Submission by

to the

Science System Advisory Group

on

Phase 1 – The role of science and innovation in New Zealand

17 May 2024

Introduction

The BusinessNZ network encompasses four large regional business membership organisations that together cover the entire country: the Employers and Manufacturers Association (EMA), Business Central, Business Canterbury and Business South. Membership of the network also encompasses special interest membership groups, including ExportNZ, ManufacturingNZ, the Sustainable Business Council, the Business Energy Council and Buy New Zealand Made. The network represents around 76,000 companies in total, ranging from New Zealand's largest businesses, to small local businesses.

We welcome the opportunity to make a submission to the Science System Advisory Group (SSAG). In our 2022 submission to MBIE on the **Te Ara Paerangi - Future Pathways** Research, Science and Innovation (RSI) Green Paper, and in our subsequent meetings with officials, we have expressed our concerns that the science system and the country's research priorities are not sufficiently supportive of New Zealand's economic and wider wellbeing interests. We, therefore, regard the work of the SSAG as being timely and important.

We note at the outset that we believe major changes to the science and innovation system are needed, if New Zealanders are to benefit from research outcomes that lead to greater levels of innovation, more productivity and higher standards of living. The current system has been failing, and its weaknesses cannot be rectified with minor adjustments.

General comments

As evidenced by the findings of Statistics NZ's Research and Development (R&D) Surveys[1], New Zealand has performed poorly, by international standards, in terms of the country's expenditure on R&D as a percentage of GDP. Moreover, the results of the survey suggest that, when it comes to spending on R&D, the business sector is largely disconnected from the other components of the Science and Innovation system: namely, the higher education sector, and the government (excluding higher education sector).

On the first of the points above, New Zealand's R&D expenditure as a share of GDP was 1.47% in 2021, compared to 2.74% in the OECD (2021 is the latest year for which OECD data is available). In the same year, business expenditure on R&D (BERD) in New Zealand was equivalent to 0.87% of GDP, compared to 1.99% in the OECD. It should be noted that BERD in New Zealand increased by 29% between 2021 and 2023, to reach the equivalent to 0.95% of GDP, but it remains to be seen how this will compare with the OECD.

On the second point, the survey results for 2023 show that businesses spent only 1.9% of their R&D budgets in the higher education sector, and only 5.1% in the government (excluding higher education) sector. By contrast, 78.3% of BERD was within the business sector itself, and 12.0% was from overseas sources. Given that BERD accounts for the majority of all R&D expenditure in New Zealand, it is questionable whether the RSI "system" is truly an integrated network of parts.

The result of this low level of spending on R&D, coupled with the disconnectedness of the components of the system, has been low levels of innovation in many sectors of the economy and a consequent slow pace of productivity growth. Recent Statistics NZ data[2] show that the annual percentage change in multifactor productivity during the past 45 years was 1.7% in the primary industries, 0.0% in goods-producing industries, and 0.6% in the service industries. The data for the past 15 years was especially concerning. During this time, the corresponding rates have been 0.4%, -0.6%, and 0.5%, respectively.

The flow on effect of slow productivity growth has been lower standards of living than in many other OECD countries and an inability for the government to fund services that enhance wellbeing, social wellbeing in particular.

We believe that the SSAG has the potential to play an important role in helping to create the conditions in which the problems outlined above can be rectified. In what follows, we address each the question sets shown in the consultation documentation.

[1] The latest survey results, for 2023, are here: Research and development survey: 2023 | Stats NZ

[2] https://www.stats.govt.nz/search?Search=Productivity%20statistics:%201978%E2%80%932023

Question set 1 – The Science, Innovation and Technology System

1. What future should be envisaged for a publicly supported science, innovation and technology system?

We would like to see a system that focuses on generating innovative and impactful outputs that can be used to drive a highly productive and internationally competitive economy. Without this, it is difficult to imagine how New Zealanders can secure well-paid employment and enjoy high quality education, health, and other key public services.

2. What are the opportunities, challenges and barriers that need to be addressed to build a more thriving research, science, innovation, and technology system that delivers positive sustainable growth and prosperity for New Zealand?

Our major company members have told us that they value the role of the university sector in training new entrants to the scientific workforce. They also find it useful to tap into the expertise of individual university academics. However, they attach less value to the knowledge creation role of the universities. This is partly because universities develop knowledge that is often at too early a stage for use by the business sector, or because the knowledge is not transformed into commercially exploitable intellectual property (IP) that can be used to create goods and services that are potentially valuable in the marketplace. Business R&D is done in response to customer/consumer demand or gaps identified in the marketplace, whereas academic research tends to be investigator push, rather than demand pull.

A key problem associated with the university part of the system is that researchers are incentivised to publish the results of their work, rather than to seek to have them commercialised. Our expectation is not that the university sector delivers commercially exploitable intellectual property that is market-ready, but that the sector should at least progress knowledge beyond the initial concept to an idea that merits further investment.

Several of our members have also remarked to us that the university technology transfer / commercialisation offices can impede the development of relationships between businesses and academics that have the potential to result in the creation of IP with commercial potential. We would, therefore, like to see individual academic researchers having more ownership and control over the potential IP they create. There also needs to be a more realistic appreciation of the value of IP versus the cost to commercialise it. The former is not valuable at all unless the latter happens and the clock starts ticking on the duration of the IP the minute the patent is approved. A slow road to commercialization devalues the IP and makes it commercially unattractive.

Some of the Crown Research Institutes (CRIs) are attuned to the needs of businesses, but a key issue is that, instead of working collaboratively, they tend to devote a lot of their resources in competing for contestable research funding with one another, and with universities and independent research associations.

In the business sector, R&D Tax Incentives (RDTIs) work well for larger businesses and they want the Government to stay the course on this approach, but it works less well for smaller businesses because the transaction costs in applying for them are high compared to uncertain benefits. Small businesses tend to find it difficult to progress from a one-off Callaghan Innovation **New to R&D** grant to accessing RTDIs to support their innovation activities on a continuing basis. In other words, there is a gap in the provision of support for businesses that want to establish ongoing R&D activities.

Nonetheless, there is considerable scientific capability and entrepreneurial talent within the different parts of the RSI system. The role of the government should be to encourage this capability and talent and get the incentives right for the talent to engage with the private sector. A first step should be to identify and remove the barriers to innovation outlined above.

3. What principles should underpin the design of a science, innovation, and technology system for New Zealand, given its demographic composition and distinctive cultural makeup, its geographical position, and its social, environmental, and economic futures?

Bearing in mind our answer to question 1, the paramount principle should be that the system should be designed to support economic and productivity growth, through innovation by businesses. Economic strength will provide the wherewithal to promote the high quality social, environmental, and cultural conditions that New Zealanders want. Conversely, in a struggling economy, it will be difficult to deliver the quantity and quality of services the population needs.

Further to our earlier comments on **Te Ara Paerangi - Future Pathways**, we believe that, until now, the system has lacked the commercial emphasis needed to create better lives for New Zealanders. Accordingly, we recommend that the system should be reorientated to encourage the country's best academics and researchers to work on real technological problems and opportunities.

Question set 2 – Public Research Organisations

4. What is the role of public research organisations such as Crown Research Institutes (CRIs) in the New Zealand context?

The Crown Research Institutes Act 1992 specifies that the CRIs should promote and facilitate the application of the results of research and technological developments. We believe that this is appropriate in relation to New Zealand's economic needs. We further believe that, collectively, the CRIs have been successful to a limited extent, but that the CRIs that focus on supporting the primary sector have performed considerably better. This has been demonstrated by the consistent productivity and export revenue growth the primary sector has generated.

One of the questions in this set is whether the public research organisations should be public good facing versus private good facing. However, we do not think this question is valid because the collective private good contributions of the public research organisations have the effect of supporting the public good.

On the question of how the public research organisations should manage IP, as we suggested earlier some CRIs are relatively sensitive to the needs of businesses; and they are fairly adept at helping SMEs and industry bodies by researching practical solutions to scientific problems that affect business performance. However, managing IP is not one of their core roles, and nor is it their forte. We believe that it would be better that they should seek private sector partners from within New Zealand to commercialise the IP they create. We understand from our major company members that undertake significant amounts of R&D that, for every $1 it takes to create IP, it takes $100 to commercialise it. This alone explains why it often takes many years for IP to transform into business success and why many companies that spin out from universities and the CRIs struggle to survive, if they survive at all.

Several of our members also suggested that New Zealand could learn from similar research institutes overseas. One example cited was Teagasc in Ireland[3], which delivers research, advisory and training services to the agriculture and food industries, as well as rural development programmes.

5. Does New Zealand need an advanced technology organisation doing applied and developmental research? If so, how would it be structured, governed, and organised? How would the private sector be engaged?

We assume these questions pertain to Callaghan Innovation (Callaghan). We believe that New Zealand needs an advanced technology organisation that is capable of undertaking applied and developmental research on behalf of individual companies and industry organisations in the manufacturing and construction sectors. However, it is unclear whether Callaghan has been successful in satisfying its remit of mixed functions. It is arguable, for example, that Callaghan's role in promoting and funding R&D by SMEs, and its role in promoting the commercialisation of ideas, would be better performed by a new entity. The feedback we get from medium to large technology businesses is that Callaghan has disappeared from view, particularly with the demise of the Growth Grants.

Despite these concerns, we believe that Callaghan, and particularly the scientists it employs, is doing some good work (e.g. in lipids and bioactive compounds we believe). Perhaps on the research side Callaghan should have a narrower focus on what it is doing that is world class and for everything else, be the connector between businesses and the best research in the world that they are looking for..

We also believe that New Zealand would benefit from having a national innovation agency that monitors emerging technologies and their economic potential, and that helps to direct funding towards R&D activities to harness the technologies. Callaghan could be a suitable candidate for hosting such an agency.

Question set 3 – The Innovation System

6. Does New Zealand have appropriate mechanisms to develop the innovation pipeline, attract global partners and funding?

We do not consider this to be the case. As implied earlier, we believe that the innovation pipeline would be improved if the incentive structures for university researchers were more favourable to the creation of intellectual property than to publication of research findings.

As far as the business sector is concerned, we believe that the RDTI scheme is effective amongst larger businesses, but that more could be done to support R&D by SMEs.

[3] www.teagasc.ie

In terms of how innovation and technology could be used to make New Zealand's economy more competitive, there needs to be more of a focus on using research outputs to enhance productivity. This would necessitate a critical review of the incentives and support for innovation by the three components of the RSI system.

In order to attract global partners and funding, we also believe that it would be important to develop more welcoming FDI settings to encourage more international businesses to locate in New Zealand and to integrate our scientists and technologists into global R&D networks. New Zealand currently ranks very low amongst OECD countries in terms of FDI inflows.

Question set 4 – Contestable Research

7. What is an optimal structure for managing mission-led and contestable research?

The feedback we have received from our members indicates that most individual businesses are neither well aware of, nor actively participating in, the current mission-led and contestable research mechanisms, including the Strategic Science Investment Fund and the National Science Challenges. New Zealand has a number of independent research associations[4] that have potential to undertake research on critical problems, but which struggle to obtain contestable research funding because the principal vehicle for promoting mission-led research, the Endeavour Fund, place too much emphasis on academic excellence, rather than on research impact.

A possible alternative model to the Endeavour Fund that has been suggested to us is the Co-operative Research Centres programme in Australia[5], which invites research proposals to address specific challenges, and which aims to develop new products, services, industries of value to the economy.

One of the questions on the issue of contestable research relates to the areas in which New Zealand should develop in-depth research expertise over the next two decades. Our view on this is that an aim should be to build on existing strengths and to address critical challenges, both of which apply, especially but not exclusively to the primary sector.

As we indicated earlier, the primary sector has a relatively strong record, compared to the goods-producing and service sectors, in terms of productivity growth over the long term. The primary sector also accounts for the majority of New Zealand's export earnings. The sector should, therefore, be a focus of the contestable research effort, with the aim of sustaining its productivity and export growth records.

At the same time, the primary sector faces a formidable challenge in terms of meeting New Zealand's climate change commitments, and this also implies that contestable research activities should help the sector to rise to meet the challenge.

To be clear, this is not to say that the other sectors do not merit support from contestable research mechanisms. It simply acknowledges that the public research organisations that work with the primary sector are probably most suited to using the mechanisms to best advantage. There also needs to be incentives for the public research organisations and businesses in other sectors of the economy to work together, rather than competing with one another. Moreover, there should be a commitment to support R&D in emerging technologies beyond the primary sector, such as advanced digital technology, materials and bio-engineering.

Question set 5 – Government Research Needs

8. How should the government's own research needs be identified and addressed? How should such research be quality assured?

The answers to these questions depend on how New Zealand's largest economic and social challenges and opportunities are viewed. Business NZ considered these, and their potential responses in our **We're all in this together** White Paper[6].

However, we believe that, largely as now, the government's own research needs should be identified by ministers of the Crown, in consultation with their supporting ministries and other disinterested advisory bodies. To assure quality, research contracts should be awarded following a sound procurement processes, and research findings should be subject to peer review.

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[4] Many of the independent research associations are members of IRANZ www.iranz.or.nz

[5] https://www.cooperativeresearch.org.au/about/overview/

[6] https://businessnz.org.nz/wp-content/uploads/2024/03/240313-Were-all-in-this-together.pdf

The government should also to consider how its procurement processes might be revised, without infringing good procurement practices, to encourage the purchase of innovative New Zealand-produced goods and services.

Conclusions

As we suggested in the Introduction, the science and innovation system New Zealand has been failing to generate enough R&D activity to drive sufficient productivity growth and business success to provide the standard of living New Zealanders want and need. It is also evident that weaknesses pervade the system, and that they have endured for years. Rectifying the weaknesses will take considerable effort on an ongoing basis, and it will be necessary to implement radical changes that will threaten some entrenched interests.

Accordingly, it will be important to proceed with the changes, as far as possible, on a bipartisan basis. We are concerned that, unless there is common ground in the political realm, New Zealand will suffer successive flip-flops that achieve nothing, and could potentially inflict more damage in the medium- to longer-term.

We recognise that high standards of living rest on more than business success, but we are unapologetic in proposing that the foremost aim of the science and innovation system should be support the development of businesses that can compete in different sectors of industry on an international basis. Business success will provide the financial wherewithal to enhance social, health, environmental and cultural wellbeing in New Zealand. Without business success, general improvements in all aspects of wellbeing are likely to be unaffordable.

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The BusinessNZ Network is New Zealand's largest business organisation, representing:

- Business groups EMA, Business Central, Business Canterbury, and Business South
- BusinessNZ policy and advocacy services
- Major Companies Group of New Zealand's largest businesses
- Gold Group of medium-sized businesses
- Affiliated Industries Group of national industry associations
- ExportNZ representing New Zealand exporting enterprises
- ManufacturingNZ representing New Zealand manufacturing enterprises
- Sustainable Business Council of enterprises leading sustainable business practice
- BusinessNZ Energy Council of enterprises leading sustainable energy production and use
- Buy NZ Made - country of origin licensing organisation for NZ-made products, NZ-grown ingredients, and NZ-coded software services

The BusinessNZ Network is able to tap into the views of over 76,000 employers and businesses, ranging from the smallest to the largest and reflecting the make-up of the New Zealand economy.

The BusinessNZ Network contributes to Government, tripartite working parties and international bodies including the International Labour Organisation (ILO), the International Organisation of Employers (IOE) and Business at OECD (BIAC).

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