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The Chairman
Economics and Industry Standing Committee
Legislative Assembly
Parliament House
PERTH WA 6000

Technological and Services Innovation in Western Australia

The following brief submission aims to highlight the following key points:

- Technology is critical for industry and the economy
- There is rapid technology change happening now and it will impact the State economy
- Industry and Commonwealth are the key funding sources for research
- The most important issue for the State is assisting to turning research into business opportunities
- The State would benefit most by focussing its efforts on how to turn the commonwealth funded research in to business opportunities for local companies
- Need to consider how to retain global businesses created in Western Australia headquartered in the State

With regards to the focus industries:

- The resource sector is not about it outputs (minerals or energy) rather its inputs, the inputs being where the money generated by exports is spent and flows through to the WA economy. The inputs are part of the supply chain and involve every sector of the WA economy from catering and food supply, through design services, construction, IT and logistics. Mining cannot be separated from the broad economic capability of the State.
- Agriculture in the current context only contributes in a small way to the economy, less than 1% of GSP, and with current technology is limited by arable land and water access. Only through technology, intensive processes and consideration of aquaculture opportunities can agriculture expand substantially.
- Advanced manufacturing is widely misunderstood and can be applied to all areas of the manufacturing sector plus may involve the increasing integration of intellectual components and service attributes. It is about the intensive use of technology in both the manufacturing process and products developed.

Technology and Innovation – Key Points

Technology and Innovation are critical to industry and the future of the economy

- *Intangible assets*, mostly derived from human capital including innovation, have increased from 17% of the S&P 500's market *value* in 1975 to 84% in 2015.

- Intellectual capital is critical in growing competitive sustainable companies. According to the OECD between 1995 and 2007 at least 33.7% of labour productivity growth in the USA was due to intellectual capital investments¹
- Technology and Innovation are critical to productivity improvements and competitiveness.

Funding Research and Innovation

- Mostly by Industry (see Attachment 1 - Chart 1)
- Commonwealth second largest – majority channelled through R&D tax incentive and university funded research – Commonwealth choose the focus – mix of basic research, applied research and significant innovation
- State is a small funder – with little made available outside Government agencies – catalytic role. WA Government is now a relatively small contributor compared to other States.
- Western Australia consistently receives less Commonwealth research funding per capita than other States (see Attachment 1 - Chart 2).

Australia & WA are good at research – the Global Innovation Index 2014 ranks Australia 12th for Scientific & Technical Articles and 8th for research and Development highlighting the quality of its research, yet Australia is ranked 78th for Knowledge Diffusion 48th for Innovation Linkages and 42nd for knowledge absorption which are a measure of the ability to translate research to commercial opportunity.

Commonwealth's research funding structures have created a culture within Universities not conducive to translating research to commercial outcomes. This has created a disconnect between the supply side and demand side of research. Addressing this will open up many opportunities for Western Australia and the State can have substantial impact.

State focus areas

- Infrastructure, regulatory environment and policy framework to enable and encourage industry investment into research in WA
- Increasing Commonwealth investment to support research in WA
- Ensuring the focus of Commonwealth research investment is on State priority areas
- Capturing and translating as much as possible of the Commonwealth research investment into State based business opportunities

Key roles for State Government

- Create environment to encourage private and commonwealth research investment
- Catalyse access to Commonwealth funds in priority State areas
- Develop mechanisms to facilitate local business access to research outcomes – mainly engagement and communications strategies
 - Private innovations
 - Research institutes
 - Access to provide solutions to major end-users – multinationals and government

¹ Supporting Investment in Knowledge Capital, Growth and Innovation; OECD; 2013

- Assist to manage barriers and impediments in the commercialisation phase
 - Poor access to risk capital – assist to facilitate
 - Understand and manage the risk aversion that has evolved in Australia
 - Small market size and low density – support market access
 - Limited commercialisation capability including within universities – assist to build skills base
 - Engagement difficulties between SMEs & Universities, SMEs & multinational end-users, and SMEs & Supply chains – SME engagement facilitation and support focus
- Create environment conducive for companies to establish and remain in the State
 - Efficient regulatory systems
 - Appropriate infrastructure
- Identify and communicate the STEM skills needs of future industries

It is a time of incredible change with multiple disruptive technologies emerging – innovation is now critical

- Impact on jobs – 40% of traditional jobs will disappear in 15 years
- Energy sources, prices, supply/demand models, markets will drastically change
- Automation will grow in application
- Increasing digital integration into most products
- Physical goods merged with services

WA is more exposed than ever, due to technological change, to global competition.

- Internet retail
- Online service provision – architectural design services, software programming, engineering, web site designs – all can be provide from other locations
- FLNG – ability to float in pre-constructed production platform
- Cost effective travel – FIFO work force
- Refrigeration and food storage technology – can import fresh foods from global sources

Critical industry issues

- Big data analytics
- Employment ready STEM skilled workforce
- Operational and production costs
- Energy costs
- Water availability

Solutions to Create and Maximise Opportunities for Western Australia

The following are practical programs to address the issues highlighted while focusing on maximising opportunities to build Western Australia's technology based economy.

Increasing Commonwealth investment in WA based research

- Improve engagement with Commonwealth research funding organisations
- Seed funding to improve strategic applications with a specific focus on industry engagement
 - Targeted State funds

- Milestones which terminate further support
- A more detailed breakdown regarding the targeting of funds under this section is provided in Attachment 2.

Building Commercialisation Skills Base

- Business Development Manager in major research institutes
- Internships with VC companies and Innovation hubs
- Encourage internships with major private sector R&D investors
- Training and skills development for University Commercialisation Offices

Improving the transfer of technology to local businesses

- WA Government IP Policy – strengthen implementation
- Virtual promotional pipeline
 - Investors want many opportunities to review
 - All identified WA Government IP under the IP Policy and available to the private sector should list on the virtual pipeline
 - All research organisations with state government funds encouraged to list opportunities on the virtual pipeline
- Commercialisation and innovation hub support
 - To build skills a small level of support be provided to a range of innovation hubs to
- Ensure the appropriate start up infrastructure
 - Wet lab incubators
 - Encouraging technology precincts across WA
 - Technology testing sites
 - University technology city concept

Risk capital and funding access

- Venture Capital Limited Partnership
- Work with the Commonwealth to unlock superannuation and insurance sector risk capital
- Venture capital skills development
- Angel Investor Networks support

Retain global businesses

- Appropriate growth support strategies to expand skills and address cashflow
- Capital access assistance
- Efficient and effective regulations
- Government purchasing process support local innovation

Funding the above initiatives

Funds should not be provided to agencies – they would simply ensure they spend all funds allocated. However program managers implementing the above initiatives need confidence to propose actions and negotiate support to deliver benefits to the State.

As such it is proposed that all funds be retained by Treasury unless approved and contracted, at which point they are then realised in forward estimates.

Treasury would provide in principal access aligned with a desired outcomes, decision making framework and approved guidelines. An analogy would be a pre-approve home loan where funds are available, held by the bank, conditions are and limits understood, however funds are not provided until a contract signed, and only to the amount of the contract.

Initial funding could be relatively small growing as multi-year financial agreements are approved.

Suggested funding limits held by Treasury and/or provided to approved projects could be as detailed in the table below.

Initiative	2016-17 \$'000	2017-18 \$'000	2018-19 \$'000	2019-20 \$'000
Increasing Commonwealth Investment	1,000	3,000	5,000	8,000
Building Commercialisation Skills Base	200	250	300	350
Technology transfer facilitation	500	700	900	1,000
Risk Capital support	250	300	400	500
Retaining global business	200	150	100	100
TOTAL BUDGET *	2,150	4,400	6,700	9,950

* Subject to funds being approved and committed as per the funding model proposed

Improving the flow and use of funding will over time increase income to the Government as well as reduce Government operating costs.

For consideration.

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Chart 1 – WA’s Major Research Investors

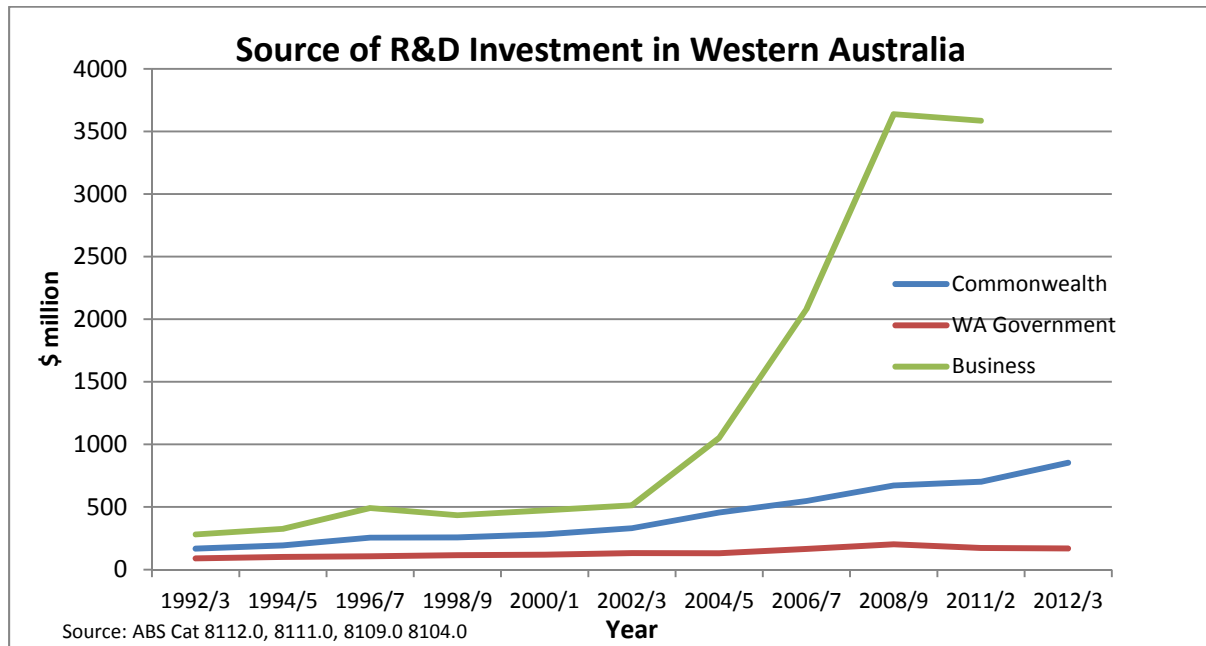
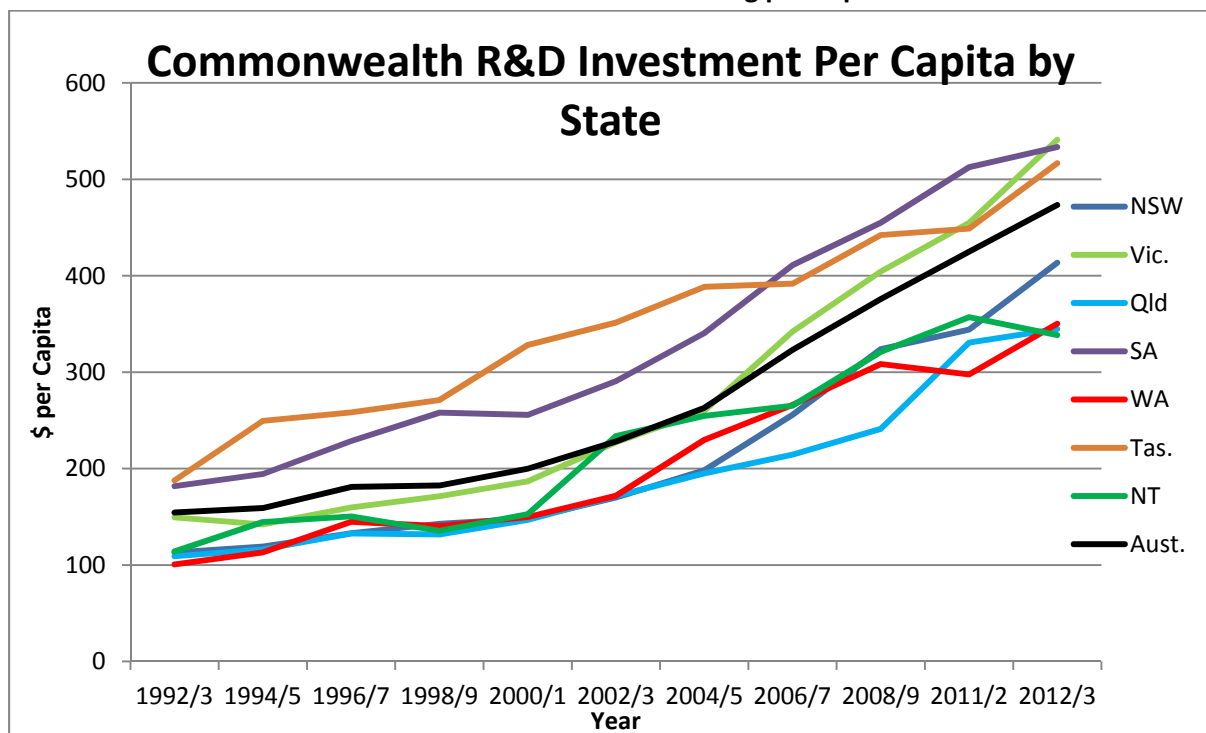


Chart 2 – Western Australian’s Receive Low Research Funding per Capita



Note: the ACT is not included in the graph as the level of Commonwealth funding to the ANU combined with the small ACT population skews the graph. By way of example the Commonwealth research funding directed to the ACT in 2012/13 was \$2,730 per capita, approximately 5 times the next highest level of funding.

Proposed support for Commonwealth research applications from WA

With regard to major research initiatives such as CRC, ARC and NHMRC grants strategic and targeted State support would have more impact.

Rather than research applicants seeking a lump sum funding contribution from State Governments as a signal for support, the following key activities would have greater value and impact:

- Government identified prioritisation framework
 - Specific WA need articulation
 - Identifying desired strategic outcomes
 - Scoping potential impact
 - Determining implementation practicality

- Pre-application funding and practical support for
 - Business case preparation
 - Support to access to Government information
 - Support to engage with industry
 - Identification of end-user priority research areas
 - IP strategy development
 - Industry participation strategy including SME engagement strategy

- Research organisation support
 - Funding for a business development manager
 - IP protection support funding
 - Bi-annual or annual end-user research review and planning support

- Research activity support
 - Access to appropriate Government research information and data.
 - Access to government agencies staff and facilities as agreed.
 - Where appropriate an agreed level of contract research (as opposed to untied grants). Typically where the government or community is a key end-user.
 - Investment in common user research infrastructure that the research team can access – if there is a demonstrated need.