that previous generations have never had to deal with. In many ways, children understand the how and what of being a digital native but need grown-ups to guide them on why they need to take care. Otherwise, they’ll end up at a different school – the one of hard knocks – where losing one’s privacy online can mean, in some cases, losing part of it forever.” [John Edwards, New Zealand Privacy Commissioner](#)

Netsafe has taken the lead in promoting confident, safe and responsible use of online technologies. Netsafe promotes cyber safety and champions digital citizenship by educating and supporting individuals, organisations and industry on a range of issues. It is a not-for-profit organisation supported by sponsorship.

[OWLS](#) is just one of the resources available from Netsafe. It is a resource for teaching internet privacy issues to primary and intermediate aged children. While OWLS is focused on internet safety, it contains lots of information and advice helpful to people thinking about sharing their data.

Netsafe, the Office of the Privacy Commissioner and other groups provide information to help people manage privacy, via programmes like OWLS, but we think that a gap remains for practical information for consumers about the implications of sharing their information, and ways they can protect their privacy.



● www.netsafe.org.nz

Genuine informed consent

The requirement for informed consent has been part of New Zealand consumer law for some time. However, many consumer terms and conditions are excessively legalistic, and research suggests only a fraction read the terms and conditions before agreeing. Often it suits companies to provide you with 'consent' and 'control' in a formal sense, but in fact you may have limited ability to opt out or limited understanding of what is actually being done, if indeed you have a real element of choice at all.

This also happens in government. While we think that there can be real value in data being used for multiple purposes – some of which may not be anticipated when the data is collected – in some cases the cost of opting out may be made so high, there is little realistic ability to do so. For example, if beneficiaries face losing their benefit if they do not consent, then how much real choice do they have? In some cases it may be appropriate that there is no choice, in which case it is good practice to make this clear. In other cases, if there is as much transparency and assurance as possible, and if an ability to exercise some genuine control over the decision really exists, it may make a lot of sense for a beneficiary to give consent.



Extract from [LinkedIn and SlideShare User Agreement](#)

License and warranty for your submissions to LinkedIn

"You still own what you own, but you grant us a license to the content and/or information you provide us.

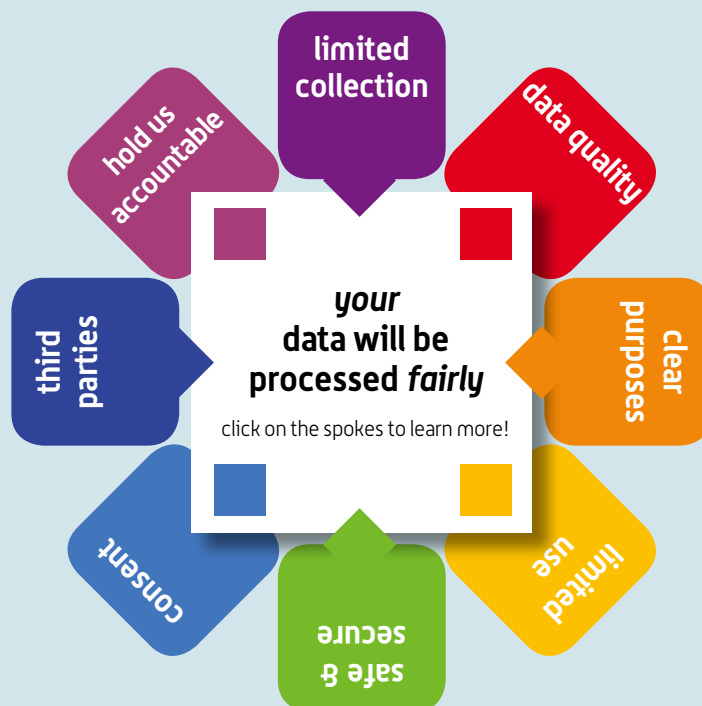
As between you and LinkedIn, you own the content and information you provide LinkedIn under this Agreement, and may request its deletion at any time, **unless you have shared information or content with others** and they have not deleted it, or it was copied or stored by other users. Additionally, **you grant LinkedIn a nonexclusive, irrevocable, worldwide, perpetual, unlimited, assignable, sublicenseable, fully paid up and royalty-free right to us to copy, prepare derivative works of, improve, distribute, publish, remove, retain, add, process, analyze, use and commercialize**, in any way now known or in the future discovered, any information you provide, directly or indirectly to LinkedIn, including, but not limited to, any user generated content, ideas, concepts, techniques and/or data to the services you submit to LinkedIn, **without any further consent, notice and/or compensation to you** or to any third parties."

Genuine consent requires that people are able to understand and make a meaningful choice. Automatically ticking a box is not informed consent. We think part of the role of the data council should be to understand what sort of data-use information different groups of New Zealanders really need to be truly informed, and in what form, and lead development of best practice tools to support this. This could include standard terms and conditions.

Obviously this is an international issue, with many, if not most, data services consumed by New Zealanders provided by offshore companies. This is an area where New Zealand can show some leadership and put a stake in the ground. Although our legislation does not bind the likes of Facebook and Google, it does send a strong message about what New Zealand consumers expect. New Zealanders are at liberty to rank and score all people who are doing data re-use business in New Zealand on the control and permissiveness of their consent forms. We are likely to have EU backing for reform in this area, and over time we might expect the international community to align over the need to regulate more strongly. Our message should be: "These are the New Zealand rules – how are you going to provide for New Zealand consumers?" Smart companies will see the market opportunities to meet the growing demand for greater transparency and consumer control.



One way to rate companies' data management approaches



This wheel was developed by Dutch researchers, based on a survey of what European citizens wanted to know about companies' data processing practices. It is based on the OECD Fair Information Principles. Users can click on the spokes of the wheel to get more information about each element.

From Bibi van den Berg and Simone van der Hof: ["What happens to my data? A novel approach to informing users of data processing practices"](#), 2012.

Recommendation 14 – Genuine informed consent

In order to provide greater transparency and control for consumers, we recommend:

- 14.1. developing a standard, plain language set of consumer terms and conditions when supplying personal information.

Provide more strongly for data correction and opting out

There has been significant international debate, especially in Europe, on the rights of individuals to correct incorrect data held on them, on the ability to opt out of data-sharing arrangements, and on the right for data held on individuals to be forgotten. The last of these issues is still being debated strongly, and as this report goes to press, new tools are being developed to assist the process of ‘online forgetting’. We have little doubt, for example, that the subjects of some of the information posted on social media – such as a number of the less formal or risqué photographs and videos – may wish subsequently to have these deleted if these are seen to stand in the way of future career prospects. It will be important to follow the ongoing debate and developments on this issue and consider New Zealand’s stance.



How do you implement a right to be forgotten?

In May, a European court ruled that citizens had the ‘right to be forgotten’. Under the ruling, Google has the responsibility to ensure that the data it holds about people is not irrelevant, out of date, inaccurate or an invasion of privacy. Since the ruling, Google has received 70,000 requests from individuals who want Google to correct information about them by removing certain links from searches that include their name.

There has been a lot of debate about how Google is implementing this ruling. Google has reversed a decision to remove links to stories on the website of the UK Guardian newspaper, but has made decisions to remove links to other media sites. It’s clear that the ruling is proving unwieldy to implement, and it’s uncertain how best to implement a right to be forgotten.



• www.theguardian.com

More generally, it seems consistent with the concept of natural justice to provide for correction of incorrect data on an individual and for a right to opt out of a data-sharing scheme, especially if an individual's understanding about the nature of the data use and its implications have changed. At the same time, this is not always as straightforward as it seems. In particular, we would not want to place additional limits on the exercise of free speech, nor impose unwieldy or unreasonable constraints on journalistic practice.

There is a middle path here. Where the data can be demonstrated to be incorrect – or at least where the organisation holding the data does not have reasonable grounds for believing the data to be correct – then there is an argument that the data should be corrected or deleted. Again, granting individuals stronger rights in this area will help to unlock data value as the knowledge that data can subsequently be deleted or corrected is likely to increase the confidence of individuals providing the data in the first place.

There are limited rights under the existing New Zealand Privacy Act to have data deleted, but we consider these could be strengthened in line with the approach we are suggesting here. In addition, the Privacy Commissioner or the proposed data council could be given the role of handling complaints around correction and the wider issues of data use and misuse.

Bolstering the right to opt out could be included in legislation and take the form of incorporation in standard terms and conditions for consent to data services. While there are technical limitations to this, opting out could also be accompanied by best-efforts provisions to delete all the relevant data.

Recommendation 15 – Enhanced rights for data correction and opting out

In order to provide more strongly for data correction and opting out, we recommend that:

- 15.1. consideration be given to providing stronger rights in the Privacy Act to have information corrected or deleted
- 15.2. consideration be given to necessary complaint procedures relating to correction and deletion and misuse of data, via the Privacy Commissioner and/or the proposed data council
- 15.3. the right to opt out be strengthened in legislation when it is reviewed, and incorporated in standard terms and conditions for consent to data services.

Appendix 1:

International responses to the data revolution

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Many governments around the world are grappling with balancing the benefits and risks of the data revolution, and seeking ways to best position themselves.

The open government movement has sparked a huge change in the way that governments share their data. People see exposing government data as a way to increase transparency and accountability, stimulate citizen participation, and enable innovation and entrepreneurship. For example, the UK has taken a multi-faceted approach to open government, with a strong emphasis on both democracy and innovation. It's not just about releasing government data. Businesses, academia, government and communities are collaborating via initiatives like the Open Data Institute and the Information Economy Council. Big data is considered of such strategic importance that big data projects have priority for government funding and research.

Governments are also looking more closely at use of their own and private sector data to create wealth and social benefits. In the UK, policymakers are considering issues like [data capability](#), [sharing of data within government](#), and [social media and real-time analytics](#) to ensure that the UK is taking advantage of the big data opportunity. A recent [White House report](#) on big data was a response to changes in technology and strong concerns about the use of information for protecting national security. It recommended seizing the opportunities and preserving values by introducing greater controls over data-sharing and use, and also ensuring that data is a public resource that is used to benefit people. Australia has also looked at how [big data can support increased understanding](#) to drive better policy and outcomes within government, and a [recent report](#) has confirmed the need to manage ethics. In Germany, they have coined the term Industry 4.0 to describe the intelligent factory "[a vision of computerized manufacturing with processes all interconnected by the Internet of Things](#)", building on the strong industrial base.

Appendix 2:

Summary of recommendations

Overarching objective

Create a competitive advantage by positioning New Zealand as a high-value, strongly inclusive, high trust and control data-sharing ecosystem

Rules of the Game

- 1. An independent data council:** To enable guardianship and responsible stewardship for New Zealand and New Zealanders in the new data environment we recommend:
 - 1.1. the establishment of an independent data council with ongoing responsibility for continuing the thinking, advising government and data users, and developing best practice guidance
 - 1.2. a review, in two years, to ensure we have a coherent and streamlined governance system – this will include review of the potential functions of the data council, along with the roles of existing watchdogs and regulators, the sanctions for misuse and in the context of proposals for legislative change.
- 2. Legislative review and key legislative amendments:** In order to provide clarity and coherence around the new data-use ecosystem, we recommend the following:
 - 2.1. A broad review of information legislation be undertaken, including (but not limited to) the Copyright Act and other intellectual property legislation, Official Information Act, Privacy Act, Public Records Act, Statistics Act, and consumer law, with the purpose of achieving better, faster, trusted and more collaborative use of data and a more coherent and responsive data-use ecosystem.
 - 2.2. We also recommend the following legislative changes and reviews be put in place in the short term:
 - Legislate for proactive release of government's open data
 - Conduct a further review of the Copyright Act, to enhance its clarity and coherence in relation to data

→ Amend the Privacy Act to:

- update the definition of personal data
- extend the information sharing provisions beyond central government
- include protections against the re-identification of anonymised data.

Value:

New Zealand should use data to drive economic and social value and create a competitive advantage

3. Treat data as a strategic asset: In order to get value from the data we hold collectively, now and into the future, we recommend that:

- 3.1. government and sectors come up with a set of clearly defined collaborative catalyst projects that create value by tackling real problems via trusted sharing and use of data
- 3.2. in conjunction with businesses and communities, government develop a set of strategies to ensure that all New Zealand is best placed to use and benefit from our data-use ecosystem.

4. A champion to drive innovation and data- sharing

4.1. In order to accelerate our efforts to use and share data, we recommend the appointment of a champion to drive innovation and data-sharing. The champion would:

- support the sharing, release and use of government and non-government data
- lead an Open Data Agenda for all New Zealand

An Open Data Agenda for all New Zealand will include data and people outside government, looking to the UK's Open Data Institute as a possible model. The Open Data Agenda should be resourced to:

- encourage, broker and support the use of open data to drive value – working with government, entrepreneurs, communities, enterprise and citizens
- explore which data types need to be protected, and build a framework for degrees of openness, taking into account intellectual property and commercial sensitivity
- lead development and adoption of tools, standards and processes for open data to ensure interoperability and accessibility – this includes exploring mechanisms to enable the release and exchange of the private sector's open data
- update, if required, current licensing arrangements for data-sharing, such as NZGOAL

- broker and support protected data-sharing via a programme of collaborative projects based on sharing of data to deliver value
- develop and promote the standards and infrastructure needed to support openness and sharing, building on what is already in place.

4.2. We also recommend exploring whether the provisions that govern the availability of data collected by government agencies could be extended to include government service providers such as contractors and schools.

5. Incentivise an innovation culture: In order to incentivise and support an innovation culture we recommend:

- 5.1. using the critical mass of government as a customer to discourage monopolies, kindle new enterprise and encourage innovation through outsourcing and supporting collaboration
- 5.2. greater use of standards and open source tools to encourage competition and innovation
- 5.3. government establish a 'prize-based' data innovation fund to solve specific problems and design innovative solutions
- 5.4. using universities more proactively as neutral places to bring diverse thinkers together to play and experiment
- 5.5. government showing greater tolerance for risk by building a greater risk tolerance into the expectations for data-driven projects, including those brokered by the champion, accompanied by explicit strategies to manage risk, including stop/go provisions.

6. Grow skilled data scientists and innovators: In order to grow the technical capability New Zealand needs to drive value, we recommend:

- 6.1. support for post-graduate or mid-career courses to allow data-smart diverse thinkers to refine their skill set in modern data analytics and data management
- 6.2. seed or prize funding to encourage sharing of resources across universities and to encourage collaborative multi-disciplinary research and teaching in data science
- 6.3. data analytics, data science and data management be included in the relevant immigration skills criteria
- 6.4. promoting data analysis and management as a career, by, for example, information dissemination to secondary schools and universities, scholarships and prizes
- 6.5. targeting managers and influencers, through executive courses for leaders, to raise awareness of the scope of data science to bring insights to the problems they are grappling with.

7. Promote New Zealand's data-use ecosystem overseas: To support the interests of New Zealanders in the global data environment we recommend:

- 7.1. New Zealand takes an active role in promoting our unique data-use ecosystem overseas and continues to actively participate in international discussions and agreements around data-use rules and regulations
- 7.2. NZTE and other relevant organisations explore opportunities to capitalise on and exploit our principles-based data-use ecosystem, to create value.

Inclusion:

All parts of New Zealand society should have the opportunity to benefit from data use.

8. Raise public awareness and capability: In order to raise public awareness and capability and ensure data is used inclusively, we recommend:

- 8.1. continuing the conversation – broadening the discussion that the NZDFF has started, raising the debate across the country and building a consensus on the way forward for New Zealand (this conversation could be led by the proposed data council and/or the champion for data-driven innovation)
- 8.2. promoting data visualisation – modelling excellence in data communication when presenting government information and, in doing so, demonstrating the possibilities, stimulating demand and enhancing transparency for New Zealanders – businesses should see data visualisation as a market opportunity, in New Zealand and beyond
- 8.3. supporting 'data brokers' – government support for organisations that advise communities and connect them to data and data users.

9. Support Māori in the new data environment: To support Māori in the new data environment, we recommend that government:

- 9.1. continue and broaden a constructive discussion with a wide range of Māori stakeholders on Māori opportunities, requirements and strategies in the new data environment
- 9.2. consider the appropriate Māori role in governance and advisory bodies in the data arena, including ensuring Māori representation on the proposed data council
- 9.3. Build programmes to develop capability among Māori to engage with and use data, working in partnership with stakeholders such as Te Puni Kōkiri, Te Wānanga and Statistics New Zealand, building on existing programmes as appropriate.

Trust:

Data management in New Zealand should build trust and confidence in our institutions

10. Privacy and security 'by design': In order to protect privacy and security, we recommend:

- 10.1. the application of privacy-by-design and security-by-design tools and solutions at all stages of a data-use initiative
- 10.2. the use of a Privacy Impact Assessment as part of the preparation of a data-use initiative.

11. Regulate data use and re-use: We recommend that in considering the rules for any data use, trust be promoted by:

- 11.1. applying the 'rules' that are consistent with the level of collective, or individual decision rights and accountability for each data use or re-use
- 11.2. not identifying individuals when the purpose of use does not require it
- 11.3. using informed consent, unless it is not possible or reasonably practical to do so
- 11.4. being transparent about the purposes and maximising the security and access arrangements to be consistent with the purpose of data use.

12. Tools for transparency: In order to enable transparency, we recommend:

- 12.1. developing and using good practice arrangements that enable people to see what data is held on them and being used by whom and for what purpose – government agencies could consider providing a lead in this respect
- 12.2. encouraging the development of 'trustworthiness' rankings or certifications.

Control:

Individuals should have greater control over the use of data about them.

13. Equip individuals to determine levels of privacy: To achieve enhanced individual control we recommend:

- 13.1. educating the public on the management of data about them
- 13.2. ongoing adoption of digital personal information management systems in online relationships between government and individuals (and, increasingly, businesses and individuals).

14. Genuine informed consent: In order to provide greater transparency and control for consumers, we recommend:

- 14.1. developing a standard, plain language set of consumer terms and conditions when supplying personal information.

15. Enhanced rights for data correction and opting out: In order to provide more strongly for data correction and opting out, we recommend that:

- 15.1. consideration be given to providing stronger rights in the Privacy Act to have information corrected or deleted
- 15.2. consideration be given to necessary complaint procedures relating to correction and deletion and misuse of data, via the Privacy Commissioner and/or the proposed data council
- 15.3. the right to opt out be strengthened in legislation when it is reviewed, and incorporated in standard terms and conditions for consent to data services.