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Science Policy and the needs of Mathematical Sciences

If you have initiated an ARC Linkage project and seen it grow to fruition in the mathematical sciences, then you are very lucky. In the 2015 round, one single Linkage project out of 252 was funded in this field of research code [2, Table 6]. In this context, it is useful to reflect on industry connections in the mathematical sciences and where our needs lie in the context of science policy and advocacy. I welcome your reflections on this nexus.

Since the National Committee for Mathematical Sciences is a committee of the Australian Academy of Science (AAS), I will limit my column to issues of advocacy on which the AAS has been active. This is captured by submissions that are available on the AAS website www.science.org.au under 'Science Policy'.

The latest submission concerns the government review of research policy and funding arrangements [1]. This was made in response to the Australian Government's review of university research funding and policy (announced on 07 July 2015) as part of its *Boosting the Commercial Returns from Research* strategy [3]. The submission addresses a number of issues. Let me focus on the following:

[1, p. 2]: There are a number of systemic barriers to greater collaboration between university researchers and industry and to subsequent commercialisation of Australia's research discoveries.

[1, p. 8]: The most important of these is that Australian businesses collaborate far less with other organisations on innovation (whether with universities or other businesses) than in other countries in the Organisation for Economic Co-operation and Development (OECD).

The submission also points out that (i) relatively few Australian businesses are engaged in innovation; (ii) business innovation in Australia lacks novelty; and, (iii) Australian businesses collaborate mainly with value-chain partners (i.e. with clients, customers, buyers and suppliers).

This is a systemic problem. Those companies that do engage in innovation tend to do so within the areas of production, marketing, or provision of after-sales service. No agricultural company pays for the development of a better numerical algorithm

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in Australia even though they may rely on the accuracy of the Bureau of Meteorology's forecasting model when they decide whether they will borrow money to plant seed.

A recent article on start-up companies in Australia [4] adds to this view. The author states

[T]here is no actual need in our economy for a tech sector to exist. The commodities sectors do not need one; they have their own R&D channels. The oligarchies in the services sector don't need one; they buy their technology from overseas vendors. The educational exporters don't need one; they only innovate to reduce costs and improve their marketing.

The author goes on to suggest that Australian companies in the services sector have the capital but neither the management nor the culture to 'morph from being domestic oligarchies that use third-party off-the-shelf technology platforms' to vendors of new, useful technology platforms in their own sector.

The lack of appetite for a 'vibrant' tech sector in Australia also reflects a lack of appetite for a mathematical approach to novel commercial developments. Most Australian companies do not see the need to improve mathematical sciences, but sometimes see the need to use what is already out there.

What does this mean for mathematical collaborations with Australian industry? How can we increase the number and throughput of ARC Linkage projects in mathematical sciences? Is it purely up to us, the mathematical scientists, or is there a need for government to consider a systemic problem in Australian industry? What do you think?

References

- [1] 'Submission by the Australian Academy of Science to the Review of Research Policy and Funding Arrangements,' <https://www.science.org.au/sites/default/files/user-content/australian-academy-of-science-review-of-research-policy-and-funding-arrangements.pdf>, accessed 18 October 2015.
- [2] 'ARC Linkage projects: selection report for funding commencing in 2015,' http://www.arc.gov.au/sites/default/files/filedepot/Public/NCGP/LP15/LP15_Selection_Report_and_Outcome_Statistics.pdf, accessed 18 October 2015.
- [3] 'Review of Research Policy and Funding Arrangements,' <https://education.gov.au/review-research-policy-and-funding-arrangements>, accessed 18 October 2015.
- [4] I. Maxwell, "There can only be one Silicon Valley, so let's try something else," <https://theconversation.com/there-can-only-be-one-silicon-valley-so-lets-try-something-else-48752>, accessed 18 October 2015.



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