From:	no-reply@mbie.govt.nz
To:	Research, Science and Innovation Strategy Secretariat
Subject:	Draft Research, Science and Innovation Strategy submission
Date:	Friday, 8 November 2019 4:35:44 p.m.
Attachments:	Online-submission-form-uploadsdraft-research-science-and-innovation-strategy-submissionsCONZUL-submission-to-research-science-and-innovation-strategy-Nov-2019-v1.0.docx

Submission on Draft Research, Science and Innovation Strategy recevied:

Are you making your submission as an individual, or on behalf of an organisation?
Organisation

Name
Moira Fraser

Name of organisation or institutional affiliation
Council of New Zealand University Librarians (part of Universities New Zealand)

Role within organisation
Project Lead

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Which of the below areas do you feel represents your perspective as a submitter? (Please select all that apply)

If you selected other, please specify here:

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Name of organisation on whose behalf you are submitting, if different to the organisation named above

In which sector does your organisation operate: (Please select all that apply)
Research

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How large is your organisation (in number of full-time-equivalent employees)?
About 800 people work in NZ university libraries

Please indicate if you would like some or all of the information you provide in your submission kept in confidence, and if so which information.

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MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Research, Science and Innovation Strategy
Submission form

Submission from Council of New Zealand University Librarians (CONZUL)

This is a submission by the Council of New Zealand University Librarians (CONZUL), a committee of Universities New Zealand – Te Pōkai Tara. While universities will be making whole of institution responses and university libraries have contributed to those, this submission focuses on the intersection of the Draft Research, Science and Innovation Strategy with CONZUL's objective to act collectively to improve how knowledge is created, preserved and shared to support excellence in learning, teaching and research.

CONZUL believes the draft RSI strategy is timely and we strongly support its overall emphasis on connections, equity and facilitating the spread and advancement of knowledge which fits well with our own objectives. We believe New Zealand universities, as a key player in New Zealand's research ecosystem, need to increase the proportion of our research that is freely available in a timely manner. This is more achievable with the support and policy direction MBIE's draft strategy indicates, especially if MBIE begins working on an Open Access policy for publicly funded research.

Much of this CONZUL response draws on recent work by a CONZUL working group on open access. This group produced a detailed environmental scan of the current state of open access in the New Zealand university sector,[1] much of which is directly relevant to the issues discussed in the RSI consultation draft, and an associated infographic[2] summarising the findings of that work. A key finding was that 51% of NZ's university research funded from the large public research funds was published behind paywalls, inaccessible to most New Zealanders.

The research conducted by CONZUL detailed in this submission was conducted on a large sample set: all journal articles published in 2017 with at least one author affiliated with a New Zealand university and that was identifiable by a Digital Object Identifier (DOI). We can use the program developed to analyse data on any set of publications with a DOI, to compare outputs from any single institution or group of institutions, or for any funder or group of funders, for any country and any time-period. Our plan is to develop a longitudinal view of New Zealand's open access performance.

[1] For the full report see: CONZUL OA Project Group (August 2019). *Open Access in New Zealand universities: an environmental scan*. www.universitiesnz.ac.nz/sites/default/files/uni-nz/OA%20CONZUL%20Environmental%20Scan%20version%201.02.pdf

[2] CONZUL OA Project Group (June 2019). *NZ open access: what do we know?* *www.universitiesnz.ac.nz/sites/default/files/uni-nz/CONZUL%20OA%20Infographic%20v1.0.pdf*

Contribution of Research, Science and Innovation

This strategy is about New Zealand's Research, Science and Innovation (RSI) at a high-level. Its aim is to identify challenges and opportunities that will have the broadest impact on our research and innovation activities. For this reason, it mentions few specific areas or sectors of research and innovation. For this draft version of the Strategy, we are keen to hear from researchers, innovators, businesses, and providers of public services on what the RSI system could be doing to accelerate progress on Government's priorities.

Question 1: Where can the RSI system make the greatest contribution towards the transition to a clean, green, carbon-neutral New Zealand?

Question 2: Where else do you see it making a major contribution?

Question 3: What else could else the RSI system be doing to accelerate the progress towards the Government's priorities*?

* see list of the Government's twelve priorities included in Part 1 of the draft Strategy.

Improving access to the research of New Zealand's universities, which constitutes 65% of NZ's basic research and 25% of NZ's applied research[3] would support many of the government's priorities. We will detail the evidence in this submission. As a general point related to Questions 1 – 3: wherever we see that a contribution can be made by people or groups outside the university research ecosystem to the challenges and opportunities we face, then making NZ's university research accessible to those people and groups makes it easier to connect and engage, particularly where the research is NZ focused.

The priorities that would most benefit from better access to research are highlighted below:

Build a productive, sustainable and inclusive economy

1. Grow and share New Zealand's prosperity
2. Supporting thriving and sustainable regions
3. Deliver responsible governance with a broader measure of success
4. Transition to a clean, green carbon neutral New Zealand

Improving the wellbeing of New Zealanders and their families

5. Ensure everybody who is able to is earning, learning, caring or volunteering
6. Support healthier, safer more connected communities
7. Ensure everyone has a warm dry home
8. Make New Zealand the best place in the world to be a child

Providing new leadership by government

9. Deliver transparent, transformative and compassionate government
10. Build closer partnership with Māori
11. Value who we are as a country
12. Create an international reputation we can be proud of

[3] https://www.universitiesnz.ac.nz/sector-research/driving-research-and-innovation

Researching and innovating towards the frontier

Question 4:	Do you agree that the RSI Strategy should be focused on innovation at the "frontier" (creating new knowledge) rather than behind the frontier (using existing knowledge to improve the ways we do things)?
Question 5:	In which research and innovation areas does New Zealand have an ability to solve problems that nobody else in the world has solved? Why?
Question 6:	In which areas does New Zealand have a unique opportunity to become a world leader? Why?
Question 7:	What do you consider to be the unique opportunities or advantages available to the RSI system in New Zealand?
Question 8:	What RSI challenges are unique to New Zealand, that New Zealand is the only country likely to address?
Question 9:	What are the challenges of innovating in the public sector? How do they differ from those in the private sector?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Relevant to this group of questions we note that the draft RSI Strategy does not reference creativity which is an essential contribution towards innovation and is frequently written about as an important attribute to look for in the workforce of the future.

Q8: NZ is the only country that will address Matauranga Māori and has unique opportunities to determine how to include indigenous views in our RSI system. While our RSI system demonstrates a desire to be inclusive, current research shows that the values and policies are not demonstrating increases in participation in the RSI system by Māori and Pasifika.

Q9: there are challenges relating to the relationship between risk and innovation for the public sector. Innovation only exists where there is a culture of allowing mistakes and failures and using those as learning opportunities. The public sector operates on a low risk appetite with an aversion for failure which makes innovation challenging.

Our key challenge – Connectivity

Question 10: Do you agree that a key challenge for the RSI system is enabling stronger connections? Why or why not?

Please type your submission below.

A key challenge is the current disconnect between university researchers and those outside our sector.

CONZUL's research has found that more than half of our research outputs are only accessible to those who work at institutions who pay subscriptions. Universities themselves will have access to most of our own research outputs (though not necessarily all), but we have much better access than most other teaching or research organisations. Policy-makers in government or local bodies, health and other practitioners, businesses, innovators, the media, iwi groups and other stakeholders, as well, of course, as the general public, has very limited access to research journals. All of these groups will have little or no access to paywalled research publications, where nearly 60% of university research articles are being published. This is despite most university research being funded by the New Zealand taxpayer.

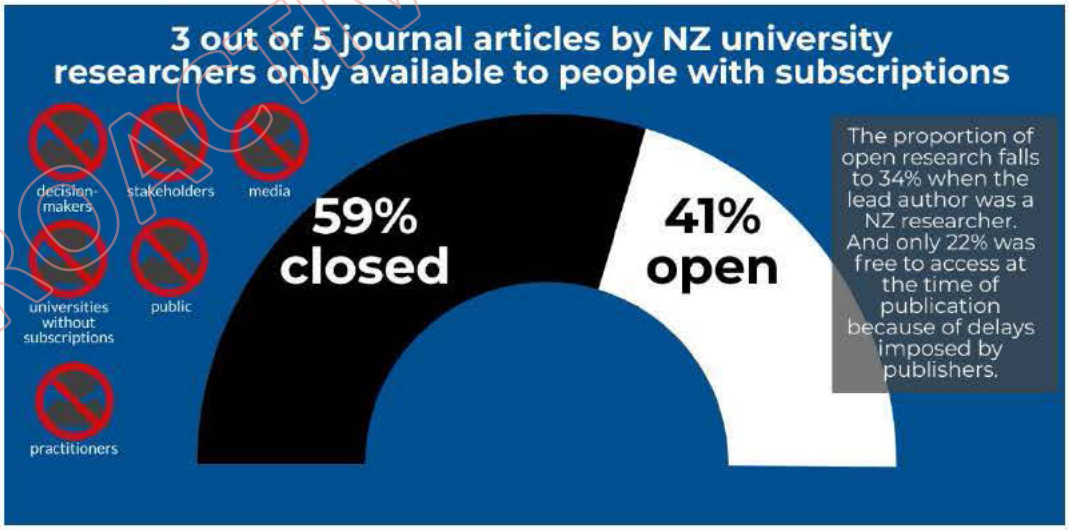

Figure 1 Proportion of New Zealand research available freely

Our research found that only 41% of research articles are openly accessible where any of the authors are from a NZ university. In fact, this number falls to 34% where the lead author is a New Zealand researcher. We also found, from our analysis, that only 22% of all of our articles were accessible to everyone *immediately on publication* with licenses that enable reuse of that work. This is largely because some articles are subject to an embargo period imposed by publishers before an open version can be made available.

We also examined the openness of research outputs directly funded by our major funding bodies, finding that overall 51% of such research was openly available. When we narrowed analysis to the three major funding agencies we found these results.

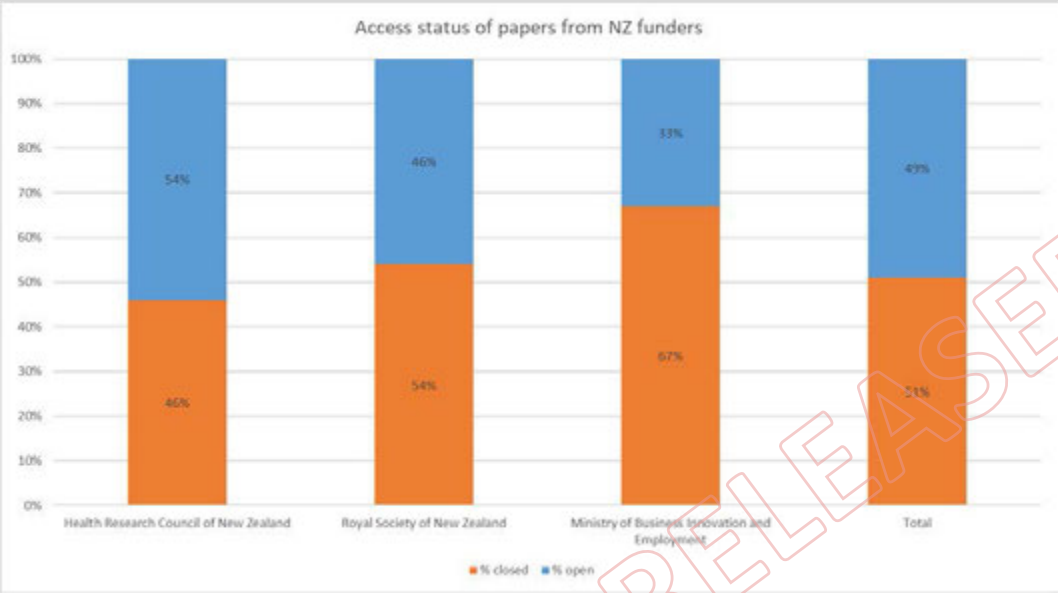

Figure 2 Proportion of research outputs funded by major funding agencies available freely

Overall, 49% of university research that is publicly-funded by our biggest research funders (HRC, Marsden, MBIE and others) is behind a paywall – inaccessible to government agencies and to the New Zealand public. Only 33% of MBIE-funded research which was appropriate to be published (i.e. not released publicly because commercial advantage or confidentiality) was published in a journal or platform that made it readily accessible.

Our work also demonstrated – for the first time with New Zealand data – that there are clear advantages to making our work open.

- Research that is openly accessible is cited in academic papers 41% more than research that is behind a paywall.
- Open research articles were referenced in the media 3.5 times more than closed ones and mentioned in policy documents twice as often.

These results are in line with international studies of the effects of openness on impact and engagement.[4]

The challenge then, is to open up more of our research, to increase impact and support engagement and connection with people and groups outside of universities. The CONZUL working group identified that over 3000 of the articles published in 2017 in our sample set could have been made accessible in an open repository but are currently behind publisher paywalls. We are putting initiatives in place to make more of that research widely accessible.

It is worth noting the global context for our research findings which shows us lagging behind the countries we commonly compare ourselves with. The Leiden Ranking tool evaluates global trends and provides comparable results to our study although using a different method. Leiden's figure for the proportion of NZ research that is openly available in some form is 38.4%, similar to our research finding of 41%. Compare this to Leiden's figures for: Canada 42%, Australia 42%, Germany 48%, Ireland 49%, Norway 54%, United States 54%, and United Kingdom 71%. 34 of the top 50 universities for proportion of open research are

[4] Piwowar H, Priem J, Larivière V, Alperin JP, Matthias L, Norlander B, Farley A, West J, Haustein S. 2018. The state of OA: a large-scale analysis of the prevalence and impact of Open Access articles. *PeerJ* 6:e4375 doi.org/10.7717/peerj.4375

from the UK; New Zealand's top-ranked university is the University of Canterbury at number 416 in the list. These countries are taking advantage of the citation advantage for open research and we are missing out on the research impact. Clear policy initiatives in the higher ranked countries has led to their advantage – more on this below.

Guiding Policy – Excellence

Question 11:	Do you agree with the definition of excellence presented here as the best thing possible in its context? Why or why not?
Question 12:	How can we achieve diversity within our research workforce? What are the current barriers preventing a diverse range of talent from thriving in the RSI system?
Question 13:	Do you agree that excellence must be seen in a global context, and draw from the best technology, people, and ideas internationally? Why or why not?
Question 14:	Do you agree that excellence is strengthened by stronger connections?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

We have detailed the many groups that do not have access to research. Access to paywalled research is expensive and only available to the privileged. CONZUL figures show that the eight New Zealand universities spent $68 million dollars in 2017 on access to electronic resources, which includes access to journal articles.

CONZUL has a stronger concern about how universities work with Māori and Pasifika communities to engage and connect with them.

Research[5] recently published on the demographics of Māori in universities shows that "despite values espoused by universities in terms of diversity and within their equity policies regarding Māori staff, there has been no progress in increasing the Māori academic workforce. Māori academics were severely under-represented at universities between 2012 and 2017, comprising approximately 5% of the total academic workforce. ….We highlight the immediate need for universities to move beyond diversity and equity statements and not only commit to, but also initiate, significant actions to recruit, retain, support and promote Māori scholars within the academy".

The research[6] on Pasifika in universities shows similar data: "despite national and university policies to see education serve Pasifika peoples better, there has been no change in the numbers of Pasifika academics employed by the universities between 2012 and 2017. ….Pasifika who are in the academy are continually employed in the lower, less secure levels of the academy. … This paper builds on current Pasifika understandings and experiences of universities and highlights the urgent need for universities to reconsider their current recruitment, retention and promotion practices, and overarching structures and habits that operate to exclude Pasifika peoples.

In general, the lower representation of Māori and Pasifika amongst university academics is likely to mean that the problems of access to research will be exacerbated for Māori and Pacific communities.

[5] Why isn't my professor Māori? DOI: 10.20507/MAIJournal.2019.8.2.10

[6] Why isn't my professor Pasifika? DOI: 10.20507/MAIJournal.2019.8.2.9

Guiding Policy – Impact

Question 15: How can we improve the way we measure the impact of research?

Please type your submission below.

Improved citation rates are one measure of impact, which is positively affected by the open research citation advantage. Citations mostly record impact upon other academic researchers. Globally there is an emerging trend to measure non-academic impact in research evaluation exercises including RE and ERA overseas, and PBRF in New Zealand. Altmetrics.org uses DOIs to determine the frequency with which articles are referenced in tweets, Facebook posts, Wikipedia articles, mainstream news media stories, and official policy documents.

In our sample it was found that open articles were cited in the media 3.5 times more than closed ones and mentioned in policy documents twice as often. This advantage increased slightly for articles primarily available through repositories which were 3.7 times more likely to be cited in the media and 2.5 times more likely to be mentioned in policy documents. While the absolute numbers of policy documents mentioning the research in our sample were small, and we have reservations about the overall effectiveness of Altmetric's methodology in this area; the difference between the two sample sets is striking enough to suggest that this is genuine evidence of the greater reach and impact of openly available research. Research that is referenced by policymakers and the media is more likely to have real-world outcomes than research that is cited only by the academic community.

Guiding Policy – Connections

Question 16:	Where do you think weak connections currently exist, and what are the barriers to connections at present?
Question 17:	What actions will stimulate more connectivity between parts of the RSI system?
Question 18:	How could we improve connections between people within the RSI system and people outside it, including users of innovation, and international experts, business communities, and markets?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

More connectivity between parts of the RSI system will be stimulated by earlier consultation with community groups about what research should be undertaken.

Greater access to the research outputs to the people outside the RSI system will stimulate improved connections, especially if scholarly communications broaden beyond traditional research journals to places where communities, users of innovation, media, policy makers and business communities look for information relevant to them.

Moving towards an open access policy which mandates that the default position for publicly funded research should be that it is published in journals and platforms which are openly accessible and immediately available would stimulate and strengthen connections.

Specifically, we strongly endorse and encourage the suggestion on p.29 that MBIE may consider policies around open access to data and research, management of intellectual property with research organisations and incentives that MBIE policies place on researchers and innovators to connect and share freely. There is ample evidence of such policies supporting and furthering connections, engagement and impact of research. We would be pleased to work with MBIE and other research partners to draw upon the best examples of overseas policies to contribute towards appropriate open access policies for MBIE.

Actions – Making New Zealand a Magnet for Talent

Question 19:	How can we better nurture and grow emerging researchers within New Zealand and offer stable career pathways to retain young talent in New Zealand?
Question 20:	How could we attract people with unique skills and experience from overseas to New Zealand?
Question 21:	What changes could be made to support career stability for researchers in New Zealand? What would be the advantages and disadvantages of these approaches?
Question 22:	Do you agree with the initiatives proposed in the Strategy to support and attract talented researchers and innovators? Are any changes needed for these initiatives to be successful? Are there any other initiatives needed to achieve these objectives?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

CONZUL supports the desire to attract the best people with unique skills and experience to New Zealand.

We would also like to see serious attention paid to growing our own, especially to address the diversity and inclusivity issues mentioned in response to question 12. The research on the low participation in the academic workforce from Māori and Pasifika academics despite diversity policies and values espoused by the universities, indicates that thoughtful investment is required to grow diversity to reflect our student populations and communities.

Actions – Connecting Research and Innovation

Question 23:	What elements will initiatives to strengthen connections between participants in the RSI system need to be successful?
Question 24:	What elements will initiatives to strengthen connections between participants in the RSI system and users of innovation need to be successful?
Question 25:	What elements will initiatives to strengthen connections between participants in the RSI system and international experts, business communities, and markets need to be successful?
Question 26:	Are there any themes, in addition to those proposed in the Strategy (research commercialisation and international connections), that we need to take into consideration?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Q 23 -25: As mentioned previously, we believe that an initiative to develop an open access policy as the default for publicly funded research will strengthen connections between participants in the RSI system as they will have access to research outputs.

Q26: Research commercialisation is sometimes cited as a reason why open access is not appropriate. CONZUL would like to query this perception. If the potential for commercialisation means that research outputs will not be widely shared then it is inappropriate to publish the research in any journal – open or closed. Many research projects with commercial potential publish some of their research findings and use other mechanisms to protect their commercial interests. If the research is being published, there are no disadvantages and many advantages to publishing in an open journal or platform rather than a closed journal.

Actions – Start-up

Question 27:	How can we better support the growth of start-ups?
Question 28:	Do the initiatives proposed in the draft Strategy to support growth of start-ups need to be changed? Are there any other initiatives needed to support start-ups?
Question 29:	What additional barriers, including regulatory barriers, exist that prevent start-ups and other businesses from conducting research and innovation?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

As indicated above only 22% of New Zealand university research outputs are open at the time of publication. This increases to 41% over time, largely due to publishers' embargoes on research publications expiring. However the majority would still be inaccessible to start-ups, who would be amongst those potential stakeholders most keen to have immediate access to research. We support MBIE adopting a policy on immediate access to research with an appropriate re-use license that has been publicly funded. CONZUL would like to work with MBIE and other partners on developing an appropriate open access/scholarship policy for publicly funded research.

Actions – Innovating for the public good

Question 30:	How can we better support innovation for the public good?
Question 31:	What public-good opportunities should our initiatives in this area be focused on?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

CONZUL supports a broad approach to innovation for the public good that covers all the spheres of research within our universities, not just research that is science based or has a commercial or business potential.

There are considerable variations between subject disciplines in their approach to open scholarship. Health focused research has a lot of international collaboration between research partners, and significant international research funders with long commitments to open and transparent publication of research outputs. In the NZ context, health focused research is the only area of publicly funded research is the only subject area that attains more than half of the research widely accessible. MBIE-funded research lags behind with 33% of articles being openly accessible.

Scale up – Choosing our areas of focus

For this draft iteration of the strategy, **we seek input on the selection of possible areas of focus**. We will consider establishing around five focus areas, but, depending on the eventual selection, are likely to introduce them over time, rather than immediately. In addition to the criteria set out in the Strategy document, we invite stakeholders to consider the following factors in their suggestions –

- The ambition of this strategy to focus efforts in the RSI portfolio at the global frontier of knowledge and innovation.
- Ways in which the RSI system can accelerate progress on the government's goals.
- The focus areas already determined by *From the Knowledge Wave to the Digital Age*.
- Work already underway where we are already seeking to build depth and scale in the RSI system.

The following areas could be a useful start, and are highlighted in *From the Knowledge Wave to the Digital Age:*

- **Aerospace**, including both autonomous vehicles and our growing space industry.
- **Renewable energy**, building on recent investments in the Advanced Energy Technology Platform.
- **Health technologies** to improve delivery of health services and explore opportunities in digital data-driven social and health research.

We invite comment on these suggestions and welcome input on other possible focus areas.

Please type your submission below.

Actions – Towards an Extended Vision Mātauranga

This section of the draft Strategy signals our intention to consult and collaborate further with Māori stakeholders to co-design our responses and initiatives. From that perspective, we consider the signals in the draft Strategy to be a start, rather than a set of final decisions. Nonetheless, we are keen on initial feedback in the following areas.

Question 34: Does our suggested approach to extending Vision Mātauranga focus in the right five areas? If not, where should it focus?

Question 35: How can we ensure the RSI system is open to the best Māori thinkers and researchers?

Question 36: How can we ensure that Māori knowledge, culture, and worldviews are integrated throughout our RSI system?

Question 37: How can we strengthen connections between the RSI system and Māori businesses and enterprises?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Actions – Building Firm Foundations

Question 38:	Do the current structures, funding, and policies encourage public research organisations to form a coordinated, dynamic network of research across the horizons of research and innovation? What changes might be made?
Question 39:	Is the CRI operating model appropriately designed to support dynamic, connected institutions and leading edge research? What changes might be made?
Question 40:	What additional research and innovation infrastructure is necessary to achieve the goals of this Strategy? What opportunities are there to share infrastructure across institutions or with international partners?
Question 41:	What elements will initiatives in this area need to be successful?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

The New Zealand tertiary sector has lagged behind our comparator countries in the lack of policy direction from the government or our chief funding agencies with regard to ensuring publicly-funded research is publicly-available. It is recognised in many other places that open policy is a key factor in facilitating the spread of knowledge, the pace of scientific discovery, as well as innovation and applicability. For example:

- The National Institutes of Health has since 2009 required that research it funds be made publicly-available: "We believe that widespread access to and sharing of peer-reviewed research publications generated with NIH support will advance science and improve communication of peer-reviewed, health-related information to scientists, health care providers, and the public."[7]
- The United Kingdom's Research Excellence Framework also requires that publicly-funded research be made as widely-accessible as possible; this is a requirement for certain types of research output to be considered as part of the REF assessment. UK Research and Innovation declares that "Open access is central to UK Research and Innovation's ambitions for research and innovation in the UK."[8]
- Plan S – an open access mandate adopted by a coalition of major funding agencies, including the Wellcome Trust and the Gates Foundation – take the view that science fundamentally cannot operate optimally unless all research can be read by all: "the chain, whereby new scientific discoveries are built on previously established results, can only work optimally if all research results are made openly available to the scientific community."[9]
- The New Zealand government's own NZGOAL Framework also recognises the benefits of open access to publicly-funded work (highlighting added):

> It is widely recognised, in New Zealand and abroad, that significant creative and economic potential may lie dormant in such material when locked up in agencies and not released on terms allowing re-use by others. That potential is two-fold:
>
> a) individuals, non-profit and commercial organisations can leverage this material for creative, cultural and economic growth, improved environmental sustainability, greater productivity, and the wider public benefit; and
> b) experts and others can contribute to improved policy development and more efficient financial performance by government through being able to access, manipulate and provide feedback on such material.

When NZGOAL was implemented, it was specifically excluded from the university sector. It is timely to reconsider that decision and consider an open, fair, accessible policy approach to most of NZ university research outputs.

We note too the emphasis in both Plan S and NZGOAL that research should be licensed for re-use, as well as being free to use and immediately available. Both these frameworks recognise that removing barriers to reuse is key to fostering the adoption of research and the building of connections.

[7] Policy on Enhancing Public Access to Archived Publications Resulting from NIH-Funded Researchhttps://grants.nih.gov/grants/guide/notice-files/NOT-OD-05-022.html
[8] UK Research and Innovation website. 'Open Access Research.' Accessed 31 October 2019 from https://re.ukri.org/research/open-access-research/#policy
[9] Coalition S. 'Why Plan S?' Accessed 31 October 2019 from https://www.coalition-s.org/why-plan-s/

Actions – General

Question 42: How should the Government prioritise the areas of action, and the initiatives proposed under each area?

Please type your submission below.

General

Question 43:	Do you have any other comments on the Strategy which have not yet been addressed?

Please type your submission below.