



The Productivity Commission: Draft Report on New Models of Tertiary Education Response from Science New Zealand

The Productivity Commission released its draft report, *New Models of Tertiary Education*, on 29 September 2016. It released an issues paper in February 2016. A final report to Government is due in February 2017.

The draft report is a constructive contribution to the necessary public discussion on the future of New Zealand's tertiary education system. It addresses issues arising from societal and technological changes, some of which have been in train for some time and some still incipient. While how those changes and the issues will evolve is uncertain, it is certain that retaining the same model of tertiary education as New Zealand has at present is not a sustainable option in the face of these dynamics.

The Report asks what it is that New Zealand requires from its tertiary education system to meet the challenges of a new century - and answers that, above all, the ability to be responsive and agile is vital.

In contrast, it finds that the New Zealand system is neither responsive nor agile to sufficient degree, and rewards uniformity and avoidance of significant innovation.

This submission supplements the pre-draft report submission from Science New Zealand. The comments are restricted to those matters most pertinent to the science & innovation area.

Why this issue matters to Crown Research Institutes

It is worth reiterating why CRIs take such an interest in tertiary education:

1. A strong, vibrant, agile tertiary education system (universities, polytechnics, wananga) is vital to the wealth and wellbeing of New Zealand i.e. as a cultural good as well as developing skills pertinent to New Zealand needs.
 - a. It creates an environment in which research and its application is a natural element in social debate, policy making, and decision making by public and private sector bodies, community and social groups.
 - b. Strong, well-regarded tertiary institutions have a role and set of responsibilities distinctive to their purpose (education and training), which complement the role and responsibilities of CRIs (research which benefits New Zealand) and so make them vital collaborators as well as source of capability.
2. Crown Research Institutes are major employers of science graduates. On an FTE basis, CRIs account for more two-thirds of the nation's publicly funded science researchers in their

areas of expertise (excluding health and ICT which are primarily the domains of university-based researchers). In addition, CRIs are employing greater numbers of social scientists.

3. The quantity and the quality of STEM graduates (science, technology, engineering and maths) is a direct concern to the CRIs, for two major reasons: first, CRIs need a top-quality workforce familiar with New Zealand practice and issues; and second, the more that people with STEM backgrounds are found within the wider New Zealand community (regardless of whether they take up science research as a career) the more open New Zealand will be to science-informed thinking and application.
4. CRIs make a considerable contribution in the tertiary education arena, including:
 - a. the education of Masters and PhD learners (NZQF levels 9 and 10). In 2015, CRIs were involved in the supervision of 645 tertiary learners: 411 PhD candidates and 204 Masters learners. In 2011, the number was 514. CRIs make a critical contribution to post-graduate completion rates.
 - b. CRI staff hold academic positions primarily at Professorial or Associate Professorial level. This may be as part time employees paid directly by the university, or via their CRI employer. The minimum number of hours is 0.2 as this enables the staff member's entire publication record to be counted for PBRF purposes. Thus, CRI staff also contribute to global rankings of New Zealand's universities.
5. CRIs partner in graduate schools, as well as in specialist courses or programmes with universities. The joint graduate schools are innovative responses arising from identification by CRIs that:
 - a. there were insufficient graduates from New Zealand universities in some disciplines (not least agriculture, environmental and related studies which are the intellectual underpinning to grow and protect more than 70 per cent of New Zealand's merchandisable exports); and
 - b. that graduates had insufficient familiarity with New Zealand-specific knowledge, practices and issues – including with commercialisation or tech transfer environments.

Key points from this submission

Science New Zealand supports:

- A. Financial model re-assessment
 - Encouragement of greater efficiency in capital allocation by TEIs
 - Results-based funding.
- B. Greater autonomy and differentiation amongst TEIs
 - This can enable CRIs and TEIs to explore different collaborative models
 - Consideration of international entrants
- C. Favourable consideration of separation of research and teaching
 - provided research training is adequately resourced.
- D. Opening PBRF to research excellence regardless of where it occurs
 - Aligns with policy in other areas (Vote RS&T)

A. Financial issues

Efficiencies

The Report identifies incentives which result in perverse outcomes for the institutions and for the tertiary system. In particular, that the financial targets reward accumulation of assets, and do not favour efficient use of assets.

The inefficiencies also impact the wider economy:

- lead to higher costs to students and to other stakeholders (including the taxpayer);
- take money away from better uses in the wider economy;
- create privileged financial treatment with negative competition outcomes for other participants in the research system such as CRI or independent research organisations which pay rates, tax, generate capital and make a return on investment (as opposed to a surplus on revenue. A TEI's required 3 per cent surplus on revenue would need to be raised to 20 per cent to match the financial viability requirements of other players).

The appropriate requirements and measures is something for the Commission to advise on, and to discuss with TEIs and the Crown. This should consider the mission of TEIs, the culture specific to various types of TEI, and the potential for unintended consequences. Nonetheless, this is worth pursuing for the potential gains arising from efficiencies and from innovation. As a comparison, the CRIs have improved focus on efficiency and productivity compared to the pre-CRI requirements upon the Department of Science & Industrial Research (DSIR), and fund their capital and operating requirements.

Results-based funding

The Report proposes that funding tools should be based on results, not inputs, to assess quality. This is a sound approach, given the CRI experiences of operating in an outcome-based environment for more than 25 years. Developing or selecting appropriate KPIs can be challenging, and many measures may be proxies for outcomes that are hard to measure or to attribute. Nonetheless, the process is valuable in aligning the general purpose of the organisation with the national objectives. This is not counterproductive to the fundamental values of intellectual discovery and exploration or of academics being a critic and conscience of society – elements which CRIs strongly support.

B. Greater autonomy and differentiation

The Report proposes that TEIs be allowed greater autonomy and be encouraged to better differentiate from each other than at present.

Science New Zealand supports this objective. Greater autonomy and differentiation amongst TEIs will likely assist development of different collaborative models with non-TEIs. (The financial disparities will still need to be addressed). This will include areas such as staffing, IP management and commercialisation, sector engagement and global networking.

Trialling new and varying models of closer engagement between individual CRIs and TEIs will be useful for the wider system, enabling all participants to learn from the innovations.

The CRI innovations arising from the CRI Taskforce chaired by Sir Neville Jordan, and which reported in March 2010, may be a useful reference. It affirmed that the model itself was not broken; but that

some important changes could be made to improve focus on efficiency and productivity whilst remaining true to the science culture.

It noted that each CRI was intended to serve specific groups or productive sectors, but that a process of centralised one-size-fits-all monitoring and evaluation had led to lack of clarity on these areas of specialisation, excessive competition and lack of collaboration where it might be most useful to New Zealand. The taskforce noted that the CRIs needed to be re-focused on benefit to New Zealand, rather than the narrower benefit to the CRI which had resulted from the single model.

Now 6 years on, CRIs and stakeholders acknowledge that a highly successful outcome has been the introduction of Statements of Core Purpose (SCP) for each CRI. The SCP details the mission of the CRI, specialist areas of expertise and responsibility and where it complements the expertise of other CRIs. This clarity has contributed positively to both reinforcing the niche capability and the collaboration rather than inefficient competition.

International entrants

The Report proposes allowing greater participation by overseas institutions as a means to introduce new ways of organising and delivering tertiary education and to meet current and future needs of students, employers and the wider community.

Science New Zealand members engage with different types of TEIs around the globe and so experience and appreciate a diversity of TEI education, training and research models.

If new players are to come into New Zealand, CRIs will focus on the areas of strength and complementarity and collaboration where this assists CRIs deliver on their core purpose. The critical element is the same as with existing players: is New Zealand attracting into STEM the numbers we require, and delivering the quantity and quality of graduates for New Zealand?

This concern links back to the Tertiary Education Strategy objectives, in particular *Priority 1 – Delivering skills to Industry*. CRIs have been concerned that, in the drive to sustain or improve international rankings, New Zealand's universities may be inadvertently lessening their connectedness to New Zealand needs (such as research areas and skills sought by New Zealand employers). The CRIs identified that risk and initiated joint graduate schools and participation in specialist programmes and courses, plus engagement as mentors and co-supervisors as a means of mitigating that to some extent. Other indicators of disconnect from New Zealand needs include the declining volume of research commissioned by business from New Zealand universities.

Allowing foreign entrants into New Zealand may provide a stimulus for innovation; but only if the current model is re-fashioned. The New Zealand tertiary leadership is perhaps more in advance than the current models allow.

C. Favourable consideration of separation of research and teaching - provided research training is adequately resourced.

The Report proposes unbundling research and teaching requirements on the basis that there is weak evidence that the two benefit from being linked, and that in practice research is prioritised over teaching.

That is not a debate for CRs to enter. It is pertinent however to note that the development of a research-only (or primarily research) staff will alter the nature both of the universities and of the

wider science research system, and especially so if there is duplication rather than additionality. The implications for non-TEIs will be amplified if the TEIs remain financially privileged. The proposal deserves further consideration, taking into account wider context and national goals.

CRIs have an interest in ensuring that research training, as opposed to either teaching or research, is adequately encompassed. As noted above, CRIs already play an important role in working with university colleagues in helping with this element of student development. The Report notes the extensive level of co-supervision and mentoring undertaken by CRIs.

The previous submission noted that TEIs have two related but different roles in STEM education: helping to equip graduates (whether majoring in STEM or not) to be STEM-literate, and growing the next generation of researchers. Current practice indicates a focus on the latter, when relatively few students will take that career route. Greater autonomy and differentiation may assist TEIs to develop new models of education for both groups.

The Report acknowledges that New Zealand's TEIs rank highly in major international ranking systems. Having all New Zealand's universities in the top 3 per cent of international rankings is an impressive feat; but begs the question whether this is achieved at cost to investment that meets the educational and skills development needs of a broader range of people and in areas where New Zealand has identified needs rather than being driven by an international market.

The Report compares New Zealand's system to those elsewhere and finds greater diversity off-shore, reflecting the broad range of outcomes desired by students and societies in those countries – and able to be funded by those countries.

The Report indicates that New Zealand is dependent upon immigrants if we are to retain our current proportion of higher level educated people in the national population. This is even more so in the specialised skills arena of CRIs and TEIs. Of CRIs annual recruitment of PhDs in recent years 48 to 54 percent come from offshore (of which some 10 points are returning New Zealanders).

Recruiting from offshore has obvious benefits such as new ideas, exposure to different models and networks. CRIs have to ensure that the work environment is and is likely to remain attractive to globally mobile staff who are familiar with adaptive and innovative places of employment off-shore.

Attracting overseas academics into the New Zealand system certainly assists the global outlook and networks that New Zealand needs; the ability to attract and retain top faculty and thus students is greatly assisted if there are departments of known specialisation.

The Crown and the system stewards should ask, however, if those areas of specialisation are helping increase the national research and skills development investment into areas New Zealand needs; and whether the drive to lift international rankings means greater focus on issues of importance to other countries, rather than our own.

There is an associated hazard: that is, that the students coming through the New Zealand system may not be exposed to New Zealand-oriented issues (because they are of less interest to the academic); and that students emerging are not au fait with the issues of concern or practices of the wider New Zealand research environment and the sectors they support. It is precisely to address such matters that CRIs have initiated extensive engagement with TEIs, as noted above.

D. Opening PBRF to research excellence regardless of where it occurs.

The Report advocates that the PBRF (Performance Based Research Fund) is opened to reward excellent research “wherever it occurs”. The proposal echoes the recent policy decision by Government to make SSIF (Strategic Science Investment Fund) “provider neutral.” PBRF currently sits at \$300M pa; SSIF at \$200M pa.

The SSIF mechanism enables the government to have confidence that it is purchasing capabilities which New Zealand needs, and is doing so in a transparent, highly visible and measurable process which also allows for dynamism, contest and introduction of new areas and entrants.

It is timely to reconsider the purpose of the PBRF and its assessment process. Its policy intent to reward and thus promote clusters of excellence, and thereby encourage differentiation has been of limited success. The process is expensive, and results in relatively little money being moved around the TEIs. It is now primarily an important component of a TEIs marketing. There is no direct linkage between the high-performing researchers (some of which are primarily CRI-employees), and the use of the money.