DELIVERING GREATER IMPACT FROM RESEARCH

DIAGNOSING BARRIERS & ENABLERS

GUIDING SYSTEMS CHANGE

iPEN

Turbocharging Impact

July 2022

EXECUTIVE SUMMARY

OUR WORK & THIS PAPER IN A NUTSHELL

We need to up our impact game, and we (CRIs and iPEN) have already initiated work to do this

iPEN has done some further research and thinking to address known barriers that get in the way of activities that deliver impact.

We used systems thinking to identify the *best* opportunities (see right) to achieve meaningful change.

We encourage you to use these insights to inform efforts within your organisations and to work with others (including with iPEN) to influence change across the system.

KEY FOCUS AREAS

1. Clearer signals and priorities
2. Embedding Te Tiriti
3. Build impact capability and capacity
4. Delineate science excellence and impact
5. Reward and recognise impact
6. Increase funding flexibility
7. Make space for strong relationships
8. Reinforce change through changed processes

CONTEXT & BACKGROUND

Summary of findings

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PURPOSE OF THE PAPER

IMPACT IS A COLLECTIVE ENDEAVOUR

The New Zealand Research, Science and Innovation system exists to deliver benefits (impact) to New Zealand, and in many cases, the world.

Previous insights gathered by iPEN indicated that while researchers in CRIs are, in general, motivated to deliver impact, a number of barriers reduce their capacity and capability to maximise impact from their work.

iPEN is working with a range of stakeholders to remove these impediments in ways that do not conflict with other expectations or requirements (such as financial responsibility).

This paper summarises research completed by iPEN to systematically explore and test barriers and enablers to impact, and inform collective action.

We also outline here the next steps iPEN is taking to deliver more impact from the system.

iPEN's PERSPECTIVE OFFERS NEW INSIGHTS

- Our perspective is drawn from open discussions with 'front line workers' in CRIs, who are predominantly scientists or researchers.

  Our results offer an unfiltered and uncensored perspective.

- We used *systems thinking* to find patterns of change and seek more enduring solutions
- In combination with our knowledge of pathways to impact, iPEN is well-positioned to identify drivers and barriers experienced by those embedded in the current system.
- That's helped us to see what needs to change.
- Some of these things aren't being thought about by anyone else.

WHAT DOES IT TAKE TO GENERATE IMPACT?

Summary of findings

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RECAP: WHAT WE FOUND IN OUR RESEARCH

Our analysis identified and validated seven **THEMES THAT IMPEDE SCIENCE IMPACT** (in addition to the encompassing theme around a bi-cultural context) that either enable or get in the way of delivering impact from research and science.

These **THEMES** are applicable at the national, organisational (CRI), portfolio and individual project levels. They also link back to the supporting environment necessary to maximise impact from science.

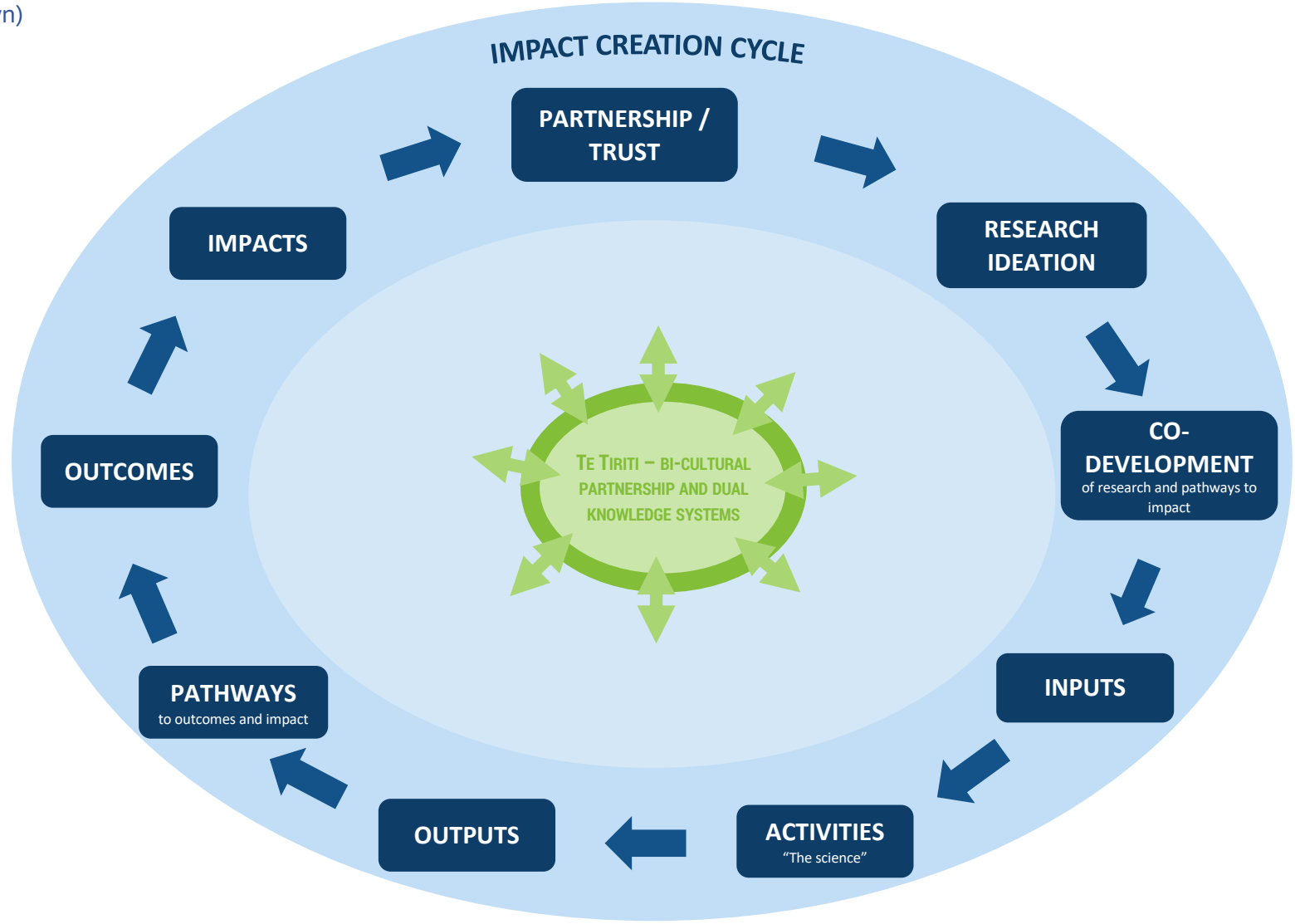
As well, we have identified **ACTIVITIES** needed to deliver impact from science. We've illustrated these in the form of an **IMPACT CREATION CYCLE.**

The **THEMES** and **IMPACT CREATION CYCLE** need to be considered within the wider context of Te Tiriti, including recognising dual knowledge systems.

The **THEMES** align to systems concepts, or conditions for systems change. This is the subject of the next section.

THE IMPACT CREATION CYCLE

(SIMPLIFIED: non-linear process, feedback loops not shown)



IMPACT CREATION CYCLE DESCRIPTIONS

COMPONENTS	DESCRIPTION
Partnerships/Trust	The relationships that individuals, teams, and organisations have with others who are needed to identify, plan, and deliver research and action / progress the outputs of the research.
Research ideation	The process where you generate ideas and solutions, often through sessions such as prototyping, brainstorming, problem definition, worst possible idea, and a wealth of other ideation techniques. Ideally done in partnership.
Co-development of research and pathways to impact	Ensures stakeholders/partners are engaged and play an active role in developing and delivering research activities, outputs and pathways to outcomes and impact. Increases the likelihood of impact.
Inputs	The 'things' we need to do our research, including our staff, funding, facilities, knowledge and IP. It can also include intangibles such as relationships, as well as documentation that guides or influences the direction or how we do our research (e.g., policy documents, declarations and agreements, and legislation). *MBIE definition: Resources that support research activities.*
Activities	The things we do to deliver research. This includes both research/science activities and supporting activities (finance, planning, legal, insights, monitoring and evaluation). *MBIE definition: Activities that, directly or indirectly, generate new knowledge and new applications of knowledge, including identifying research problems and opportunities.*
Outputs	The things we deliver from our science and research. This includes publications, reports, presentations, guidance material and resources, communications, and IP. *MBIE definition: The knowledge and skills that are developed by activities.*
Pathways to outcomes and impacts	How outputs are translated to outcomes and impacts. Roles/concepts of outreach, commercialisation, knowledge mobilization, tech transfer, knowledge brokering, knowledge transfer all fit here.
Outcomes	This is typically the direct results of the use of outputs, such as something being done more efficiently or effectively, or an entirely new activity (sometimes considered the difference made in the short and medium term). *MBIE definition: Mechanisms that lead to impacts by use or application of outputs*
Impacts	Changes to the economy, society, and the environment (sometimes also called long-term outcomes) that are difficult to measure because they involve multiple contributors. Includes direct and indirect, intended and unintended, positive and negative changes. *MBIE definition: A change to the economy, society, or environment, beyond contribution to knowledge and skills in research organisations.*

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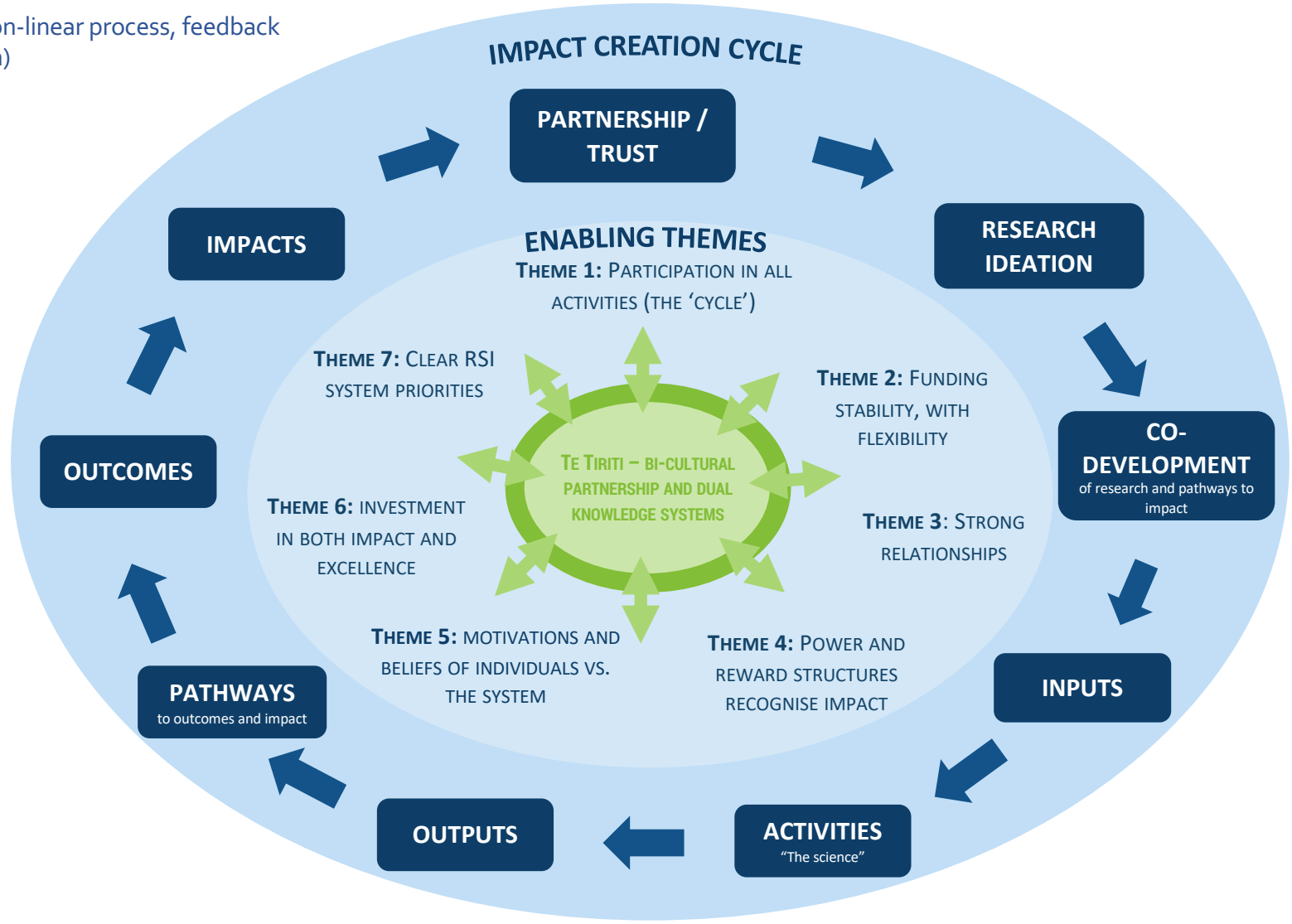
THE COMPLEX RELATIONSHIP BETWEEN IMPACT CREATION CYCLE AND ENABLING THEMES

(SIMPLIFIED: non-linear process, feedback loops not shown)



THEMES THAT ENABLE IMPACT

THEME	DESCRIPTION
THEME 1: PARTICIPATION IN ALL ACTIVITIES (THE 'CYCLE')	A wide range of activities are needed to deliver impact from science (impact creation cycle). Additional to 'science production' activities of input-activity-output, there needs to be an increase of focus on activities including relationship building, ideation and co-development, supporting pathways to impact, support users at the outcome stage and evaluation of outcomes and impact. Some of these activities aren't routinely considered, supported, or funded, but when they are it has made a real difference to achieving impact
THEME 2: FUNDING STABILITY, WITH FLEXIBILITY	Funding is required to attend to all the activities required around the impact creation cycle. Adequate stable funding over sufficient timeframes as well as flexibility during programmes are essential to creating conditions for impactful science. SSIF funding has helped.
THEME 3: STRONG RELATIONSHIPS	Relationships are key to the delivery of impact. Developing and maintaining them takes time, resources and skills. However, the way science is currently contracted often results in insufficient resources for these activities. Scientists often `creatively' pull resources from other sources or compensate for this deficit using their own time, carefully rationing their inputs across multiple projects. Relationships (and the trust they create) are particularly important when working alongside Māori. The system currently rewards activities other than relationship building, e.g. strong publishing records.
THEME 4: POWER AND REWARD STRUCTURES RECOGNISE IMPACT	Power and reward structures shape behaviour. These factors operate at different scales in the system, and cascade through levels and processes. Reward includes funding, peer approval, citations, career progression. It is biased towards what is currently valued and measured. Reward processes currently fail to adequately incentivise impact, rather continuing to recognise and endorse science excellence. Funders and the wider science fraternity hold these levers in place.
THEME 5: MOTIVATIONS AND BELIEFS OF INDIVIDUALS VS. THE SYSTEM	Individuals who are highly motivated to deliver impact find ways to do this, but often this is despite rather than because of the system. Although there are opportunities for the system and individuals to pursue impact pathways (e.g. via SSIF), organisational and systemic barriers prevent them from sustaining pathways to impact.
THEME 6: INVESTMENT IN BOTH IMPACT AND EXCELLENCE	The system currently largely considers science excellence first, and then impact, and presupposes that science excellence must happen before science impact. Feedback from those delivering impact noted that in many cases impact results from the sequential building of knowledge, often brick-by-brick.
THEME 7: CLEAR RSI SYSTEM PRIORITIES	The research community lacks clarity around what is regarded as important. Because there are no clear signals about priorities, resources are dissipated around a largely investigator-led research agenda, a lack of co-ordination around complex critical challenges and/or wasted effort competing for funding, replicating investment in capability and infrastructure.

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APPLYING SYSTEMS THINKING

Identifying the best opportunities for change

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SYSTEMS THINKING

"For every complex problem there is an answer that is clear, simple, and wrong."

H.L. Mencken

We used systems thinking to identify the best opportunities for change.

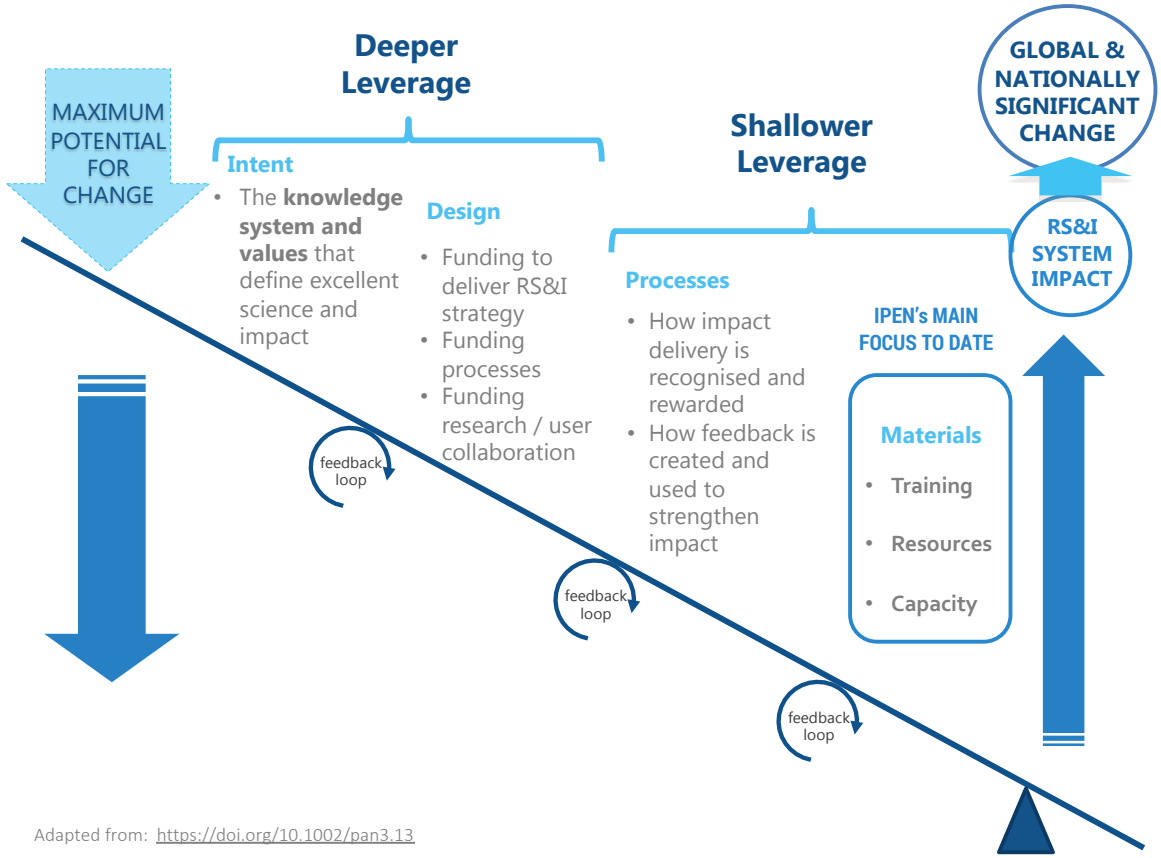
This approach recognises that systems are complex and messy.

We linked **THEMES** with impact creation **ACTIVITIES** to help identify focus areas for intervention that are most likely to engender systems change.

OUR KEY SYSTEMS TOOL

Using the Donella Meadows framework, we identified 'interventions' to leverage systems change.

We then located these interventions from left to right on this seesaw diagram, acknowledging interventions at the shallow end are less likely to generate the desired outcome if those at the deep end are not addressed; and that interventions at the deep end create self-organising flow-on change at the shallow end.



Adapted from: https://doi.org/10.1002/pan3.13

CRITICAL INSIGHTS

Drawn from discussions with frontline workers in CRIs, and other system actors

1. CRIs are in a KPI trap, one that is output and activity-focused.
2. Over time, the system has reinforced the marginalisation of Mātauranga Māori, from macro to micro levels.
3. Limited resources for relationship development and impact creation activities (including evaluation) have negative flow-on effects to other parts of the system.
4. Whilst the system talks impact, its design means that the resources required are not specifically provisioned, yet CRIs must 'keep the lights on'. This tension propagates through the system at all levels.
5. Confusion around RSI system priorities has created a drift and dispersal of effort. Delayed feedback loops have resulted in poor systems learning and adaptation.

OPPORTUNITIES TO DELIVER GREATER IMPACT

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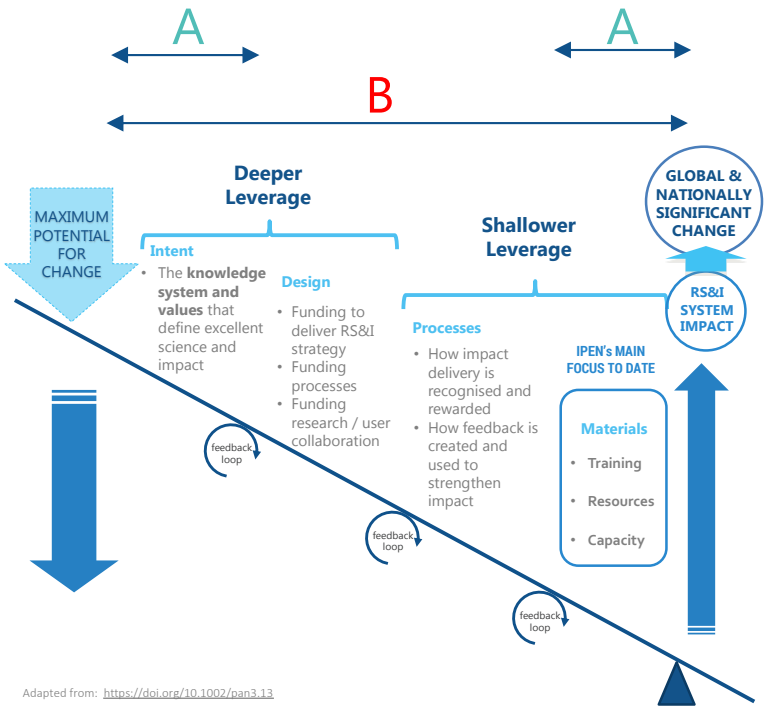
FOCUS AREAS

We have identified **8 focus areas** for delivering greater impact. These are grouped into:

1. Areas that support current change initiatives, notably Te Ara Paerangi and initiatives we are aware of within CRIs. We provide some valuable additional insights to this work.
2. Areas to focus on where we recommend more change. Our systems analysis suggests that without addressing these areas other recommendations/change initiatives in the system will have limited success.

There is considerable interrelationship between the two focus areas, that is the nature of a complex system and a good sign that the focus areas are likely to have systemic impact.

FOCUS AREAS FOR CHANGE



Adapted from: https://doi.org/10.1002/pan3.13

A. INSIGHTS INTO AREAS THAT ARE IN FOCUS

1. Determine national priorities (INTENT)
2. Embed Te Tiriti (INTENT)
3. Build impact capability and capacity (MATERIALS)

B. AREAS WHERE MORE ATTENTION SHOULD BE FOCUSED

4. Delineate science excellence and impact (INTENT & DESIGN)
5. Reward and recognise impact (DESIGN & PROCESS)
6. Increase funding flexibility (DESIGN)
7. Make space for strong relationships (DESIGN & PROCESS)
8. Reinforce change through changed processes (PROCESS & MATERIALS)

A NEW INSIGHTS ON CURRENT CHANGE INITIATIVES

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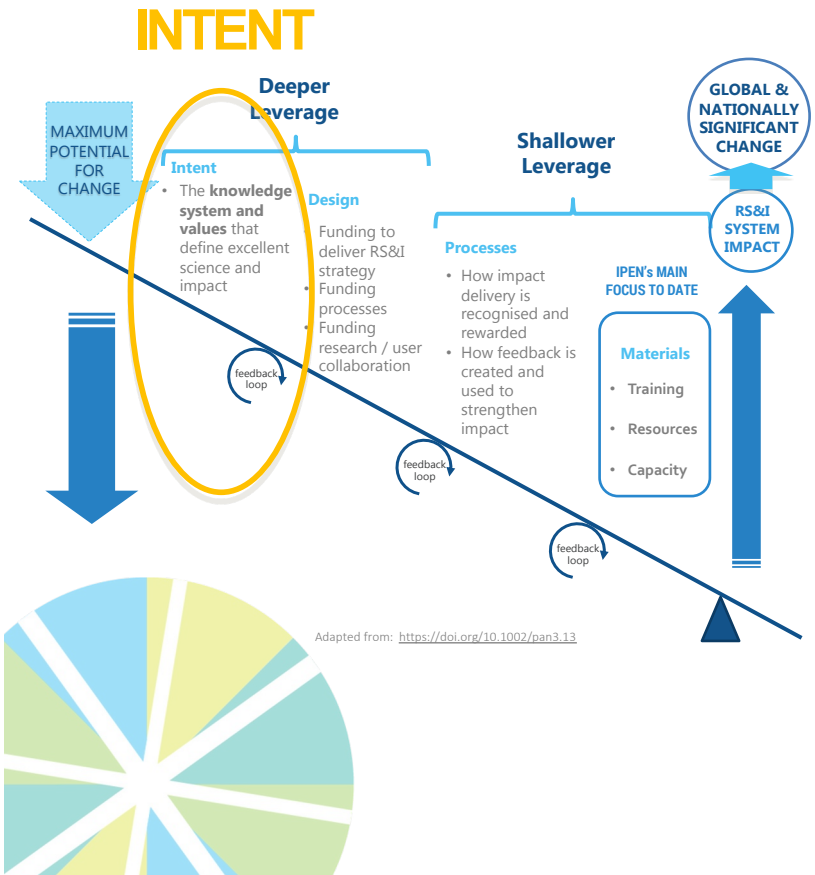
1. DETERMINE NATIONAL PRIORITIES

We support calls for clearer 'signals' on New Zealand's priorities for RSI investment.

"At the moment, you can put in a proposal about anything... They [the funder] might think that they're doing a good thing by allowing whatever idea to come up and not direct the research, but it doesn't give us any indication of what is important to New Zealand."



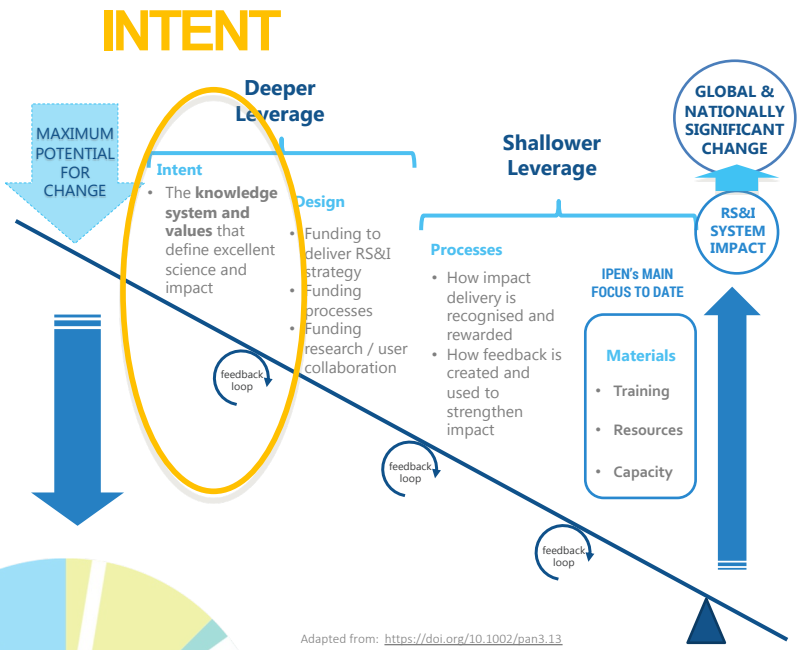
Insights:

- Untargeted fundamental science remains essential to delivering impact, and needs to be provided for in the prioritisation processes.
- The process will require identification of the strategic priorities as well as the research required to address them.
- Getting the levels of decision making and granularity of priorities right will be critical, from the highest level (e.g. economic v. environmental v. social dimensions) to a level that is sufficiently granular to usefully guide the identification of the research required (e.g. ensuring on-farm practices are climate-ready).
- Who sets the priorities is central. Science itself (and so scientists) must be part of the prioritisation process to provide medium (5-20 years) to longer term (20+ years) perspectives.
- The fragmented investment landscape is a barrier to assembling funding trajectories capable of addressing complex and persistent priorities.

2. EMBED TE TIRITI

We support initiatives to embed Te Tiriti, Te Ao Māori and Mātauranga Maori.

"...[Its] totally up to the Government and the ministries to decide if they want to have Treaty partnerships in research or not. If you want to have Treaty partnerships, then you need to pay for those.... if you want to have Treaty partnerships that means that most of the [costs] are going to be doubled.' Because that's what it means. But they are not going to pay that ....the message is a bit contradictory."

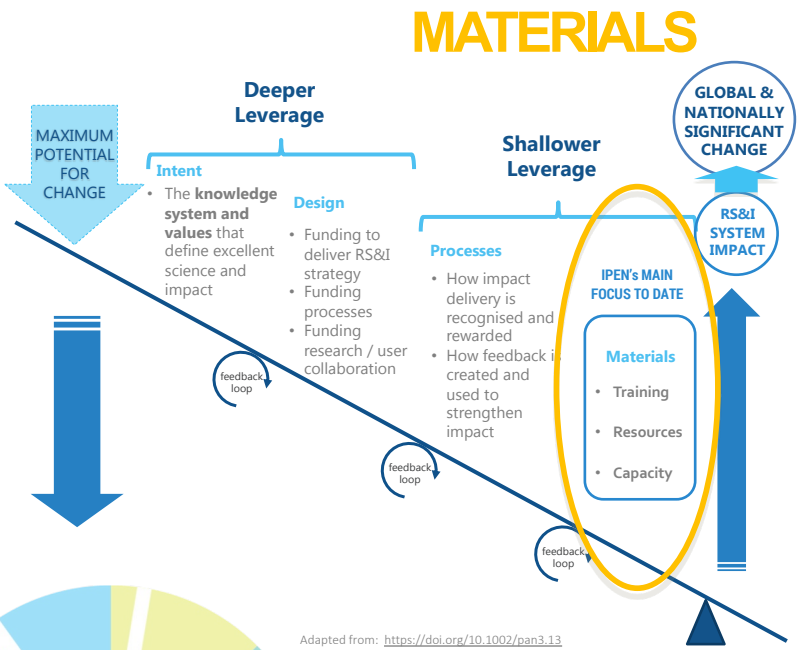


Insights:

- Clarifying the responsibilities of New Zealand's RSI system in relation to Te Tiriti will help establish what knowledge is 'accepted', and also HOW research is conducted by, with, for and as Māori.
- This will require a change in the 'mindset' of the system (at the INTENT level) to fully acknowledge that Te Ao Māori underpins a legitimate knowledge system.
- If this system-level INTENT is clarified, it will guide DESIGN elements, open and flexible PROCESSES and MATERIALS to facilitate 'science' by, with, for and as Māori.
- The more holistic and systemic approach that comes from a Te Ao Māori perspective also lends itself to more effectively addressing the 'wicked' problems we currently face. Many believe that giving effect to Te Titiri in the RSI system will ultimately enable great impact.
- A key enabler in this focus area is control of resource allocation, which determines who has power and control.
- Using dual knowledge systems will present challenges to those working in and with the RSI system, but one that is expected to benefit all New Zealanders.

3. BUILD IMPACT CAPABILITY AND CAPACITY

"The activities people describe as pivotal to achieving the greatest impact are not funded."



We support the broad range of initiatives across CRIs and the RSI system to grow the capability and capacity of people to generate more impact from science.

Insights:

- Such initiatives, while vital, will have limited effectiveness if deeper issues are not addressed.
- Clarity is required around the roles of people (from managers to scientists to support staff) in impact delivery and the skills they require.
- Stakeholders must be brought on this journey so they see the value of investing in all activities around the IMPACT CREATION CYCLE and so the range capability they require.
- Impact capability should be fully integrated into organisational- training/capability/personal development and reward systems.
- Universities have an important role to play in creating an 'impact- focused' workforce rather than research experts whose career is based on individual advancement according to traditional excellence criteria, rather than collective efforts required to deliver impact.
- If funders (e.g. MBIE) required and funded projects utilising skills and activities from around the IMPACT CREATION CYCLE, the system would respond by building and assembling these impact-ready teams, including with industry and community stakeholders – as they have to other funding signals in the past.

B

FURTHER CHANGES REQUIRED

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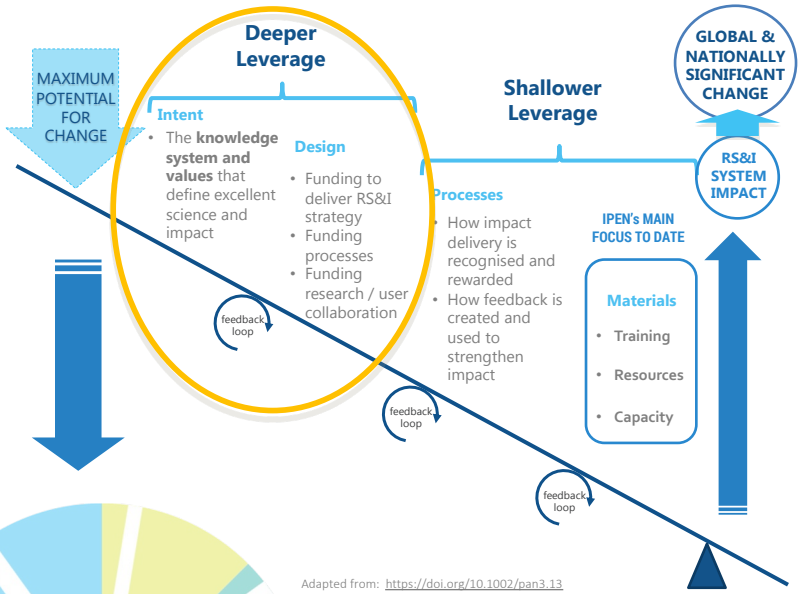
4. DELINEATE SCIENCE EXCELLENCE & IMPACT

"We're stuck in this system where it's the traditional publication in high impact journal output that is recognised and required to get that funding. So [I've been] quite selfish with my research time and made sure that I did get those publications out."

INTENT & DESIGN



Adapted from: https://doi.org/10.1002/pan3.13

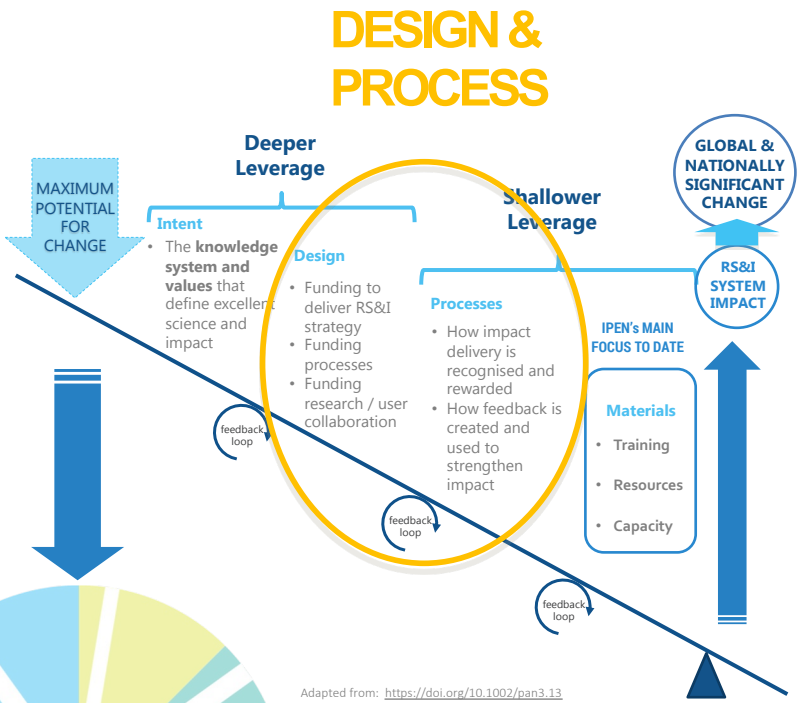
We recommend delineating science 'excellence' and `impact' to reduce tensions at multiple points in the RSI system.

Insights:

- The current system design infers some critical underpinning assumptions around how impact is delivered from science and research. This includes an inference that impact inevitably follows high-risk, stretchy science. However, this is not always the case.
- Further, the definition of 'excellence' is inconsistent, meaning it sometimes ***excludes*** other 'excellent science' (e.g. applied science) that delivers impact.
- This is further exacerbated by the lack of guidance or description on how funders expect the pathways and sequence from research to impact operate, creating further confusion and frustration.
- The results of the current design are:
  - Potential impact is being forgone because the projects proposed are not considered sufficiently 'excellent' in current funding allocation decisions
  - Some of the 'brick by brick' research that is most needed by New Zealand is not proposed and/or funded as it is unlikely to generate high citations (research impact and 'excellence').
- Clarifying the system's assumptions and expectations about how research delivers impact will inform performance management processes. It will also help to resolve the conflicting messages scientists currently describe, where their organisations are required to be 'mission-focused' but reward 'high research impact' (interpreted as high citation/ranking).

5. REWARD & RECOGNISE IMPACT

"I might have gone and attended 20 field days, but they weren't recognised. 'Yes, but you didn't write a paper'.... so it sort of wasn't counted as being recognised. I think there's been a bit of a shift lately.....people now don't see it as such a waste of time."



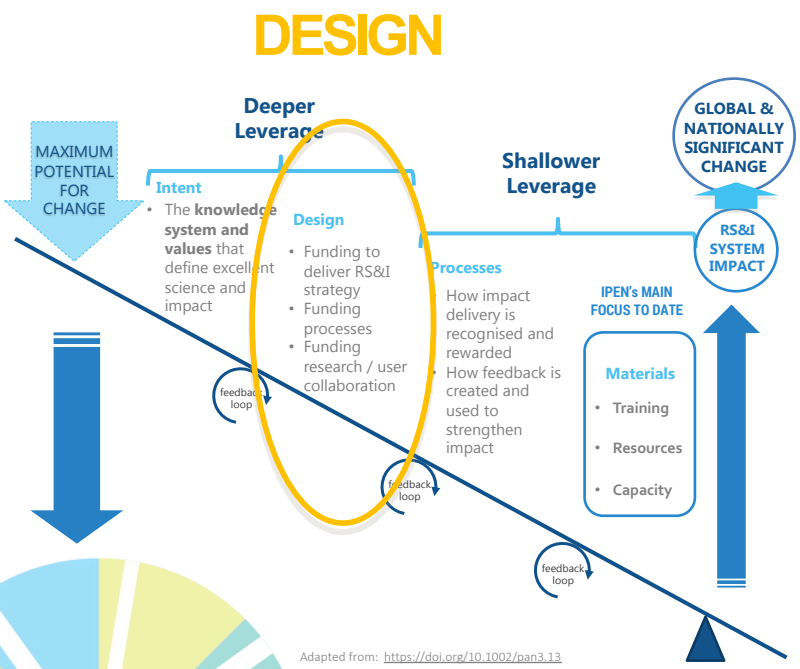
We recommend giving impact the same status as science excellence in reward, recognition, and career progression processes for scientists and research organisations.

Insights:

- There is a need to redesign performance management systems so impact as a determinant of performance is recognised. This needs to be equally applied to individual, team, organisation, and system performance, and explicitly tied to reward (career progression, allocation of funds) and recognition (beyond citations).
- There are already a range of ways in which this is being implemented in organisation and systems in New Zealand and internationally that we could learn from.
- Recognising the value of a wider range of activities will also mean the inclusion of a wider and different set of skills that need to be assembled beyond/outside of a 'traditional' research team.
- Some researchers are more motivated by and focus on delivering traditional science outputs. This isn't a problem; we just need to make sure that rewarding, recognising and promoting those who choose to focus on impact aren't sacrificing their career and career progression. This is a particular issue for early career researchers who don't have the degree of freedoms that senior scientists tend to have (once their publication record is established).
- Fully addressing this will require interventions at multiple levels of the system (including internationally).

6. INCREASE FUNDING FLEXIBILITY

"Impact is not something that is necessarily 100% related with your [a single] project.....And that's why I thought that seeing it as a project is not realistic. [it has been] a research line [many projects that] has created quite a lot of impact."



We recommend advocating for changes to funding contracts to allow greater flexibility for resources that can be used on a wider set of activities around the IMPACT CREATION CYCLE.

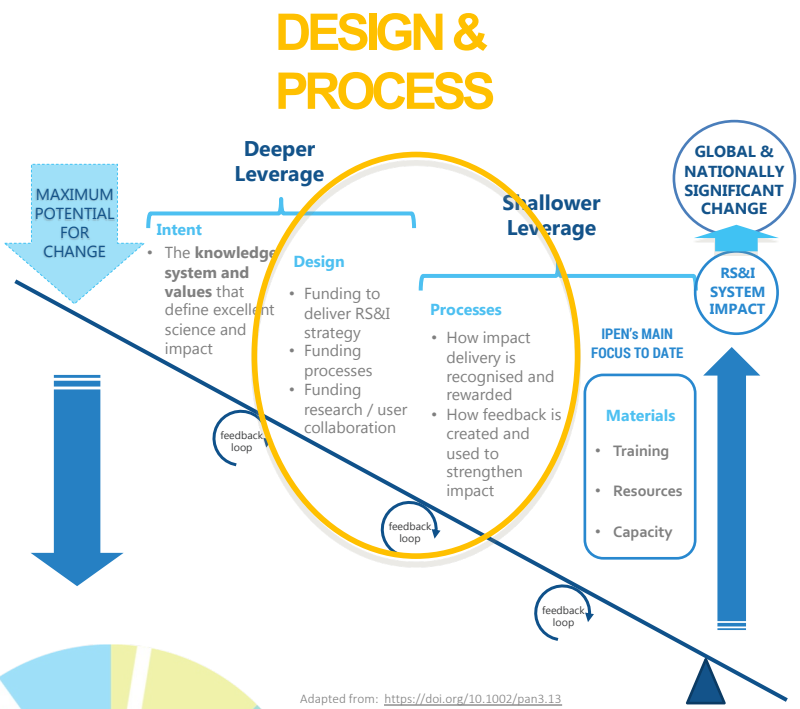
Insights:

- Funding basic, targeted research for longer periods of time with flexible conditions will increase capacity to plan and support pathways towards impact, and increase agility to respond to change
- This may result in larger (and fewer) contracts in many cases, and/or contracting/funding at a programme rather than project level, and also the use of alternative contracting models (which are already in place elsewhere)
- This may help attract additional investment, as the benefits of a strategic approach to delivering impact rather than piecemeal approaches
- This will improve capacity to better support building and maintaining relationships with collaborators and stakeholders (who are critical enablers for impact)
- Although greater flexibility is needed in many cases, there still remains a need for 'science as a service'.

"Usually every project has their own specific objectives. But SSIF is what allows us to do the learning from all of them together.... SSIF is the one [that] lends us a little bit to flexibility to explore what nobody else wants to pay for."

7. MAKE SPACE FOR STRONG RELATIONSHIPS

"In the funding model for most CRIs, there is no way to resource or support long-term relationships beyond the life of a project [but] this is essential for long-term impact."



We recommend prioritising greater investment into building strong relationships across the RSI system and external to it

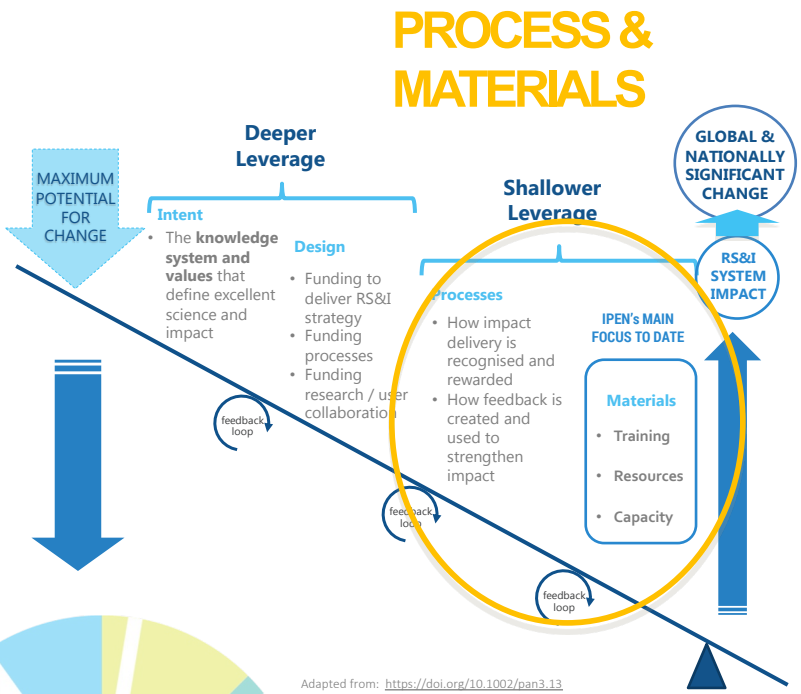
Insights:

- Relationships and trust are key to delivering impact; they start the **Impact Creation Cycle**
- Currently, many researchers invest their own time, or 'hide' this investment, or forego a focus on science excellence and publications. This has been identified as an issue for RSI both in New Zealand and internationally.
- Structural change is unlikely to lead to greater collaboration, the key barrier is time and the mandate or permission to develop these outside/beyond a given contract or project. **This is particularly critical when engaging by, with, for and as Māori.**
- The organisational imperative to 'keep the lights on' can compromise relationships, as developing and maintaining them is treated as a 'no revenue' activity.
- Investment in relationships needs to be reframed as an investment in creating greater impact.

"The enabler is clearly to go work with the people to create the science for the people who are going to use the science. In our case that is mostly councils and Māori.... So we have been trying to do papers to engage through conferences or, newsletters ....but [this is] much less [successful] than working directly with the people who are going to use the science."

"it's money well spent to continue working on impact, but often, you're just trying to squeeze all the science into whatever dollar amount you're applying for, and there's seldom any money left."

8. REINFORCE CHANGES THROUGH CHANGED PROCESSES



Adapted from: https://doi.org/10.1002/pan3.13

We recommend changes to 'the rules of the game' to reinforce the conditions / changes described in other focus areas.

Insights:

- The RSI system intent and design are translated via 'rules of the game' expressed in contracts and other accountability mechanisms, which are then built into our respective organisational systems and processes.
- The consequence of these 'rules' are:
  - CRIs being 'stuck' in a 'KPI Trap', focusing on what is easily measured (e.g. output delivery, citation metrics, project plan/budget compliance) rather than what is intended (often impact)
  - Constraining CRI capacity to invest in activities and capabilities that support longer term outcomes and impacts, and instead operating in a `project economy'. A project economy has also created aversion to failure, an adherence to short-term financial and accounting time envelopes, and forgoing development opportunities for the future workforce (emerging researchers).
- Examples of the kinds of changes needed include:
  - Contracts with flexible milestones and measures that recognise diverse, and emergent impact trajectories
  - Budget requirements for other 'impact creation' activities (monitoring and evaluation, communications, relationships, and translation), and more diverse teams
  - Create feedback loops into the system (particularly through the use of evaluation) to support learning, improvement, and increase impact.

TAKING ACTION

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WHAT NEXT?
iPEN is continuing to …

1. Share our insights, experiences, and conceptual frameworks with:
   - our organisations and partners to promote impact conversations (e.g. presentations to ELT/SLT and key customers)
   - MBIE, and have follow-up discussions
   - any others who are interested in impact from research (e.g. KiwiNet, TEC, HRC, University of Auckland)
2. Share knowledge and explore opportunities for collaboration with other interested and willing parties (e.g. KiwiNet and UoA, nurture our international linkages), to grow a common and collective approach to supporting the delivery of impact from research.
3. Advocate and help inform organisational change at our CRIs (e.g., contributing to discussions around reward and recognition, professional development)
4. Connect with Te Ara Putaiao (TAP) to progress thinking around how to more effectively build impact for, with, and by Māori
5. Proactively build the research impact community, including by organising at least one national hui and linking with other thought leaders.
6. Continue to address capability building through tools, training, and extending these offerings to other partners/actors.
7. Share our findings and examples of our work and way of working internationally, including by exploring publications

WHAT NEXT?
For system actors

We recommend that system actors:

1. Consider iPEN's insights and if and how they apply to your organisation with a view to identifying opportunities to address the barriers and enablers identified.

2. Engage with other actors and, using iPEN's insights, work together on initiatives that support greater impact from research investment. Including with:
   - non-MBIE actors/stakeholders (private, public, NGO)
   - Māori
   - MBIE's existing science policy and processes
   - MBIE's Te Ara Paerangi – Future Pathways work to explore changes that could be made to the future system.