December 18, 2006

Public Support for Science and Innovation
Productivity Commission
PO Box 80
BELCONNEN ACT 2616

Dear Sir/Madam,

Re: Enabling a Region for Technology Driven Growth via Triple Helix Principles

1. Introduction

The Queensland Nanotechnology Alliance (QNA) congratulates the Productivity Commission on the preparation of the Draft Research Report *Public Support for Science and Innovation*. The QNA provides, in principal, support for all the draft findings, and compliments the Productivity Commission on its rational comments on many aspects of the status quo assumptions of R&D in Australia and the compilation of Australian innovation capacity data, as highlighted in the Draft Report's Appendixes.

While the QNA provides in principal support for the Draft Report and its draft findings, QNA believes there to be areas of oversight which, in the view of the QNA, need to be addressed in the final report.

Of significance is the role played by intermediaries. While the report touches upon the role of financial, consulting or single industry association intermediaries, QNA believes these organisations only provide limited vertical support to a sector within the science/innovation community. In contrast, across sector and stakeholder intermediary groups with globally accepted triple helix organisational structures, have no ulterior motive but to see growth within the community, and it is these groups that have been largely omitted from the report's findings. Such intermediaries have genuine commitment to new and existing research stocks and the development of benefits to the community that would not have occurred in the absence of the facilitating organisations.

Another area of concern is the international comparative level of development funding to value add to Australia's substantial funding of research. The draft report comments that innovation spending, including commercialisaton, should be around 10 times that of R&D, while ABS data suggests that on average in Australia, innovation spending is only two times that of R&D. While the QNA acknowledges the Productivity Commission reasoning that there may be discrepancies between the data sources, the general feeling within the private business community involved in science and innovation that the QNA deals with, would agree that Australia is well below international trends. Current policy initiatives aimed at addressing this discrepancy act by the provision of support to research organisations to move ideas to market. However global data suggests mechanisms that directly encourage industry uptake of beneficial technology returns benefits that would not normally would have resulted.

QNA supports the general efficiency and enhanced productivity thrust of the Draft Report. QNA acknowledges that while knowledge development and R&D create value, it is through the commercialisation of technology into new processes and products that businesses will create jobs and nations will see a return on their investments. Strategic investment in the development of technologies will allow Australia to enhance the building of a sustainable, knowledge based economy. This initiative must have the long term objective of generating economic viable companies with long term

manufacturing opportunities. The priority of policy makers, in conjunction with the science and innovation community has to:

- Establish high value added manufacturing
- Enabling high value Research and Development
- Stimulating high value employment

2. Outstanding Issues

2.1. Investment

QNA is in agreement with draft findings 9.1 and 9.2 relating to R&D and supports the approach taken by submission 82 (Department of Industry and Resources – WA) that a national audit of R&D and innovation infrastructure should be undertaken.[1] From the draft report, QNA is in agreement that R&D produces significant returns to the economy through productivity increases that are not captured as rents by the firms undertaking R&D.

QNA argues that it is inefficient to rely on serendipitous interaction between collaborative firms and Public Sector Research Agencies (PSRA). Efficiency would be afforded by development of formal links within knowledge hubs that embraces salient and fringe stakeholders within the community to efficiently and effectively identify opportunities for business to business (B2B) or business to research (B2PSRA) organisation interactions. Within this model, IP is contributed equally from all parties for long run economic gains and enabled by a technology intermediary.

The draft report provides evidence that within the last 20 years, small firms are better at commercialising disruptive technologies into discontinuous innovations thereby creating increased competition, better product/service performance and greater economic benefits to society. Thus the paucity of small firms involved in the transfer of technology from government laboratories to private sector firms is a cause for concern to the national laboratory community in the United States and undoubtedly to other nations. To the QNA, this evidence needs to result in greater R&D benefits being available to SME development and start-up companies.

In line with greater flexibility in R&D, the QNA agrees with commentary in the draft report that patent pools, in which collaborating firms benefit from predetermined access rights to the pool. Further, fee arrangements on IP would be based on option models, whereby IP is transferred at marginal cost unless subsequently used in successfully commercialised projects.

SME's understand they have to pay for IP, the issue is when and how much. Not enabling the transfer of IP from the shelves of PSRA's, because of misaligned and uninformed transfer conditions, does not add value to the community. Further, QNA alliance members have been in situations where they were unable to agree to financial and ownership terms with leading Australian PSRA's. These firms however ventured internationally to obtain the IP required to reduce their concepts to practice, under terms that fostered technology transfer. A global leader such as Stanford University realises only a fraction of its operating budget will be raised from technology transfer activities, and as such places much higher value on building relationships with growth companies such that in the future these companies will grow and provide high valued employment prospects for Stanford graduates; Intel, HP, Google are examples of these once small companies.

2.2. The QNA *Success* Model and the Triple Helix Intermediary Model

[1] Such an audit is scheduled by the QNA in late 2007 for Queensland PSRA's.

The QNA has been founded on a model of *success* as productivity enhancement (success) can only be measured through one parameter; the number of growth firms with technology driven revenue streams.

By embracing all stakeholder groups within the knowledge community, that of industry, PSRA and governments, realisation of academic, commercial and social outcomes can be planned and addressed. Resources, including time, reputation, and money from all stakeholders seeking to afford a triple bottom line on investment naturally implies the creation of a portfolio of short-; medium- and long-term development opportunities. Such pooling of resources to create a portfolio and thus providing opportunities to build long term innovative capacity, results in both emerging and traditional industry sectors benefiting.

The outcome of an effective innovation sector is sustainable, high value job creation. Via this mechanism, higher education sectors now partners with growth industries (emerging and mature), providing the broad spectrum of human resources required to meet the demand of the industry (from technicians to PhD qualified across disciplines). The right mix of economic drivers lead to additional benefits, such as enhancing Australia's export in niche technology areas. Obstacles to achieving this effective outcome include Australia's fragmented industry base; the number of small companies with little experience in innovation and the industries reliance on imported innovations which result in reducing, non-sustainable margins.

Moreover, Australia's innovation policies appear to overlook established manufacturing strengths and research infrastructure. Within the QNA activities, this strategy has been developed with great success by bringing together researchers with representatives from mature industries, in conjunction with the R&D community of developing organisations. This resource intensive task involves building social networks and ensuring commitment and respect within the networks. Australia's first functional nanotechnology alliance was spawn from this investment and acknowledgement of the role played by organisations such as the QNA needs to be marketed and exploited.

In fact, the Productivity Commission draft report notes that linkages within the innovation system are essential for the flows of information, knowledge, technology, people and capital on which the system relies. The importance of such linkages has grown over time as the innovation process has become more interactive, with the literature particularly emphasising the importance of value chains and the benefits of interactions at sector boundaries. Through QNA's liaison with growth, start-up companies, close new partnership have arisen with aligned mature industries, resulting in real additional gains for both parties and the overall community.

High value added, innovation driven industries MUST respond to global priorities rapidly. Australia cannot just simply do R&D without a manufacturing outcome (be it prototyping, clinical trials, fabrication). Global evidence indicates R&D supply will migrate to where the manufacturing demand is performed and hence it is essential to do what it takes to have a viable manufacturing sector in the targeted niche industries to protect and ensure a return on the public investment science and technology. Supply migrates to where demand dictates profits.

2.3 A Pilot System for Productive R&D – *Pilot Alliance Development Program*

The QNA has identified a significant market failure in the Australian economy that of a Technology Development Facility, created in a diverse, existing and high technology precinct, such as the Queensland Centre for Advanced Technologies (QCAT) site. Such a facility would seek to overcome concerns of poorly developed linkages, inappropriate standards, poor regulations, inadequate technology infrastructure and high entry costs, as well as providing the photocopier.

Technology incubation founded on bricks and mortar will not afford the productive outcomes that could be gained and hence society forgoes the benefits. Further, this is not a technology transfer solution, but a market lead, development focused effort designed to extract useful technology to market from the patent pools of under utilised technology in both commercial and public organisations.

The solution, in QNA's view, is the establishment of public-private partnerships (triple helix model) which are becoming increasingly popular features of innovation systems in a number of countries over the last two decades. While they have taken a variety of different forms they share the same underlying goal - to reap broader additional benefits from the national investment in public and private sector innovation support.

As such, these structures are explicitly viewed as a more effective means of addressing perceived gaps in innovation systems than other policy instruments. By bringing together researchers and research users from markedly different backgrounds to pursue genuinely challenging projects at the emerging interface of today's technology, they have the potential to deliver outcomes with high spillover benefits which would not otherwise be pursued. But cultural differences in terms of the respective aims and approaches of the different partners also means that the transaction costs of these relationships can potentially be very high.

3 The Elements of Success

The elements of success are present today in many highly performing groups in the local technology space; however they are not located in one unified umbrella organisation. Successful activity includes:

a) AEEMA QLD cluster meetings: enabling project based partnerships spanning grant to new product development and global contracts with significant export opportunities through a dedicated AusTrade sponsored position with the organisation.
b) AusBiotech: industry focused, annual forum for the alliance partnership to highlight industry development and address critical path issues such as resources and finance, and a method by which to demonstrate to local and global stakeholders of the annual growth of the industry.
c) National Food Innovation Industry Grant Scheme: direct support from idea to market of industry lead, innovative new product or new process development, regardless of turnover.
d) Future Materials: Provision of a full time, well connected and trusted, technology literate professional, by PSRA, to liaise between the market place and PSRA and the establishment of industry focused, technology network programs. This inward investment and market focused program complementing the technology transfer operations of PSRA's.
e) Australian Mineral Industry Research Association (AMIRA): industry association that manages collaborative research for its members in the global minerals industry, by utilising a partnership approach to R&D.
f) Australian Institute for Commercialisation (AIC): The Techfast program which seeks to bundle IP from PSRA for utilisation by industry, particularly SME's.

Further, most benefits from the CRC Program have come from industry application of research rather than through narrowly defined 'commercialisation' events such as spin-off company formation and licensing of IP. Measured benefits from the Program have primarily been delivered through the application of research by industry to reduce costs and increase productivity and through the sale of

new products (by existing or new companies) that are based on CRC research.[2] The CRC program is however more suited to large companies / PSRA interactions and predicated on long term research and development goals for an identified and defined industry sector.

QNA strongly supports draft finding 9.5 which identifies the need for an effective and efficient system with functionality similar to that of the a CRC program but with broader collaboration goals to support smaller, shorter and more flexible collaborative arrangements between groups of firms either independently or in conjunction with universities and public sector research agencies.

The QNA is seeking to build on its efforts of unify and embrace the successful elements identified in established innovative organisations as it believes the development of the Pilot Alliance Development Project would encapsulate the Productivity Commission's recommendation thereby driving a sustainable innovation and science sector in Australia and hence would:

- ensure selection of the most suitable user-group partners (given they know more about the expected return and risk profile of individual projects);
- secure the desired amount and quality of R&D at least cost to the taxpayer; and
- avoid opportunistic behaviour by university, public sector or user-group partners (such as the risk of choosing inappropriate projects or a bias in research focus).

The QNA again congratulations the Productivity Commission on its thorough reporting and would welcome the opportunity to meet face to face to further progress our views.

Yours sincerely

Dr Peter Kambouris
Treasurer, Queensland Nanotechnology Alliance

[2] Submission 11 to Public Support For Science and Innovation, Page 15)