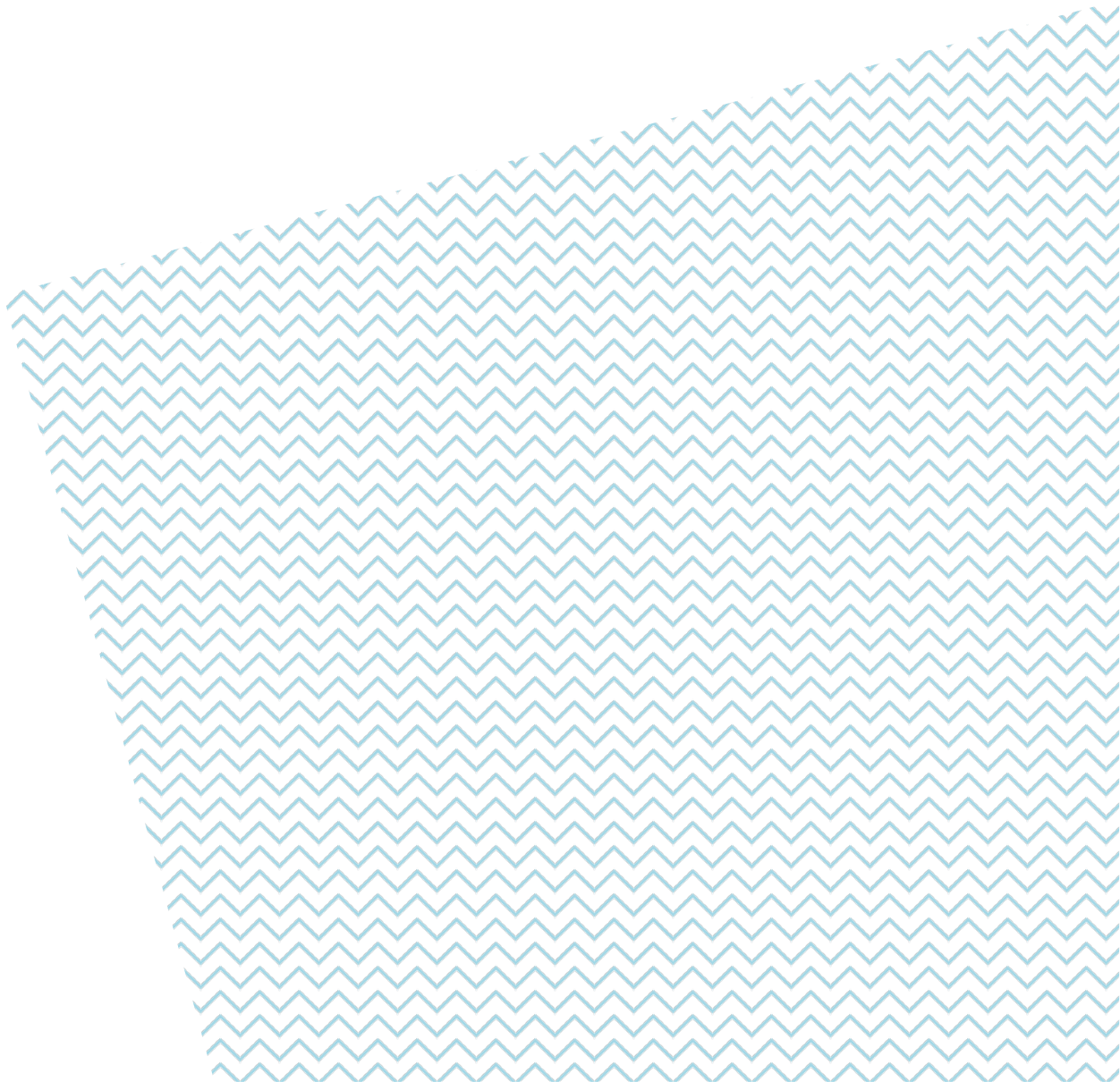# National Reconstruction Fund

Submission to the Department of Industry, Science and Resources

3 February 2023

Introduction

The University of Melbourne welcomes the opportunity to contribute to the Federal Government's consultation on the National Reconstruction Fund (NRF). The NRF has the potential to play a key role in Australia's innovation eco-system, complementing existing research and innovation programs, providing greater public investment in emerging sectors, and generating new jobs. The University sector, along with other research providers, has much to offer our industry colleagues and should be represented on the NRF Reference Group. A forum that brings together the university, industry and Government sectors would be a valuable addition to the NRF consultation process.

The university sector, along with other research institutions, has been the anchor that underpins knowledge generation and its translation for impact, including economic benefits. In recent years, there has been considerable investment in the research translation capability within the sector, driven both by a desire to derive greater societal impact from world-leading research and Government policy priorities. The University of Melbourne is always seeking to translate its world-class research into innovation and public good. Last year, the University established the $15 million Genesis Pre-Seed Fund and the $100 million Tin Alley Ventures Fund in partnership with Breakthrough Victoria and Tanarra Capital respectively. This made the University the first in Australia to introduce such a funding platform along the full research commercialisation pathway and at this scale.

Noting the NRF's primary focus on industry, this submission responds specifically to those questions that have the most relevance to the university sector, including the supply of skilled graduates and the creation of research that underpins innovation.

In this submission, we encourage the Government to focus the NRF's efforts on industries, sectors and investments which align with Australia's strengths, skills, position in the global economy and natural advantages. The University also proposes that the NRF invests in sectors that could conceivably continue to operate in Australia long-term, to ensure that jobs created through the program are sustainable and secure. There may well be merit in considering and evaluating opportunities in one or two key areas in which Australia can truly achieve global leadership. The submission also suggests that the NRF include incentives to drive greater university-industry collaboration, to join up the component parts of the innovation ecosystem more effectively.

The University highlights the large number of skilled graduates that will be required to support a more diversified economy and encourages the Government to consider how other reforms, such as those under the Universities Accord and the new National Skills Agreement, might support the NRF's ambitions. The submission suggests investment (either through the NRF or complementary innovation programs) into smart manufacturing hubs or innovation precincts to support the broader innovation ecosystem and to attract and retain global talent.

The University recommends further consideration of the role of Government in innovation markets and where intervention may be necessary. This should inform the NRF's desired rate of return, noting that a requirement to generate a positive rate of return in the short-term or self-perpetuate may lead to more conservative investments than is envisaged for the NRF (including in projects that already attract private investment without government intervention). Doing so may crowd out existing private investment.

Beyond the NRF, the University urges the Government to consider other complementary levers that could be used to drive industry investment in innovation and research. For example, the Government could consider reforms to the R&D Tax Incentive, such as the introduction of a research collaboration premium. This could better target existing sources of R&D funding towards the research and innovation that will drive growth in the outlined priority areas.

We acknowledge that the Government already supports innovation through other programs like the Australian Research Council (ARC), National Health and Medical Research Council (NHMRC) and the Medical Research Future Fund (MRFF). We note that the Federal Government has also introduced legislation to establish Australia's Economic Accelerator (AEA), which will further support research commercialisation and translation. We expect that these programs will continue to play a crucial role in the innovation eco-system, albeit at an earlier stage of the pipeline.

For further information or to discuss the submission, Professor James McCluskey, Deputy Vice-Chancellor (Research) can be contacted at dvc-research@unimelb.edu.au.

Response to Questions

Priority areas

What types of projects or investments should the Government direct the NRF to focus on, or not invest in, within each of the seven priority areas to achieve the NRF's purpose?

The NRF should focus its investments on sectors where Australia has a natural advantage and in industries that can sustainably continue onshore. For example, some advanced manufacturing companies may relocate offshore once they reach a certain size to automate processes, reduce labour costs and take advantage of overseas tax arrangements. There is a risk that industries supported by the NRF could follow a similar path. To achieve the NRF's stated goal of creating secure well-paid jobs, the NRF will therefore need to consider which industries can reasonably continue and expand in Australia longer-term.

One option would be to identify a few areas/sectors in which Australia can truly achieve global leadership and bring together diverse capabilities. An example is the extraction, processing and utilisation of rare earths/critical minerals across a range of applications and technologies. This would require a larger investment in a single or smaller number of areas.

The NRF's mode of funding should incentivise collaborations among multiple organisations (consortia) to produce innovations rather than simply targeting individual organisations. These investments should promote longer-term collaborations to achieve true transformation and support ongoing development of sovereign capability and sector growth. These collaborations must factor in the potential for future shocks to the global economy and supply chains (as was seen during the pandemic) and increase the resilience of individual businesses and industries impacted by the global environment.

To get the most out of the NRF, the Government will need to provide a ten-year view on areas in which industry and universities should invest and build capacity. Industry is unlikely to pivot from existing strategies unless there is a clear, long-term return on investment and confidence that the Government will support their journey. At a minimum, having clarity around sovereign capability would help inform investment decisions.

Additionally, the NRF should consider projects and investments that encourage international R&D-intensive companies to establish themselves within Australia. There may be a role for local jobs guarantees to ensure these international companies build local capacity.

Strategic investment is important and setting clear priority areas is useful for driving activity and providing greater clarity/transparency. However, each priority area will require a specialised/targeted approach. The process for commercialising medicines is very different from the process for commercialising textiles or transport manufacturing, for example – the NRF will need to account for this diversity when deciding where and how to invest in each area. It will also be important for Government to retain sufficient flexibility within the NRF so that it can pivot and adjust its priority areas as circumstances change.

Investment needs and opportunities

What are the manufacturing capabilities needed to support each priority area? What are other capabilities needed to support each priority area?

All the priority areas will require a concentrated skills effort to develop Australia's manufacturing capabilities. For example, the Net Zero Australia report outlines the skills requirements to support different pathways to net zero carbon emissions. The interim results found that 1 to 1.3 million new workers will be required in the energy sector to meet net zero emissions. Both vocational education and training and higher education will be vital to equip these new workers to succeed. Investing in skills development is an investment in innovation as the people who train and inspire the next generation are also the people that make the breakthrough discoveries that can be translated into goods and services.

Similarly, numerous reports outline the dearth of engineers and data scientists needed for the future. Each graduate takes at least four years to train and be job-ready. However, this pipeline starts much earlier when school-aged children are inspired to pursue careers in STEM. Therefore, STEM education needs to be considered a critical enabling capability

for the NRF. Beyond technical STEM skills, emerging and innovative industries will require financiers, lawyers, and other supporting occupations. The Government may wish to consider how reforms under the Universities Accord process allow universities to equip more people with the necessary skills and knowledge to support the NRF's ambitions. Similarly, the Government might consider alignment under the new National Skills Agreement, to ensure the two sectors are working in tandem to respond to skills needs.

Another important consideration may be work rights for PhD graduates who seek to remain in Australia upon completion of their research studies. Visa arrangements that permit such graduates to remain longer in Australia to contribute to innovative industrial sectors would leverage their research experiences, especially if they included an industry internship and/or placement.

Enabling infrastructure will also be necessary – whether it is large research infrastructure (e.g. a synchrotron, model hydrogen plant) or smaller scale (e.g. an incubator/demonstrator). For example, in July 2021, the University of Melbourne and the Bionics Institute opened a joint venture, Neo-Bionica, to design and manufacture prototypes of implantable medical devices. A small number of high-quality devices are required for early clinical studies, but previously no manufacturing facilities in Australia could make this type of device. Neo-Bionica filled this gap with its state-of-the-art facilities, including two large workshops and two independent ISO 7 cleanrooms, which have the precision technology needed to develop prototype devices (in part funded through the Victorian Higher Education State Investment Fund). The Government will therefore need to ensure that each priority sector has the enabling infrastructure for both research and translation.

A major gap in the Australian innovation system is the bridge from research discovery to application. An industry test bed with a workforce capable of scaling up prototypes to manufacturing commercially viable products could help fill this gap. This could take the form of smart manufacturing hubs or innovation precincts, noting that currently universities and Australian businesses do not have this capability at any size that would be truly cost effective.

Smart manufacturing hubs or innovation precincts provide a mechanism to progress technologies through all phases of innovation, creating products, process, technologies and new businesses that drive productivity growth. As anchor partners, universities ensure the exchange of world-class research, increasing innovation intensity and facilitating the transfer of innovative ideas to the market. One model adopted could be a "smart factory" model that comprises a range of laboratories and manufacturing environments, enabling reconfiguration to service multiple sectors. The ability to prototype new products will de-risk innovation investments and access to innovation incubators and accelerators will send products and services to market faster.

Government often plays an important role in the establishment and operation of these precincts internationally. For example, a highly successful model is the MaRS Discovery District in Toronto, which is partially funded by the Canadian Government and targets scaling start-ups whose growth exceeds 20 per cent year-on-year. This drives jobs growth, with these start-ups creating more than half of the country's new jobs, despite only representing five per cent of new companies. The Government could consider a similar model (either through the NRF or through other innovation programs such as Australia's Economic Accelerator) that targets jobs growth by supporting start-ups and spin-offs with high impact potential.

The creation of this infrastructure, including in the form of innovation precincts, can also help recruit and retain global talent to Australia. For example, the Melbourne Biomedical Precinct employs 49,000 people, who are attracted by its critical mass of world-leading companies and institutions with cutting edge facilities. The Precinct has also attracted major research-intensive businesses, including CSL, which decided to establish its $700 million global headquarters in Parkville, despite most of its revenue being generated outside of Australia. CSL is itself investing in precinct infrastructure, which will foster new businesses setting up in the area, further enhancing the biomedical eco-system.

How can the NRF help build or encourage stronger pathways for Australian developed innovation and research, and encourage additional private investment in priority areas?

The introduction of the NRF into the innovation ecosystem is a positive step, building and capitalising on the world-class research produced in Australia (noting the outsized contribution Australia makes, producing 2.7% of the world's scientific output despite comprising 0.34% of the world's population). Universities play an important role in this ecosystem as research providers, educators of skilled graduates, and generators of the innovation on which the NRF will seek to build. The NRF will be also helpful for leveraging industry investment and encouraging partnerships in the innovation eco-system (e.g. industry-university partnerships).

Australia will achieve much greater return on investment in innovation if those investments can more effectively join up the component parts of the innovation ecosystem – to link market knowledge, innovation expertise, enabling infrastructure and product development. Australia currently has relatively low levels of university-industry collaboration, particularly in terms of co-development of new products and services. The NRF could enhance this collaboration to stimulate and align new R&D activities in emerging markets and technology areas where Australia has the potential to develop sustained competitive advantage. This would also maximise knowledge-sharing between universities and businesses earlier in the innovation process, to bring together complementary expertise and resources.

To achieve this, the NRF could include incentives, criteria or sub-programs that encourage more direct links between universities and businesses. This could be via involvement of university researchers as collaborators in NRF-funded programs; commercialisation of IP developed in Australian universities/research institutes; or effective use, or development, of new shared enabling infrastructure, platforms and equipment. It could also incentivise targeted development of new technologies that will underpin selected high growth areas. Examples of analogous strategies that have successfully supported economic development through innovation include Innovate UK's programs, such as the Grand Challenges and Catapult centres.

In designing the NRF, the Government should carefully consider opportunities to align with complementary programs such as Australia's Economic Accelerator (AEA). For example, there may be opportunities for the NRF to support projects that have successfully progressed through the AEA. It may also be appropriate to align the national priority areas under the AEA with those of the NRF to ensure a coherent and consistent pipeline of funding and support for government policy priorities. NRF funding should also leverage other government investments, supporting the translation of exceptional research undertaken in joint industry-university funding schemes, such as Cooperative Research Centres (CRC) and the ARC's Industrial Transformation Research Hubs.

The Australian Government has recently invested in the development of more entrepreneurial and industry-focused PhD students, including through the National Industry PhD Program. Yet, there is a need for ongoing employment opportunities to ensure this emerging workforce stays in Australia. The Government should consider how NRF investments provide suitable job opportunities for this cohort and connect them into a dynamic innovation system. This could be through the aforementioned smart manufacturing hubs or innovation precincts, noting that knowledge-intensive communities are more likely to be economically resilient in the face of increasing technological disruption. A recent study revealed that in the US, areas with an innovation intensity (percentage of employees working on knowledge-intensive activities per geographic unit) of 30 per cent and above had an unemployment rate of 2 – 4 per cent, with every innovation-focused job created within an innovation precinct generating an additional 4 to 5 support jobs.

Beyond the NRF, there are substantial opportunities to leverage tax arrangements to drive additional R&D activity. The R&D Tax Incentive remains the single biggest source of Australian Government support for research and development, and the primary mechanism through which the Government aims to drive private sector support for R&D. Australia's low level of business expenditure on R&D indicates that, in its current design, the program is not delivering the intended increase in R&D activity.

The Review of the R&D Tax Incentive by Ferris, Finkel and Fraser recommended introducing a collaboration premium of up to 20 per cent to address the modest levels of industry-research collaboration. The Review noted that this would help address the cultural barriers and lack of familiarity that limit interaction between universities and business. Similarly, the tax offset for investing in early-stage innovation companies (ESIC) could be increased so that it is competitive internationally, to help drive additional investment.

The Government may also wish to consider broader tax arrangements and how they compare internationally, noting that favourable offshore tax settings can lead to the relocation of Australian companies (and discourage international firms from setting up in Australia).

Finally, there would be merit in considering the possibility of co-design of regulatory systems to accompany technological developments, including concurrent embedding of regulatory design. Our social scientists have much to offer in understanding the social and behavioural consequences of emerging technologies and their application. The growing application of artificial intelligence and machine learning is but one, high profile example.

Returns, financial instruments and working with other investors

What factors and considerations should inform the portfolio rate of return for the NRF?

The Government has traditionally made investments to address market failures and enable economic development and social returns. While the Government should continue to play this role, the NRF offers an opportunity to complement existing funding in the ecosystem while providing a direct return to the public. When determining the NRF's rate of return and timelines, care should be taken to guard against mandate drift to a more conservative model, like that of some existing private venture capital firms. Similarly, if the NRF is set up as an evergreen fund (i.e., self-perpetuating, with returns reinvested in the fund), this may lead to more conservative investments, crowding out existing private investment.

As part of its 2020-21 Budget, the Victorian Government established the $2 billion Breakthrough Victoria Fund, which aims to bridge the gap between discovery and commercialisation and mobilise innovation in priority areas. The Federal Government may wish to draw from the Victorian Government's experience, including in relation to timelines, investment decisions, having the right commercial teams, and ensuring the KPIs and measures are set up to drive intended benefits.

What factors drive or constrain co-investment (for example, by industry, financial sector or domestic or offshore investors) and how should these be taken into account?

The NRF should be encouraged to model returns (direct/indirect) on both co-investment and non-co-investment approaches to inform investment decisions. Finance from the private sector may prove to be a false economy and may not always lead to the best returns.

However, if the Government seeks to drive co-investment, it will need to carefully consider the NRF's investment instruments. For example, if the NRF seeks to gain a share of a company's intellectual property or seeks an equity return, this will reduce the possible return on investment for industry and may therefore discourage private investment.

In setting co-investment requirements, the NRF should be cognisant of the different roles played by research providers, financiers and industry. Research providers should be seen as a source of research and expertise and as a collaborator – not an industry investor.

Complementary reforms

How could the NRF work alongside other complementary reforms to best deliver on the Government's policy priorities?

The NRF should consider alignment with other government programs, including procurement, investment in science and technology (through the ARC, NHMRC, MRFF and NCRIS), and investment in education and training. The NRF should be seen as an exciting complement to existing research, training and innovation funding schemes rather than as an alternative to them or a competitor for funds. The Government should continue to invest in the early stages of innovation and in skills across the post-secondary system as well as through existing key R&D funding sources and programs.

As discussed previously, beyond the NRF, there are substantial opportunities to leverage tax arrangements to drive additional R&D activity, including through the introduction of a research collaboration premium under the R&D Tax Incentive. The Government may also wish to consider broader tax arrangements and how they compare internationally.