



**Grains  
Research &  
Development  
Corporation**

#### **SUBMISSION FOR:**

- **REVIEW OF CLOSER COLLABORATION BETWEEN UNIVERSITIES AND MAJOR PUBLICLY FUNDED RESEARCH AGENCIES (PFRA)s, and**
- **REVIEW OF PAYMENT BY DEST TO UNIVERSITIES FOR RESEARCH INFRASTRUCTURE VIA PERFORMANCE BASED BLOCK FUNDING**

#### **Key Messages**

This is an opportunity to build university/PFRA collaboration in a context of better linkage to industry and to the whole innovation process. Australia needs stronger pathways between public sector science and private sector assets and resources.

The system of block grants is a major impediment to doing this because of the criteria that are applied with respect to open competition and the required funding pathway to university accounts only.

Government facilitation of innovation must continue to mature beyond an approach of paying the operating costs, bit by bit, to specific parts of the innovation chain.

Performance based funding needs a more fundamental rethink than just fine-tuning current formulas.

Competition and collaboration both have an important place. But ‘open competition’ is suited predominantly to ‘pre-competitive’ research only. ‘Collaboration’ needs to be understood and facilitated in the ‘exclusive’ as well as the ‘inclusive’ sense.

Current Policy impacting on collaboration is not an effective catalyst for a strong national performance in commercialisation and ‘value-capture’ from R&D. This review might contribute to improving the policy environment in this respect.

It is important not to measure performance through the number of start-ups or spin-offs or patents.

Enhancing excellence requires a policy environment that encourages flexible structuring. Universities and PFRA)s need to be part of this, along with RDCs.

Making this work requires a new focus on developing and acquiring the right skill-sets to link public sector and private sector resources.

“Crowding out” of the private sector can be reduced, enlarging the national ‘cake’ of R&D assets and resources.

## **Background and introduction**

Ours is a nation with a well-developed public sector in science and technology, a relatively low level of private sector business expenditure on research and development ('BERD'), and (compared to some of our competitors) poorly developed links between science and business. There is an important role for government in facilitating and encouraging the development of this science/business interface, and this is potentially a powerful means of engaging business in investment into research and development.

There are several major constraints on the development of this interface and these go to the core of issues associated with PFRA/university collaboration. Moreover, the terms of reference of the current inquiry and the general policy environment indicates that as a nation we may collectively have our eyes on the 'wrong ball'. The experience of the Grains Research and Development Corporation (GRDC) highlights rich linkages between PFRA and universities. There is a shared culture and plenty of career paths from and to academia from PFRA. There are joint PFRA/university involvements in CRCs, ARC Centres of Excellence, and the national CSIRO flagship programs.

On the other hand, linkage between PFRA/universities and industry (dominated, of course, by the private sector) is relatively sparse. There are some linkages through the structures of CRCs and rural research and development corporations (RDCs) such as the GRDC. However, even within these domains the broader policy environment mainly encourages 'pre-competitive' research<sup>1</sup> and acts as a constraint on industry engagement.

So the focus of this submission is to put potential developments in PFRA/university collaboration into this context. In doing so, there are implications for many of the issues raised in the background issues paper, including:

- the benefits and disadvantages of collaboration;
- the drivers of collaboration and how they can be enhanced;
- whether current programs, agendas and initiatives facilitate effective collaboration;

---

<sup>1</sup> Pre-competitive research = research that is not close enough to having commercial value to generate competition to own or control the research outputs.

- barriers to effective collaboration;
- cultural issues that enhance or restrict collaboration;
- the current system of funding and its advantages and disadvantages for collaboration between PFRAs and universities; and particularly
- how the commercialisation of research can be promoted further.

The over-riding issue is “how can we build collaboration between PFRAs and universities, such that we are not just creating more of the same, and such that we advance the whole science and innovation policy environment?”

### **Why is the science/business interface so important?**

This is an era of rekindled tax incentives for private sector R&D investment, with high potential to engage the private sector in new ways. It is also an era in which, for many domains of research, the public sector/private sector interface is changing. Biotechnology is one of the most salient examples at the moment.

Greater engagement of public sector/private sector partnerships will be particularly beneficial in the following ways.

- It will facilitate the influence of “market pull” as well as “science push” elements on the direction of research efforts, as well as the planning and conduct of research.
- It will encourage, whenever possible, market and product development in parallel with scientific development. This enhances commercialisation options and strategies as well as access to the competencies to implement these. Moreover, in competing on the world stage of R&D, the parallel approach will accelerate Australian paths to market and adoption.
- With the right skill sets in place, it will enhance Australia’s capacity to ‘capture the value’ of research applications, rather than being prone to develop intellectual property and lose control of the economic value created by that IP to foreign capital.
- It will ensure that maximum national R&D resources are mobilised and that there is not an excessive focus on the collective ‘public sector R&D investment cake’. Public sector R&D management effort can be easily consumed in accessing the

relatively static resource of public sector funds, through the maze of dynamic pathways to these funds in both Commonwealth and State arenas. The whole system of chasing these funding streams is characterised by ‘money in the door’, not ‘value out the door’. Previous ‘external earnings’ policy was part of the environment driving such behaviour.

The GRDC mission drives increasing involvement in this public/private sector interface. It is moving from an exclusive focus on PRFAs and universities, to partnering with such organisations as Syngenta, GrainCorp, and George Weston Foods. The GRDC experience offers a distinctive insight into the policy issues and necessary institutional arrangements associated with this changing business environment.

Unfortunately, and for a number of reasons, the *National Survey of Research Commercialisation (ARC, CSIRO and NHMRC)* does not provide a very helpful basis for assessing Australia’s relative performance in commercialising R&D. The research methodology gave too much attention to the wrong measures (patents and star-ups and spin-offs). To the extent that it gave attention to more appropriate measures of outcome (revenue/value creation and perhaps execution of licenses), it specifically excluded surveying or assessing private/public sector partnerships and structures. And this is exactly where innovative business activity would be expected to flourish, rather than within the traditional public sector structures. The GRDC would be pleased to address this in more detail should the review committee so request.

### **The competitive funding model**

Australian science funding is dominated by the notion of competitive research funding based on peer review. The thrust of material pertaining to the current review seems oriented towards expanding the scope of this approach to PFRAAs, and using this as the basis for enhanced university/PFRA collaboration.

The competitive funding approach is an essential feature of effective resourcing of science, as it underpins ‘pure basic’ and ‘strategic’ research. However, if the competitive funding approach is excessively emphasised, and there is a lack of supplementary policy and resourcing frameworks, the result will be:

- preoccupation with ‘pre-competitive’ research only;

- a paucity of pathways between pre-competitive and post-competitive research, between publicly funded science and private capital; and
- consequent poor performance with respect to commercialisation and ‘value capture’ by Australia of Australian research.

An open and competitive system will generally act as a disincentive to private capital engaging with and partnering the science and innovation emerging from the public sector. Private capital will tend to seek dedicated longer-term relationships where there is potential for commercial confidentiality, and the comfort of experienced management of the pathway of intellectual property to market. The current policy environment severely limits this.

On the other hand, within the competitive funding approach, it would be more consistent with the ‘labelled’ intent to make this system truly competitive. This means not only opening up ARC funding paths to PFRAs, but also to RDC consortia that do not have universities as a partner, and to the private sector. There is no inherent reason why the private sector should be unable to bid for contract research, whether it be basic, strategic or applied. Indeed, it seems a natural extension of the ‘ARC Centres of Excellence’ strategy. Moreover, private sector ‘delivery’ of public sector research is a relatively untapped resource.

One way forward could combine the ‘opening up’ of the competitive funding approach with more effective development of collaborative funding processes. These would both have effects of reducing ‘crowding out’ of private sector involvement in R&D. In this regard, it is extremely important that collaboration be understood in the ‘exclusive’ as well as ‘inclusive’ sense. It is not just a matter of increasing collaboration between public sector scientists from different organisations, in the tradition of peer linkage. It is about encouraging networks of scientists with other skill-sets, within closed or semi-closed alliances, in an environment of potential competition between different collaborative networks.

### **Input cost sharing versus sharing in outcomes**

In the GRDCs experience, collaboration between itself, PFRAs and universities has been dominated by ‘input cost sharing’. It is an important ‘*modus operandi*’ but is only one side of the coin. The other side of the coin involves the “commercialisation of science agency research”. Although this can be greatly facilitated by public/private

sector partnerships, it is important to distinguish between ‘input sharing’ and ‘collaborative earnings’ or ‘commercial revenue’. The latter two terms involve a revenue flow based on the creation of a product or service for which a customer is willing to pay a price. ‘Input sharing’ involves a sharing of risk but does not necessarily lead to the production of anything of value for which anyone is prepared to pay a price. It is possible to be very successful in leveraging available agency resources through input sharing without having much success at all in producing commercial or potentially commercial outcomes, and without building sound links between agency research and business development processes. Again, this was a key weakness in the behaviours driven by ‘external earnings’ policy.

Therefore, in assessing the success of an agency in linking science to commercial and business processes, it is essential to distinguish between (and separately monitor) input-sharing investment and shared earnings (or other tangible value creation). This distinction should form part of the performance monitoring regime for both PFRA and universities. Widespread failure to deliver on the latter indicates an ongoing tendency for the nation to excel at science without commensurately excelling at business and commercialisation.

### **Direct costs, indirect costs and research infrastructure**

The traditional competitive funding approach is focused almost exclusively on operating costs. Within the ARC domain, the approach targets direct salary costs and perhaps consumables. The ‘block funding’ system nominally deals with ‘infrastructure’ needs, but the ultimate destination of block funds is not transparent. Within the PFRA domain, Commonwealth budget allocations are presumably intended to provide for infrastructure, capital costs, overheads and operating costs. But increasingly these organisations are seeking their operating costs through ‘input sharing’ and contract research, with the application of ‘multipliers’ to direct costs in their collaborative ventures. State agency based researchers also apply ‘multipliers’ to direct costs when they enter collaborative arrangements, and supplement this with capital bids of various kinds to various potential funding sources, including the RDCs. And despite the block grants system, universities also apply multipliers and pursue various other pathways for capital bids.

It is all rather non-transparent, clumsy, inconsistent, and nearly always derived from salary-based formulae. It tends to focus exclusively on the scientific research rather than the whole innovation process. It is inimical to a true outcome focus. It can result in inadequate or ad hoc consideration of research infrastructure, fixed assets, equipment, technological facilities and access to intellectual property, because it all revolves around the salaries.

A true ‘investment’ approach assesses the totality of skills and assets required for the whole innovation process. The preoccupation with salary formulae is an artefact of traditional funding methodology. If Australia is to compete on the world stage of transferring and capturing value from new technology the shift in thinking needs to be fundamental. It is about assembling skills and assets, wherever they might be found, to deliver an outcome. It is not about paying the operating costs, bit by bit, to various parts of the innovation chain.

New structures need to be able to assemble and bring together the right people (offering the right salary package to get them), the right access to intellectual property ‘inputs’ (achieving ‘freedom to operate’), the right equipment (maintained and upgraded as necessary), the right relationships to market, and the right capital (in terms of ‘patience’, expectations of return and so forth). The development of alternative public/private business models and structures is and will become part of the answer to these issues.

What is needed is a more consistent and sophisticated approach to understanding true costs and infrastructure requirements. The review team should be wary of changing the formula for one sector, in an attempt to resolve issues of indirect cost and/or infrastructure resourcing. This could suddenly ‘tip the playing field’, in terms of the attractiveness of various funding sources, without addressing the underlying issues. Introducing indirect cost formulas to the ARC system will be to the relative disadvantage of PFRAAs and RDCs. Introducing broader competition to the competitive funding approach will generate a relative disadvantage to universities.

Policy developments around these issues might give particular weight to the criteria of:

*“what changes will drive funding along pathways that build stronger industry linkage and maximum national value-capture from Australian R&D?”*

## **Key policy constraints**

Chief amongst these is the block grants system applying to universities. To qualify for block grants, research must be awarded through a competitive process and must be held within the accounts of the academic institution. Both these requirements directly militate against any involvement in post-competitive research or the engagement of industry partners. As a result, the GRDC has faced resistance from academic institutions and large ‘transaction costs’ in establishing partnerships involving universities and industry, particularly when it has involved the creation of a separate legal entity. Recent examples include the establishment of more commercially focused wheat breeding entities – Sunprime Seeds Pty Ltd (GrainCorp plus Sydney University plus Sunprime Seeds plus GRDC) and Australian Grains Technology (‘AGT’ comprised of Adelaide University/SARDI plus GRDC).

This is but one aspect of the problem of excessive reliance on the competitive funding approach. The CRC approach is an example of supplementing this approach on terms more favourable to industry. However, CRC is relatively scarce and highly competitive. Moreover, CRCs do need to evolve further in terms of their governance and business focus. There needs to be further development and new programs in this direction, in terms of incentives for dedicated relationships in more business oriented structures. Collaboration between PFRAs and universities needs to be predicated on further developing such incentives, not just on enlarging the scope of competitive funding.

Different state and Commonwealth agencies take various views, at various times, with respect to their willingness to help create and/or take part in separate incorporated legal entities. Unwillingness to be part of such arrangements can sometimes be a barrier to commercial partnerships and links to industry. It is important to create a climate that is not too risk averse in this respect. Some commercial or industry partners will expect such structures for many reasons including:

- flexibility and ability to attract excellence through employment arrangements and non-public-sector salary packages;
- to isolate risk;
- to provide a vehicle to hold and transform intellectual property and other assets;

- to provide a vehicle for business contracting; and
- for the distinctive accountability requirements of an incorporated entity.

In constructing collaborative links between PFRAAs and universities, attention should be given to incentives and barriers in the structuring of joint ventures and alliances. Again, the need is to think beyond standard competitive funding arrangements.

There are a number of DEST schemes which target commercialisation of science through encouraging ‘seed-funding’, ‘start-ups’ and ‘spin-offs’. These include the ‘pre-seed’ fund, COMET and BIF. This kind of incentive could be specifically brought to bear on PFRA/university collaboration. However, there are potential weaknesses in the current approach. These incentives, unless carefully designed and implemented, can encourage links to ‘inexperienced capital’ (eg the academically dominated ‘start-up’) and/or venture capital. The alternative and generally less risky sources of development capital are partnerships with established companies, or ‘experienced capital’. These will have an established place in the relevant market and have the skills and complementary assets required to effect the whole innovation process, and not just the scientific research. Because of existing business synergies, these capital sources may be less demanding, in terms of expecting quick or venture capital levels of return. An organisation’s existing positions in related products and markets can drive a longer term and strategic commitment, rather than the potentially fickle behaviour of venture capital.

However, dealing with this kind of contractual relationship development without ‘giving away value’ to companies, requires excellence in different skill-sets to those generally accessible to public sector science managers. Rectifying this also needs to be an ongoing focus of policy development in training and education.

The development of policy on PFRA/university collaboration provides an opportunity to review the incentive structure, to enhance ‘experienced capital’ policy drivers, and link this to the policy framework for such collaboration.

### **Implications for the review**

Peer review processes will generally enhance ‘science-push’. Co-investing with private capital will enhance ‘market-pull’. Much of the policy rhetoric concerns achieving a better balance of these forces. This review on collaboration presents an opportunity to look broadly at both competitive and collaborative funding processes,

to improve science/market balance and to enhance national excellence in science and technology delivery and ‘value-capture’. Some more specific implications and possibilities are as follows.

- PFRAs and RDCs are increasingly engaging in collaborative partnerships which, if universities are to be included, will exclude that portion of the universities research from the block grants formula. Unless universities are to become bystanders to many of the innovative emerging collaborative ventures, the block grants policy framework needs to be changed as a matter of urgency. This needs to address both the open competition requirements, and the issue of funds flowing to entities other than the participating university. Moreover, there could consideration of more onerous requirements (or conversely incentives) for how the block grant element of university funds should be used.
- The competitive funding approach might be opened up to broader competition, as outlined above.
- However, this sort of reform should probably not occur without broader reform of the policy environment. This would aim at enhancing collaborative (as opposed to competitive) funding and investment processes, with a greater emphasis on industry partnerships. Universities will need to effectively access new funding sources if the traditional university grants are to be opened up to broader competition. In the right policy environment, the university of the future could be drawing significant proportions of its funding requirements from dedicated industry relationships.
- This could include review of other Commonwealth innovation incentives. This would have the aim of ensuring that universities and PFRAs become part of an Australian trend towards collaborative arrangements which include post-competitive research, and which effectively access ‘experienced capital’ and paths to market.
- The issue is not just “the balance between competitive and performance based funding”. The issue is the adverse consequences of the current approach to performance based funding (ie the block grants). One of these consequences is a constraint on PFRA/university collaboration where there are industry or commercial partnerships. Performance based funding needs innovative attention.

- Performance based funding in general needs fundamental and innovative attention. Performance regimes for universities, and potentially PFRA, could be based on different sorts of performance indicators, which would drive quite different sorts of collaborative behaviour. Some possibilities include:
  - success in attracting industry or commercial partners in research;
  - success in attracting early involvement of commercial or industry partners in research, in contrast to post-scientific development partnerships;
  - revenue flows from organisations with university and/or PFRA equity, either from licenses or royalties or divestment of IP or sales;
  - revenue from contract research to the private sector;
  - execution of licenses, perhaps giving attention to the kind of licensing activity and the kind of companies that were licensed to.

It is important to not measure performance through the number of spin-offs or start-ups or patents. These are poor measures and drive the wrong behaviours.

## **Conclusion**

Within prevailing academic and PFRA culture, these kinds of policy developments may be resisted, on the basis of a perceived threat to basic research, or threat to ‘public good research’, or threat to information sharing. These are misconceptions and the GRDC would be pleased to address these issues in more detail should the review team so request. But it should be emphasised that the sorts of policy developments being advanced here can coexist with a system of extensive and traditional funding of ‘pre-competitive’ research.

However, if collaboration is to be encouraged, and if that collaboration is to have greater focus on the whole innovation and delivery process, then there is no escaping the sort of policy developments being advocated. Collaboration must also be understood in the context of ‘closed’ collaboration – the exclusive alliances and joint ventures required to progress post-competitive research. It is not just a matter of scientists from academic institutions and PFRA working together on projects.

Policy developments of this kind will also enhance collaboration between RDCs, universities and PFRA.

The development of PFRA/university collaboration can be advanced as part of a broader policy direction that will:

- reduce ‘crowding out’ of the private sector from R&D;
- build stronger pathways to ‘post-competitive’ research and commercialisation;
- enhance excellence through the encouragement of flexible structuring, and
- access new resources for Australian science, through wider input sharing with industry and through the generation of commercial revenue streams and other economic ‘value-capture’.

**For further information and discussion, please contact:**

**Morris Lloyd**

**Executive Manager Strategic Development**

**Grains Research & Development Corporation (GRDC)**

**Ph. 0262725525 or 0419-433135**