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Causal diagrams to support 'a fair chance for all'

A report for the New Zealand Productivity Commission

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1 Introduction

In September 2022 the New Zealand Productivity Commission released the draft report of its 'A fair chance for all' inquiry. At that point these causal diagrams were commissioned as a way of helping to summarise the complex interactions and tensions that had been identified.

The inquiry highlights some serious challenges with individuals and communities experiences of persistent disadvantage in Aotearoa New Zealand, and it lays down some significant recommendations and challenges for improving the Public Management System[1].

Reference to the Crown has generally been avoided in this report. Instead, Government with a capital 'G' refers to the executive (elected ministers); while government with a lower case 'g' refers to the operational elements of government (staff in ministries, departments, agencies, etc). These operational elements of government are also referred to as the Public Management System. This is because there may be different causal influences on or from these different entities that make up the 'Crown'.

These diagrams are intended as a way of developing an integrated picture of the interconnected variables contributing to people's persistent experience of disadvantage, particularly as they pertain to the Public Management System. They should be read in conjunction with the inquiry interim and final reports, which provide the analysis and sources for the ideas and concepts shown in the diagrams.

The causal diagrams described here seek to highlight, in a synthesised and summarised way, the way these many challenges are interconnected and influence each other. That is, they are intended to provide a shallower but broader view of causality between the variables described. In this way they represent a hypothesised reality of how the challenges and barriers identified in the inquiry inter-relate. They are not intended to replace more rigorous analytical interrogation of specific areas of interest, which are usually able to provide a deeper and narrower perspective of causality in specific areas. They are seen as complementary to such analyses.

It is hoped that they help to highlight the inter-connected and circular chains of influence relating to many of our most pressing social challenges, and where agency for change lies. There are no silver bullets to address these challenges. Rather, it is hoped these causal diagrams may help to highlight some of the unspoken assumptions and attitudes that can be unhelpful when trying to address persistent disadvantage.

The causal diagrams were developed from the knowledge that the inquiry team had generated during their inquiry, as well as a selection of the sources they used. These sources are listed in the references section.

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[1] Public Management System is used in this report and diagrams to represent government ministries and departments which are responsible for the provision of policies and support services/activities, which is the focus of this inquiry. In other parts of the report, the term Government is used to refer to the executive, primarily the elected portion of the executive.

This report is structured in the following way. Section 2 describes the methodology to develop the causal diagrams and section 3 provides an overview on how to read/use them. This section should be read before viewing the diagrams to get the most from them.

The causal diagrams are then described in sections 4 and 5. Section 4 describes the experience of disadvantage and the barriers to addressing it that have been identified in the inquiry. There are two versions of this diagram – a simple version (section 4.1) and a more detailed version (section 4.2).

Section 5 describes trust, accountability and Government's willingness to change. This section was heavily informed by insights gained from a te ao Māori perspective, which is sometimes generalised for a general community perspective. Section 5.1 provides this general perspective. Section 5.2 provides the same perspective through a Māori lens, as well as including how these relate to Tiriti partnerships between Māori and the Government (Crown).

Section 6 provides a summary of the report and appendices provide supporting detail.

2 Methodology

In this section causal diagrams are introduced (and elaborated on in Appendix 1), and the methodology for developing these conceptual causal diagrams is summarised.

2.1 What is a causal diagram and systems thinking?

The world that we live in is a highly interconnected place of causality and effect. The work of government policy and operations is often in response to undesirable or unhelpful behaviours or patterns being experienced in the natural or social environment. Government policy seeks to take action that influences these behaviours or patterns to alter or improve them.

Systems Thinking is a name often applied to a range of approaches to thinking about issues holistically. One of these approaches is the academic discipline of System Dynamics. System Dynamics originated from the Sloan School of Management at the Massachusetts Institute of Technology, Cambridge, Massachusetts in the late 1960's.

Systems thinking, as articulated by the discipline of System Dynamics, is a conceptual framework and set of tools that have been developed to help make the patterns of interconnectedness causing the behaviours or patterns of concern clearer (Senge, 2006)[2]. These tools help us understand the how different variables are interconnected to create a behaviour or pattern that we are trying to understand. Once these interconnections are better understood, this increases our awareness of which parts of a system are having the most influence on the behaviour, allowing action to be undertaken in the areas of greatest leverage.

Where the term systems thinking has been used here, it refers to the qualitative concepts articulated by the discipline of System Dynamics (Sterman, 2000). The main qualitative tool that this discipline uses to understand systems is called a causal loop diagram (CLD) or a causal diagram. Throughout this report the term causal diagram has been used.

2.2 The process used in this report

Deliberate was commissioned after the draft inquiry report had been completed. The causal diagrams were considered useful to help synthesise and summarise the complexity of the findings in the report and the systemic issues that the inquiry seeks to address.

The insights in this report were developed by interviewing the team working on the inquiry and reviewing some of the supporting documents/reports/data that was used, or commissioned by, the inquiry. This data was then used to develop the causal diagrams and insights described in following sections.

Draft causal diagrams were then tested and refined with the inquiry team in a series of workshops.

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[2] For a detailed introduction to the concepts of Systems Thinking, the reader is referred to *The Fifth Discipline – the art and practice of the learning organisation* (2nd ed.) by Peter Senge (2006) as an accessible introduction.

2.3 Benefits of the causal diagram approach

This approach can help to interrupt a narrow focus on sectoral, ministerial, or departmental interests or activity. These diagrams are intended as a way of developing an integrated picture of the interconnected variables contributing to people's persistent experience of disadvantage.

Like any tool, the approach has its limitations – its use does not provide rigorous quantitative analysis. It is intended to complement other more rigorous (and often narrower) quantitative analysis.

Rigorous quantitative analysis will not always be possible or necessary. In these situations, causal diagrams will be useful as an independent decision-support tool.

The causal diagrams that are described in this report are useful for:

- providing ministries, departments, and stakeholders with a synthesised and simplified overview of the complex relationships contributing to people's experience of persistent disadvantage, the barriers and pathways to addressing these that have been identified in the inquiry, and who has agency;
- facilitating the perception of the broad system dynamics which can benefit anticipatory thinking and innovation and provide the basis for effective collaboration between differently affected users;
- assisting in creating a common language to enable experts from a range of disciplines to contribute effectively to impactful action;
- enabling effective policy(ies), support(s) and decision-making that anticipates and avoids unintended consequences and achieves multiple benefits.

3 The fundamentals of causal diagrams – articulating causal structure

At the core of a causal diagram is the desire to visually articulate the relationships between variables that best explain the behaviour of the system that you are trying to understand. This visual articulation of relationships is known as **causal structure**.

It is often helpful to think of a causal diagram or causal structure as a **visual hypothesis**. It is a way of visually demonstrating *why* things occur the way they do due to the *interconnection and influence* of the variables identified as contributing.

This section outlines important fundamental elements of causal structure. These are:
- feedback loops;
- how feedback loops are correctly annotated; and
- the use of the 'goal/gap' structure (as this can explain how different loops are dominant in a system at different times).

It is recommended that the reader familiarises themselves with these concepts, as an understanding of them is required to read the causal diagrams in this report and to gain insight from them.

3.1 Feedback loops – the basic building blocks of a causal diagram

Systems thinking focuses on moving away from thinking of causality as *linear* to *circular*. That is, a linear way of thinking about causality might be that A influences B, whereas a circular way of thinking about causality might be that A influences B, and then B influences A. This means the causality 'feeds back', so where this is identified it is known as *feedback loops*.

Figure 1. Moving from linear to circular causality
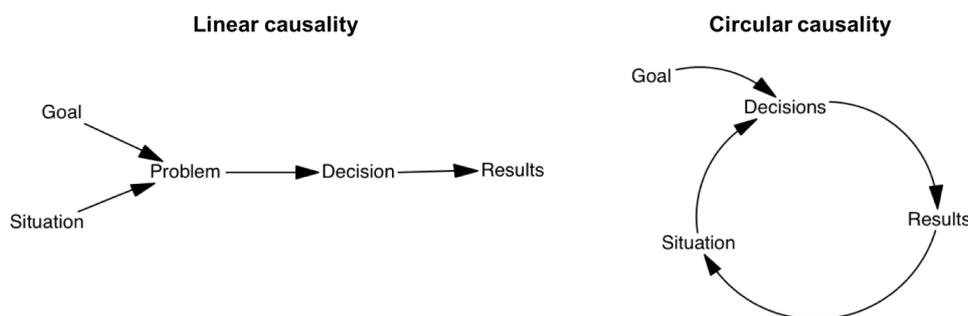
There are two types of feedback loops, *reinforcing* and *balancing* (Senge, 2006).

In a ***reinforcing feedback loop***, the direction of influence provided by one variable to another will transfer around the loop and influence back on the originating variable in the *same* direction. This has the effect of *reinforcing* the direction of the original influence, and any change will build on itself and *amplify or spiral*. **Reinforcing loops are what drive growth or decline within a system**.

In a **balancing feedback loop**, the direction of influence provided by one variable to another will transfer around the loop through that one variable (or series of variables) and influence back on the originating variable in the *opposite* direction. This has the effect of *balancing out* the direction of the original influence. **Balancing loops are what create *control, restraint, or resistance* within a system**.

The two types of feedback loop are shown in Figure 2.

Figure 2. The two types of feedback loops

Reinforcing feedback loop

R

A certain condition encourages a certain type of action, which encourages more of the same condition, thus reinforcing itself in a cycle.

Exponential Growth

Time ⟶

Balancing feedback loop

B

A certain condition encourages a certain type of action, which in turn has a balancing or cancelling effect on the initial condition.

Oscillation

Time ⟶
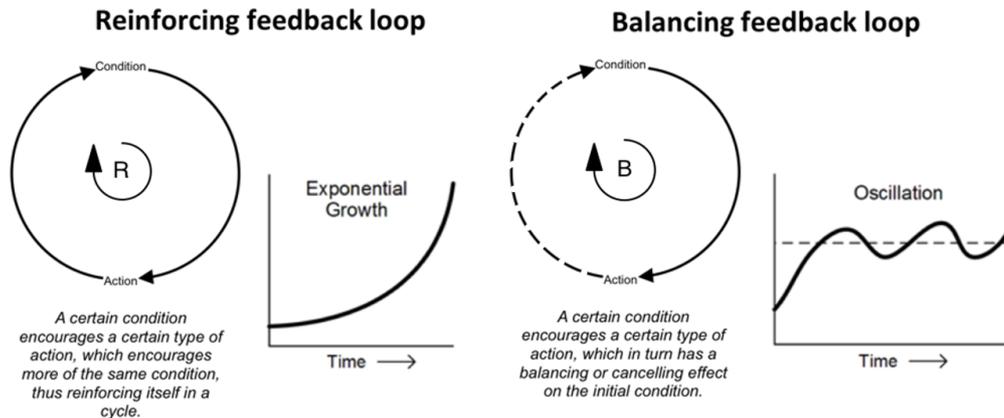
Adapted from Senge (1990) & Ford (2010)

Feedback loops can be made up of more than two variables and can be mapped together to form a causal diagram. How these feedback loops interact provide insight into how a wider system operates.

For an explanation of the solid and dashed lines in the feedback loops, see section 3.3.

3.2 Labelling variables

An important concept within causal diagrams is the concept of accumulation (or decumulation) – where do things build-up (or decrease) in your system? The simple analogy of a bathtub filling or draining is often used to describe this.

Figure 3.Labelling variables

	INCORRECT	CORRECT

Use names or noun phrases — Costs rise → Price rises | Costs → Price

Variable names should have a clear sense of direction — Feedback from the boss → Mental attitude | Praise from the boss → Morale

Use variable whose normal sense of direction is positive — Costs → Losses ; Criticism → Unhappiness | Costs → Profit ; Criticism → Happiness

Adapted from Sterman (2000)
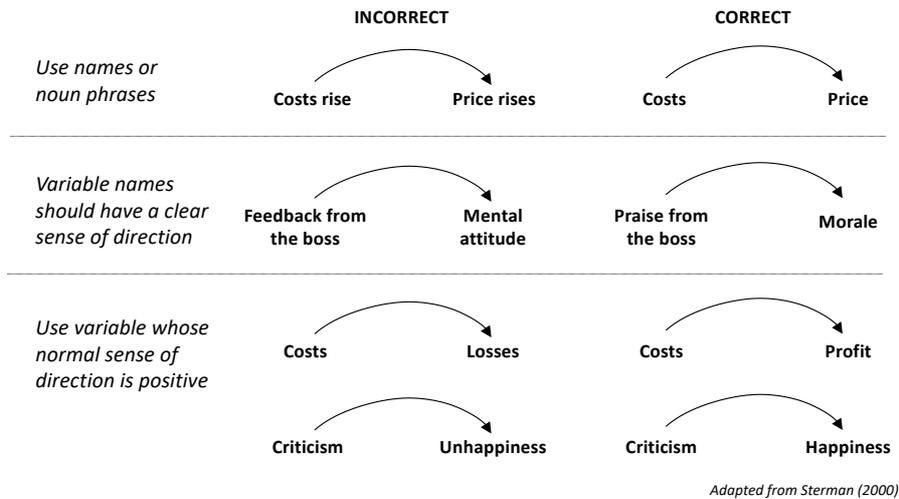
In causal diagrams, this concept of accumulation is captured by describing variables in such a way that their name implies that they can *increase or decrease*. This means that they should be described as *nouns*; have a clear sense of *direction*; and have a normal sense of direction that is *positive*. Examples to demonstrate this are shown in Figure 3.

Each of the variables used in this report is described in the Glossary (Appendix 1).

3.3 Annotating loops

Variables within causal diagrams are connected (and made into feedback loops) by arrows, which indicate that one variable has a causal relationship with the next. **'Same'** arrows are drawn with a **solid line**, while **'opposite'** arrows are drawn with a **dashed line**. These terms correspond to the direction of change that any change in the first variable will have on the second variable.

For example, if a directional change in one variable leads to a directional change in the next variable in the *same direction*, it is a *same relationship*. Likewise, if the second variable changes in the *opposite direction*, it is an *opposite relationship*. See Figure 4 for a visual description.

Figure 4.How arrows are labelled in causal diagrams

	If factor A *increases...*	If factor A *decreases...*

'Same' relationship *(the impacted factor moves in the **same** direction)* — ↑A → ↑B | ⇓A → ⇓B

'Opposite' relationship *(the impacted factor moves in the **opposite** direction)* — ↑A → ⇓B | ⇓A → ↑B

Adapted from Sterman (2000)
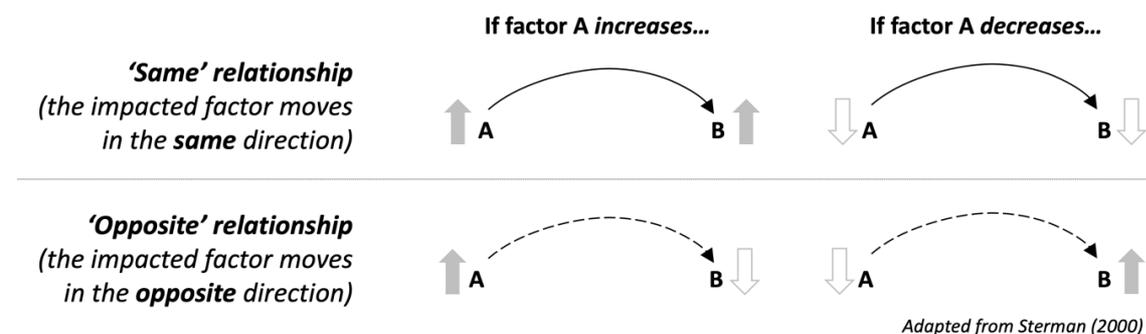
If there is a notable *delay* in this influence presenting in the second variable, when compared to the other influences described in the causal diagram, this is annotated as a *double line crossing the arrow*. An example of this is shown in Figure 5.

Figure 5.How delays are annotated on arrows

No delay   Delay

A   B   A   B

3.4 Goals and gaps – driving individual loop dominance

Realising that multiple loops are operating within a system is the first useful insight of systems thinking. A further useful insight is understanding that not all loops operate at the same strength all the time. Different loops can dominate the dynamics of a system at different times. For example, a system might be dominated by a period of growth (a reinforcing loop), but when a physical limit is approached (e.g., the available space in a pond for algae to grow) a balancing loop will start to dominate, therefore constraining the rate of growth.

One useful mechanism for gaining insight into the strength of a balancing loop is the *'goal/gap'* *structure*. This is a structure that combines both a *desired level* of something (a 'goal'), with an *actual level* of something. This *difference between these variables* is the 'gap' between the desired and actual levels.

The higher the desired level and the lower the actual level, **the greater the 'gap' or difference and the stronger the operation** of the loops that this gap influences. The lower the desired level and the higher the actual level, **the lower the 'gap' or difference, and therefore the weaker the operation** of the loops that this gap influences.

The 'goal/gap' mechanism can be seen within the causal diagrams in this report. A conceptual example is shown in Figure 6 which shows pouring a glass of water as a feedback loop.

Figure 6. Example of a 'goal/gap' structure in a causal diagram – pouring a glass of water
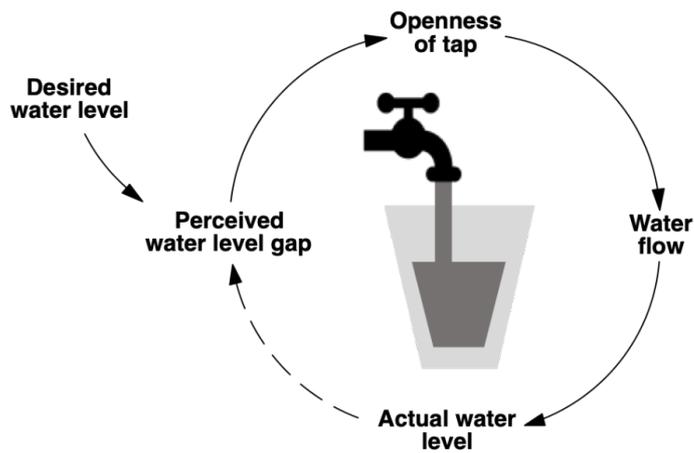
Adapted from Senge (2006)

Initially, while the *gap/difference* between the desired and actual water level is *high*, the tap will be opened more, and the strength of the water flow is higher.

As the desired level of water is approached the *gap/difference reduces*, so the tap is closed further, weakening the flow of water (you don't want the water to overflow the glass), until it is fully closed when the water level reaches the desired amount (Senge, 2006).

4   Causal diagram 1: Disadvantage and the barriers to addressing it

This section describes the causal diagram relating to the experience of disadvantage and the barriers to addressing that. Two versions of the same diagram are described. Both are simplified representations of a hypothesised reality, which is what causal diagrams are. Yet to help make the complexity they represent accessible to as wide an audience as possible, a simplified version is described first (diagram 1A), and a more detailed version second (diagram 1B).

A glossary for all variables used in each diagram is provided in Appendix 1.

Two colours are used for the arrows in these diagrams. While all arrows describe causal influences, blue arrows describe general influences and red arrows describe those influences in feedback loops *relating to the four barriers* identified in the inquiry report. **The use of colour is for visual identification of the four barriers only. It is *not* an indication of the relative importance or strength of any of the influences described.**

4.1   Causal diagram 1A: Simplified version

The parts of the causal diagram are described and gradually built up into the complete diagram in the following sub-sections. Note again that causality is circular and feedback loops have no starting point. The narratives describing a given loop choose a start point for descriptive purposes only.

4.1.1   The experience of disadvantage and policies/support to address it

The diagram begins with 'experience of disadvantage', which is an aggregated variable to represent the many ways that people experience disadvantage. This represents both the type of disadvantage as well as the length that it is experienced – that is both the absolute and the temporal (i.e. persistent) elements of disadvantage.

This variable is influenced by the 'extent support(s) meets needs' and the 'likelihood of appropriate long-term service(s) & policy(ies)'.

Figure 7. The experience of disadvantage and policies to policies/support to address it
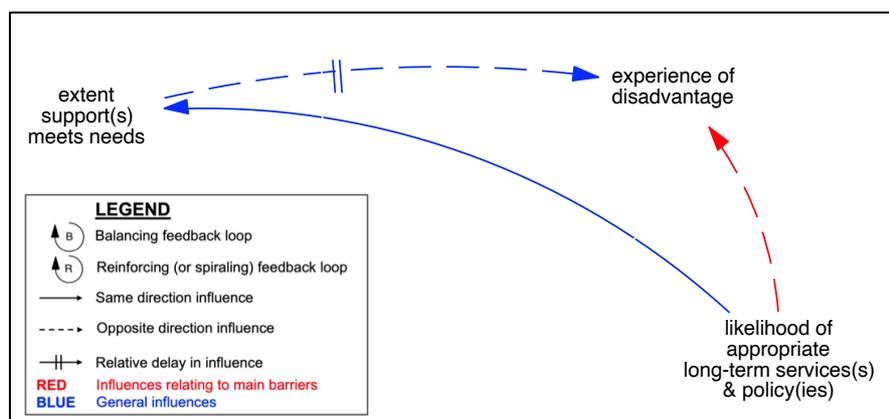
The 'extent support(s) meets needs' refers to the policies and direct support activities that are intended to reduce the 'experience of disadvantage'. The *higher* the 'extent support(s) meets needs', then over time (hence the delay mark – double dashes on arrow) the *lower* the 'experience of disadvantage'.

The 'likelihood of appropriate long-term service(s) & policy(ies)' refers to the extent that policy(ies) and support activity(ies) are appropriate to address individuals' families/whānau and communities' 'experience of disadvantage'. This has two pathways. Firstly, the *higher* this variable, the *higher* the 'extent support(s) meets needs' (solid arrow), and therefore the *lower* the 'experience of disadvantage' (dashed arrow). Secondly, the *higher* the 'likelihood of appropriate long-term service(s) & policy(ies)' the *lower* the 'experience of disadvantage' due to the direct impact of this (dashed arrow).

4.1.2 Trauma, trust in the Public Management System, and disengagement

Trauma has been identified as an important variable in the inquiry. The term is used here to capture a range of various forms of trauma that individuals and communities can experience through disadvantage. Trauma may be immediate or delayed and may be temporary or long-term, including intergenerational. It includes such things as the psychological impacts of inappropriate support, or in some cases physical trauma from the inadequacy of support services.

Trauma can have a huge psychological impact and contribute to further disadvantage. The intergenerational experience of trauma has also been identified by the inquiry as a major issue. This is where trauma can be carried through generations, or an older generations' experience of trauma can be passed on to following generations through the way they raise subsequent generations. Both contemporary and inter-generational trauma are represented by the variable 'experience of trauma'.

The *greater* the 'extent support(s) meets needs', the *lesser* the 'experience of trauma' for individuals or communities (a dashed arrow).

Figure 8. Trauma, trust and disengagement
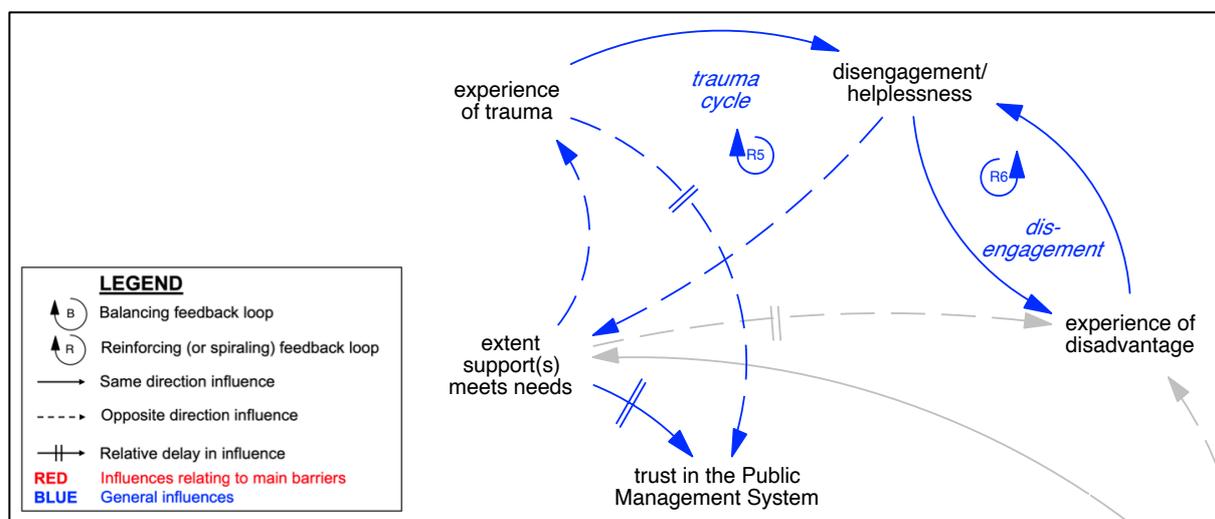
Disengagement with the Public Management System[3] and the sense of feeling helpless within it is represented here as 'disengagement/helplessness'. 'Trust in the Public Management System' represents the trust that individuals or communities may have in the Public Management System based on their experience of it.

The *greater* an individual or community's 'experience of trauma', may result in them having a *greater* feeling of 'disengagement/helplessness', as people may choose to disengage from the system (Haemata, 2022b). It was noted by the inquiry team that this is not necessarily an absolute relationship, as different people will varying abilities to deal with trauma in different ways. However, where this does have an influence, this will in turn *lessen* the 'extent support(s) meets needs' because this recognises that individuals and communities need to be in a mental position to be able to engage with the support they receive for it to be successful. When taken in conjunction with the relationship between support and trauma, this completes the **trauma cycle reinforcing loop (R5)**. This loop may spiral in either an upward or downward direction – the more trauma and disengagement individuals and communities experience, the less likely existing support is to meet their needs, adding to their trauma and disengagement.

The level of 'trust in the Public Management System' represents the trust of individuals and communities with the ministries and departments of government that they interact with. Their 'experience of trauma' has a *delayed opposite* impact on this trust (the *greater* the trauma, the *lower* the trust) while the 'extent support(s) meets their needs' has a *same* impact (the *more* that support meets their needs, the *higher* their trust in the Public Management System).

Another reinforcing or spiralling loop is the **disengagement reinforcing loop (R6)**. There are *same* influences between both 'disengagement/helplessness' and 'experience of disadvantage' –the *higher* one the *higher* the other (and vice versa), so these spiral with each other.

4.1.3   Likelihood of response and a reactionary bias

This sub-section describes a *likelihood of response* feedback loop as well as a *reactionary bias* that can result.

Firstly, the variable 'likelihood of response(s)' represents the likelihood that some kind of support will be provided to an individual or community experiencing trauma. This incorporates the fact that due to the limited resources of the Public Management System, threshold criteria often must be met *before* support(s) can be accessed or provided. Therefore, the *greater* the 'experience of trauma' the *greater* the 'likelihood of response(s)' (same influence). If trauma is too low to meet relevant accessibility criteria for the support(s), then individuals and communities are less likely to receive a response.

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[3] Public Management System is used in these diagrams to represent government ministries and departments which are responsible for the provision of policies and support services/activities, which is the focus of this inquiry. In other parts of the report, the term Government is used to refer to the executive, primarily the elected portion of the executive.

Figure 9. Likelihood of response and reactionary bias
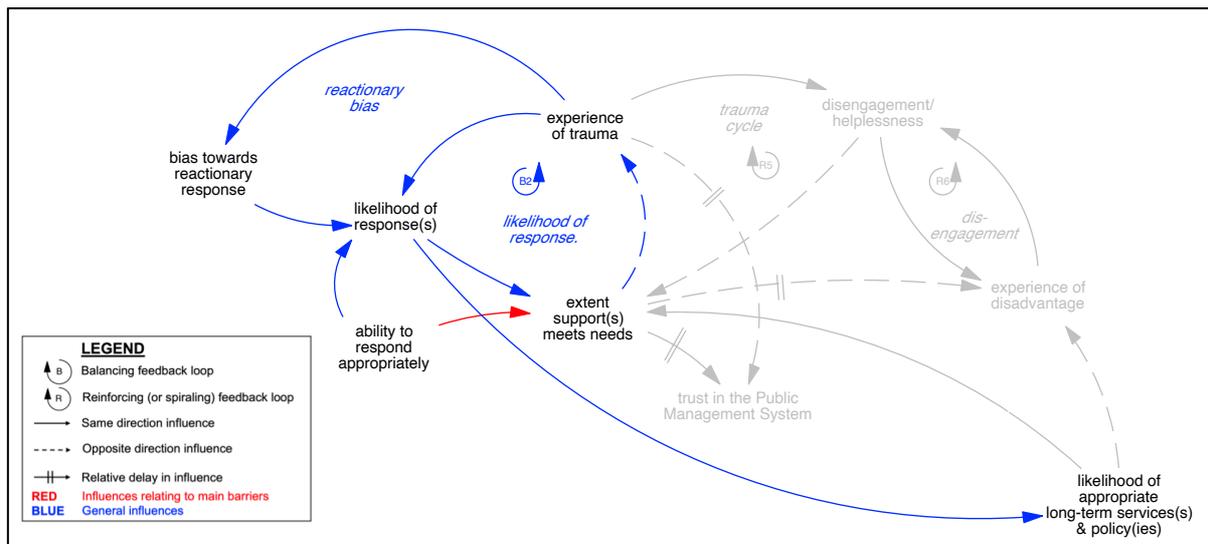
The 'likelihood of response' is also influenced by the Public Management System's 'ability to respond appropriately'. This variable represents the level of coordination and alignment between different elements of the Public Management System. The more aligned and coordinated they are, the better able they are to provide support services that meet multiple complex needs. Therefore, this has *same* influences on both the 'likelihood of response(s)' and the 'extent support(s) meets needs'.

The *greater* the 'likelihood of response(s)' the *greater* the 'extent support(s) meets needs', so this has also been shown as a same influence. This completes the ***likelihood of response balancing loop (B2)*** which represents how these things have a balancing effect on each other. For example, the *greater* the chances of support meeting communities' needs, the lower the trauma experienced, which over time will reduce the likelihood that they meet threshold criteria which, in turn, will reduce the extent to which support meets their needs. This indicates that the likelihood of the provision of support plays an important role in the level at which this balancing loop will operate.

Finally, the ***reactionary bias*** influences also have an important influence on the dynamics. This recognises that because there are persistent levels of the 'experience of trauma' (both contemporary and inter-generational), this encourages (*same* relationship) a 'bias towards reactionary response'. In other words, because there is a lot of trauma in communities experiencing disadvantage there is often a focus on responding to the most critical at any one time. This may result in action that increases the 'likelihood of response(s)' through making the accessibility thresholds for support services lower.

4.1.4   Success to people who are advantaged

This portion of the causal diagram demonstrates how the experience of advantage (or disadvantage) in society can lead to more (or less) opportunities and status within society, further reinforcing or spiralling the original experience of advantage (or disadvantage).

Figure 10.   Success to people who are advantaged
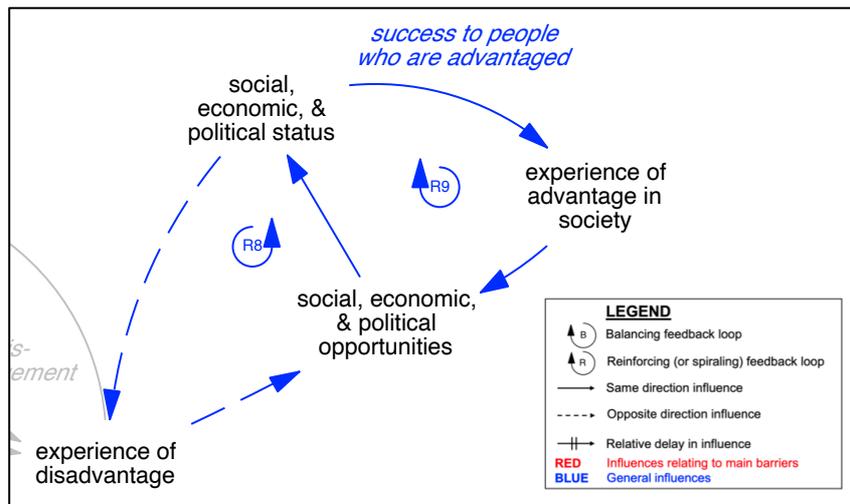
Here, an *increased* 'experience of disadvantage' leads to *lower* 'social, economic, & political opportunities' (an *opposite* influence), which leads to *lower* 'social, economic, & political status' in society (a *same* influence), which further reinforces or spirals on the 'experience of disadvantage' (an *opposite* influence). This is labelled as **reinforcing loop R8** and can spiral in either an upwards or downward direction.

The same applies to an individual or community's experience of advantage in society. Here, an *increased* 'experience of advantage' leads to *higher* 'social, economic, & political opportunities' (a *same* influence), which leads to *higher* 'social, economic, & political status' in society (a *same* influence), which further reinforces or spirals on the 'experience of advantage' (a *same* influence). This is labelled as **reinforcing loop R9** and can spiral in either an upwards or downward direction.

Together these two loops demonstrate the dynamics of ***success to people who are advantaged***.

4.1.5   Barrier 1: Power imbalance

This section of the diagram describes the first of the barriers identified in the inquiry – that power imbalances prevent the right decisions being made by the right decision-makers, processes, and values. This has been summarised in this diagram as the ***power imbalance loop (R1)***.

Here, the *greater* an individual's or community's 'experience of advantage in society' leads to *greater* 'influence on institutional arrangements' (a *same* influence). This may be conscious or unconscious, as institutional arrangements tend to reflect those that have the interest and ability to be involved in their development or maintenance. Consequently, over time this *increases* the 'extent that institutional arrangements favour people who are advantaged', which in turn reinforces the 'experience of advantage in society'.

Figure 11.   Barrier 1: Power imbalance
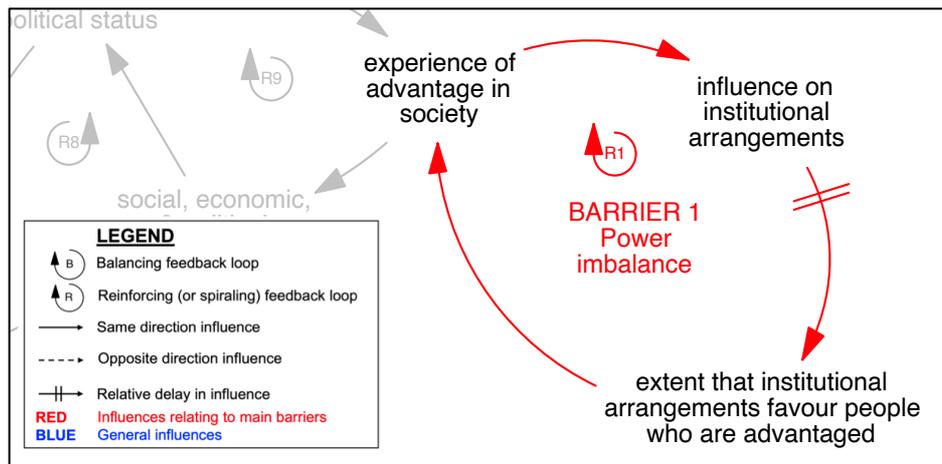
As one of the four main barriers identified, this loop has an important influence on other parts of the diagram. This is on the *success to people who are advantaged* loops described earlier; as well as unconsciously influencing structural discrimination (see section 4.1.6) and the ability of policies and supports to address the root cause issues (see section 4.1.8).

4.1.6   Barrier 2: Discrimination

This section describes the second of the barriers identified in the inquiry – that discrimination prevents care and respect from occurring. This has been summarised in this diagram as the ***discrimination* loop (R2)**.

Figure 12.   Barrier 2: Discrimination
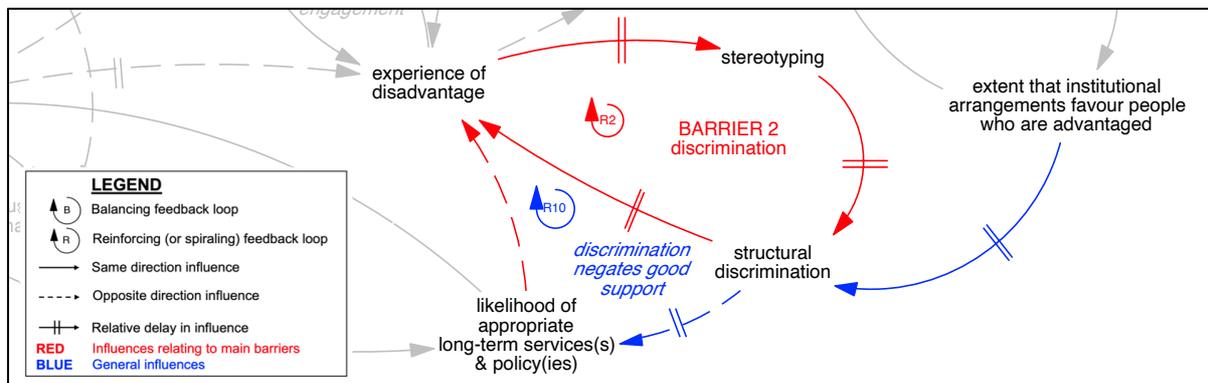
Here, a *persistent* 'experience of disadvantage' will, over time, reinforce (*same* influence) a *persistent* level of stereotyping. For example, the perception that people experiencing disadvantage have made bad choices to lead them to their current situation. Over time, this stereotyping will reinforce (*same* influence) the likelihood of 'structural discrimination'. This is where such dominant assumptions or attitudes held by individuals become entrenched and reflected in the way that an organisation or institution operates. Over time, this will further reinforce or spiral an individual's or community's 'experience of disadvantage'.

It is noted that, even in this summarised form, this loop has delays on all influences between the variables. Therefore, the rate at which this is likely to change will be slow when compared to some of the other loops in the diagram.

'Structural discrimination' also *decreases* the 'likelihood of appropriate long-term service(s) & policy(ies)' being delivered, which in turn further *increases* the 'experience of disadvantage'. This further reinforces 'stereotyping' and 'structural discrimination', creating its own additional reinforcing or spiralling loop, labelled the ***discrimination negates good support* loop (R10)**.

The **discrimination loop (Barrier 2)** is linked to the **power imbalance loop (Barrier 1)**, as over time the 'extent that institutional arrangements favour people who are advantaged' reinforces or maintains 'structural discrimination' (*same* influence).

4.1.7   Barrier 3: Siloed & fragmented government

This section describes the third of the barriers identified in the inquiry – that a siloed and fragmented government system makes unity and coordinated responses to issues difficult to achieve. This has been summarised in this diagram as the ***siloed & fragmented government* loop (R3)**.

Figure 13.   Barrier 3: Siloed & fragmented government
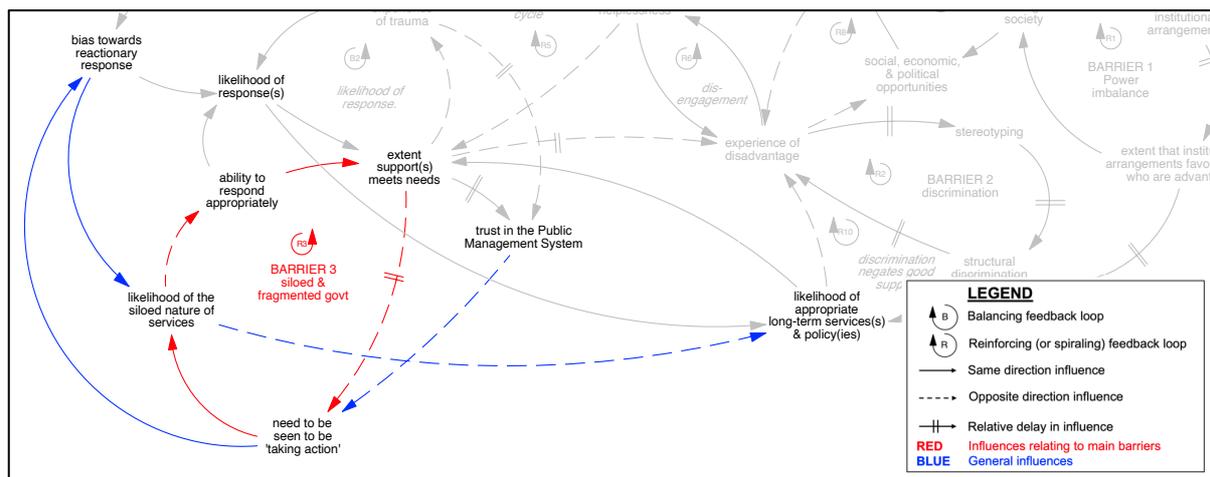
Here, the 'extent support(s) meet needs' has a delayed opposite influence on the 'need to be seen to be 'taking action''. That is, the *less* any support measures are successful, the *greater* the need to be seen to be taking action that is successful (Mazey & Richardson (2021), p24-25; Dalziel, L. in Mazey & Richardson (2021), p105). This predominantly represents the perception of the delivery of these services in the mind of the *public*, not necessarily the intended recipients. Therefore, this can largely be interpreted as a political challenge – that is, the public get frustrated that money being spent on support does not seem to be having any effect, therefore there is a greater demand for 'action' and 'accountability'.

As a result, an increase in being seen to 'take action' is likely to result in a greater demand for accountability of spend at a departmental level, and a greater level of public and political

interest in the activity of a department[4]. Counter-intuitively, this *increases* the 'likelihood of siloed nature of services' (same influence) as departments tend to retreat to managing what they are in control of, reinforcing a siloed experience of activity. This in turn decreases the Public Management Systems 'ability to respond appropriately' (opposite influence) and therefore further reduces the 'extent support(s) meets needs'. Overall, this reinforces or maintains need not being met, resulting in persistent disadvantage.

This is an important dynamic to understand and is a good example of the type of counter-intuitive insight that can be gained from thinking more systemically.

Outside of the siloed & fragmented government loop, the 'need to be seen to be 'taking action'' variable also reinforces the 'bias towards reactionary response'. In turn this further reinforces the 'likelihood of the siloed nature of services'. Further, any *increase* in the 'likelihood of the siloed nature of services' will *decrease* the 'likelihood of appropriate long-term service(s) and policy(ies)' (an opposite influence).

4.1.8   Barrier 4: Short-termism

This section describes the fourth of the barriers identified in the inquiry – that short-termism makes guardianship and stewardship more difficult to implement. This has been summarised in this diagram as the ***short-termism (R3) and short-term fixes (B1)* loops**.

Figure 14.   **Barrier 4: Short-termism**
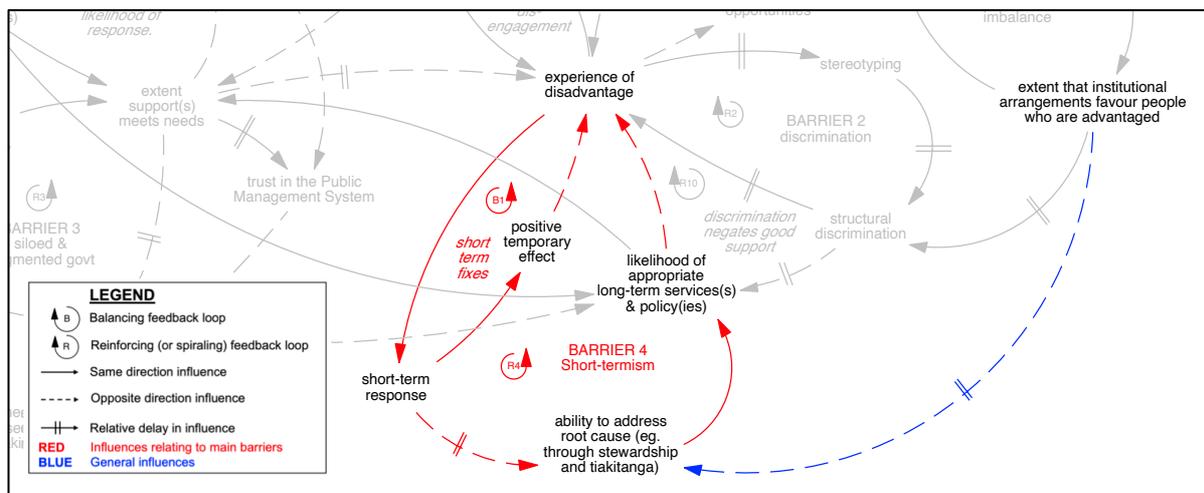
Here, the *greater* an individual's or community's 'experience of disadvantage', the *more likely* (same influence) that a short-term response will be applied. This diagram assumes most short-term responses may have a beneficial or positive impact (for a discussion around how that might not be the case, see section 4.2.8), so there is an *increase* (same influence) on the 'positive temporary effect', which (at least temporarily) *decreases* (opposite influence) the 'experience of disadvantage'. It is important to note that responses that provide such temporary relief are likely to be responses that are relieving a *symptom* of disadvantage – for

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[4] Greater detail of this loop is described in the detailed version of the causal diagram. See section 4.2.8.

example food parcel support may relieve hunger but doesn't relieve the fundamental reason hunger exists.

While the **short-term fixes loop (B1)** can have a temporary positive effect, the **short-termism loop (R4)** tends to have a longer term reinforcing or spiralling effect. Combined, the two loops tend to have the effect of providing *fixes that fail*. In the short-termism loop, the *more* a 'short-term response' occurs, the *lower* (opposite influence) the 'ability to address root causes (e.g., through stewardship and tiakitanga)'[5]. That is, the application of short-term fixes reduces the ability to address root causes. In the longer term this further reduces the 'likelihood of appropriate long-term services(s) & policy(ies)' (same influence) which further increases the 'experience of disadvantage'.

The **short-termism loop (Barrier 4)** is linked to the **power imbalance loop (Barrier 1)**, as over time the 'extent that institutional arrangements favour people who are advantaged' reduces the 'ability to address root cause (e.g., through stewardship and tiakitanga)' (opposite influence).

4.1.9 How needing to be seen to take action reinforces short-termism and fragmented government

The final loop to be described in this version of the causal diagram is the **perception of action loop (R7)**. This loop links the **siloed & fragmented government loop (Barrier 3) (R3)** and the **short-termism loop (Barrier 4) (R4)**.

Figure 15. Reinforcing short-termism and fragmented government
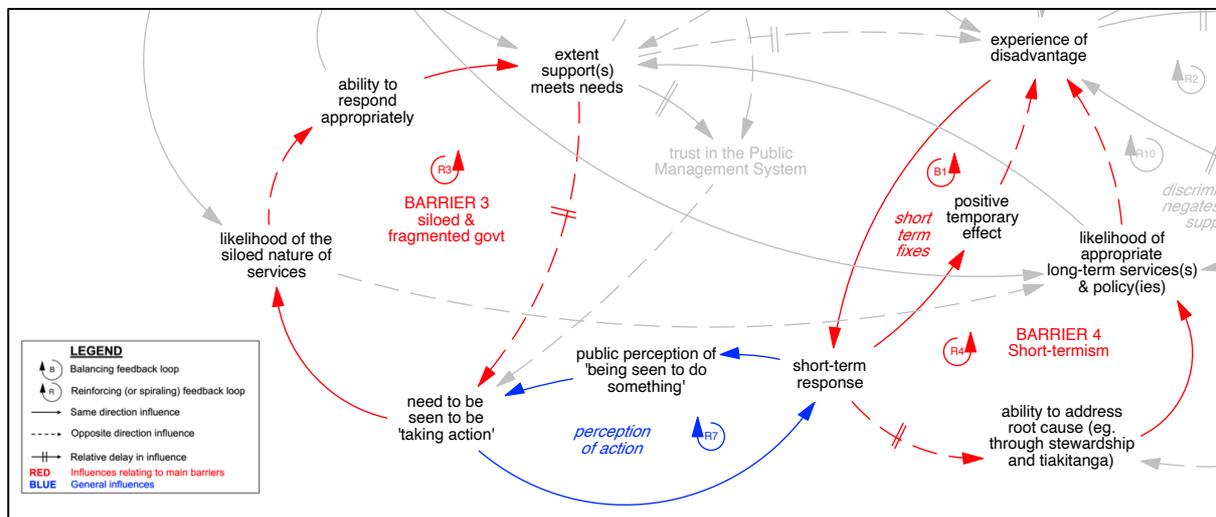
Here, the 'need to be seen to be 'taking action'' further reinforces the 'short term response', which further reinforces the actual 'public perception of 'being seen to be doing something'' (that is, the public see action and feel things are being acted upon). When this is successful,

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[5] In this variable, stewardship refers to the responsibility to care for and support others, be that whānau, friends or other community members. Tiakitanga refers to the act of caring for each other and looking out for, or after, each other in a connected and reciprocal way. The two concepts are related and are used here as general phrases to capture a range of reciprocal care and support.

such success further reinforces the original variable of 'need to be seen to be 'taking action''. Therefore, these variables form a reinforcing or spiralling loop which is the ***perception of action* loop (R7)**. This is an important way that Barrier 3 and Barrier 4 interact, and spiral off each other.

4.1.10 The complete simplified causal diagram 1A

The previous sub-sections described the various sections of this initial (simplified) version of the causal diagram. For completeness, the entire causal diagram is shown here.

A more detailed version of this same diagram is described in the following section (4.2).

Figure 16.   Complete simplified causal diagram 1A – Disadvantage and the barriers to addressing it

4.2 Causal diagram 1B: Detailed version

This section describes a detailed version of the first causal diagram. This is called Causal diagram 1B.

The fundamental structure, loops and overall dynamics remain the same. However, for the benefit of aiding the description of some of the dynamics, some variables have been split into two, or additional variables have been added in.

This section is structured in the same way as the previous section. However, the following descriptions should be read in conjunction with the previous sections. The descriptions that follow will focus more on how these diagrams differ from the simple version already described.

4.2.1   The experience of disadvantage and policies/support to address it

In this version of the diagram, the relationship between the 'extent support(s) meets needs' and 'experience of disadvantage' remains the same (opposite influence – if the former increases the latter decreases). However, the variable relating to appropriate policy and services has been split into two. The separated variables are the 'likelihood of appropriate long-term service(s)' and the 'likelihood of appropriate policy'. This recognises the difference between these two activities and that the development of policy and the provision of appropriate services are often provided by different organisations (e.g., ministries versus departments) and require quite different skill sets to deliver.

The 'likelihood of appropriate long-term service(s)' still directly impacts the 'experience of disadvantage', as well as via the pathway of the extent that support(s) meets needs'. Yet the 'likelihood of appropriate policy' only directly influences the 'extent support(s) meets needs' and it has a delay. This highlights that policy action has a flow on impact, not a direct one, and that any change in this variable will take time to have impact.

This does not mean that it is a less-impactful variable. Indeed, many services and supports may not be provided without first being required by policy.

Figure 17.   **The experience of disadvantage and policies to policies/support to address it (detailed)**

21
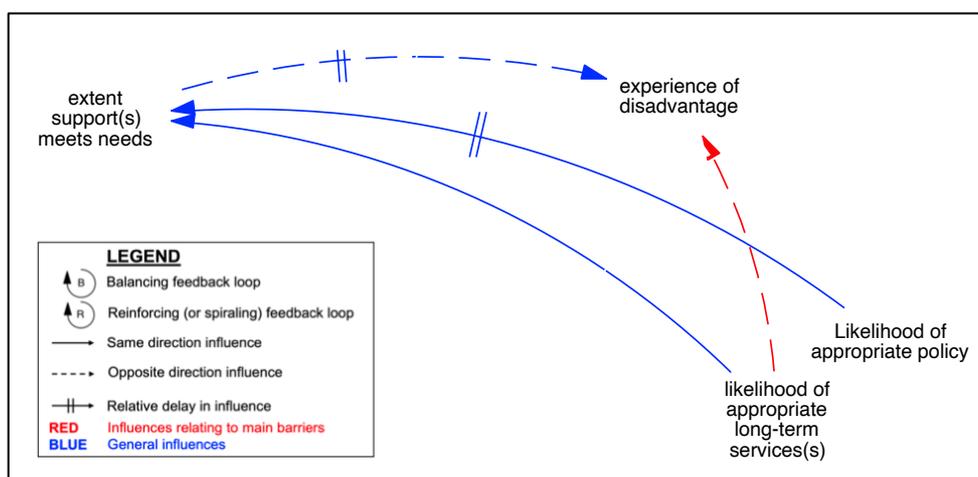
4.2.2 Trauma, trust in the Public Management System, and disengagement

In this section of the diagram, the 'experience of trauma' variable from the simple version has been broken into the 'likelihood of contemporary trauma', 'cumulative experience of trauma', and 'intergenerational trauma'. The variable for 'disengagement/helplessness' remains unchanged.

The different trauma nodes help to highlight that trauma can be a contemporary experience, as well as a cumulative and intergenerational one. Here the same **intergenerational trauma reinforcing loop (R5)** remains, just with more variables. More contemporary trauma can add to the cumulative experience of trauma, which can add to the intergenerational trauma. The naming of these two nodes indicates that these types of trauma are cumulative and can be felt for a long time. This is an important point made in the inquiry and it is important to recognise the legacy impacts of trauma on disengagement and consequently peoples 'experience of disadvantage'.

'Intergenerational trauma' can have an ongoing (and delayed) impact on the level of 'trust in the Public Management System'. This is an opposite relationship – more trauma can lead to less trust.

Figure 18.   Trauma, trust and disengagement (detailed)
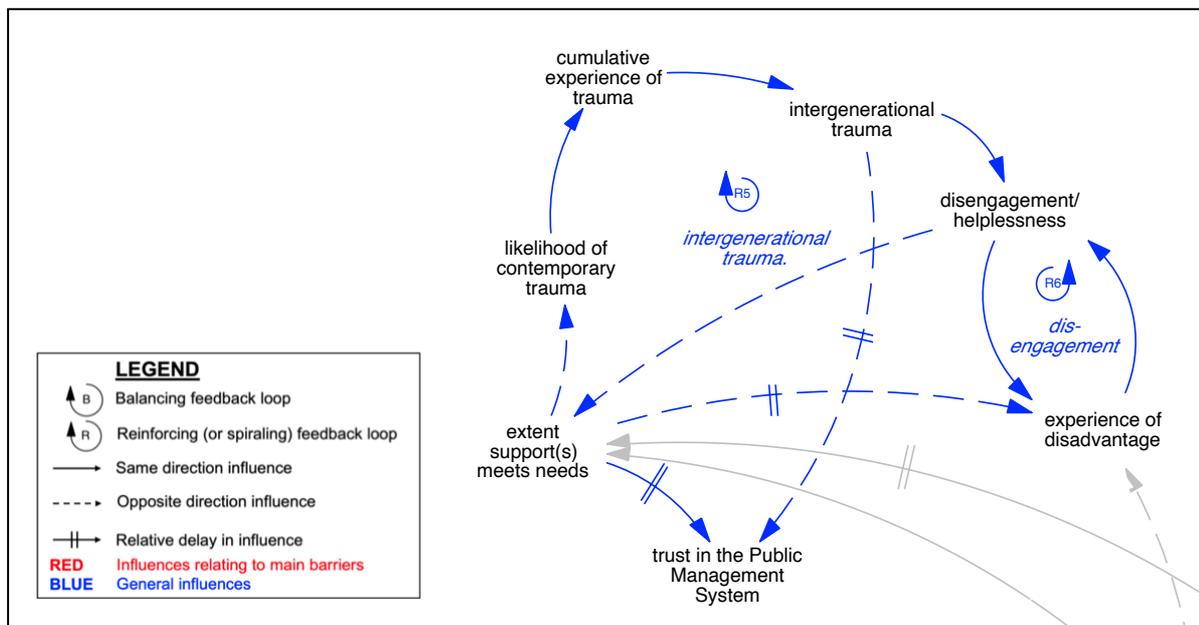
4.2.3 Likelihood of response and a reactionary bias

The likelihood of response and reactionary bias has also had some variables added to make it more nuanced.

The *likelihood of response* **balancing loop (B2)** effectively remains as it was in the simplified diagram, although with the trauma variable now being 'likelihood of contemporary trauma', this makes it much more focused on the likelihood of immediate response.

A new variable called the 'likely severity of contemporary trauma' has been added. As has a variable called the 'criteria required before response is available'. This means that the 'likelihood of response(s)' effectively becomes dependent on the Public Management System's 'ability to respond appropriately'; the 'likelihood of contemporary trauma'; the 'likely severity of contemporary trauma'; and the 'criteria required before a response is available'.

A new loop called the **severity of trauma balancing loop (B3)** is also added. Here, the *greater* the 'cumulative experience of trauma', the *greater* the 'likely severity of contemporary trauma' due to the compounding effect of the cumulative trauma. Any *increase* in the 'likely severity of contemporary trauma' *increases* the 'likelihood of response(s)', which in turn has the potential (in the longer term) to *reduce* the 'cumulative experience of trauma'.

The 'likely severity of contemporary trauma' is now the key influence on the 'bias towards reactionary response'. And if these variables are *high*, this increases the likelihood that the 'criteria required before response is available' will be *lowered*.

The additional variables described here add important nuance relating to the level of trauma required before responses may apply, and the temporal dimension of how long trauma is experienced.

Figure 19.   Likelihood of response and reactionary bias (detailed)
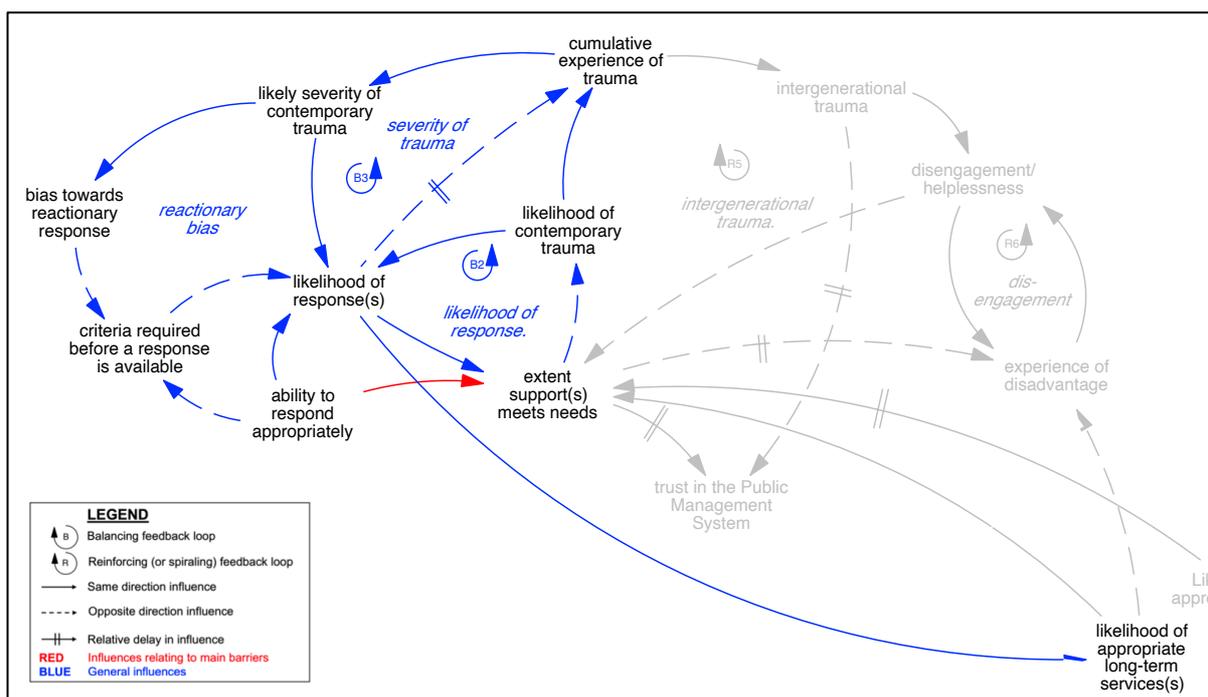
4.2.4   Success to people who are advantaged

The *success to people who are advantaged* loops (B8 & B9) remain as they did in the simplified diagram. However, one additional influence has been added directly from 'social, economic, & political status' to 'influence on institutional arrangements'. This adds further nuance to the ways in which this influence occurs, either consciously or unconsciously.

Figure 20.   **Success to the advantaged (detailed)**

4.2.5   Barrier 1: Power imbalance

The *power imbalance (Barrier 1)* **loop (R1)** remains as in the original diagram, as do the influences from this loop to both 'structural discrimination' and the 'ability to address root cause (e.g., through stewardship and tiakitanga)".

Figure 21.   **Barrier 1: Power imbalance (detailed)**

4.2.6   Barrier 2: Discrimination

The structure of the **discrimination (Barrier 2) loop (R2)** remains the same, with the addition of one variable, as well as a couple of external variables that link to the loop.

The additional variable is the 'experience of structural discrimination' which is influenced by 'structural discrimination' with a delay. This highlights that structural discrimination in a system exists first, then the experience of that discrimination will follow.

Two variables have also been added as influences on 'stereotyping'. Firstly, 'ongoing influences of discriminatory attitudes' has a *same* relationship with 'stereotyping'. This is to highlight that the attitudes and perceptions that are often used to stereotype people, are often informed by discriminatory attitudes (possibly relating to disability, sex/gender, or embedded in a colonial mindset). People may not recognise that they hold such attitudes. This is important to recognise because the structural discrimination that occurs in an organisation is influenced by the attitudes of the wider society that it sits within.

The other variable that was added was 'care and respect (manaakitanga)' which has an *opposite* influence on stereotyping. This is important to note because increasing this variable is one of the ways that the dominance of this loop can be reduced.

The **discrimination negates good support loop (R10)** remains unchanged.

Figure 22.   **Barrier 2: Discrimination (detailed)**
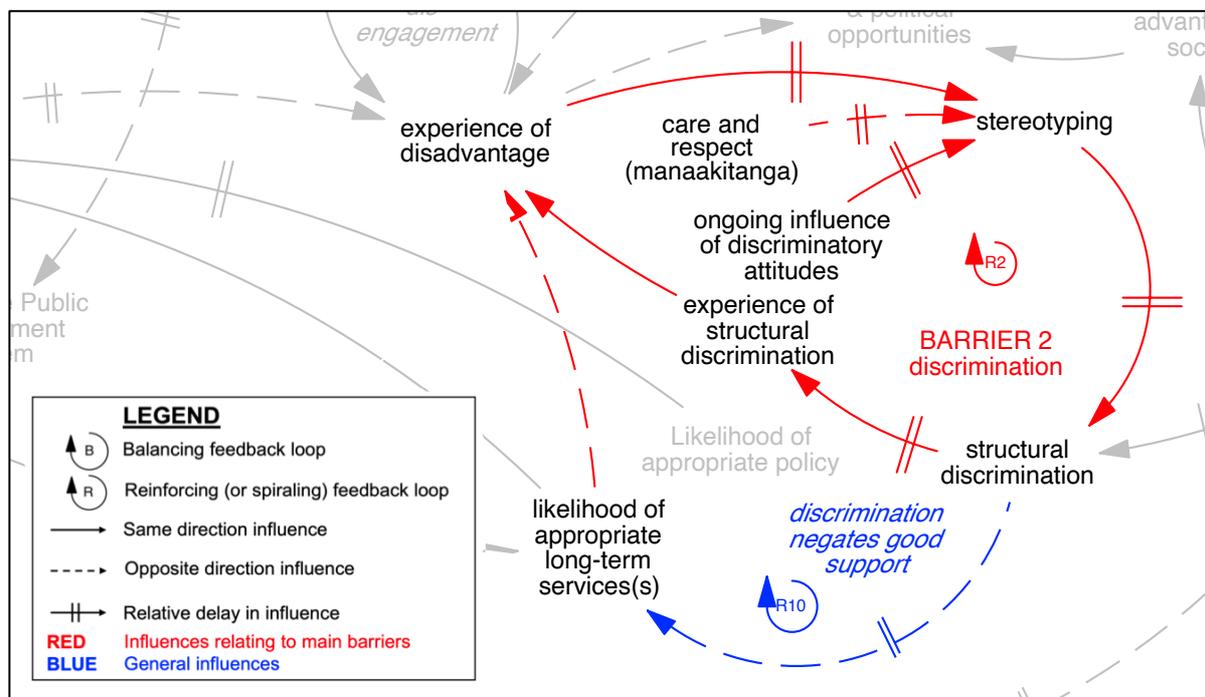
4.2.7   Barrier 3: Siloed & fragmented government

The nature of this loop also remains fundamentally the same, with some variables added in for nuance. The additional variables added to this loop are: 'need to demonstrate 'accountability'' and 'need for 'measurable actions''. One additional variable that is external to the loop, yet influences it, is 'alignment of agency 'goals' within Public Management System'.

The more nuanced chain of influence flows as follows. The *lower* the 'extent support(s) meets needs', the *higher* the 'need to demonstrate accountability' (this relates to the public demand for action and accountability as explained in the original diagram), then the *higher* the 'need' to be seen to be 'taking action'' (for example in response to an adverse event). Consequently, the *higher* the 'need for 'measurable' actions' which, as noted in the simplistic description is what tends to happen when people are seeking accountability, and this tends to drive silos within organisations. This then *increases* the 'likelihood of the siloed nature of services',

decreasing the 'ability to respond appropriately' and reducing the 'extent that support(s) meets needs.

Figure 23.   Barrier 3: Siloed & fragmented government (detailed)

The 'alignment of agency 'goals' with Public Management System' is also a same influence on the 'likelihood of siloed nature of services'. This highlights the fact that different ministries or departments – or even different parts of the same ministry or department – are often driven by different operational goals, and these may not always be aligned.

4.2.8 Barrier 4: Short-termism

The structure of the two main loops relating to short term fixes and short termism remain the same. However, an additional loop has been added to represent ***incorrect fixes* (R11)**. This is to highlight that not all temporary fixes alleviate the experience of disadvantage in the short term. Some may make the experience worse. This tends to produce a 'negative temporary effect' which spirals or amplifies the 'experience of disadvantage'.

Figure 24.   Barrier 4: Short-termism (detailed)

4.2.9 How needing to be seen to take action reinforces short-termism and fragmented government

Finally, the *perception of action* **loop (R7)** remains, with some variables added in for nuance.

Figure 25. **Reinforcing short-termism and fragmented government (detailed)**
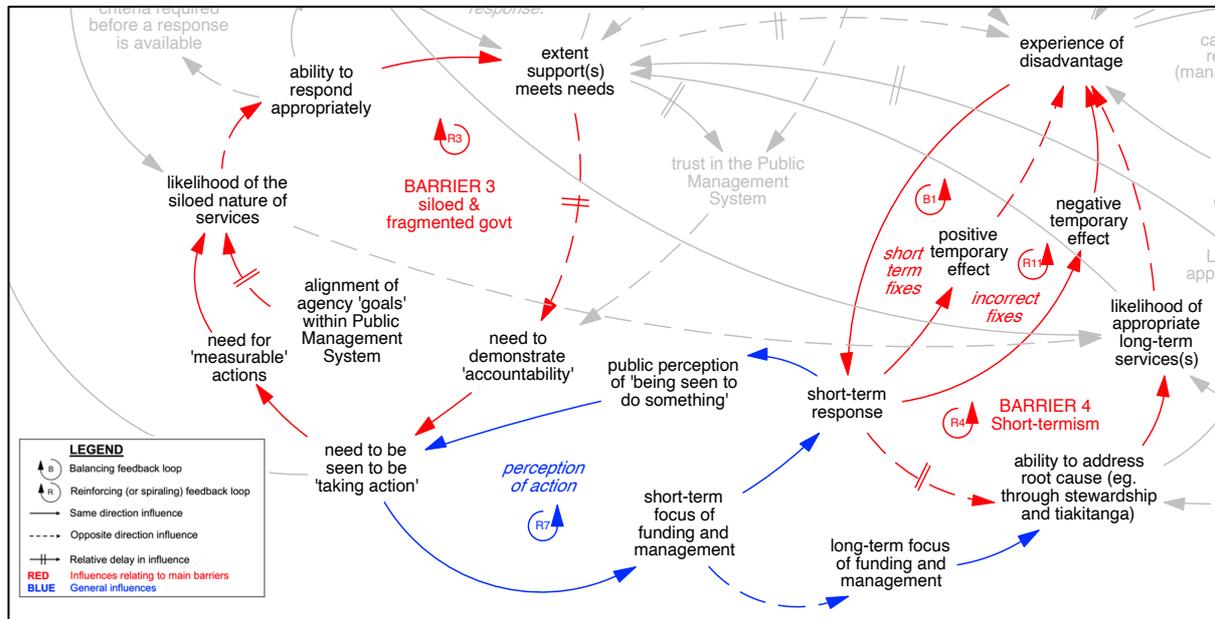
Here, any *increase* in the 'need to be seen to be 'taking action'' *increases* the 'short-term focus of funding and management'. In turn, this *increases* the 'short-term response' which completes the *perception of action* **loop**. At the same time, this also *decreases* the 'long-term focus of funding and management' which, in turn, *decreases* the 'ability to address root cause (e.g., through stewardship and tiakitanga)'. This helps to further highlight that any attempts to increase a focus on short-term responses tend to come at the expense of investing in longer-term (and often more impactful) responses.

4.2.10 The complete detailed causal diagram 1B

The previous sub-sections described the various parts of detailed version of the causal diagram. For completeness, the entire causal diagram is shown here.

Figure 26. Complete detailed causal diagram 1B – Disadvantage and the barriers to addressing it
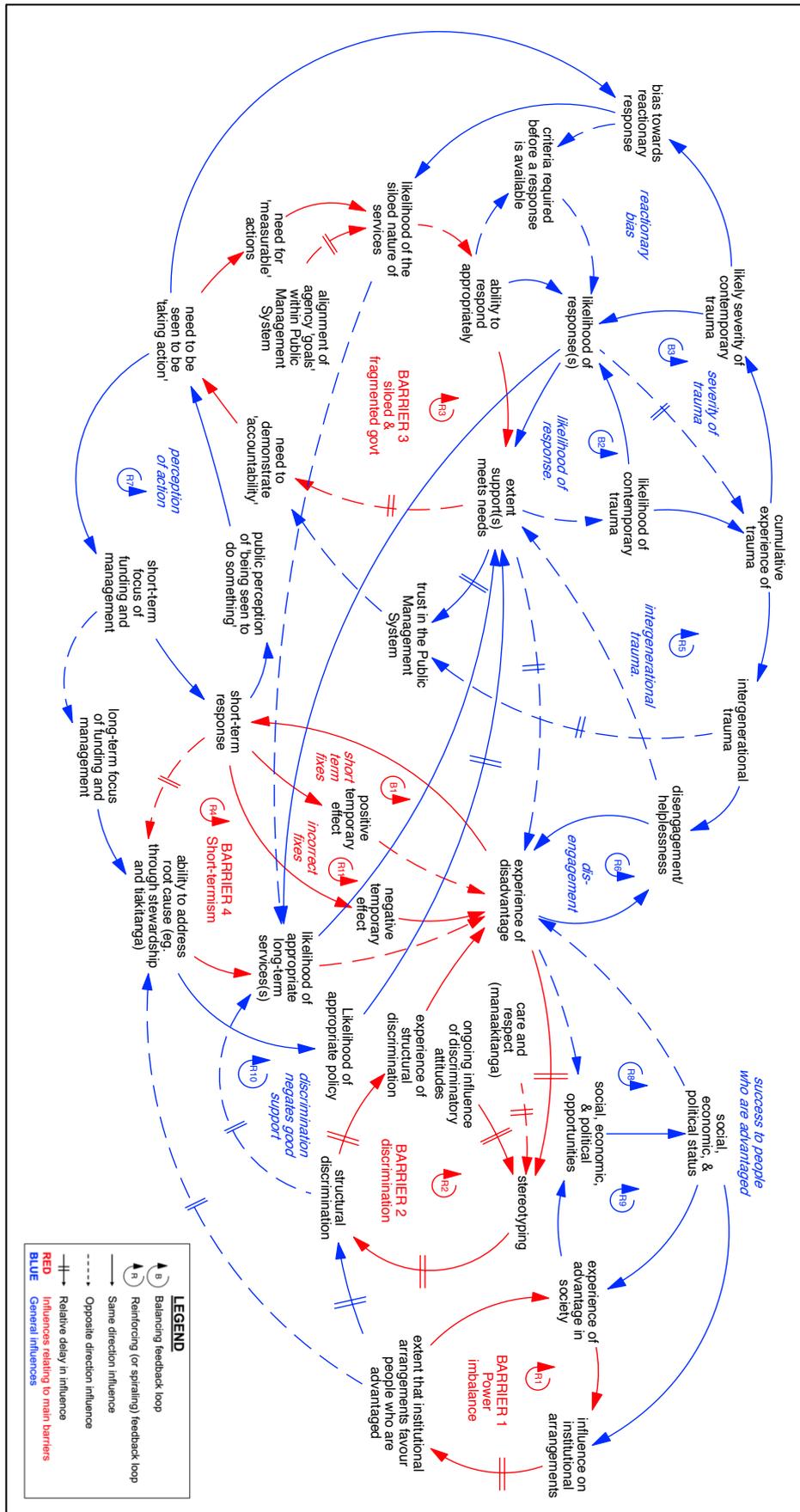
5 Causal diagram 2: Trust, accountability and Government's willingness to change

This section describes the causal diagram relating to the interconnectedness of trust, accountability, and the Government's willingness to change. As with the first diagram, two versions of the same diagram are described. Both are synthesised and simplified representations of a hypothesised reality, which is what causal diagrams are. Yet in this instance the first is a summarised representation of the way that trust is interconnected and can broadly be related to any individual or community (diagram 2A). Many of the relationships described in this diagram were inspired by insights from a Māori perspective and then generalised for a general community perspective.

The second looks at these same interconnections from a Māori perspective and adds a perspective on the relationship between Māori and the Government through te Tiriti o Waitangi and how this impacts on trust, accountability, and the Government's willingness to change (diagram 2B).

It is noted that this is not to suggest that Māori should be dealt with in a separate way. Rather, it seeks to highlight that in addition to the variables described in the general diagram, the equity of Tiriti partnerships is also related to Māori levels of trust.

A glossary for all variables used in each diagram is provided in Appendix 1.

Diagram 2A only uses colour (blue). In the second diagram (2B) two colours have been used. The blue arrows are the same arrows as in 2A, while the maroon arrows relate to those variables relating to the partnerships under te Tiriti that have been added for greater context.

Note: Reference to the Crown has generally been avoided in this report. In these loops, Government with a capital 'G' refers to the executive (elected ministers); while government with a lower case 'g' refers to the operational elements of government (staff in ministries, departments, agencies, etc). These operational elements of government are also referred to as the Public Management System.

5.1 Causal diagram 2A: A broad perspective on trust, accountability, and Government's willingness to change

The parts of the causal diagram are described and gradually built up into the complete diagram in the following sub-sections.

5.1.1 Trust is reciprocal

Several loops summarise how trust is reciprocal **(R12, R13, and R14)**. This relates to trust arising over time as an emergent characteristic of relationships where it is both given and returned/received over time.

In this diagram, 'Community trust of Government' describes the level of trust a community of interest has in the Government (elected representatives). 'Government trust of community'

Figure 1.Trust is reciprocal
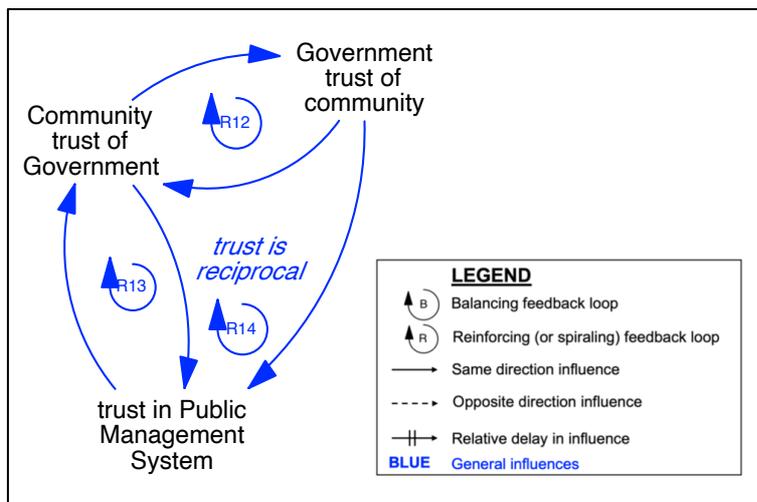
describes the level of trust that the Government (elected representatives) has in a community of interest. 'Trust of the Public Management System' describes the trust held by communities of interest and the wider public in the Public Management System (the operational arm of the Government).

R12 shows how any 'Community trust of Government' (the executive) and 'Government trust of community' are self-reinforcing/spiralling. An *increase or decrease* in one will encourage an *increase or decrease* in the other.

R13 also shows how any 'Community trust of Government' and 'Community trust of the Public Management System' are self-reinforcing/spiralling. An *increase or decrease* in one will encourage an *increase or decrease* in the other.

Finally, **R14** is a spiralling loop that links all three variables. If 'Government trust of community' is high, this *increases* the 'trust of the Public Management System' because policies and direction will flow through to it from the executive, which increases 'Community trust of Government' for having trust in them and delivering on their needs, which further increases 'Government trust of community'.

5.1.2   Trust is relational

Trust is also relational, meaning it is heavily dependent on the relationships that are built between and amongst people. This is demonstrated by reinforcing loops **R15, R16, and R17**.

In this diagram, 'personal connection' describes the level of personal connection that individuals, communities, or cohorts have with the operations of the Public Management System and the staff and services they interact with. 'Authenticity' describes the level of sincerity and authenticity that people working in the Public Management System have towards the communities that they work with. This determines how authentic the system is when working with others. 'Leaders front messages' describes the extent that leaders of/within the Public Management System proactively front messages and communications, especially difficult ones. 'Consistency of staff' describes the consistency of staff within the Public Management System. This means that there is familiarity and a consistent relationship between the individuals/communities and the Public Management System. 'Consistent institutional knowledge' describes the consistent level of knowledge and capability that members of the Public Management System have, thus improving the experience of those interacting with them.

Figure 27.　　　　**Trust is relational**
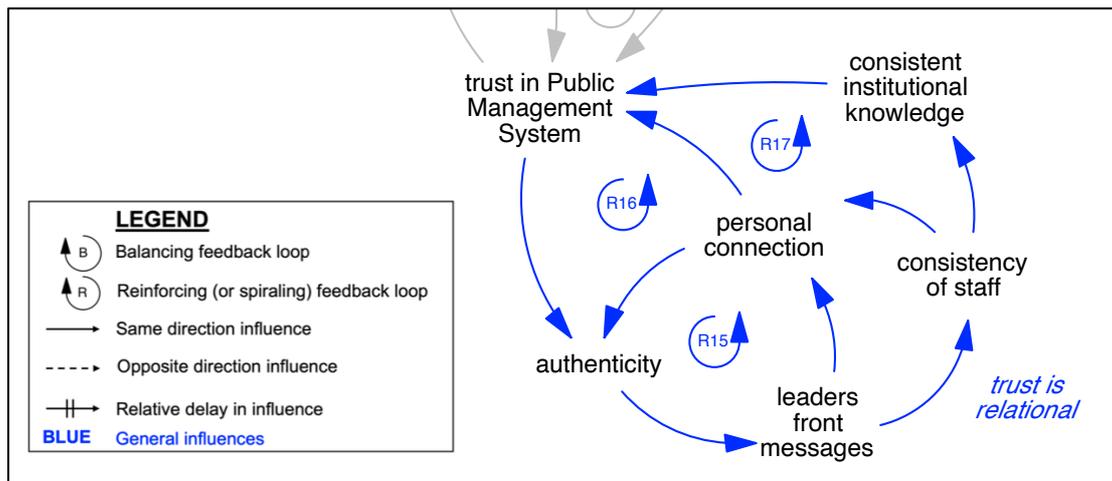
R15 describes how 'personal connection' reinforces 'authenticity' which reinforces the likelihood that 'leaders front messages' (especially difficult ones), which further reinforces the personal connection. This loop can spiral in a positive or a negative way, with all these variables eroding each other if this loop spirals in the wrong direction.

'Trust of the Public Management System' can also be included in this loop, which it is in **R16**. Here, 'personal connection' reinforces 'trust of the Public Management System' which reinforces 'authenticity' and 'leaders front messages'. This can also operate in a positive or a negative way.

Finally, **R17** illustrates how the 'consistency of staff' and 'consistent institutional knowledge' also helps to reinforce 'trust of the Public Management System', which further reinforces 'authenticity' and 'leaders front messages'.

Often when issues are experienced, it can be found that many of these variables are in decline or depleted, thus spiralling all these relationships downward.

5.1.3　How trust influences political risk

Trust also affects the 'Government's ability to tolerate or accept political risk'. This variable describes the Government's (elected officials) tolerance of political risk. Put another way, this is the extent that they are willing to expend political capital to undertake the most appropriate responses required for the challenges presented. Trust influences this directly through 'trust of the Public Management System' and indirectly through the other variables described above, such as 'community trust of Government' and 'consistent institutional knowledge'.

Both 'consistent institutional knowledge' and the 'Government's ability to tolerate or accept political risk' are also influenced by the length of political and funding cycles. The shorter the length of these cycles, the less institutions can be committed to projects and organisational structure, and therefore the less likely there will be consistent institutional knowledge. While constitutional reform is beyond the scope of this inquiry, it should still be noted that the length of political and funding cycles has an impact.

Figure 28.   **Trust and political risk**

5.1.4   Accountability to each other

Being trusted and respected is an important way that people are informally held accountable to each other in society. This is represented by the **accountability reinforcing loop (R18)**.

Figure 29.   **Accountability to each other**

Here, the *more* 'actions are undertaken in service of community in [an] appropriate way' (i.e. they are appropriate for the community they are intended for), the *greater* the 'extent people perceive you as trustworthy' and the greater the 'respect given to you by others' – both based on their interactions with you, your friends and whānau. This loop can spiral in a positive or a negative way, either building or eroding trust and accountability.

Accountability is also linked to whether support is provided from a strengths-based or deficit-based approach. Over time, any *increase* where 'actions are undertaken in service of community in an appropriate way' also *increases* 'knowledge of appropriate community ways and practice', which further *builds* a strengths-based view by *increasing* the 'support provided from a 'strengths approach'. This increases 'Community trust in Government'.

Conversely, any increase in 'Support provided from a 'deficit approach'' has an *opposite* influence on 'Community trust in Government', decreasing it.

5.1.5 Willingness to change leads to active learning and devolved decision-making

The final loops in this diagram are enabled because **trust builds willingness to change**. Two main loops operate here: one related to **active learning (R19)** where the support providers learn about a world they are unfamiliar with, to deliver appropriate services; and one related to **devolved decision-making (R20)**, where support providers devolve decision-making and resources to the community. Both are ways that allow for appropriate services to be delivered, and both are underpinned by a strengths-based approach and trust.

Figure 30.   **Willingness to change, active learning and devolved decision-making**
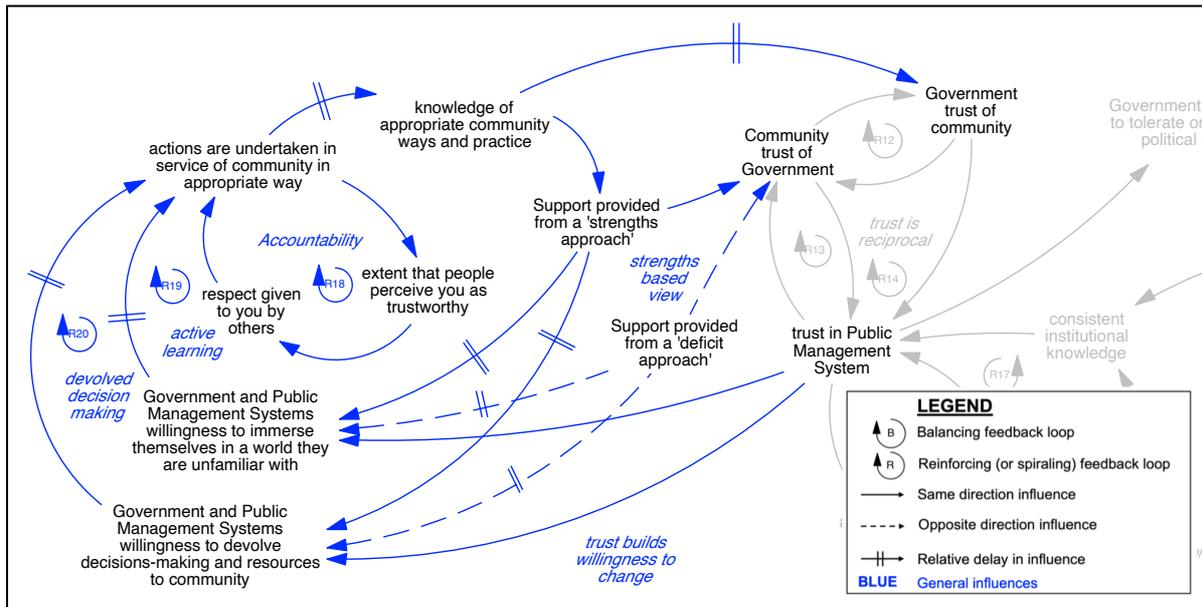
5.1.6 Complete diagram 2A – a general perspective on trust

The previous sections described the various parts of this causal diagram relating to trust, accountability, and the Government's willingness to change. For completeness, the entire causal diagram is shown here.

A version of this same diagram specifically from a Māori perspective is described in the following section (5.2).

Figure 31. **Complete causal diagram 2A – A general perspective on trust and accountability**
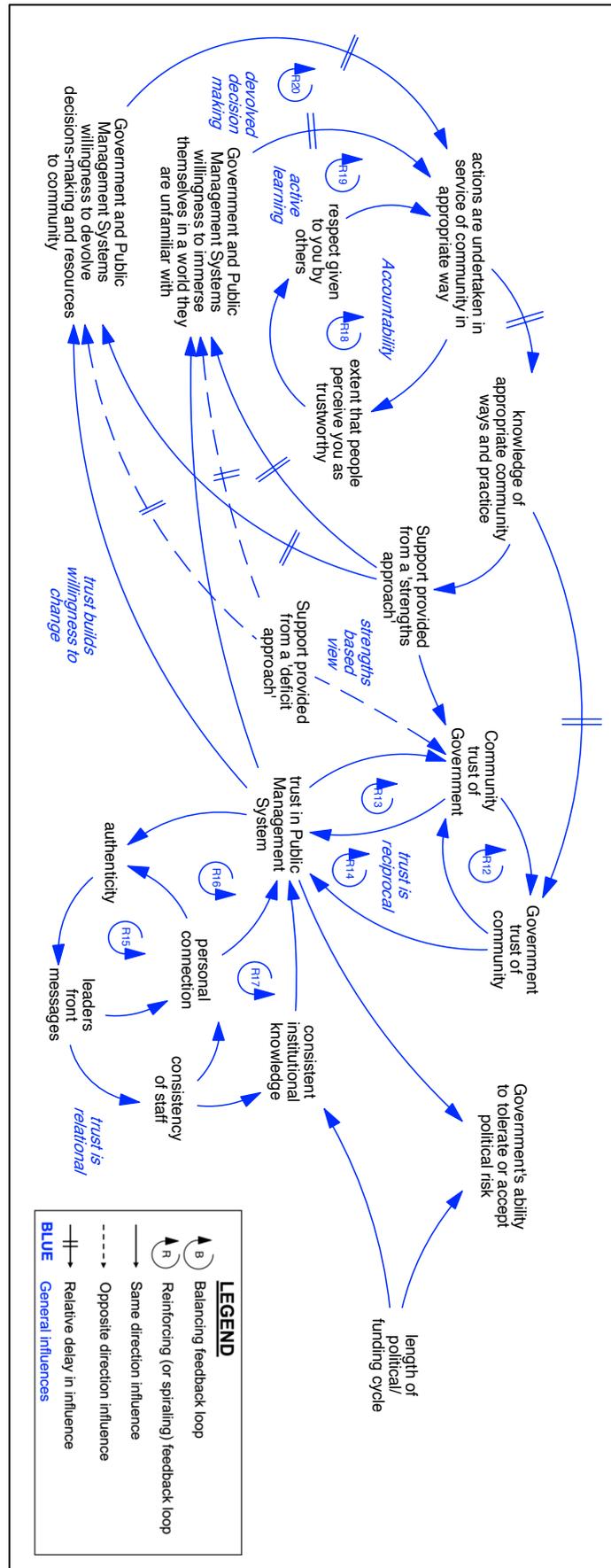
5.2 Causal diagram 2B: A Māori perspective on trust, accountability, the Government's willingness to change, and Māori-Crown relationships in relation to persistent disadvantage

This section describes a version of the causal diagram described in section 5.1, specifically from a Māori perspective. It also has interconnections with the Māori-Crown relationships added in (these are referred to as Tiriti partnerships in the causal diagrams). This is called Causal diagram 2B.

The fundamental structure, loops and overall dynamics of the trust and accountability part of the diagram remain the same. However, some of the variables are described specifically from a Māori perspective. While this may appear like a Māori perspective is being applied to a general diagram, in fact the opposite is true. The general diagram was heavily influenced by insights from a Māori perspective and then generalised to be applicable to a wider audience.

This section is structured in the same way as the previous section and should be read as an extension of the previous sections. Additional sub-sections have been added for those relationships relating to te Tiriti.

5.2.1 Trust is reciprocal, relational, and linked to political risk

The first sections of the general diagram are covered here. This is because they remain the same except that general 'community' trust is replaced with trust in Government by Māori. Therefore, 'Māori trust in Government' and 'Government trust in Māori' are reciprocal along with 'trust in the Public Management System'. All other interconnections that describe relational trust still apply, as do the influences on political risk.

Figure 32. Trust is reciprocal, relational and linked to political risk
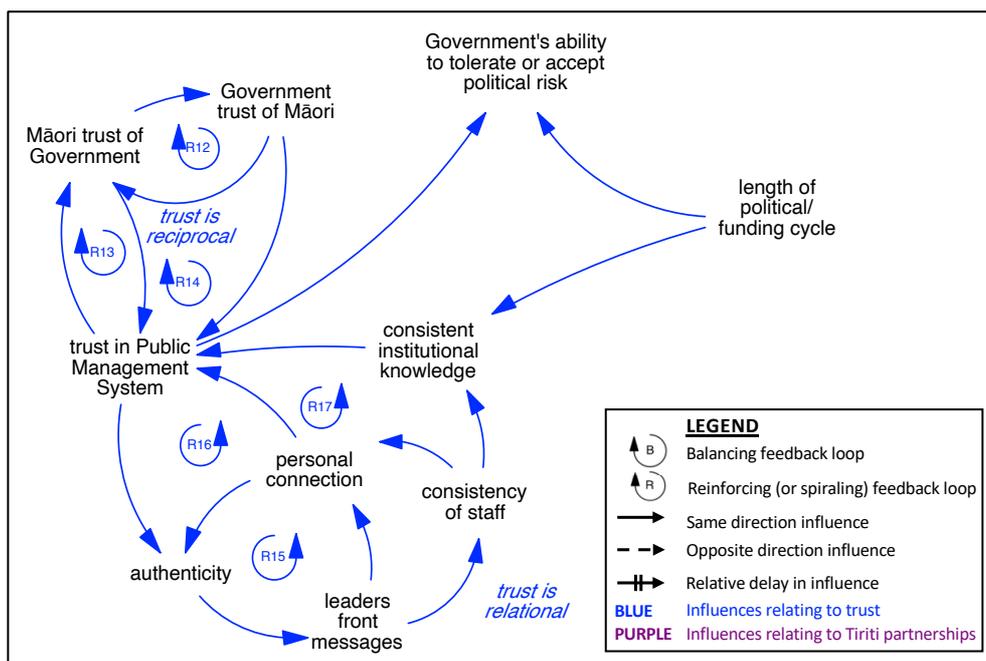
5.2.2 Accountability to each other in te ao Māori

In te ao Māori, one of the important ways that accountability can be achieved (but not the only one) is through mana and tikanga. These terms are used here to refer to the way in which people or organisations operate, so that they earn the trust and respect of those they work with or support. In a practical sense this may manifest through appropriate cultural knowledge and practice, or it may be through having appropriate consequences for non-performance or independent monitoring of government (Haemata (2022a).

The way this has been represented in this diagram is with the variable 'actions are undertaken in service of Māori in accordance with tikanga'. While this is worded from a Māori perspective ('in service of Māori'), it is not exclusive of actions that are undertaken in service of all. Rather, this section seeks to take a Māori perspective on these influences. Similarly, this applies to actions being taken 'in accordance with tikanga'.

The *more* that 'actions are undertaken in service of Māori in accordance with tikanga', the *greater* the 'extent that people perceive you as trustworthy', and the greater the 'mana given to you by others'. This is shown here by the **reinforcing loop R18**, which in this version of the diagram is labelled **Accountability (te ao Māori)**.

Figure 33. Accountability to each other in te ao Māori
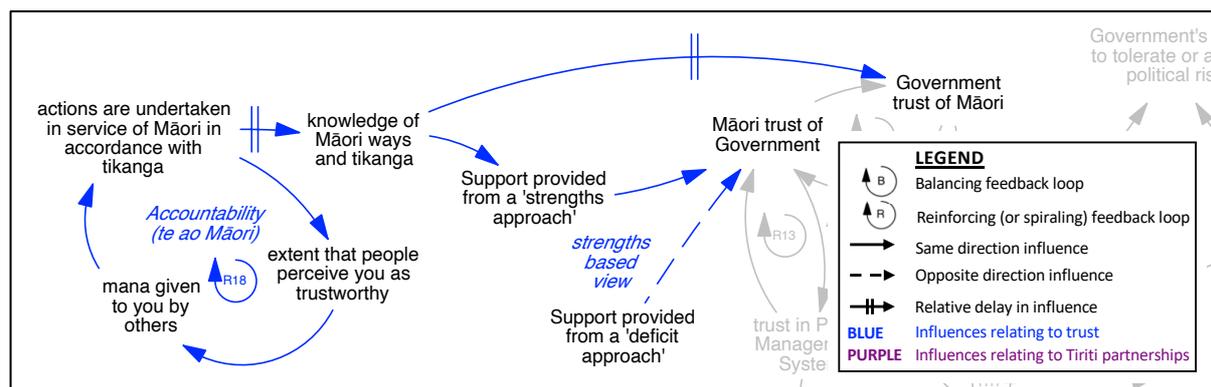
Increasing the 'actions are undertaken in service of Māori in accordance with tikanga' also *increases* the 'knowledge of Māori ways and tikanga' in the Public Management System, which further *increases* the extent that 'support provided from a 'strengths approach''.

5.2.3 Willingness to change leads to active learning and devolved decision-making

The structure of how **trust builds willingness to change** also remains the same in this diagram. However, the reference to devolved decision-making is specific to Māori rather than other communities. This demonstrates that trust supports the reinforcing loops that enable **active learning (R19)** and **devolved decision-making (R20)**.
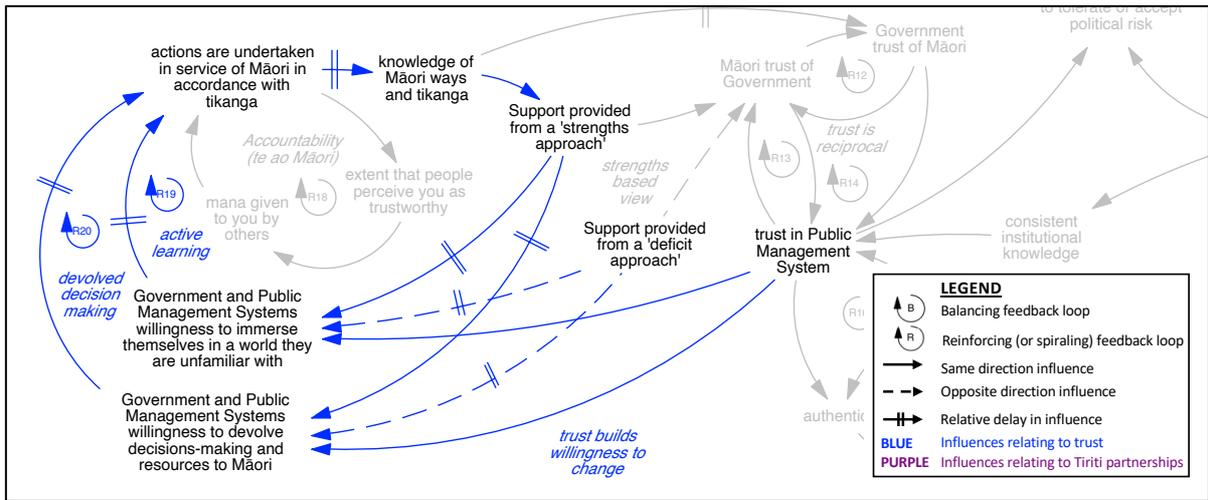
5.2.4   The power imbalance in Māori-Crown relationships thwart trust

This section and the following sections describe some simplified dynamics of Māori-Crown relationships, how they are interconnected, and how they influence trust and knowledge of Māori ways and support delivered in accordance with tikanga.

Figure 35.   **The power imbalance in Māori-Crown relationships thwart trust**
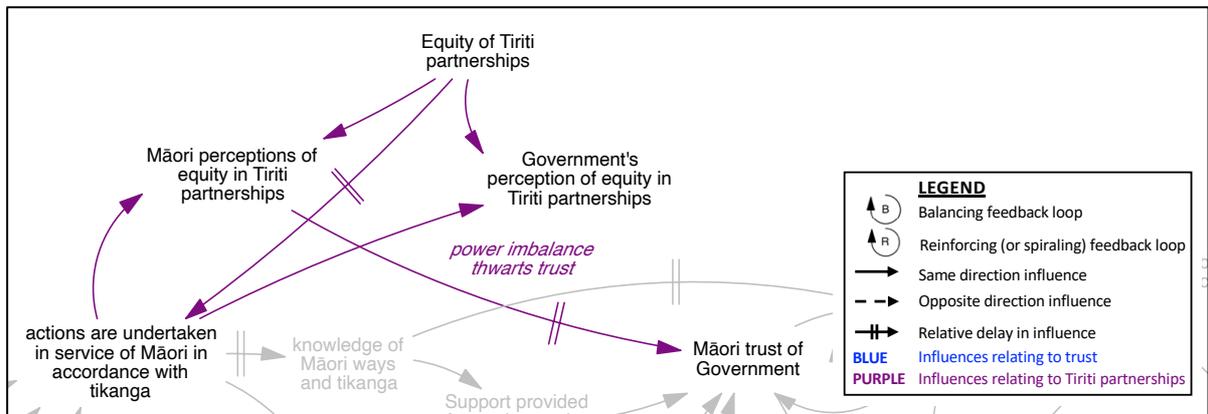
The main variable in this part of the diagram is the variable 'Equity of Tiriti partnerships'. This represents the equity of the actual legislative and institutional arrangements that bring Tiriti partnership to life. This reality is one of the many influences that informs the ability to deliver 'actions undertaken in service of Māori in accordance with tikanga' – the greater the equity, the greater the ability such actions are achieved.

This reality also informs the perceptions that both Māori and the Government have of the equity in Tiriti partnerships. It is noted that Māori are not one homogenous group and therefore the same perceptions of fairness may differ by iwi and hapū. Yet the *greater* 'Māori perceptions of equity in Tiriti partnerships', the *greater* 'Māori trust of Government'. This is a key relationship which is noted in the inquiry, *a power imbalance in The Māori-Crown relationships will thwart trust*.

Also, the *greater* 'actions are undertaken in service of Māori in accordance with tikanga', the *greater* both Māori and the Government's perceptions of equity in Tiriti partnerships.

5.2.5 Māori and Government loops relating to perceptions of Tiriti partnerships

Two loops operate, based on the perceptions of those they describe: one for Māori and one for the Government. Both involve a goal/gap structure (see section 3.4 for the explanation of these) relating to Tiriti partnerships aspirations, the parties' perceptions of the reality of the relationship, and a gap which describes how in (or out of) line the reality is with their aspirations.

It should be noted that reference in this discussion to Māori or Government's *aspirations* in respect of te Tiriti refer to their aspirations for the relationships between those parties in te Tiriti. That both Māori and the Government (Crown) have *rights* under te Tiriti is a given. The influences described here relate to the changes required in the relationships to fully realise these rights. Put another way, it describes variables that influence their commitment to delivering on existing rights.

In the **Māori perception of te Tiriti loop (B4)**, *increased* 'Equity of Tiriti partnerships' *increases* 'Māori perceptions of equity in Tiriti partnerships'. Both this variable and 'Māori Tiriti partnerships aspirations' inform how in line those things are. If their aspirations and perceptions are close to each other, the gap is low. If they are not near each other, the gap is large. Currently it is understood by the inquiry team that for Māori this gap is large, yet over time as/if this gap closes (*reduces*), 'Māori perceived need for change' will *reduce,* as will the need for 'Māori advocacy for change' to change the equity in the relationships.

Figure 36. Māori and Government loops relating to perceptions of te Tiriti

The same causal structure exists on the **Government's perception of te Tiriti loop (B5)**. Here, a similar goal/gap structure exists: The 'Government's Tiriti partnerships aspirations' and the 'Government's perception of equity in Tiriti partnerships' both inform the 'Government's Tiriti partnerships aspiration gap'. The lower this is, the closer their aspirations are with their perceived reality. It is likely that this gap is lower than the Māori aspiration gap, and so the Government is currently more likely than Māori to feel like Tiriti partnerships are equitable.

The 'Government's Tiriti partnerships aspiration gap' informs both their 'willingness to change' and the extent that 'institutions and legislation reflect Tiriti partnerships equity'. These relationships have delays and will take time to influence the 'Equity of Tiriti partnerships',

however they are the main pathway to changing the equity of Tiriti partnerships, given the need for legislation to enable equitable operating models.

5.2.6 Government willingness to work with Māori to correct and redress historic actions

While the Government (the Crown) has obligations under te Tiriti, these have not always been upheld. Having obligations does not mean that they will be upheld. The variable 'willingness to change' has been included as a way of recognising that the Government of the day's aspirations to (or acceptance of the need to) uphold their obligations is an important driver of actions and legislation that reflect equity in Tiriti partnerships.

Therefore, the Government's 'willingness to change', which is driven by their Tiriti relationships aspirations, has a direct (yet delayed) influence on the 'opportunities to correct historic actions by being accountable and working with Māori', which in turn helps increase the 'actions undertaken in service of Māori in accordance with tikanga'.

Figure 37. **Government willingness to work with Māori to correct and redress historic actions**

Being accountable to and working with Māori is another important way that services can be delivered in line with tikanga, improving outcomes for Māori and building trust in the longer-term. Services being 'in line with tikanga' is an aggregate term used to describe services that are respectful of and/or based on/in line with cultural practices, and therefore culturally appropriate for Māori. The exact nature of these will vary on a case-by-case basis.

5.2.7 Māori advocacy influences Government's Tiriti relationships aspirations

One important feedback loop is the ***Māori advocacy builds Government's aspirations* loop (B6)**.

Māori advocacy can increase the 'demand(s) for equity in Tiriti partnerships', which builds the 'Government's Tiriti relationships aspiration'. Over time, this will continue to keep upward pressure on the gap between the Government's Tiriti relationships aspirations and their perceptions of the reality of those relationships, encouraging a willingness to change, greater equity in the relationships, and a reality that is more aligned with Māori aspirations of equity in the relationships.

Figure 38. **Māori advocacy influences Government's Tiriti relationships aspirations**

5.2.8 Public pressure relating to te Tiriti and political risk

The final part of this diagram describes two general types of public pressure relating to Tiriti partnerships, and the impact this has on the 'Government's Tiriti relationships aspiration'.

Figure 39. **Public pressure relating to te Tiriti and political risk**

Firstly, the 'Government's ability to tolerate or accept political risk' has a longer-term *same* influence on their 'willingness to change'. The 'perceived political risk relating to Tiriti partnerships' also has an *opposite* influence on the Government's ability to tolerate or accept political risk – that is, if there is high political risk, this will reduce the Government's ability to tolerate risk.

This perceived political risk is influenced by both 'public pressure for no change in Tiriti partnerships' (opposite influence) and 'public pressure for equitable Tiriti partnerships (same

influence). In short, the more people in the public that understand and support equitable Tiriti partnerships, the lower the political risk and the greater the demand for equity.

It is important to note that both Barrier 1 (power imbalance) and Barrier 2 (discrimination) tend to reinforce 'public pressure for change in Tiriti partnerships', which would lead to those relationships being better honoured. Therefore, efforts to reduce these barriers will help reduce resistance to equity in Tiriti partnerships.

5.2.9   Complete diagram 2B – a Māori perspective on trust, accountability and Māori-Crown relationships in relation to persistent disadvantage

The previous sections described the various elements of this causal diagram describing a Māori perspective on trust, accountability, willingness to change, and Tiriti partnerships. For completeness, the entire causal diagram is shown here.

Figure 40. **Complete diagram 2B – a Māori perspective on trust, accountability and Māori-Crown relationships in relation to persistent disadvantage**
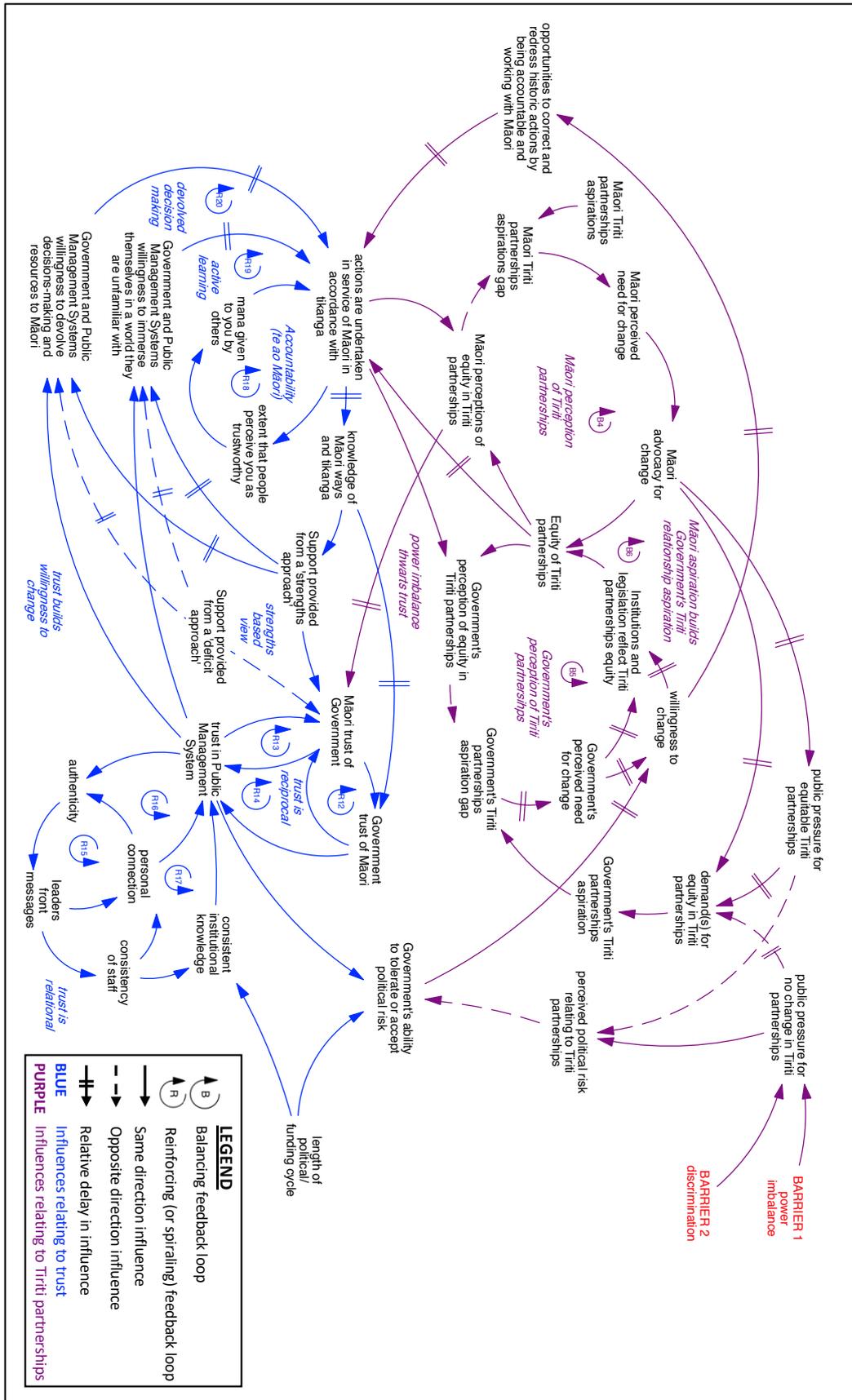
6 Summary

This report has described a range of causal diagrams. They they are designed to synthesise and summarise the complexity of the challenges relating to individuals and communities experiencing persistent disadvantage in Aotearoa New Zealand.

All diagrams in this report are conceptual diagrams only and are intended to be read in conjunction with the 'A fair chance for all' inquiry report, other more rigorous analyses undertaken on any part of the diagram, or from a specific perspective (e.g., a specific community or the provision of a service).

Two broad diagrams were described – each with two slightly different versions, (so four distinct diagrams in total).

The first described a range of variables causing people's experience of disadvantage and the barriers to addressing it that had been identified in the inquiry. This is useful as it might be considered a high level and single page overview of the most important influences and tensions at work within the Public Management System. There are two versions of this map. While both are only conceptual diagrams, diagram 1A provides the simplest high-level overview, while diagram 1B provides the same overview with a slightly greater level of detail, to allow those more familiar with certain areas to intuit a greater level of nuance from the diagram. A general audience will most likely be interested in 1A, while a more technical audience will most likely be interested in 1B.

The second described trust, accountability, and the Government's willingness to change. Two diagrams for this were described, however from two different perspectives rather than two levels of aggregation. Diagram 2A provided a *general* perspective on trust, accountability, and Government's willingness to change (i.e., from the perspective of any community). It should be noted that many of the influences in here were derived from a specific Māori perspective and then found to be generalisable to a wider audience. Diagram 2B provided a perspective on trust, accountability, and the Government's willingness to change specifically from a Māori point of view. This also included a perspective on some of the causal influences relating to equity in the Māori-Crown relationships.

It is hoped that these diagrams provide cause for reflection and insight to the interconnected nature of these challenges. Especially how well-intentioned interventions can sometimes have detrimental impacts due to the complex nature of the interactions.

Causal diagrams are intended to highlight that there are no silver bullets when dealing with complex issues, and they should highlight that navigating complexity is best understood when appreciating that influence operates in feedback loops, rather than straight lines.

Perhaps most importantly, causal diagrams can help people reflect on the beliefs and assumptions that underpin the way they believe the world does work or should work. It is hoped that they provide this opportunity for the reader.

7 References

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Appendix 1 Glossary of variables used in the causal diagrams

This appendix provides a tabulated summary of all the variables used in the causal diagrams.

Table 1 describes variables used in both versions of causal diagram 1 (1A or 1B). All variables are listed in the table, with the applicability to either diagram 1A or 1B (or both) being noted in the righthand columns.

Table 2 describes variables used in both versions of causal diagram 2 (2A or 2B). This table is structured differently, with all variables from each diagram listed separately, in two sets of columns. As they many variables are similar, they are listed beside each other so that they are comparable. As diagram 2B contains many more variables that are not in diagram 2A, this list is longer and where variables are not relevant to diagram 2A, they are noted as 'N/A' in those columns.

Table 1. Glossary of variables contained in the two versions of Causal Diagram 1: Disadvantage and the barriers to addressing it.

Causal diagram 1: Disadvantage and the barriers to addressing it

Variable	Description	Diagram version	
		1A	1B
Experience of disadvantage	The experience of an individual or community of disadvantage. This is any disadvantage, but the longer people spend in this situation the greater they are at risk of being in persistent disadvantage.	✓	✓
Extent support(s) meets needs	The extent that the support(s) provided by the Public Management System meet the needs of the recipient, in that it reduces their experience of disadvantage.	✓	✓
Likelihood of appropriate long-term service(s) & policy(ies)	The likelihood that support(s) (i.e., services) and policy(ies) provided by the Public Management System are appropriate for the long-term needs of the recipients. Short term responses are covered by the variables 'short-term response' and 'positive temporary effect'.	✓	
Likelihood of appropriate long-term service(s)	The likelihood that support(s) (i.e., services) provided by the Public Management System are appropriate for the long-term needs of the recipients.		✓
Likelihood of appropriate policy	The likelihood that policy(ies) provided by the Public Management System are appropriate for the long-term needs of the recipients.		✓
Experience of trauma	The overall experience of trauma by individuals or communities. This can be contemporary or historic, and it may be cumulative.	✓	
Likelihood of contemporary trauma	The likelihood that an individual or community will experience contemporary trauma. i.e., trauma or distress in their life.		✓
Cumulative experience of trauma	The cumulative experience of trauma by an individual or community.		✓
Intergenerational trauma	Trauma experienced by previous or current generations that has (will have) an impact on current (and future) generations.		✓

Causal diagram 1: Disadvantage and the barriers to addressing it

Variable	Description	Diagram version	
		1A	1B
Likely severity of contemporary trauma	The likely severity of contemporary trauma, as informed by the cumulative experience of an individual's or community's experience of trauma.		✓
Bias towards reactionary response	The extent that the Public Management System provides policy(ies) and support(s) that are biased towards responding in a reactionary way. i.e., reaction dominates the way in which they operate, rather than addressing root causes longer-term.	✓	✓
Likelihood of response(s)	The likelihood that a recipient will receive a response from the Public Management System in response to their needs. This will be dependent upon the resources of the Public Management System, and the criteria that may need to be met to qualify for a response.	✓	
Likelihood of response(s)	The likelihood that a recipient will receive a response from the Public Management System in response to their needs.		✓
Criteria required before response is available	The criteria or 'threshold' of severity relating to a situation that may need to be met before an individual or community qualifies for a response.		✓
Disengagement/ helplessness	The level of disengagement and/or helplessness that an individual or community may experience. This is in their everyday life, not necessarily in relation specifically to the Public Management System. However, this is often felt by the Public Management System when dealing with individuals/ communities.	✓	✓
Trust in the Public Management System	The level of trust held in the Public Management System by an individual or community.	✓	✓
Social, economic, & political opportunities	The social, economic, and political opportunities that are available to individuals or communities and that they may experience.	✓	✓
Social, economic, & political status	The level of social, economic or political status that individuals or communities may realise or experience, based on their socio-, economic- and political- opportunities.	✓	✓
Experience of advantage in society	The level of advantage or privilege that an individual or community may experience in society.	✓	✓

Causal diagram 1: Disadvantage and the barriers to addressing it

Variable	Description	Diagram version	
		1A	1B
Influence on institutional arrangements	The level of conscious or unconscious influence that an individual, community, or cohort may exert on the institutional arrangements of society. This may be intentional or unintentional.	✔	✔
Extent that institutional arrangements favour people who are advantaged	The extent that institutional arrangements may favour some individuals, communities, or cohorts more than others, because of conscious or unconscious bias in their formation or operation.	✔	✔
Stereotyping	A series of simplistic assumptions or beliefs that some individuals, communities, or cohorts in society hold about other individuals, communities, or cohorts in relation to persistent disadvantage.	✔	✔
Structural discrimination	The extent that the structures, processes, and accessibility of the Public Management System favour some individuals, communities, or cohorts over others, intentionally or not. Who then experience discrimination and receive differing levels of service or outcomes as a result, contributing to persistent disadvantage.	✔	
Structural discrimination	The extent that the structures, processes, and accessibility of the Public Management System favour some individuals, communities, or cohorts over others, intentionally or not, in relation to persistent disadvantage.		✔
Experience of structural discrimination	The extent that individuals, communities, or cohorts experience structural discrimination in the Public Management System and receive differing levels of support or service as a result, contributing to persistent disadvantage.		✔
Ongoing influence of discriminatory attitudes	This captures the attitudes and perceptions that are often used to stereotype people. These are often informed by discriminatory attitudes (possibly relating to disability, sex/gender, or embedded in a colonial mindset) that people may not recognise they hold. Structural discrimination that occurs in an organisation is influenced by the attitudes of the wider society that it sits within and the people that make up the organisation.		✔
Care and respect (manaakitanga)	This represents an attitude and approach to interacting with people that is characteristic of caring for/about and respecting people.		✔

Causal diagram 1: Disadvantage and the barriers to addressing it

Variable	Description	Diagram version	
		1A	1B
Short-term response	Responses that tend to focus on providing a short-term response to an immediate issue or challenge. Such challenges may only be symptoms of deeper issues and such short-term responses will not deal with the deeper issue. Sometimes these are the product of a funding system that only works on short term cycles and does not provide long-term funding certainty.	✓	
Short-term response	A support response that is provided as a short-term measure or responds to an immediate need, which may only be a symptom of deeper issues.		✓
Short-term focus of funding and management	Funding that is provided in short funding cycles, only lasts for short periods of time (e.g. a few years rather than a decade), so has low certainty over the longer term. Likely prioritises immediate spend on challenges that are symptoms, not root causes.		✓
Positive temporary effect	A short-term positive effect from the provision of a support or service that is unlikely to have a substantial longer-term effect. For example, the provision of food may alleviate immediate hunger, but it is unlikely to alleviate the deeper reasons why hunger exists.	✓	✓
Negative temporary effect	An aggregate variable to describe a variety of short-term negative effects from the provision of a support or service. This may be because it has been designed the wrong way or is inappropriate and makes an issue worse, not better. *Note: Long term negative effects of support and services are captured via the pathway of short-term responses reducing the ability to address root causes.*		✓
Ability to address root cause (e.g., through stewardship and tiakitanga)	The ability of Public Management System services and supports to be able to address longer-term root causes of issues. This will be heavily dependent on the approach taken in delivering services, such as taking time, not just responding to short-term symptoms and taking a stewardship approach based on tiakitanga. Stewardship here refers to the responsibility to care for and support others, be that whānau, friends or other community members. Tiakitanga refers to the act of caring for each other and looking out for, or after, each other in a connected and reciprocal way. The two concepts are related and are used here as general phrases to capture a range of reciprocal care and support.	✓	✓

Causal diagram 1: Disadvantage and the barriers to addressing it

Variable	Description	Diagram version	
		1A	1B
Need to be seen to be 'taking action'	The need for the Government and the Public Management System to be seen to be 'taking action' to address issues being experienced in society.	✓	
Need to demonstrate accountability	The need for the Public Management System to demonstrate short-term accountability for where it directs its resources and that such allocation achieves results.		✓
Need to be seen to be 'taking action'	The need for the Public Management System to be seen to be 'taking action' to address issues being experienced in society.		✓
Need for 'measurable' actions	The need for the Public Management System to be structuring its operations so that it is delivering 'measurable actions'. This tends to drive siloed behaviour and focuses on a narrower set of actions that can only be measured by limited metrics and may not be appropriate for addressing the issues of concern over the longer-term.		✓
Alignment of agency 'goals' within Public Management System	The extent that the different 'goals' of the Public Management System are aligned when service provision overlaps across individuals, communities, or cohorts. Goals here are loosely used to refer to the political and management drivers of different organisations. For example, one organisation might be tasked with preserving something, while another might be tasked with an activity that is at odds with that preservation. It is important to realise that such conflicting goals may not always be obvious.		✓
Likelihood of the siloed nature of services	The likelihood that services provided by the Public Management System may be siloed within organisations and therefore constrained by these limitations.	✓	✓
Ability to respond appropriately	The overall ability of the Public Management System to respond appropriately to the needs of different individuals, communities, and cohorts.	✓	✓
Public perception of 'being seen to be doing something'	The perception by the public that the Public Management System is 'doing something'. This is in response to the activity that the Public Management System is undertaking.	✓	✓

Table 2. Glossary of variables contained in the two version of Causal Diagram 2: Trust, accountability, and Government's willingness to change.

Causal diagram 2: Trust, accountability, and Government's willingness to change

2A General perspective on trust		2B Māori perspective on trust and Tiriti partnerships	
Variable	**Description**	**Variable**	**Description**
Community trust of Government	The level of trust a community of interest has in the Government (elected representatives).	Māori trust of Government	The levels of trust Māori have in the Government (elected representatives).
Government trust of community	The level of trust that the Government (elected representatives) has in a community of interest.	Government trust of Māori	The levels of trust that the Government (elected representatives) has in Māori.
Trust of the Public Management System	The trust held by communities of interest and the wider public in the Public Management System (the operational arm of the Government).	Trust of the Public Management System	The trust held by Māori in the Public Management System (the operational arm of the Government).
Authenticity	The level of sincerity and authenticity that people working in the Public Management System have towards the communities that they work with. This determines how authentic the system is when working with others.	Authenticity	The level of sincerity and authenticity that people working in the Public Management System have towards Māori that they work with. This determines how authentic the system is when working with others.
Leaders front messages	The extent that leaders of/within the Public Management System proactively front messages and communications, especially difficult ones.	Leaders front messages	The extent that leaders of/within the Public Management System proactively front messages and communications, especially difficult ones.

Causal diagram 2: Trust, accountability, and Government's willingness to change

2A General perspective on trust		2B Māori perspective on trust and Tiriti partnerships	
Variable	**Description**	**Variable**	**Description**
Personal connection	The level of personal connection that individuals, communities, or cohorts have with the operations of the Public Management System and the staff and services they interact with.	Personal connection	The level of personal connection that Māori have with the operations of the Public Management System and the staff and services they interact with.
Consistency of staff	The consistency of staff within the Public Management System. This means that there is familiarity and a consistent relationship between the individuals/communities and the Public Management System.	Consistency of staff	The consistency of staff within the Public Management System. This means that there is familiarity and a consistent relationship between citizens and the Public Management System.
Consistent institutional knowledge	The consistent level of knowledge and capability that members of the Public Management System have, thus improving the experience of those interacting with them.	Consistent institutional knowledge	The consistent level of knowledge and capability that members of the Public Management System have, thus improving the experience of those interacting with them.
Government's ability to tolerate or accept political risk	The Government's (elected officials) tolerance of political risk. Put another way, this is the extent that they are willing to expend political capital to undertake the most appropriate responses required for the challenges presented.	Government's ability to tolerate or accept political risk	The Government's (elected officials) tolerance of political risk. Put another way, this is the extent that they are willing to expend political capital to undertake the most appropriate responses required for the challenges presented.
Length of political/ funding cycle	The length of the political or funding cycle that funding, or operations are tied to.	Length of political/ funding cycle	The length of the political or funding cycle that funding, or operations are tied to.

Causal diagram 2: Trust, accountability, and Government's willingness to change

2A General perspective on trust		2B Māori perspective on trust and Tiriti partnerships	
Variable	**Description**	**Variable**	**Description**
Support provided from a 'strengths approach'	The extent that support(s) and services are provided from a 'strengths-based' approach rather than a deficit-based approach. A strengths approach tends to reflect 'you are capable of determining what you need to improve your life' mindset.	Support provided from a 'strengths approach'	The extent that support(s) and services are provided from a 'strengths-based' approach rather than a deficit-based approach. A strengths approach tends to reflect 'you are capable of determining what you need to improve your life' mindset.
Support provided from a 'deficit approach'	The extent that support(s) and services are provided from a 'deficit-based' approach rather than a strengths-based approach. This tends to reflect a 'you are broken and need fixing' mindset.	Support provided from a 'deficit approach'	The extent that support(s) and services are provided from a 'deficit-based' approach rather than a strengths-based approach. This tends to reflect a 'you are broken and need fixing' mindset.
Actions undertaken in service of community in appropriate way	Any action, support(s) or services are undertaken in such a way that they are appropriate for the individual or community they are intended to help.	Actions undertaken in service of Māori in accordance with tikanga	Any action, support(s) or services are undertaken in accordance with relevant tikanga of the Māori individual or group that they are intended to help. This may be in partnership with Māori or through devolved decision-making.
Extent people perceive you as trustworthy	Extent that people perceive you as trustworthy, based on their interactions with you, your friends and whānau.	Extent people perceive you as trustworthy	Extent that people perceive you as trustworthy, based on their interactions with you, your friends and whānau.

Causal diagram 2: Trust, accountability, and Government's willingness to change

2A General perspective on trust		2B Māori perspective on trust and Tiriti partnerships	
Variable	**Description**	**Variable**	**Description**
Respect given to you by others	The level of respect given to you by people based on their interactions with you, your friends and whānau. It is phrased as 'given to you by others' as it may also be lost over time, depending on your actions.	Mana given to you by others	It is acknowledged that mana is a broad concept. This variable refers to the level of mana bestowed on you by people based on their interactions with you, your friends and whānau. In other words, this refers to the element of mana that is earned by you through your interactions with others. It is phrased as 'given to you by others' as it may also be lost over time, depending on your actions. It is noted that other elements (such as whakapapa) can also be contributors to your mana. This type of mana is not represented in the causal diagrams.
Knowledge of appropriate community ways and practice	The knowledge of what is an appropriate way to interact with and deliver support(s) and services for individuals and communities of interest.	Knowledge of tikanga Māori	The knowledge of tikanga Māori so that support(s) and services for individuals and communities of interest are delivered in a culturally appropriate way.
Government and Public Management System's willingness to immerse themselves in a world they are unfamiliar with	The extent that the leadership and staff of the Public Management System are willing to immerse themselves in a world that they are not familiar with to learn appropriate ways to deliver support(s) and services. They may not know much about these, which may challenge many of their established social norms or beliefs.	Government and Public Management Systems willingness to immerse themselves in a world they are unfamiliar with	The extent that the leadership and staff of the Public Management System are willing to immerse themselves in a world that they are not familiar with to learn appropriate ways to deliver support(s) and services. They may not know much about these, which may challenge many of their established social norms or beliefs.

Causal diagram 2: Trust, accountability, and Government's willingness to change

2A General perspective on trust		2B Māori perspective on trust and Tiriti partnerships	
Variable	**Description**	**Variable**	**Description**
Government and Public Management Systems willingness to devolve decision-making and resources to community	The extent that the leadership and staff of the Public Management System are willing to acknowledge that individuals and communities are the best placed to understand their needs and how to best deliver support(s) and services for them, so they devolve resources and decision-making to them.	Government and Public Management Systems willingness to devolve decision-making and resources to Māori	The extent that the leadership and staff of the Public Management System are willing to acknowledge that Māori are the best placed to understand their needs and how to best deliver support(s) and services for them, so they devolve resources and decision-making to them.
N/A		Equity of Tiriti partnerships	The actual equity of Tiriti partnerships *in practice*. While Māori have rights under te Tiriti, this refers to how they are realised on a day-to-day basis through the legislative recognition of an equal partnership, and the way it is lived by Tiriti partners.
N/A		Māori perceptions of equity in Tiriti partnerships	Māori perceptions of the equity in Tiriti partnerships and how well it is lived by Tiriti partners. This considers multiple Māori perspectives.
N/A		Māori Tiriti partnerships aspirations	Māori aspirations for what equitable Tiriti partnerships would look like. This considers multiple Māori perspectives.
N/A		Māori Tiriti partnerships aspirations gap	The difference between Māori aspirations and the reality of the equity in Tiriti relationship. If reality is out of line with expectations, the gap is large; if they are aligned, the gap is low.

Causal diagram 2: Trust, accountability, and Government's willingness to change

2A General perspective on trust		2B Māori perspective on trust and Tiriti partnerships	
Variable	**Description**	**Variable**	**Description**
N/A		Māori perceived need for change	The perceived need for change so that Tiriti partnerships are more equitable.
N/A		Māori advocacy for change	The extent that Māori advocate for changes in Tiriti relationships, to the Government.
N/A		Government's perceptions of equity in Tiriti partnerships	The Government's perceptions of equity in Tiriti partnerships and how well it is lived by the treaty partners.
N/A		Government's Tiriti partnerships aspiration	Government's aspiration for what equitable Tiriti partnerships would look like.
N/A		Government's Tiriti partnerships aspiration gap	The difference between the Government's aspiration and the reality of the equity in Tiriti relationship. If reality is out of line with expectations, the gap is large; if they are aligned, the gap is low.
N/A		Government's perceived need for change	The perceived need for change so that Tiriti partnerships are more equitable.
N/A		Willingness to change	The Government is legislatively required to develop and maintain the ability to work with Māori in partnership (e.g. S14 Public Service Act 2020). This variable describes the extent that the Government is actually willing to change Tiriti partnerships to be more equitable.

# Causal diagram 2: Trust, accountability, and Government's willingness to change

| 2A General perspective on trust		2B Māori perspective on trust and Tiriti partnerships	
Variable	**Description**	**Variable**	**Description**
N/A		Institutions and legislation reflect Tiriti equity	The extent that legislation and the institutions that they enable and guide, reflect equitable Tiriti relationships.
N/A		Opportunities to correct and redress historic actions by being accountable and working with Māori	The extent that the Government realises opportunities to correct and redress historic injustices done to Māori by being accountable and working with Māori in a respectful and constructive way.
N/A		Perceived political risk relating to Tiriti partnerships	The perceived political risk to the Government of adjusting expectations relating to Tiriti partnerships, or how they are operationalised.
N/A		Demand(s) for equity in Tiriti partnerships	The extent that the public demand more equitable arrangements in Tiriti partnerships.
N/A		Public pressure for equitable Tiriti partnerships	Public pressure to better honour te Tiriti and adjust Tiriti partnerships arrangements so that they are more equitable. For example, demands for better involvement of Māori in decision-making or co-governance arrangements.
N/A		Public pressure for no change in Tiriti partnerships	Public pressure to resist changes to Tiriti partnerships arrangements. Possibly believing that they are equitable enough, or that they are biased against non-Māori. For example, demands to remove co-governance arrangements.

Appendix 2   How causal diagrams can be used

This appendix briefly outlines how causal diagrams themselves fit within a spectrum of complexity in the discipline of System Dynamics, and how they may be used in conjunction with other methodological approaches.

A1   Causal diagrams on the spectrum of complexity within System Dynamics

The tools of System Dynamics themselves exist on a spectrum of quantitative rigour. These are shown in Figure 41 which highlights how these varying tools can demonstrate the same system, each being able to demonstrate the complexity if that system, yet to differing levels of quantitative rigour or robustness. This spectrum is also intended to highlight that causal diagrams are not the only possible output from the use of System Dynamics tools.

Figure 41.   **System Dynamics tools exist on a spectrum – Causal diagrams (or Causal loop diagrams), Stock and flow diagrams, and Simulation modelling.**
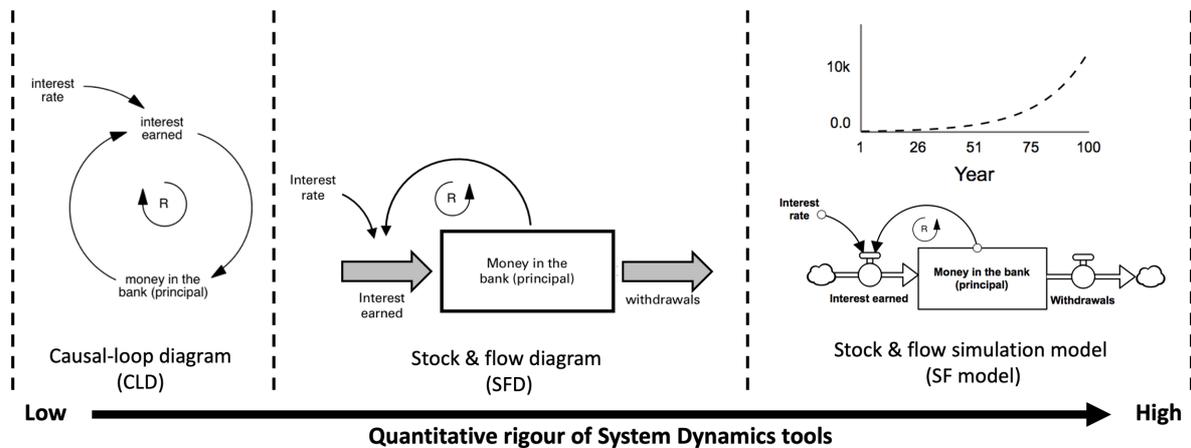
Causal diagrams as developed here, exist at the conceptual (low quantitative rigour) end of this spectrum. These can range from using the simple dynamics of a single feedback loop to demonstrate a type of behaviour, to multiple loop systems (as in this report) – which can demonstrate the high level of complexity of a system.

The next step up in quantitative rigour are Stock and Flow Diagrams (SFD). Although not all variables need to be stocks, their architecture tends to represent a greater level of mathematical functionality (although this may not actually be computed). This is because SFD tend to be qualitative representations of the actual functions and equations that would be represented in a stock and flow model. No variables have been represented as stocks and flows in this report.

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Computer simulation modelling (based on the stock and flow formulation) is the next step in quantitative rigour – that is, turning stock and flow diagrams into simulation models. There is huge variability in the types of simulation models that can be developed, with some people advocating that large system insights can be gained from using small scale models (Meadows, 2008), to others demonstrating the utility of large scale and highly complex simulation models (Sterman, 2000).

A2   How causal diagrams may link with other methodological approaches

While causal diagrams may result in complex stock and flow diagrams and/or simulation modelling within System Dynamics, it may also link with or inform other methodological approaches within a wider research project. A diagram outlining how this can work is shown below in Figure 42.

Figure 42.   **How causal diagrams can link with other research methodologies**
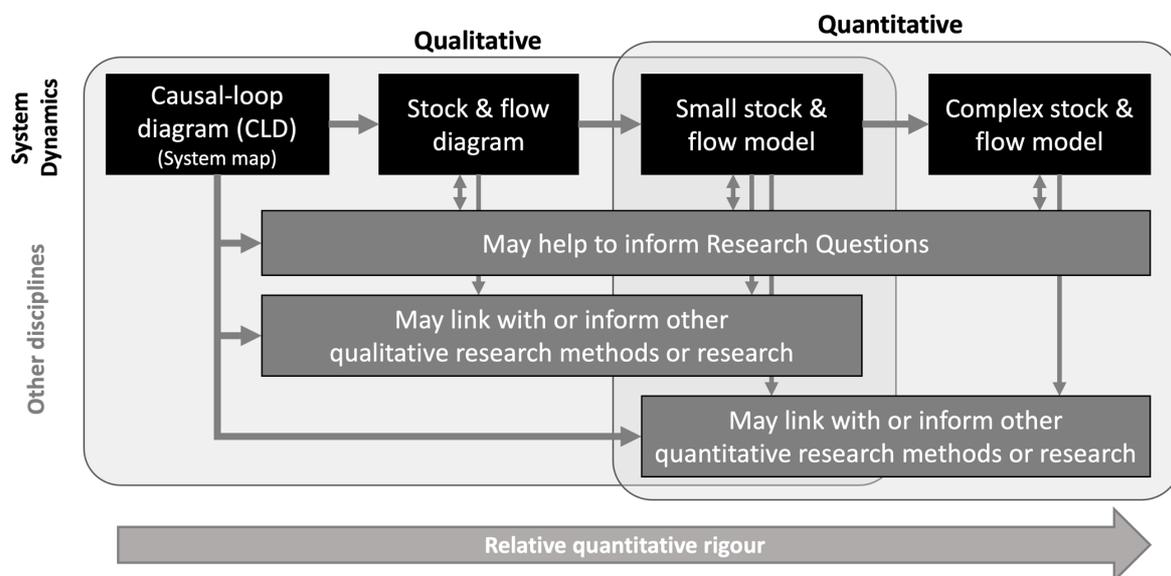
Note: There is an overlap of the qualitative and quantitative areas of application because they are not mutually exclusive. For example, some quantitative relationships in models and their calculations may be informed by research or data, while others may be informed or assumed via some form of participatory process.

The series of *black boxes* across the top of the diagram in Figure 42 represent the increasing quantitative rigour of the System Dynamics tools. The *grey boxes* in the lower part of the diagram represent the research questions that may be generated during research, as well as the different qualitative and quantitative methods that may be employed within the research. All of these may be informed by the causal diagram process, or a more rigorous evolution of a causal diagram (for example a small stock & flow model).

For example, a causal diagram may provide insight to the nature of relationships within the system that may inform how a research question is framed. It may also inform the types of people who might be involved (as researchers or as research subjects). Further, the nature of the relationships elicited throughout the causal diagram process could also inform other research methods – either qualitative or quantitative – that may be used.

Please note that the authors position here is that more precise numerical measures tend to give systems theorists the opportunity to specify more precise relationships and thus add layers of quantitative rigour to their models. Yet highly complex systems need not only be represented with tools of high quantitative rigour – these can be articulated with the qualitative tools also, as in this report.

In fact, in complex worlds, qualitative methods are more likely to capture complexity and make it available for analysis. In complex worlds, systems thinking and causal diagrams may be used as a decision-support tool that enables a more holistic view of inter-relationships that may otherwise be missed or excluded from reductionist analyses (Senge, 2006).