

Submission to the Department of Education, Skills and
Employment

National Priorities and Industry Linkage Fund

30 October 2020



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NATIONAL PRIORITIES AND INDUSTRY LINKAGE FUND

The Australian Academy of Technology and Engineering (ATSE)¹ is pleased to contribute to consultation on the National Priorities and Industry Linkage Fund (NPILF).

ATSE strongly supports the objectives of the NPILF as there is significant alignment between ATSE's vision for a strong, diverse, and appropriately skilled STEM workforce and the NPILF's focus on meeting the future Australian workforce requirements for STEM-skills and increasing the number and quality of Work-Integrated Learning (WIL) opportunities for students in Australia.

However, ATSE finds the approach presented in the consultation paper is unlikely to achieve these objectives. This submission addresses ATSE's key concerns with the approach and offers the following recommendations to the Department of Education, Skills and Employment (DESE):

- Separate the development of a national evidence base for WIL, STEM-skills and university-industry engagement from the NPILF.
- Develop metrics that are guided by industry and the professions.
- Investment by the NPILF should be guided by advice from industry and business, ensuring that proven initiatives receive investment in areas of future demand.
- The NPILF should promote skills in both STEM and the Humanities, Arts and Social Sciences.
- The impact of the NPILF should be reviewed 2-3 years after it commences.

Overview

The NPILF is aimed at supporting higher education to play a critical role in Australia's COVID-19 economic recovery, through delivery of more graduates in areas of industry and community priority. In collaboration with industry, higher education must ensure that graduates have the capabilities, adaptability and experience they will need in a challenging labour market.

WIL, STEM-skills in STEM+ disciplines (STEM disciplines plus Allied Health, and Architecture and Building), and industry partnerships are presented in the consultation paper as the three key mechanisms for achieving the NPILF's objectives. However, the proposed approach does not appear to address national priorities or the needs of industry and business, and the proposed metrics for success are particularly problematic.

Data and metrics

Data for measuring outcomes in WIL, STEM-skills and industry partnerships is limited, and the Department of Education, Skills and Employment does not currently collect information on WIL activities. There is great merit in the proposal to address the identified lack of data by creating a new national evidence base. However, ATSE suggests this is not and should not be the purpose or responsibility of the NPILF. Given the number, complexity and experimental nature of the metrics proposed in the consultation paper, a separate process should be undertaken by DESE to develop this data capability.

The development of relevant (and new) metrics should be guided by industry and the professions, to achieve suitable objectives and give consideration to the cost-benefit of a more, or less, complex approach to collecting national data for measuring WIL, STEM-skills and industry engagement. For

¹ The Australian Academy of Technology and Engineering is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

examples of metrics developed in partnership with industry see LinkedIn's Economic Graph², or PostAc³ which maps high-level research skills in Australia's job market.

The NPILF metrics proposed for research students should go further to include joint research arrangements between universities and industry (captured in grants, industry funding or scholarships), joint supervision, and time spent by students in the business. This would expand evidence of research engagement and could be based on a measure of engagement already collected in the Higher Education and Research Data Collection (HERDC).

ATSE notes that some of the metrics being proposed may overlap with other performance-based funding metrics in areas such as graduate employability. The Department should look at the relationship between existing higher education metrics to evaluate potential overlap and ensure optimisation.

Industry engagement

The NPILF aims to encourage university-industry collaboration in research, and to allow co-design of curricula and the expansion of WIL opportunities. However, it is unclear how the NPILF will provide targeted investment, particularly to industry-led initiatives, or ensure that proven initiatives receive investment in areas of future demand.

Universities are the appropriate vehicle to implement the NPILF, but the current design frames engagement as a one-way activity that is only incentivised from the university perspective. The proposed measures do not capture the benefits or outcomes for industry or business partners, and the scheme does not appear to be responsive to their needs.

Existing collaborative models such as the Cooperative Research Centres (CRCs) or the Industry Growth Centres (such as MTPConnect) have demonstrated that industry-led approaches generate positive outcomes that are responsive to both need and opportunity. ATSE therefore recommends that investment by the NPILF should be guided by advice from industry and business, to ensure its aims are achieved.

Universities administer highly successful industry-led programs, such as the 3A Institute at ANU, and there are several examples of successful industry-led programs outside universities, such as MTPConnect's REDI initiative, Australian Postgraduate Research Intern (APR.Intern) or ATSE's IMNIS industry mentoring program. These success stories provide models for the NPILF to achieve industry-focused outcomes.

Graduates and skills

Predicting the future of work is notoriously difficult, and COVID-19 has only added to this challenge.^{4,5} Industry Innovation and Science Australia predicted that by 2030, jobs in Australia will require a greater mix of interpersonal, creative, problem-solving, entrepreneurial, and digital skills.⁶ To future-proof Australia's workforce and respond to the changing nature of work, driven by technological disruption and now COVID-19, Australia's education system must deliver a creative, flexible, and technologically skilled workforce.⁷

² <https://economicgraph.linkedin.com/>

³ <https://thesiswhisperer.com/postac/>

⁴ <https://100jobsofthefuture.com>

⁵ https://www.ijwil.org/files/IJWIL_21_4_355_364.pdf

⁶ <https://www.industry.gov.au/sites/default/files/May%202018/document/pdf/australia-2030-prosperity-through-innovation-full-report.pdf>

⁷ https://acola.org.au/wp/PDF/SAF05/SAF05_Report_web_17Sept.pdf

The discussion paper argues that immediate future employment growth will occur in STEM+ industries, and that universities should therefore focus on developing STEM-skilled graduates, using WIL to provide them with preparation for professional roles. ATSE agrees that STEM skills are important, and that increasing the number of STEM vocational education and training and university graduates, particularly women, is critical. Australia's 2020 STEM Workforce Report showed that in 2016 only around one-quarter (27%) of qualified Australians had a STEM qualification, while the majority (73%) had a non-STEM qualification.⁸

The consultation paper proposes to measure STEM skills using metrics such as the number of STEM graduates and the proportion of STEM courses or units that a graduate completes. The number of STEM graduates and graduates with STEM skills are two quite different metrics, however; measuring graduates alone may therefore fail to capture the capabilities of Australia's STEM-skilled workforce. There is evidence which shows that the skills of STEM workers quickly become obsolete post-graduation, particularly as the pace of technological change increases.⁹

The NPILF should also recognise the contribution of the Humanities, Arts and Social Sciences to the future STEM workforce. For example, a recent workplace skills report by MTPConnect found that the top skills in medical technology, biotechnology, pharmaceutical and digital health sectors in the future will be business, commercial, regulatory, and clinical.¹⁰ A 2019 study by the Australian Council of Engineering Deans (ACED) found that the future of engineering work will be more complex and human focused by 2035, requiring problem finding, creativity and innovation, digital intelligence, communication, collaboration, adaptability, and resilience.¹¹ The NPILF presents an opportunity to promote interdisciplinarity and a breadth of skills that prepare Australia for the future of work.

As with all such interventions, the impact of the NPILF should be evaluated within 2-3 years of its implementation, with a requirement to publish results and implement improvements based on findings. This will ensure that the measures are having the desired effect.

⁸ <https://www.chiefscientist.gov.au/news-and-media/2020-australias-stem-workforce-report>

⁹ https://scholar.harvard.edu/files/ddeming/files/dn_stem_may2020_main.pdf

¹⁰ https://www.mtpconnect.org.au/images/MTPC_Workplace_Skills_Report.pdf

¹¹ http://www.aced.edu.au/downloads/Engineering%20Futures%202035_Stage%201%20report%20for%20ACED_May_16_2019.pdf