Submission by

to the

MINISTRY OF BUSINESS INNOVATION & EMPLOYMENT

on the

TE ARA PAERANGI - FUTURE PATHWAYS

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16 March 2022

CONTACT:
Dr Zahra Champion
Executive Director
BioTech New Zealand
Auckland Based
E: zahra.champion@biotechnz.org.nz

BIOTECHNZ SUBMISSION ON TE ARA PAERANGI FUTURE PATHWAYS GREEN PAPER - THE FUTURE OF NEW ZEALAND'S RESEARCH SYSTEM.

SUMMARY

The Executive Council of BioTech New Zealand (BioTechNZ) wishes to thank the Ministry of Business, Innovation & Employment for the opportunity to submit on the Te Ara Paerangi - Future Pathways consultation process. We welcome the invitation to provide feedback on this submission and are happy to have The BioTechNZ name and contact information published.

SUBMITTER INFORMATION

BioTechNZ is a purpose driven, membership-funded **sector representative body**. Its vision is to maximise New Zealand's bioscience and technology capability to create a strong New Zealand bioeconomy. Its diverse range of members all share a desire to maximise the ways biotechnology can help address the world's agricultural, environmental, and health problems.

BioTechNZ raises awareness and increases understanding of biotechnology to enable the nation to embrace the best opportunities biotech offers, helping New Zealanders to live better, healthier and more productive lives.

BioTechNZ connects innovators, investors, regulators, researchers, social entrepreneurs and the public, and acts as a neutral centre of gravity for discussion, debate, policy development and collaboration around biotechnology in New Zealand.

Taking a practical but informative and evidence-based approach, BioTechNZ focuses on harnessing the opportunities and addressing the issues. It draws on the active contributions of all members.

In 2018, BioTechNZ joined NZTech, a member funded, not-for-profit, non-governmental organisation that represents 20 tech associations (the Tech Alliance). NZTech has more than 1600 members who collectively employ over 100,000 New Zealanders: more than 10 percent of the New Zealand workforce.

Important Note: This submission is the view of BioTechNZ. These comments are taken from the perspective of BioTechNZ industry members who **<u>are not</u>** Crown Research Institutes (CRI) or research organisations (RO) yet are a vital cog in the biotech ecosystem as research users. BiotechNZ assumes that CRIs and RO members will be commenting on Te Ara Paerangi - Future Pathways through their own submissions. These organisations typically co-fund projects, collaborate with researchers in-kind or pay-for-service, licence intellectual property from RO research and commercialise biotech innovation.

SUMMARY:

BioTechNZ understands MBIE has requested input into determining national priorities and the ways to best support these priorities through the restructure of the research, science and innovation (RSI) sector.

RSI needs to create an impact that reaches the lives of all New Zealanders, and requires commercialisation and strong relationships with private sector partners to achieve this.

BioTechNZ supports the comments presented in the KiwiNet submission and has not replicated their comments.

SECTION 1:
RESEARCH PRIORITIES

Questions:

1. **Priority Design:** What principles could be used to determine the scope and focus of research priorities?

BioTechNZ is in support of KiwiNet's comments that "there are overarching issues to be addressed to achieve any potential gains through future priority setting and/or restructure. These issues are related to the effectiveness of knowledge exchange pathways which lead to impact generation".

The term "Research Users" should be defined in the glossary.

Firstly, there are many different types of research methods to help professionals gain the information they seek, basic (fundamental) and applied, and these are both important and reliant on each other for scientific advancements. Therefore, when we talk about research innovation, both areas need to be supported through government funding as the two are both important for innovation. A great example is mRNA vaccine development preceded by decades of basic research before it was used in the commercial setting.

Secondly, creating the priorities: The paper says, "How we set research Priorities in New Zealand will also need to uphold Te Tiriti and the diversity of the community as a whole." We acknowledge this. However, first and foremost we need research to focus on national/global needs where New Zealand can derive environmental, social and economic benefits.

As the pace of population growth and climate change has accelerated, biotechnology has been identified as a critical technology globally. Its wide application illustrates how a country's success may largely depend on the national capabilities in mastering production and innovation in these crucial areas.

The growing global demand for biotechnology has led to the development of a global market that is expected to be worth US$729 billion by 2025. New Zealand is positioned well in the world, ranking fourth for innovation potential in biotechnology. Currently, our vibrant biotech sector is small but growing, including 211 companies and $2.7 billion in revenues. Nearly half of the sector, 45 percent, is based in regional New Zealand.

There is increasing global demand across the biotechnology spectrum for solutions to health, agri-food and environmental challenges, in addition to the role that biotechnology plays in enabling and growing New Zealand's critical bioeconomy, worth $49.4 billion.

We need to support areas of research in which we already have national strength. Biotechnology cannot be ignored, whether it is a key priority (eg priority = biotechnology) or it is embedded into other priorities (eg climate change - to ensure that biotech is a technology recognised as part of the solutions, such as LanzaTech using microbes to recycle carbon oxide emissions).

Research should support the "next wave" of industry coming through New Zealand's start-up ecosystem and create the structure for these ventures. After reviewing the COVID-19 pandemic response, urgent priority should be given to New Zealand's ability to be self-sustainable in times of need – manufacturing its own vaccines, personal protective equipment and virus detection

products, creating national standards for imported goods (and testing thereof), using natural resources that can derive higher value (eg foods and natural health products, vaccines) or are in need of repair (wetlands, water quality in rivers and sea), and for social good.

It is clear how important a thriving biotechnology sector is for our future. However, New Zealand lacks a bioeconomy strategy. Research priorities need to focus around human, animal and environmental research for New Zealand, in the context of the global environment.

2. **Priority-Setting Process:** What principles should guide a national research priority-setting process and how can the process best give effect to Te Tiriti?

Clear priority to Te Tiriti should be given to issues of national environmental significance – sustainable businesses that use the resources from Aotearoa's land, sea and waterways for economic benefit; and the creation of research and jobs that strive to protect those resources. Te Tiriti is an important aspect of New Zealand science and community, but it should not drive our research priorities; rather, it should supply valuable context and opportunity for Te Tiriti principles to be applied to New Zealand's research response to clear macro-economic or socio-economic needs.

There is no mention of New Zealand industry representatives being involved in priority setting. We have a vibrant ecosystem within the New Zealand Tech Alliance, with experts and entrepreneurs passionate about their businesses and the future of New Zealand. We urge the Government to acknowledge the voices of New Zealand industry representatives in the priority setting process.

3. **Operational Priorities:** How should the strategy for each research priority be set and how do we operationalise them?

The issue is that the current research funding is so fragmented and creates competition for funding, which is not adding but detracting from collectively working together to the common good of New Zealanders. This fragmentation and misalignment drive competitive and short-term behaviours that undermine connection and lead to inefficiency within the system. Coupled with the lack of clearly defined vision or cohesive support, it creates insufficient inertia to realise the full potential.

As above, we urge the Government to engage with sector groups (eg the NZ Tech Alliance) in setting priorities. As previously stated, there is no mention of New Zealand Industry representatives and research users being involved in priority setting. We urge Government to acknowledge the voices of New Zealand industry representatives in the priority setting process.

The strategy needs to have all the key organisations across the strategy (including industry), clear goals, and clearly articulate what will be delivered. Each priority should be governed by a board that includes representatives from industry, Māori, relevant CRIs, and subject-matter experts from ROs. Being led by one CRI has been done before and not worked in collaboration as hoped by Government. A board of "stewards" for the research priority will ensure all stakeholders are aware of research progress and can assist the CRI with commercialisation, scale-up, roll-out and other areas where it does not have a great history of success.

The process of moving world-class scientific research discoveries from our public research organisations out into the world as new products and services is key for New Zealand, and this is a process that is often not seen, or misunderstood. There is a significant misalignment between

Government, research institutions and the private sector regarding the basic premise to commercialise and who benefits from commercialisation. Currently, New Zealand's institutions are funded for research, which can deliver impact, yet they are not incentivised to commercialise their research discoveries.

SECTION 4:
INSTITUTIONS

13. **Knowledge Exchange:** How do we better support knowledge exchange and impact generation? What should be the role of research institutions in transferring knowledge into operational environments and technologies?

Knowledge transfer is lacking in the New Zealand ecosystem. In particular, CRIs, TEOs and ROs have an increasing number of commercial advisors and IP "sellers" trying to sell licences or patents for technologies that have yet to be optimised or proven commercially.

New Zealand industry, as taxpayers and the engine behind economic growth, should get "first right of refusal" to new IP developed by CRIs (especially in instances where New Zealand business are not co-funding such IP development).

Furthermore, if R&D is successful and New Zealand companies choose to use the IP, further funds should be made available to that successful alliance to manage the cost of commercialisation. Often "blue sky" endeavours are easier to get funding than pilot-scale production of a useful material/process. Too many great New Zealand science discoveries have been left floundering on the edge of the cliff with no option but to sell off-shore.

CRIs and universities need to be judged on commercialisation – number of businesses formed, licences granted, JVs or collaborations, as well as the more established "papers, patents and PhDs" route.

Section 5:
RESEARCH WORKFORCE

14. **Workforce and Research Priorities:** How should we include workforce considerations in the design of research Priorities? What impact would a base grant have on the research workforce? How do we design new funding mechanisms that strongly focus on workforce outcomes?

BioTechNZ agrees there needs to be a serious approach to talent development and retention. There is huge scope for building capability across the research science and innovation system to support knowledge exchange for impact generation. Creating a culture of science innovators and entrepreneurs should be encouraged.

The funding flow should bring together fundamental research and applied and commercial endeavours, with workforce able to choose career paths or sabbaticals across any part of that continuum. It should support greater temporary and permanent mobility of researchers between public and private sector, ensuring reward and incentive schemes enable this. It should rebalance the reward and incentive system for researchers towards outcomes and impact rather than solely academic measures (publications, etc.).

It should support many more joint graduate schools between universities and other institutions (public and private) with some base funding. There needs to be longer contracts to retain staff and adequate remuneration.

Section 6:
RESEARCH INFRASTRUCTURE

17. **Funding Research Infrastructure:** How do we support sustainable, efficient and enable investment in research infrastructure?

Large capital funding should have its own dedicated government funding that is not linked to research funding.

Government should welcome private and public partnerships with international corporates to help invest in infrastructure. The definition of research infrastructure should also take into account digital infrastructure.

Multiple users of research infrastructure should be welcomed and should not be limited to research-to-research relationships. Opening the research infrastructure door to New Zealand industry, for a reasonable fee, is a must. Research users often need access to scientists and analysis tools, pilot plants for characterisation, and benchmarking of materials and innovation. A more open, collaborative infrastructure will invite collaboration, prototyping, analysis and publications – while New Zealand industry gets to “know more” before embarking on costly R&D or performance. This does not include a “quality control” service, rather a collaborative open relationship in the early discovery phase.