



Charles Sturt
University

DEPARTMENT OF PREMIER and CABINET
Accelerating Research &
Development in New South Wales

Submission – 20 December 2019

Office of the Vice-Chancellor
Charles Sturt University



20 December 2019

Mr Tim Reardon
Secretary
Department of Premier and Cabinet
52 Martin Place
SYDNEY NSW 2000

Dear Mr Reardon

ACCELERATING R&D IN NEW SOUTH WALES

On behalf of Charles Sturt University, I am pleased to provide you with this submission in response to the Department's inquiry into accelerating research and development (R&D) in New South Wales.

Charles Sturt University is Australia's largest regional university, with more than 43,000 students and approximately 2,000 full time equivalent staff. We are a unique multi-campus institution with campuses at Albury-Wodonga, Bathurst, Canberra, Dubbo, Goulburn, Manly, Orange, Parramatta, Port Macquarie and Wagga Wagga, as well as various study centres located throughout regional and rural south-eastern Australia.

Further, Charles Sturt University has deep and proven experience in matters affecting regional, rural and remote Australians, including the learning, research, development and engagement needs of regional Australians. Our experience spans more than a century of contributing to the economic prosperity, social inclusion and environmental sustainability of Australia's regional cities, rural towns and remote communities.

This experience places Charles Sturt University in a unique position to understand and respond to opportunities to accelerate R&D in New South Wales, and particularly our regional cities, rural towns and remote communities. Accelerating R&D to address the challenges facing and to capture the opportunities before regional New South Wales will underwrite future prosperity, inclusion and sustainability, particularly in responding to the increased frequency and severity of drought and bushfire, as well as contributing to water security.

R&D is a major source of innovation and an important driver of economic growth. R&D activities not only have the potential to lead to job creation and investment but also support improved health and social wellbeing and better planning for the future. New South Wales's research already demonstrates strengths in a range of fields, supported by New South Wales's world-class universities.

Charles Sturt University believes that the New South Wales Government has a key role to play in continuing to foster R&D and its commercialisation for the benefit of the State. We see that government policies and programs impact R&D and innovation, within the broader ecosystem spanning universities, industry and the start-up sector.

Charles Sturt University welcomes the opportunity to contribute to the policy discussion around accelerating R&D in New South Wales, as well as to contribute to the identification of potential government support for R&D with particular reference to regional businesses, economies and communities. By adopting our suggestions below, together we can get the most out of the State's R&D activity, as well as support and improve the R&D and commercialisation ecosystem more generally.

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Charles Sturt University has prepared this submission in accordance with the terms of reference for the Department's inquiry into accelerating R&D in New South Wales (refer, <https://www.nsw.gov.au/improving-nsw/have-your-say/accelerating-r-and-d-in-nsw>). Our submission adopts agricultural R&D as an example, and outlines our efforts to lead in this space through the Wagga Wagga Agrisciences Research and Business Park.

How can the New South Wales Government better support you/your organisation in its R&D efforts?

The effectiveness of innovation in Australia today is hamstrung by poor cross sector collaboration. This is even more profound when we consider that the technology and the people to drive innovation will come from a broad range of disciplines, some of which are outside traditional enterprises. This in turn demands novel collaboration models which must be managed and cultivated, not left to chance. The emerging technology and the new collaboration models will also require people with exceptional leadership skills and broad cross industry and discipline knowledge.

The New South Wales Government can support Charles Sturt University's research efforts by facilitating and supporting such collaboration. For example, the Agrisciences Research and Business Park on the Wagga Wagga campus (The AgriPark) is Charles Sturt University's strategic initiative to create the place and provide the opportunity in which innovation and productivity is accelerated through deliberate and pro-active collaboration and selected co-location. The AgriPark will provide the infrastructure and the intellectual and social capital to be an active leader among the vibrant regional communities and participate as an equal in national and international agricultural research.

The most advanced collaboration configurations are those that include the "triple helix" of government, industry and academia. The New South Wales Government could support the Charles Sturt University AgriPark R&D effort, including the translation of research, by both direct financial support for the next phase of infrastructure investment and by encouraging and fostering the partnerships between the Special Activation Precincts (SAPs) in the regions (in this case Wagga Wagga) and the AgriPark. For example, the support for new enterprises to relocate to SAPs including relocation packages and concierge support could be extended to R&D enterprises interested in moving into the Charles Sturt University AgriPark.

How can the New South Wales Government better support the R&D and innovation ecosystem in NSW?

Direct and indirect State support for regional innovation is required as a result of market failures in the R&D system of regional Australia. Market analysis and surveys consistently highlight that practice change in agricultural production systems is most successful when the new technology is demonstrated. Field based research and the opportunity to pressure test and then showcase novel technology in the area of adaptation is critical for rapid adoption.

Locating innovators near to the end users improves the understanding of the challenges and improves the adoption. For example, location of the Research and Development Corporations (RDCs) in the regions while supporting businesses to relocate to regional areas. In this way, multidisciplinary and multi-organisational clusters of critical mass can be sustainably established and developed.

What barriers for R&D in New South Wales have you experienced and how can the NSW Government address these?

The barriers to accelerating R&D in New South Wales are not dissimilar to the barriers facing most other regions of developed countries around the world. Primarily, these barriers relate to:

- Development of and investment in technology parks and innovation centres where the focus has been solely on infrastructure and facilities – successful and self-sustaining R&D is all about the capability and the capacity of the people – without State-backed long-term visions and plans it is very challenging to attract and grow talent.



- Successful and self-sustaining R&D relies on critical-mass, global connections and “soft” or “smart” infrastructure, that is the human capital to deliver and their connections and networks. This is more challenging for regionally-based industry such as agribusiness even though much important capacity is situated there. Connections and networks require an “honest broker”, the New South Wales Government needs to build this capacity (alongside the State’s efforts in trade).
- Commercialisation of R&D relies on business, be it translation, application and/or product/service development – we should not expect our research institutions to become businesses. R&D partnerships built on clustering market knowledge and discipline skills are required where each partner has a particular and well-defined role to play in accelerating R&D, for example a new variety of apple is developed through R&D, but a commercial propagation nursery scales-up production and sells the tree to farmers.
- Bringing the three points above together, R&D “clusters” must be based on addressing emerging challenges and/or capturing future opportunities. To be effective State investment in R&D and innovation systems must be about connecting capability to solve complex challenges. For example, establishment of a centre for regional water security, rather than a narrow research program for irrigation efficiency. In other words, at the State level, R&D can only be accelerated through thinking that is “market-pull” rather than “technology push”.
- Finally, the metrics we have imposed on our researchers and academics are driving behaviours that do not necessarily encourage deep business engagement and integrated partnerships across disciplines. This has largely arisen through the measurement of academic performance based on scientific publications in peer reviewed journals as the key method for determining professional development. This measurement has the perverse incentive of driving down commercialisation of R&D, primarily around the urgency to publish at the expense of the “D” part of the R&D equation, which by its very nature relies on commercial secrecy and in some industrial sectors application for patent (application for patent is often stifled by prior knowledge, that is previous publication).

What does the New South Wales Government do well in the R&D space and what are the key opportunities for New South Wales Government to accelerate R&D in New South Wales?

While further investments could be made state-wide, the New South Wales Government has played an effective role in driving R&D partnerships, for example, where local health districts partner with universities to undertake impactful R&D which translates into solutions to real world problems, for example at Charles Sturt University’s Orange Health Precinct. Initiatives such as this demonstrate that the best R&D outcomes are achieved when governments take the time to understand system capability and gaps, and understand where other capability exists, and then forms partnerships to address problems and issues that need solving.

On this front, the New South Wales Government could also learn from recent experiences in Victoria and at the Commonwealth level regarding preliminary steps to introduce a government problem solving program like the Small Business Innovation Research Program (SBIRF) in the US. Refer, <https://www.sbir.gov/about/about-sbir>. Modification and adoption of a program like the SBIRF in New South Wales would accelerate R&D in the State to address many of the wicked challenges that we are facing as a society including agricultural sustainability, water security and chronic disease. Indeed, a New South Wales version of the SBIRF could provide the basis from which to build future university-business R&D collaborations.

Establishing the role of a Chief Scientist who encourages broad engagement is an excellent government initiative. This highlights the value of personal leadership and the increasing demand by industry for high profile leaders from within the New South Wales Government and across academia to champion good science and tangible solutions. Recent market research reinforces the plea by many enterprises for research organisations to take industry leadership roles.



Investment in roles for people who have experience and skills in research and academia and provide support from advisors with government experience to oversee innovation precinct development for example. The SAP model is excellent but should also allow for partnerships with enterprises and organisations who may not be physically located within a SAP geography.

How can New South Wales better leverage Australian Government investment in R&D?

There are many ways that the New South Wales Government can better leverage Australian Government investment in R&D. Potential mechanisms for leveraging Australian Government investment in R&D are covered at length in the section below addressing the efforts of the Victorian and Queensland Government over the last two decades. As a result of the policies and programs that have been implemented by both States they have significantly increased their respective shares of ARC, NH&MRC and Defence research funding, while concomitantly dramatically increasing the amount of private R&D undertaken in both States – by both Australian companies and foreign multinationals.

Are there examples from other jurisdictions supporting R&D that New South Wales can learn from/adopt?

The innovation systems of small countries and economies have been well studied, for example in Israel, Singapore and the Netherlands. However, direct replication of country and/or regional innovation systems to other regions rarely leads to success, as shown by the many efforts to replicate Silicon Valley in other parts of the world in the late 20th Century. So, while lessons can be learned, experience of others must be considered with caution as there are often cultural elements that do not translate, for example Silicon Valley is a military-industrial complex, whereas Singapore is an elaborately transformed manufactures (ETM) economy.

Further, many lessons could be learnt closer to home. Charles Sturt University encourages the New South Wales Government to research, analyse and consider the effectiveness of the Science Engineering and Technology (SET) and Smart State initiatives of Victoria and Queensland respectively, over the last two decades. Many lessons for successful R&D policy design and program implementation can be learnt from these two States. Both States have invested several billion dollars in the development of their innovations systems, which has resulted in a step change in their R&D performance. The key messages from the work of Victoria and Queensland over this period include:

1. State governments have a leadership role to play in the development of strategic objectives and the communication of these state-wide and system wide, to ensure a vision is clearly articulated, mission is widely understood and system players understand their individual roles and responsibilities in delivering on the State's R&D goals. Only the State Government can do this – not only is it the trusted broker in the system, but it is the only player that can “see” whole-of-system.
2. Building on the leadership role of state governments, raising aspiration and awareness is critical to accelerating R&D as well. Both the Victorian and Queensland Governments made this a focus of their R&D efforts, particularly in taking their system players to the world (leading conferences, trade fairs, policy meetings etc.), but also in bringing those events to Melbourne and Brisbane respectively. For example, the World AIDS Conference in Melbourne in 2014. Further, there is also a role to “import” world's-best and world leading R&D system players, from leading researchers (suggest for example, creation of The Premier's Foundation Chairs Program) to leading technology business people (suggest programs like those offered at Queensland University of Technology (QUT), which in partnership with the Queensland Government, leads Australia in this space, see <https://qutcea.com>). Much of this type of work of state governments is most effective when it integrates with trade initiatives, such as the Premier's recent announcement regarding the General Consuls for New South Wales.
3. As touched on earlier, a key role for state government in accelerating R&D is facilitation of system players, and in particular breaking down barriers to cooperation and collaboration. This can be achieved by designing program requirements that mandate cooperation across business sectors and



academic disciplines. Again, this is a role that the Victorian and Queensland Governments have played very effectively in recent times, for example the development of the Synchrotron in Victoria and the QIMR in Queensland (refer, <https://www.qimrberghofer.edu.au>). To be effective state interventions in this space must include a combination of carrot and stick – funding to cooperate, collaborate and co-locate for the creation of world-scale R&D clusters and penalties (or constraints) by way of legislation/regulation and/or decreased funding where appropriate. Noting that there will be winners and losers in such required reforms, for example, the initial resistance of the 35+ biomedical research institutions in Melbourne in the late 1990s, which by the mid-2000s had been consolidated into approximately five centres of excellence with global scale through Victorian Government programs and financial incentives.

4. Building on the last point, driving and funding the development of new clusters of R&D capability and capacity, with all interventions in this space solely focused on developing international scale and reputation to attract foreign direct investment in R&D, direct linkages to international facilities (as the Synchrotron has done with other synchrotron and related facilities around the world) and the opening up of channels to translation, application and commercialisation of new knowledge, not only in New South Wales, but internationally. Outcomes arising from such investment over the long term in Victoria are now materially contributing directly to the local economy, especially to jobs and growth in inner Melbourne and the South East.
5. Successfully executing activities in this space requires a degree of risk taking. Investments should be managed through a typical investment cycle; opportunity, feasibility, business case, investment case, securing funding. Some projects will fail at opportunity, while others may fail at investment case. As with all private equity funding, a portfolio approach will need to be taken with such interventions aimed at accelerating R&D. Finally, success will require long-term commitment, the results achieved in both Victoria and Queensland were multidecade and, above all else were bipartisan. Indeed, the Victorian Labor Party's 1999 SET policy statement commended the SET policies of the Victorian Liberal Government and committed the Labor Party to continuing the investment and reforms instigated by the Kennett Government should they win government (which they did).

Charles Sturt University would like to work with the New South Wales State Government to continue the development of the Wagga Wagga Agrisciences Research and Business Park as a long-term case study, demonstrating the impact of the initiatives and investments undertaken by the Victorian and Queensland Governments to accelerate R&D in their respective States, with policy and program customised and tailored to the specific needs of New South Wales and agricultural research, development and commercialisation.

Such a project would underwrite agricultural innovation in regional New South Wales and contribute to addressing the challenges of and capturing the opportunities arising from drought resilience, bushfire management and water security.

In conclusion, Charles Sturt University believes that the State Government has a key role to play in accelerating R&D in the State. I would be very pleased to provide further information to the Department and would be available to attend any proposed consultations that you may undertake regarding accelerating R&D in New South Wales.

Yours sincerely

Professor Andrew Vann
Vice-Chancellor

