Submission to Productivity Commission Study of Public Support for Science and Innovation in Australia

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Impact of funding arrangements internal to public sector research agencies on academic institution research programs

Introduction

The draft research report explores to some considerable extent the linkages between public sector research agencies and other research-providing sectors, including those in academic institutions. This present submission has no particular argument with the report's analysis concerning linkages between public sector research agencies and private sector research, to which it rightly devotes considerable attention. In particular there is sound analysis of the potential for CSIRO research to "crowd-out" private sector involvement (page 10.15 and appendix M) and much the same analysis could be applied to DSTO, drawing, presumably, a similar conclusion.

This submission does not attempt to embellish further this public/private sector debate but, rather, considers whether the linkages between public sector and *academic* science and innovation processes are well-tuned. The contention is that they are not, and that public sector research agency internal funding and accounting approaches play a key role in determining this tuning. It is contended that an approach that invites senior managers in public sector research agencies to manage to a bottom line would deliver major national benefits. The submission is accordingly focussed on tactics rather than strategy.

Current arrangements

The draft report states that "The objective of public sector research agencies is to perform socially beneficial strategic and applied scientific research that would not, or could not, be conducted by other research providers …" [Page 10.1]. However, in reality there is much research supported in public sector research agencies, notably CSIRO and DSTO, that could be conducted in academic institutions and would be if funds were appropriately and strategically directed by public sector agencies to extra-mural research in academic institutions.

Setting aside until later the question as to whether this would be a good thing, it is important to analyse why senior managers in major public sector research agencies have such a strong preference to conduct their research in-house rather than out-source significant amounts. The draft research report notes that DSTO, in particular, carries out the majority of its research internally and its "external expenditure is mainly directed at technical support and manufacturing services." [Page 10.25]. Section 10.6 of the report goes into this issue in more depth but concludes with a highly non-specific and bland statement of the obvious: *The effectiveness of DSTO research is heavily dependent on the effectiveness of the procurement practices and the research direction set by the Australian Defence Organisation.*

There is a critical missed opportunity if the matter is left there. The focus of this submission is the potential for greater academic institution involvement in defence research but clearly there are related arguments about outsourcing research to

industry: to some extent the draft report covers this and I do not have the personal background in industry innovation processes to venture into this topic.

Why keep research in-house?

The reasons public sector research agencies so prefer to keep their research in-house may be summarised under four headings.

Management convenience: In-house staff are obviously easier to direct and control (and re-direct if efforts turn out to be nugatory) than are external staff delivering over a contractual boundary. There are many cases of research contracts run to completion, notwithstanding that it becomes clear that their outputs are of limited or no use, simply because it is easier or cheaper to let them run than terminate them early. Furthermore, there is a perception that being a "contract-jockey" within a public sector research agency is a less-esteemed profession than being directly and personally involved in research.

Efficiency: The need for research contract monitoring means an in-house overhead (in my experience about 30%) in order to deliver sound return on investment. Research contracts that are run hands-off, or with limited agency control and review, have an undistinguished history of returning a (possibly) right answer to the wrong question.

Confidentiality and security: Much of DSTO's research is directed to outcomes with major security implications. These may be the mere fact that research is being carried out in an area, or the targeted research applications, or international collaborative arrangements, or assurance of availability of research effort against specific schedules that allow the "national security" flag to be raised, leading to the decision that the specific research program can only be conducted in-house. Similar arguments can be raised on commercial sensitivity or IP management and control grounds by both CSIRO and DSTO. Without detailed inside knowledge, which security considerations would normally preclude, it is difficult for an 'outsider' to challenge such agency judgements. But circumstantial evidence points to the fact that the "security/confidentiality" flag is all too readily used to ensure research is kept in-house. For example, in other countries defence research, some of it heavily classified, is carried out in many universities to a far greater extent than in Australia. In the US, as the draft research report notes, the Defence Advanced Projects Agency (DARPA) spends *all* its massive research budget externally.

Overall apparent cost: In addition to the efficiency argument above, which reflects a real cost to the funding agency, there is a tendency for public sector agencies to have a range of on-costs and overheads submerged in their accounting systems. These costs are not treated as "real" costs to research programs under the control of research managers. So it is hardly surprising that academic institutions promoting research programs to senior managers in public sector research agencies are met with the statement "why should I contract with you when, for the same amount of money, I can employ three people on my staff for every one person employed under contract with you?" I have operated on both sides of this question!

Below-the-line accounting of most of the total cost of employment for research staff in public sector agencies presents any external academic research-provider, obliged to include all on-costs and overheads in research labour rates, with an almost insuperable slope to the playing field. Only if the academic institution has uniquely-qualified or talented researchers, or if there is a strategic "centre of excellence" argument, would a senior research manager from a public sector research agency pay a premium and

direct funds away from in-house employment towards extra-mural research in academic institutions.

The impact of current arrangements

But does it matter, so long as research is carried out and the research outcomes targeted by public sector research agencies are achieved in a cost-effective fashion? It can be argued that, notwithstanding what may be described as above- and below-the-line accounting aberrations, choosing to have research carried out within these agencies rather than by academic institutions under contract involves simply an arid debate about in which institution the researcher sits. Using in-house resources delivers efficiency and convenience gains and the security regime can be managed much more readily. And if there is a uniquely capable individual in academe, then he or she can be recruited to the staff of the agency. There is such a disparity between public sector research agency salaries and academic ones that an employment offer will usually succeed.

These are short-term arguments and in a number of cases public sector research agencies have taken a longer-term strategic approach by setting up Strategic Agreements or Centre of Expertise in academic institutions, designed not only to deliver short-term research outputs, but also to be self-regenerating through student education, course design and post-graduate research to which other areas of funding may contribute (such as industry grants or contracts and ARC funds). This is the very important additional benefit from investments by public sector research agencies (and some major industries) in academic centres of expertise. The self-sustainment of the targeted area of expertise is something that public sector research agencies are unable to achieve effectively in-house, precisely because their mission is seen as delivery of science outputs. A centre of expertise funded within an academic institution may well be able deliver both the research outcomes sought by the funding public sector research agency as well as bring the benefits of self-sustainment and symbiosis which has not only potential benefit to the agency's programs but to the nation as a whole.

Technology transfer is too often seen as a linear process of taking an idea through research, development and into commercialisation – far more significant, but far harder to track and assign success/failure ratings to, is the general dissemination of research capability in the open research environment of an academic institution when it is seeded with "problems to solve". Australia's public sector research agencies have a golden opportunity to play a far more significant role in this process if factors that inhibit extra-mural research are tackled.

A retuning of funding processes

There is a better approach from that which currently prevails. It must first be said that the setting of priorities within public sector research agencies is a matter for the agency to manage and against which it is accountable through its reporting lines. This submission specifically avoids intruding into this area. It is not the "what" but the "how" with which the submission concerns itself.

The approach advocated is that public sector research agencies be required to administer their budgets at Divisional level (the lowest level of meaningful discretion in funds allocations) so that the total cost of employment is reflected in staffing decisions and can be readily contrasted with the costs of contracting-out research

effort. A Chief of Division could then make sensible judgements about the tradeoffs between in-house and externally-sourced research with the assurance that artificial accounting conventions do not tilt the playing field. Taking on an additional staff member must carry with it not only a salary cost to the Division's budget but an accompanying reduction in the available funds to compensate for the other (major) items of the total cost of employment. The net real budget impact of having a research activity carried out in-house or by an academic institution must be roughly comparable so decisions as to "in-house or not" can be based on more substantive bases.

And finally, given this "manage to the (actual) bottom line" approach, it is quite inappropriate for top management to apply, or be seen as likely to apply, artificial and crude constraints on public sector research agencies such as head-counts, or discretionary funding (ie non-salary) limits. When budgets are to be changed up or down, senior management must do so on a bottom-line basis or none of the preceding makes any sense. Any senior manager having oversight of a public sector research agency who includes such tactics in his management armoury is either unfit for office or subject to political direction, the consequences of which must lie at the door of the relevant minister.

Disclaimer
This submission is lodged personally. The views expressed are my own and are not necessarily supported by the University of Adelaide, with whom I have a current employment contract, or my past or present clients or employers.

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Personal Background:
I left DSTO in 2000 after a 33-year career in that organisation, including 12 years as a Divisional Chief, in areas of defence electronic technology (SA-based) and science policy (Canberra-based). A subsequent three year term as CEO of a CRC (Centre for Sensor Signal and Information Processing) and now with a part-time professorial research position with Adelaide University have exposed me to science and innovation processes in three different sectors: a mission-directed public-sector agency, an innovation commercialisation agency and an academic environment. It is with this background that this submission is made.