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Standing Committee on Science & Innovation
House of Representatives
Parliament of Australia

EXAMINATION OF STRATEGIES TO OVERCOME BARRIERS TO, AND FACTORS WHICH DETERMINE, INNOVATION SUCCESS.

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This submission needs to be read in conjunction with the "Roach CRC Study 2005 – Australia – A Need to Improve Commercial Research and Development" attached. That study has been lodged with the "Exports & Infrastructure Inquiry" currently being conducted by the Prime Minister.

INTRODUCTION

Australia needs to identify more efficient strategies to develop commercial research, manufacturing and exports in order to overcome its growing foreign debt.

In 1981 Australia's net foreign debt was $9 billion, or 6% of GDP [ABS attached]. The foreign debt reached $422 billion in December 2004, which was 51% of GDP. Interest costs on the foreign debt reached $5.1 billion in the December quarter of 2004 ($20 billion annually) and servicing the debt was 9.3% of Australia's export income. [*The Australian* 2/3/05]. The escalating foreign debt [(a)] is unsustainable and needs to be urgently addressed.

The cause of the escalating foreign debt is Australia's inability to manufacture "elaborately transformed manufactured goods (ETMs)" and to export them to the rest of the world.

Japan, with no natural resources, has a foreign surplus. Japan relies on commercial research and development (CR&D) to create innovation for its industry, which then manufactures the innovation for export.

Japan is 6 times more efficient than Australia in developing ETM exports from R&D expenditure [(b)]. The Japanese Government is almost 12 times more effective than the Australian Government in creating exports from its R&D expenditure [(b)]. The Japanese Government is 1800 times more efficient in the expenditure of CR&D in industry than Australian Government-run research institutions [(b)].

Japanese business is 4 times more efficient than Australian business in CR&D resulting in exports [(b)]. The Japanese Government is 3 times more effective in getting the private sector to spend money on CR&D than the Australian Government.

Table 1: Expenditure on R&D as a percentage of GDP, OECD countries 2000-2001 (ABS Figures)

Country	*Business (%)*	*Government (%)*	*Higher Education (%)*	*Total*
Australia	0.72	0.35	0.41	1.53
Germany	1.75	0.34	0.40	2.49

[(a)] – Annexure (Australia's Foreign Debt Levels)
[(b)] – Annexure (Japan / Australia Comparison)

The difference between Australia and Japan is the infrastructure for CR&D for small to medium sized enterprises (SMEs). Japan has between 300 and 500 private sector commercial research centres. Australia has none.

The Federal and State bureaucracies in Australia have prevented the development of private sector commercial research centres because of their fear that they would be competition to the CSIRO and government-run research institutions. [See attached submission "ROACH CRC STUDY 2005" to the Prime Minister's "Export & Infrastructure Inquiry"]

PATHWAYS TO COMMERCIALISATION

The common feature of countries that successfully commercialise research and development (CR&D) is that they have private sector commercial research centres (CRCs). There are two types: Those run by large corporations, and those for small to medium size enterprises (SMEs).

Large companies such as IBM, Hewlett Packard, Sony, Toshiba, Krupp, Siemens and General Electric have their own CRCs. Australia has no large corporations with their own CRCs.

Small to medium sized enterprises (SMEs) also need private sector CRCs. These centres allow SMEs to cluster together to overcome the large number of learning curves involved in CR&D. Networking is the key to SMEs successfully developing innovation and this is best achieved through private sector CRCs [(c)].

Australia has no private sector CRCs for SMEs.

The Government should not be involved in trying to commercialise research [Roach CRC Study 2005].

CSIRO and Commercialisation.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is the Australian Government's key organisation involved in the development of research for industry. It is directly involved in the management of the 64 Co-operative Research Centres established in the past decade.

The Japanese Government is 1800 times more efficient than the Australian Government's public sector expenditure of CR&D that results in exports [(b)].

If there is a role for the CSIRO it should be in pure research, basic research and research for the public good. It should not be in the commercialisation of research or acting as a consulting service.

[(c)] – Annexure (CRCs Networking)

Australia needs to carry out research in areas such as "the ozone layer", "salt levels in the Murray Basin", "radio astronomy", "Antarctic", and those "for the public good" areas that the CSIRO is renowned for.

Articles in "The Age" and "Australasian Science" highlight the problem of trying to commercialise the CSIRO. Dr Max Whitten was a CSIRO executive from 1981 to 1995:

The Age 6/7/2002.

"Whitten accused Garrett, the head of the CSIRO, of subverting the CSIRO's traditional role of public research in favour of lucrative consulting work for government departments and the private sector."

"The CSIRO now has a formal target of getting 30% of its income from external revenue (half of which comes from commissions from government departments and agencies)."

"The promise of massive increases in external earnings might have landed Garrett the job, but the strategy could shift CSIRO from being a powerhouse for public-good research into just another consulting firm."

"Staff morale, says Whitten, is plummeting...half the divisional chiefs are looking elsewhere for jobs; internal surveys reveal many top managers are stressed...."

Australasian Science. Sept 2003. Editorial

"The issues raised reveal a deep divide between Garrett's corporate ideology and the values of free inquiry cherished by his scientists."

The issue concerning the CSIRO and its commercialisation has been around for decades. In 1992 I debated the then head of the CSIRO, Dr John Stocker, at a CEDA meeting on his attempts to commercialise the CSIRO. It is recorded in my letter to the Editor of The Australian newspaper 14/07/95.

The CSIRO is made up of people with research skills and proficient in writing research papers. It is not structured with people who are commercially competitive, and nor should it be. To compete with private sector commercial research centres in Japan, the US, Europe or China requires a completely different personality, one that is market driven and entrepreneurial.

Commercialisation should be left to the private sector and the government should not be involved in running any organisation engaged in CR&D, including the 64 Co-operative Research Centres.

Extracts:

"The primary role of Government in promoting advanced technology development should be supportive – not directive" (Miller and Cote, 1985).

"Experience overseas has shown that direct government involvement results, at best, in mediocrity and, more commonly, in a disappointing performance." Advanced Technology Development Strategy for Western Sydney. 1986. Cameron McNamara and Dr Ed Blakely.

The pathways to private sector CRCs:

Private sector CRCs are an essential feature of the "pathways to commercialisation". There are a number of pathways to the development of CRCs.

Pathway for an idea leading to commercialisation:

Idea → research → R&D → CRC → manufacturing → sales, exports.

Idea from marketing → CRC → manufacturing → sales, exports

Re-engineering existing technology → CRC → manufacturing → sales, exports.

Physical Infrastructures Helpful to Develop Commercialisation

1. Innovation schools
2. Innovation colleges and universities
3. CRCs
4. Technology Parks
5. Technology Satellite Cities, adjacent to existing cities and regional growth centres, and incorporating private sector CRCs, innovation universities and technology parks.

All the above can be interdependent and network with each other.

INTELLECTUAL PROPERTY AND PATENTS.

There needs to be a centralised patent structure which will evolve with the development of a number of private sector CRCs.

SKILLS AND BUSINESS KNOWLEDGE

The skills and business knowledge for commercialisation begin with the appropriate infrastructure of private sector CRCs.

Skills and business knowledge are further developed in the innovation schools, the innovation colleges and universities, the CRCs and the technology industries. They all network together to overcome shortages and develop the skills required in the changing innovation market. They need to be private sector driven.

CAPITAL AND RISK MANAGEMENT

The capital to develop private sector commercial research centres for SMEs is difficult. Banks and financial institutions are not interested in the initial capital injection because there is no immediate return. This is the reason the Japanese Government gives upfront grants and the US Government provides low interest deferred loans for the establishment of these centres.

Funding by Governments in the form of grants is usually applied at the upfront end of the innovation chain. Once the suitable projects have been identified, venture capital for various projects should be organised by the private sector CRCs. This model protects scientists, engineers, inventors and investors.

The current system in Australia of financing innovation often leaves inventors' shares, after several capital raisings, being watered down from 60%, to 6%, to 0.6%. The venture capitalists, merchant bankers and lawyers take the lions share, and often leave the scientists, engineers and inventors with little or no return.

The current capital raising system also results in high management fees by venture capitalists. Once the money is raised they often exit. Projects are rarely clustered, but left in isolation to perish, or have their innovations taken by others. There is a high failure rate and investors often receive no return. This explains the low rate of participation by the private sector in Australia compared to countries such as Japan, Germany, Switzerland and Sweden [Table 1].

Risk management is optimised in private sector CRCs where best practices can be continually monitored and reviewed.

Private CRCs continually apply risk management to:

- Venture capital in order to ensure investors receive high returns. This motivates them to return for future investments.
- Ensure scientists, engineers and inventors are properly rewarded.
- Each CR&D project to optimise returns.

RESEARCH AND MARKET LINKAGES

Attached is a diagram outlining the networking and linkages involved between private sector CRCs, industry, government, universities, other research organisations and the market [(c)].

The Australian Government should also carefully consider the role of JETRO, the Japanese Government's overseas marketing arm. JETRO provides commercial intelligence and potential innovative products and ideas to their own private sector CRCs for re-engineering and further CR&D.

FACTORS DETERMINING SUCCESS

The easiest way to determine the success of commercialisation is to compare expenditure on CR&D and the resulting level of exports. The factors which would determine success are:

1. Clustering of research projects.
2. Commercialisation of research completed in private sector Commercial Research Centres.
3. Government support in overcoming red tape.
4. Government support to develop infrastructure: CRCs, Innovation Universities, Technology Parks, Technology Satellite Cities.
5. Government support at the initial stage of identifying potential projects for venture capital funding.

STRATEGIES IN OTHER COUNTRIES THAT MAY BE USEFUL TO ADAPT IN AUSTRALIA

Australia should be following the successful models overseas and develop commercialisation of innovation in private sector commercial research centres. Countries with private sector CRCs include Japan, Germany, Sweden, United States and China. "China now has over 600 private sector CRCs, an increase of 200 since 2002" (*Technology Review*, April 05 p24).

However the CRCs should be Australian private sector CRCs. Foreign companies have the risk of doing their R&D in Australia with Australian staff and then transferring the CR&D to their parent companies for manufacture offshore.

The reason for Australia to encourage CR&D is to create our own jobs, manufacturing and exports from Australia.

CONCLUSION

Over the past 25 years many countries have developed technology based manufacturing through private sector CRCs. Australia has been trying its own path of commercialisation through government-run institutions. It is time to change.

Within a decade the foreign debt could be 100% of GDP. This would lead to a loss of confidence in the Australian dollar.

John Laird, the former MD of Australian National Industries stated in the 1980's regarding the Australian economy and the loss of our manufacturing sector that "The worst is yet to come." Australia has been living for too long exporting primary products and living off foreign debt for far too long.

Foreign debt enables overseas countries such as Japan and China to control the value of the $A and our interest rate. They will continue to allow the dollar to remain at a level to maximise their exports to Australia. Whenever these foreign owners of our debt choose to call it in, the dollar will drop, interest rates will rise and others will own all our prime assets.

It is now time for urgent action on the issue and for all Australians, politicians, union, and business leaders to be united in a common goal of addressing the foreign debt, and supporting those who want to put in the effort to redress the current crisis by commercialising research, manufacturing and exporting.

ANNEXURE

(a) **Pictorial of Australia's Foreign Debt since 1976**

(b) **Comparison of R&D Expenditure to Exports in ETM's**

(c) **Networking Flow-Chart for Commercial Research Centres (CRCs)**

ANNEXURE (a):

Australia's Foreign Debt

Figure 1. Level of Foreign Debt - $ Million
At 30 June

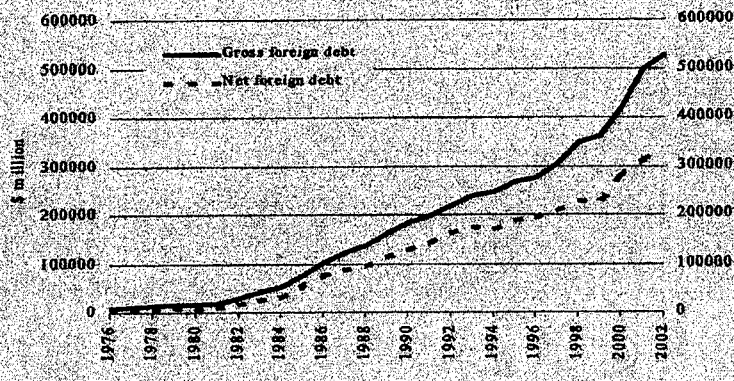
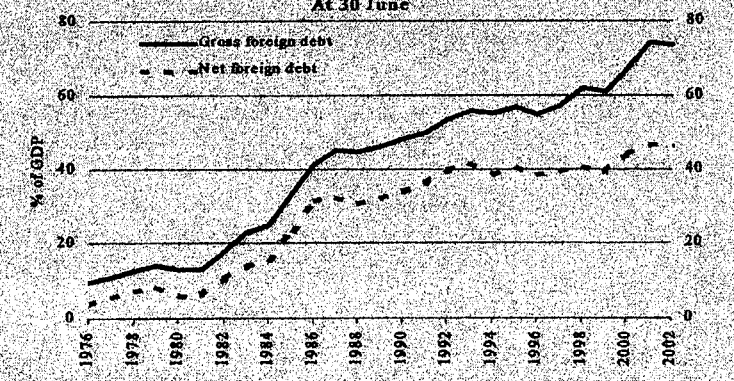


Figure 2. Level of Foreign Debt - % of GDP
At 30 June



5

ANNEXURE (b):

COMPARISON OF R&D EXPENDITURE TO EXPORTS IN ETM'S REQUIRING ON-GOING R&D IN JAPAN & AUSTRALIA

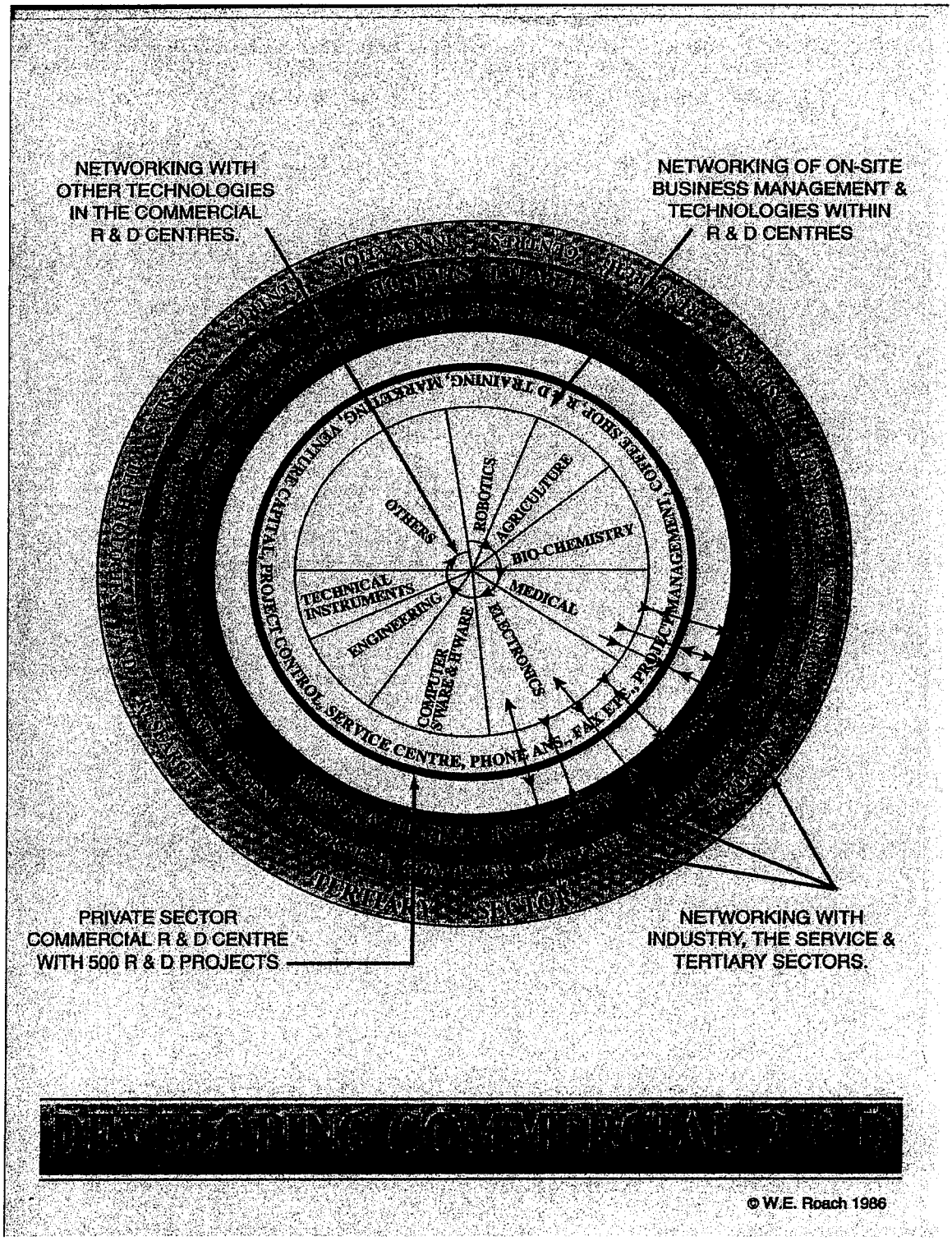
	EXPENDITURE ON R&D (Billions A$)	*EXPORTS OF ETMs* (Billions A$)*	*EXPORTS OF ETMs / $ EXPENDITURE ON R&D*	*EFFICIENCY OF R&D RESULTING IN EXPORTS*
				2.92 / 0.49 = 5.96
AUSTRALIA	**11.03** (90% of 12.25) ■	**5.45** (30% of 18.164) □	**$0.49**	**JAPAN IS 6 TIMES MORE EFFICIENT THAN AUSTRALIA+#¥**
				12.08 / 1.02 = 11.84
AUSTRALIAN GOVERNMENT	**5.32** (90% of 5.915) ■	**5.45** □	**$1.02**	**JAPANESE GOVERNMENT IS 12 TIMES MORE EFFICIENT THAN AUSTRALIAN GOVERNMENT + # ¥**
				4.12 / 1.01 = 4.07
AUSTRALIAN BUSINESS	**5.38** (90% of 5.979) ■	**5.45** □	**$1.01**	**JAPANESE BUSINESS IS FOUR TIMES MORE EFFICIENT THAN AUSTRALIAN BUSINESS # ¥**
CSIRO: 2002, 2003, 2004	**R&D appropriation. Mean for 2002, 2003, 2004**	**Sale of IP & Shares. Mean for 2002, 2003, 2004.**	**Income return per $ of R&D appropriation by Australian Government.**	**12.08 / .0065 = 1816**
	$606.8 million	**$4.05 million**	**$0.0065 (0.65 cents)**	**JAPANESE GOVERNMENT IS 1800 TIMES MORE EFFICIENT THAN AUSTRALIAN GOVERNMENT ****

Source: Statistics obtained from; OECD, Australian Bureau of Statistics, CSIRO 2002/03/04 Annual Statements.

Key:

* ETM - Elaborately Transformed Manufactured Goods.
■ 10% allowed for agricultural R&D. Approximation only.
□ % of ETMs requiring on-going R&D. Approximation only.
\+ Japanese Government spends large proportion of its R&D in private sector.
\# Japanese R&D clustered in private sector commercial research centres.
** Japanese Government does not commercialize R&D in Government-run research institutions.
¥ Australia has NO private sector commercial research centres. Refer to "Roach CRC Study 2005".

ANNEXURE (c):


NETWORKING WITH OTHER TECHNOLOGIES IN THE COMMERCIAL R & D CENTRES.
NETWORKING OF ON-SITE BUSINESS MANAGEMENT & TECHNOLOGIES WITHIN R & D CENTRES
PRIVATE SECTOR COMMERCIAL R & D CENTRE WITH 500 R & D PROJECTS
NETWORKING WITH INDUSTRY, THE SERVICE & TERTIARY SECTORS.
OTHERS
ROBOTICS
AGRICULTURE
BIO-CHEMISTRY
MEDICAL
ELECTRONICS
COMPUTER S/WARE & H/WARE
ENGINEERING
TECHNICAL INSTRUMENTS
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Submission for the Export & Infrastructure Inquiry:

ROACH CRC STUDY 2005

Australia – A Need to Improve Commercial Research and Development

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"ROACH CRC STUDY 2005"

1.0 EXECUTIVE SUMMARY

Introduction

Key infrastructure deficiencies and Government policies are responsible for restricting Australia's export performance, and the cause of the massive foreign debt and monthly trade deficits.

Australia's foreign debt reached $422 billion in December 2004, which was 51% of its GDP.

"Foreign debt rose by $1 billion a week throughout last year (2004). Interest costs on the debt reached $5.1 billion in the December quarter.....servicing the debt was 9.3 per cent of Australia's export income – a 19% increase from the previous year.....the (Australian) Treasurer conceded: 'We need to lift exports'...." (p 1, *The Australian*, 2 March 2005.).

For every dollar the Japanese Government spends on R&D, Japan receives $12 in exports of "elaborately transformed manufactured goods" (ETMs). For every dollar the Australian Government spends on R&D, Australia receives $1 in ETM exports (attachment 1).

The Japanese Government is almost 12 times more effective in creating ETM exports than the Australian Government. Using the Japanese model, Australia should, with the Government's current R&D budget, be receiving an extra $60 billion in exports of ETMs; this would create a positive monthly trade surplus and reduce the foreign debt.

Overall Japan is six times more efficient than Australia in developing ETM exports from R&D expenditure (attachment 1).

Japanese business is almost four times as efficient as Australian business in R&D expenditure resulting in the export of ETMs (attachment 1).

The Japanese Government, with its R&D expenditure exclusively in the private sector, is 1800 times more efficient than the Australian Government commercialising R&D in government-run institutions (attachment 1).

Infrastructure

Unlike Japan and Germany, Australia has no private sector commercial research centres (CRCs) (attachment 1) and this is severely restricting the growth of manufacturing and exports.

Japan spends 3% of its GDP on research and development (see table 1) and most of that is in the private sector and clustered in private sector CRCs (attachment 3).

The lack of private sector commercial research centres is the prime infrastructure deficiency impeding Australia's export potential.

Regulations and Policies

1. Australian Governments have never encouraged the development of private sector commercial research centres.

2. Federal Departments of Science and Industry, and State Governments are opposed to the development of private sector CRCs and have directly discouraged and hindered their development. Private sector CRCs are considered competition to the CSIRO, state-run Co-operative Research Centres and universities involved in commercialising R&D.

3. There is collusion between State and Federal bureaucracies to oppose private sector CRCs. The NSW State Government refuses to change the building code or support private sector commercial research centres in any way whatsoever. Local Councils enforce the NSW State Government's building code when attempts are made to develop them.

4. The Australian Government does not provide similar incentives for the development of private sector CRCs as overseas governments, like Germany, Japan and the United States. Japan provides upfront grants and the United States provides deferred low interest loans.

5. Current Federal Government commercial research policies, especially in the allocation of funding to government-run institutions to commercialise R&D, and R&D funding to private firms scattered throughout industry, are the main reasons for inefficient commercialisation of innovation and the failure to attract additional private sector funding. Research has identified that governments should not try and commercialise R&D, and that commercialising R&D should be completed in the private sector, especially in private sector CRCs, to allow clustering of research projects.

6. Small to medium size enterprises (SME) do not have the financial capacity to compete with overseas private sector CRCs and require the environment of a private sector CRC for venture capital and efficiencies when research projects are clustered. The current scattered structure and resulting poor performance of the SME section of the commercial R&D industry is the prime reason for the lack of private sector funding in this area compared to other OECD countries.

7. The Australian Government does not monitor their current R&D budget of $5.9 billion to identify exports achieved from the various allocations of that budget.

8. "Research funding" and "commercial research funding" need to be clearly defined and separated into different government ministries. Universities and government-run institutions should be funded through the Department of Science in a "research" budget for "pure and basic research", and "research for the public good".

9. Government funding for "Commercial Research" should be allocated through the Department of Industry and this funding should specifically focus on exports and import replacement and encouraging the private sector to invest in the R&D industry.

10. By targeting Government funding for commercial R&D at the private sector and encouraging the appropriate infrastructure, Australia can reach an expenditure of 3% of GDP, at the top of the OECD countries, without any further budget outlays. In Japan only 18% of R&D funding is by Government (Attached 3), and 74.4% is by business enterprises. In Australia the Government and business provide 50% each.

11. No commercialisation of research should be attempted by government-run research institutions and universities. However they should be closely associated with private sector CRCs in order that industry and exports, (and the government-run institutions and universities through shares and IP royalties), can benefit financially from pure and basic research outcomes.

2.0 INTRODUCTION

A lack of suitable infrastructure for small to medium size enterprises (SME) to develop commercial R&D, and Government policy in this area, are the prime causes preventing Australia from achieving optimum export potential.

Exports are critical to resolving Australia's foreign debt which reached $422 billion in December 2004. This was 51% of GDP. Interest costs on the foreign debt reached $5.1 billion In the December 2004 quarter or around $20 billion p.a. Servicing the debt was 9.3% of Australia's export income – a 19% increase on the previous year.

The Treasurer stated in The Australian newspaper 2 March 2005 "We (Australia) have to lift exports '.

Elaborately Transformed Manufactures Goods (ETM)

To understand how to lift exports, it is important to compare Australia's performance in exporting manufactured goods, and in particular elaborately transformed manufactured goods (ETM) which require "on-going commercialisation of Research and Development", to that of other countries with similar living standards.

Japan is an appropriate country to compare Australia's performance in exporting ETMs derived from "on-going R&D" because this is the basis of their entire economy. Japan also has a similar living standard and wage cost structure to Australia, than say China and parts of S.E. Asia. It is important to note that China and S.E. Asia are adopting hybrids of the Japanese R&D model in developing their own economies.

Australia

Australian exports are broken up into three main categories "Primary Products", "Simply Transformed Manufactures (STM)" and "Elaborately Transformed Manufactures (ETM)".

Australia's principal exports in 2003 in order of value were coal, gold, iron ore, crude petroleum, meat, aluminium, aluminium ores, wheat, passenger vehicles, alcoholic beverages and others (ABS figures). With the exception of beverages (wine, beer etc) and cars (resulting from government incentives), Australian exports are mainly primary products. We have a third world economy based on the export of primary products and debt. It is unsustainable in the short to medium term (ABS data on the DFAT STARS Database).

In 2003, 7 out of the top 10 imports into Australia were ETMs, the three exceptions being crude petroleum, gold, and refined petroleum. (ABS figures). Australia is principally an exporter of primary products and an importer of ETMs.

ETMs have several categories. Australia cannot compete with ETM exports because of our high wage structure. These are imported from China and S.E. Asia. The ETM market Australia can compete in is where "on-going R&D" is required in the manufacturing sector, for example technical instruments, medical and mining equipment etc. Another market where Australia has an advantage, is the "on-going downstream R&D" of the processing of our natural resources, such as woodchips into chipboard, furniture and other commercial products.

According to the Australian Bureau of Statistics (ABS), in 2003 Australia exported $18.16 billion in ETMs. To identify goods requiring on-going R&D, care has to be taken when comparing Australian ETMs with those of Japan. Many items classified as ETMs and exported from Australia, such as ingots of aluminium, nickel and zinc are primary products, and many of the others, such as nails, wire, glass, soap and leather for footwear are in reality STMs.

Items that Australia classifies as ETMs include nails, screws and nuts of iron, steel and copper; wire; bars and rods of iron and steel; steel and iron angles; sheet piling of iron and steel; plates and sheets of iron and steel; iron and steel wire; copper bars and rods; aluminium ingots (because they are buffed) and aluminium alloys; tin and tin alloys worked; nickel and nickel alloys; soap; leather for footwear; glass and glassware; travel goods; gold (non monetary); and gold coins that are legal tender. These products hardly need on-going R&D, although they are classified ETMs.

Furthermore, many ETM exports by Australian industry, such as motor vehicles, are manufactured by subsidiaries of overseas companies from Japan and the United States. The Australian Government has given substantial incentives to attract and hold these firms, but the bulk of the commercial R&D used in their assembly, like that for robots in the case of Mitsubishi, has been undertaken elsewhere. It is the incentives from the Australian Government, including R&D grants, that attracts these firms, not Australia's ability to commercialise R&D.

If we wish to compare apples with apples, the value of Australian exports of ETMs requiring on-going commercial R&D is between 10% and 20% of ETM exports. The figure used in *table1* is 30%.

Tracking R&D expenditure by Government and industry, and identifying the exports that are derived is critical in the development of a commercial research policy. The Australian Government does not identify R&D allocations and the resultant exports.

Japan

In 2003 exports from Japan included transport equipment 24.5%, electrical machinery 23.6%, non-electrical machinery 20.2%, chemicals 8.3%, metal manufacturers 6.2%, precision instruments 3.9%, others 13.5% (ABS figures). It would appear that around 95% of Japan's merchandised exports are at the highly developed end of the ETM category and require on-going R&D.

Efficiency in commercialising R&D is the key to Japan's strong export growth because it relies on importing raw materials and exporting products developed from commercial R&D.

In *table 1* it has been assumed that 90% of Japanese exports require on-going commercial research and development.

Australia

In 2002-03 Australian expenditure on R&D was $12.25 billion; Business $5.979 billion and the Australian Governments $5.912 billion (ABS figures). N.B This does not include pure research expenditure.

Comparisons with other OECD Countries

Table 1: Expenditure on R&D as a percentage of GDP, OECD countries 2000-2001 (ABS Figures)

Country	*Business (%)*	*Government (%)*	*Higher Education (%)*	*Total*
Australia	0.72	0.35	0.41	1.53
Germany	1.75	0.34	0.40	2.49

Note the following:

1. High ratio of Australian Government expenditure to business expenditure.
2. Business expenditure in Japan is 3 times that in Australia.
3. Business expenditure in Sweden is 4 times that in Australia.
4. R&D in higher education 0.81% in Sweden, and industry 2.84% of GDP.

The key to developing a strong economy and being able to spend more R&D in higher education and government research institutions is to encourage increased

expenditure in the private sector by having it structured correctly and making it efficient so that others will invest.

Comparison of R&D to Exports in ETMs in Japan and Australia (see attached 1)

For every dollar the Japanese Government spends commercialising research, Japan receives $12.08 in exports of manufactured ETMs. Japan, with no natural resources, has a massive trade surplus. (Attached 1)

Note the lack of investment in Australian commercial research by individuals and business. When these figures are analysed this lack of investment is in small to medium sized enterprises (SMEs).

Australians do not invest in R&D by SMEs at the same level of GDP as Japan and Europe because;

a. It is too difficult to be efficiently running a business and doing commercial R&D;
b. SMEs do not have sufficient capital, and find the current venture capital market is structured not to protect their interest;
c. Those firms which have tried commercialising R&D find they often lose their innovation to the corporate financiers;
d. Corporate financiers raise the capital, take large fees, then the ventures are left to flounder without any backup. This causes the ventures to fall over, and investors are therefore reluctant to reinvest in future commercial R&D. The only party making money are the venture capitalists with their management fees.

The Australian Government spends $5.915 billion annually on research and development (attached 1) and this would result if it was the Japanese model, with $64.26 billion (5.32 times 12.08) in ETM exports derived from commercial R&D, but the actual figure is $5.45 billion. The Japanese model of developing commercial R&D in private sector CRCs would give Australia an increase of almost $60 billion annually in foreign trade, a figure that would turn our foreign deficit into a surplus without affecting the Government's budget.

No government statistics are taken on the value of actual manufactured exports resulting from Federal and State Governments' expenditure on commercial R&D.

The fault for this on-going disaster in Australia's trade deficit is entirely due to poor policies by successive Federal and State Governments over the past 50 years.

RESEARCH, RESEARCH & DEVELOPMENT, COMMERCIAL R&D

Australian politicians and policy makers have assumed that "pure research", "research & development (R&D)", and "commercial research & development (CR&D) are similar and that those involved in universities and government-run institutions are the most capable and efficient to "commercialise research & development" because they are involved in "pure research" and "R&D". Even the OECD lumps R&D and CR&D together. There is an assumption that those involved in research are the appropriate people for the commercialisation of R&D. This assumption is invalid and commercially disastrous.

There is a difference between "research", R&D and "commercial R&D" and this has been overlooked in the development of policy.

a. Pure Research

Some people are suitable to carry out "pure research" and writing scientific papers. Einstein was one of these people. They are highly important in our society and they should be properly funded to carry out their work. The Australian Government currently funds "pure research" as a separate area of science to R&D.

This submission is not intended to change Australia's "research" policy.

b. Research & Development

People good at research may not be good at "R&D". It takes another type of person to develop research. Academics performing R&D should not be forced to obtain a commercial outcome. R&D is more fundamental research and curiosity driven. It often follows from pure research, and is not often commenced as a commercial activity. It is also broader than commercial activities and involves many other areas of research, especially those involving the "public good". It is vital that it is independent and well funded.

Australians are highly regarded overseas for their abilities in pure research and R&D, and the papers they publish.

However R&D is not the same as commercial R&D. Commercial returns may not be seen for generations with R&D. Even if the research has commercial outcomes, to try and force academics to commercialise their R&D is doomed to failure.

If Australia does develop a strong commercial research area it will allow more funding for pure research and community interest research in universities and government-run research institutions, as in Germany, Sweden and Japan.

There is considerable opposition by scientists in Government research institutions and universities in Australia when they are required to have commercial outcomes. This is very understandable because most are interested in pure research, research for the public good, and writing research papers. This requires a completely different set of skills to commercialising research.

If the work of academics does have a potential commercial outcome, it should be moved forward in the chain from pure research to R&D, then to those involved in the commercialisation of research. Sometimes the scientists and engineers move along the chain, often they receive a royalty, and allow others the tedious task of commercialising the research.

3.0 COMMERCIALISING R&D

The reality is that commercialising research is a tough and confronting industry. It covers a broader area than obtaining R&D from universities and other institutions. It has to be able to compete in a world market. It involves hard commercial decisions on a minute by minute basis. It is not for the uncommercial or academic character. It is based on outcomes, not the number of "research" papers published. Commercialising research is not the same as "research" or R&D, it has to come from a variety of areas. It may require re-engineering technology from overseas to provide existing firms with more advanced prototypes, or it may be an innovation developed by an unqualified inventor, or an idea from a marketing person, or a more efficient processing method. To have it dominated by Government science bureaucrats with pure research backgrounds is not sound economics. Most are not interested in the area.

Commercialising research needs to be in the private sector and clustered because of the large number of learning curves and the complexity of the industry. Clustering of innovation has the highest success rate, because it allows both networking and the development of the experts in the various areas required to compete in the world market place. It provides expertise in patent protection, venture capital, marketing and so on for even the smallest company, inventor or person with a commercial idea. It also allows networking between industries and within technologies. Note in attachment 2 how various industries can network with each other to achieve an optimum commercial outcome. The medical equipment manufacturer can network with computer software consultants, who can then network elsewhere in industry to obtain an appropriate solution. The mining industry may need to network with the technical instrument makers, and

they with electronics and computer hardware specialists. The networking takes place both within the CRC and out in industry.

Private sector commercial research centres specialise in developing this networking and extend the networking throughout the economy (see attached diagram) allowing large, medium and small companies the best expertise.

4.0 OVERSEAS MODELS

4.1 Japanese Model (MITI)

In the 1950's, Japan had cheap labour relative to the United States, Australia and Europe. Japanese industry initially copied overseas innovation, and at the same time developed private sector commercial research centres CRCs, to develop the next version of the innovation. China is following the Japanese model and Australia needs to be mindful of this fact.

The Japanese Government in the 1960's, started losing wage cost advantage. They appreciated that "research" and "commercialising research" were two completely different disciplines requiring separate approaches to get the best outcomes. They separated the two, one Ministry handled research funding to universities and government-run research organisations and the other, the Ministry for International Trade & Industry (MITI), was given the specific responsibility for exports.

MITI immediately provided funding in the form of direct grants for the development of private sector commercial research centres. The role of the CRC's is to identify and develop potential innovation for Japan's manufacturers to export. Even their trade offices overseas provided Japanese CRC's with potential products.

Unlike Australia which developed a government-run research organisation to help industry, the Japanese Government fully supported private sector CRC's. MITI has been highly successful. It gave grants for the construction of CRC's because it immediately needed manufacturing to drive the economy through exports and to prevent a massive foreign debt. It needed the infrastructure of CRC's to be on-going because they were vital to their economy. It supported them at every level of Government.

Private sector CRC's in Germany and Japan are like hospitals in the health industry and schools in the education system, they are considered the life blood to maintaining a manufacturing sector and strong exports.

MITI allowed their CRC's the flexibility to spend Government grants to develop early start-up commercial research and to re-engineer overseas technologies, provided outcomes were achieved in exports. It also encouraged banks and super funds to invest in both new centres and venture capital companies comprising the innovation and successful start-ups.

The Japanese Government provided tax incentives and used its trade offices overseas to help firms identify potential products. The centres found innovation and identified commercial opportunities from all over the world. They developed commercial prototypes such as video recorders, microchips, IBM compatible computers, microwaves, solar cells and robots that were then manufactured by fledging companies like Sanyo, Toshiba and Mitsubishi.

For example, over the last few decades Australia has had to sell 3 tonnes of coal to import 1 Nintendo game from Japan. Today their CRCs are developing leading technologies such as plasma TVs and nanotechnologies that will continue to push our foreign debt towards a trillion dollars.

Other areas of innovation include processing Australian raw materials. For example, Japanese research centres developed methods to process Australian iron ore using Australian liquefied gas, obtained from Western Australian ports a few hundred kilometres apart. The iron ore is used to make specialised thin sheet metal for the car industry (a technology that was developed in their CRC's). It is then shipped all over the world, including back to Australia.

Even our largest company BHP did not have the structure to compete with the Japanese and German CRCs and tended to stay in resources.

The Japanese have around 300 private sector CRCs. The skilled engineers and staff in their commercial research centres are experts at re-engineering overseas technology in a matter of weeks, as they did with IBM compatible computers and plasma televisions, as well as overcoming the thousands of learning curves like patent protection, marketing and venture capital that cause small firms to fail. Their role is to assist the small Japanese companies to remain at the leading edge of manufacturing.

The CRC's are not run by bureaucrats who have spent their lives in government–run research organisations, or appointed because of the number of research papers published in journals. They have highly motivated, commercially oriented engineers, scientists and technical staff who understand the needs of industry.

There is a little caution required with the Japanese model. MITI became too dominant in the direction of innovation R&D spending. The Government should be there to encourage investment by the private sector, not to control it, by ensuring that the commercial R&D sector has the appropriate infrastructure and efficiency.

4.2 German Model

Both Germany and Japan spend 3% of their GDP on R&D, most of which is to commercialise research in the private sector. Public sector spending is restricted to "research" areas, such as pure research at universities and public interest research carried out by government-run research institutions.

Besides adopting a similar approach to Japan in identifying fledging technologies overseas, re-engineering them in their private sector CRCs, and then becoming world leaders, the Germans are also experts at developing new methods to process raw materials, especially from Australia. For example they have in the past bought Australian tungsten (scheelite) at 80% purity, processed it to 99.9% purity and sold it back to Australia and overseas steel makers with a 1000 times mark up of the ore price. The same approach has occurred with black peat used in the mushroom industry. The Germans and Dutch imported raw black peat; they then identified uses in their CRCs and then exported processed black peat to Australia at $200 per cubic metre for use in the mushroom industry at a total value of $90 million per annum. Australia has its own black peat deposits but no commercial research centres to identify the potential markets. The same occurs with kelp washed up on beaches on King Island. The dried kelp is sent to Germany and processed into coagulants and other chemicals and sold world wide. The overseas processing of Australian raw materials is repeated in numerous countries and Australia therefore accumulates a foreign debt of billions.

5.0 TECHNOLOGY STRATEGY

There has been ample evidence and studies for Australian Governments to know how to develop technology based manufacturing. Unfortunately R&D expenditure has developed a life of its own into a $12 billion club made up of bureaucrats and some sections of industry, with poor outcomes in terms of manufacturing or exports (attachment 1).

Note the following statements in a 1986 study funded by the Federal Government called the:

"Advanced Technology Development Strategy for Western Sydney" by Cameron McNamara and Dr Ed Blakely.

> (NB: Dr Blakely has recently been appointed Dean and Professor of Urban, Regional Planning and Policy at the School of Architecture at Sydney University. He is from the United States and was Professor of Economic

Development at the University of California, Berkeley. He is a world expert on developing innovation and advising governments on commercialising innovation.)

(Copies of this study can be obtained from:
Western Sydney Regional Organisation of Councils. Blacktown. NSW)

Extracts from the study include:

P22.

"4.5 Government Support

The primary role of government in promoting advanced technology development should be supportive - not directive (Miller and Cote, 1985). Experience overseas has shown that direct government involvement results, at best, in mediocrity and, more commonly, in a disappointing performance. Unfortunately, there is a tendency for government to dictate the path of research, rather than to let market forces determine the field which research and advanced technology development should take.
Government has a very important role in supporting the research stage of the development process through direct funding of applied and generic research...."

"...Government institutes are notoriously poor at marketing their own developments..."
"....Government support is also required for private research and development..."

P23. cont
"It is essential that total political support at all levels of government be given to help encourage advanced technology development...."

P24 cont

"A major mistake that many governments and municipal authorities make in trying to promote advanced technology development is to attract a branch of an overseas subsidiary of a major company to their area. Experience has shown that the spin-offs from these subsidiary or branch companies are small (Miller and Cote, 1985) "

P25.

"Developers
Developers can play a major role in initiating advanced technology development. They can provide suitable enterprise facilities, encourage agglomeration and bring together participants in the process of technology development."

There are numerous studies that identify that innovation needs to be clustered, and that networking is also critical. Private sector commercial research centres have been proven to provide the right infrastructure for the optimum commercial outcome. Australia has no private sector CRCs and has chosen a different model.

6.0 AUSTRALIAN MODEL

The Australian Model is structured to be highly inefficient. The model has been developed to entrench the government-run research institutions and prevent the development of any competition to their dominance.

The two directions in the Australian model are; public sector research institutions, including hybrid Co-operative Research Centres run by the government, and private sector firms completing their commercial research in isolation.

There are no private sector CRCs in Australia.

The R&D administration is entirely run by government bureaucrats with a prime focus on maintaining their control. It is highly inefficient and not accountable. The main Government-run institution, the CSIRO, is highly inefficient compared to the Japanese model in terms of commercial R&D outcomes.

Australian business is poorly served by the Government. The Government has allowed the bureaucrats to stop the private sector developing CRCs. The sector is also unorganised in terms of R&D associations, and most of the research is carried out by firms in isolation. There is a very high failure rate, especially amongst small firms and individuals when developing R&D. R&D is often packaged and sold overseas, especially by Government institutions.

6.1 Private Sector

The private sector receives only a small portion of the commercial research budget and this is carefully focused not to allow private sector players to grow into anything that may compete with the government-run research institutions.

It is well documented that small to medium size firms need to be clustered in private sector commercial research centres to have any opportunity to develop. Federal and State policies have ensured there are no private sector CRC's (see attached letter 4 March 2005 from the Deputy Premier of NSW and Minister for State Development. Dr Refshauge).

Contrary to all expert advice and common sense, funding to the private sector is generally scattered, thus ensuring maximum failure rates.

Australian small to medium enterprises involved in manufacturing are left to flounder without the infrastructure of private sector commercial research centres to provide them with support.

The few start-ups that develop innovation in isolation through the maze of obstacles, and end up with a viable commercial product are likely to be quickly left behind and go bankrupt as the overseas private sector CRC's buy the first models and deprive the little inventor or firm of profit with a more commercial product.

Firms involved in commercial research need clustering and continuous development of product innovation to stay in front of the overseas competition.

In Europe, United States and Japan there are larger manufacturing firms such as Boeing, Microsoft, Siemens, Krupp, Sanyo, Toshiba etc which have their own CRC's and which take innovation and ideas from the community. Australia does not have equivalent firms and it is therefore even more important to develop private sector CRC's to prevent losing our innovation to overseas interests.

6.2 Public Sector

Australia spends $12.25billion annually trying to commercialise research. A large proportion is spent in the CSIRO and the 64 Co-operative Research Centres. They are managed by government trained science officials. Managers of these centres are often appointed according to the number of research papers published. These centres are not monitored for export outcomes.

Surely commercial research by definition needs to be commercial and produce a commercial outcome. The way to measure that outcome is to identify the value of manufactured goods that are exported as a result of governments' funding.

The Chairman of the Federal Government's Australian Manufacturing Council advised me in 1991 that the Federal bureaucracy was totally opposed to private sector commercial research centres, such as the Sydney Business & Technology Centre, because they are seen as competition to the CSIRO.

State Development in NSW is opposed to private sector CRCs. Attached is the Minister's letter and the email from the Western Sydney Office of the Economic Development Board. Meetings with Federal and State bureaucrats have reinforced their objection to private sector CRCs.

Since 1990, and contrary to all studies, various Federal Governments have developed the 64 Co-operative Research Centres. These are run by the CSIRO and universities. Industry's only incentive has been the tax breaks offered. There is no accountability in terms of export driven outcomes.

The Federal Government has provided private sector firms with grants to develop commercial research in a scattergun approach, a recipe for disaster repeatedly highlighted in research. Commercial research needs to be clustered. However failure by these firms leads to the public sector Co-operative Research Centres demands for funds to be more successful.

The Government also has a token incubator program. The incubators are little more than shop fronts packaging innovation and selling it to overseas CRC's. There is minimal down streaming of the innovation to develop manufacturing and exports.

Lecturer in Economics and a Research Associate at Trinity College Dublin, Dr. Constantin Gurdgiev, in an article in the Irish Times 28 August 2004, titled "More Government Money for Science is a Wrong Way to Knowledge" states:

"....- public financing for R&D is largely a waste of taxpayers' money. A recent OECD report on sources of economic growth finds no evidence to support the assertion that publicly financed research is productive in any way. More than that, the report states that public R&D spending 'crowds out resources that could be alternatively used by the private sector.' ....."

" the EU-wide effectiveness of public expenditure on R&D in the private sector falls below 2%, or 2¢ per €1 spent....."

"Compared to our successful competitors, Ireland has a high expenditure per government-employed researcher, low expenditure for the private sector researchers and a similar level of expenditure for those in higher education. As a result we have relatively low productivity in the R&D sector....."

"At €1.1 billion per annum, the cost of government involvement in R&D funding to the Irish taxpayer may be relatively trivial, but the potential damage to our society from the continued adherence to the idea of state-sponsored science is not. Government spending on these activities crowds out private investment, centralises research and reduces the competitive nature of scientific discovery to a cartel-like setting of plans, programmes and directives. It also creates a deception of activity, erecting real barriers to R&D entrepreneurship outside the policy agenda."

This sums up the Australian model.

7.0 AUSTRALIA - A COMMERCIAL RESEARCH FARCE

In 1991 I chaired a meeting of Japanese Government officials from MITI (Ministry of International Trade & Industry) who were bewildered and amused at the Australian Government's approach to commercialising research. This MITI economic committee came to Australia specifically to look at private sector commercial research centres. They refused to see government-run research centres and made this known to both the Federal and State organisations. Their reason when pressed was that such centres are inefficient. The Federal and State Governments directed MITI to the Sydney Business & Technology Centre (SBTC), then Australia's first attempt to develop a private sector CRC. Attached is their magazine STANCE (see attachment 3). Please note the presence of Laurie Carmichael, then Chairman of the Federal Government's Manufacturing Council of Australia in the photo. Federal and State Ministers and bureaucrats were invited but declined to attend. Over a 20 year period no invitation to visit the centre has been accepted by any Federal or State minister.

N.B the Japanese wrote up the list of handicaps placed in front of Australia's first and only private sector commercial research centre.

Laurie Carmichael expressed disgust at Australia's approach to developing industry. On his return to Canberra he phoned and advised me that the Federal bureaucracy was totally opposed to private sector commercial research centres because they were competition to the CSIRO.

64 Co-operative Research Centres have subsequently been built, all run by the CSIRO and government universities. Do economic advisors really think commercial research evolves from government controlled institutions?

The Japanese rightly thought our approach was farcical.

8.0 STOPPING THE BRAIN DRAIN

The world is borderless for developing innovation as well for those that work in the field of commercialising research. Highly qualified engineers and scientists who are successful at commercialising research, and those with commercial products, have no interest in their innovations developed in government-run research institutions; they gravitate to overseas private sector CRCs.

Australians are renowned for innovation, but very poor at commercialising research. At present a large proportion of our innovation is packaged in Australia and sent to USA and German CRCs (see attached 4). There is a high failure rate

by those who try to develop innovation in Australia. The Japanese have been re-engineering Australian innovation for decades.

Developing a strong commercial research base will keep innovation in Australia and attract young people to do science and engineering at universities, as is the case of Germany and Japan.

9.0 POLITICIANS/POLICY MAKERS SHOULD VISIT GERMAN CRC'S

A comprehensive analysis of German or Japanese CRC's should be undertaken by Australian politicians and policy makers. In 1991 Senator Chris Schacht, the then Minister for Science, visited a German commercial research centre. He was quickly lobbied out of office by the science bureaucracy after advocating private sector CRCs. There was no understanding then, and it still exists today, that these CRCs are the engine room to developing manufacturing and exports.

There are no excuses for Australia's foreign debt and poor export performance, except poor policies by Governments and nepotism in the Federal and State bureaucracies.

10.0 RECENT EXAMPLES OF NEPOTISM IN GOVERNMENT

The private sector is completely blocked from providing private sector CRC's. See the following letters attached;

1. Email I recently sent to the manager of the Economic Development Board for Western Sydney in State Development. Note their unfortunate response sent by mistake. The "ministerial" highlights the bureaucratic "no go" policy on private sector CRCs (attached 5).

2. Letter dated 4 March 2005 from Dr Refshauge, Deputy Premier of NSW (attached 6).

I have a large number of letters from both Federal and State governments, over the past 20 years. Dr Refshauge's letter is the most recent example.

11.0 FUDGING MANUFACTURED EXPORTS FIGURES

The level of manufactured exports in Australia has been statistically fudged by including processed raw materials. Items such as wool, ingots of aluminium, woodchips and seafood are now included as manufactured exports, and the list is extensive. It has been gradually increased over the years to give the impression that manufacturing in Australia has been remaining steady or had a slight increase. This has hidden the real failure of Government policy by lumping agricultural exports with ETMs and calling them "Manufactured Exports". Even ETMs are dominated by agricultural and mining products. The true decline of technology based manufactured exports would need further examination within the ETM's category.

12.0 OBSTACLES RESULTING FROM GOVERNMENT REGULATIONS

Unlike the United States, Japanese, German and other European Governments, every obstacle is placed in the way of the private sector developing CRCs.

When the Sydney Business & Technology Centre as Australia's first commercial research centre was developed, there were many government policy obstacles, including:

1. The NSW Government refused to change the building code so that more than one research project could be located in the same factory. Auburn Council insisted that we needed State Government approval. The State Government refused to change the code or give us an exemption. It was a bureaucratic nightmare. The building code is still unchanged.

2. NSW State Development refused to support the SBTC. Even today the NSW Deputy Premier and Minister for State Development has no intention of meeting with us to change this position on CRCs, or to even remove government red tape. Attached is a letter dated 5 March 2005 (attached 6).

3. "Ministerials" were and are used to prevent meetings with Ministers and other branches of Government such as 'Economic Development Boards'. See attached email (attached 5).

4. Not one Federal or State Minister visited our 53 factory, $26 million centre over a 20 year period.

5. The Chairman of the Australian Manufacturing Council, after a visit to the SBTC, advised us that Federal senior bureaucrats were totally opposed to the private sector being involved in commercial research centres because private sector CRCs were considered competition to the CSIRO. The Government went on to fund 64 Co-operative Research Centres.

6. The SBTC applied to become a Co-operative Research Centre, but the application was refused on the grounds we were not directly affiliated with a university or the CSIRO.

6. Firms in the SBTC were advised that they would not receive any government grants whilst they remained in the centre, and to my knowledge never did.

13.0 MANUFACTURING SECTOR DECLINE

The total manufacturing sector in Australia has declined from 29% of GDP in 1960 to 10.4% of GDP in 2004, with the 10.4% overstated, if processed raw materials and natural resources are excluded from manufacturing (ABS figures).

14.0 CONCLUSION

The reasons for Australia's failure to realise its export potential are directly the result of Federal Government policies, and the lack of them, in the development of infrastructure for commercial research. Australia urgently needs private sector commercial research centres and policies to encourage innovation.

Policies to monitor manufactured exports from the expenditure of commercial research funding are also required.

It is a waste of time trying to develop commercial R&D and then manufacture in Australia under the current Federal Government policies. It is critical the Government makes urgent and harsh decisions, as the longer this is left the greater the economic crisis.

I am available and willing to discuss the history of the Sydney Business & Technology Centre and the opposition this centre had from the Federal and State bureaucracies.

I appreciate there are a number of areas of Government policy affecting exports, however Australia is a clever, innovative country and we are capable of competing in technology and manufactured exports with the best in world. All we need is the same level playing field.

The Australian Government has to make a tough decision. If it wants exports, then it has to provide the correct infrastructure. Exports of raw materials are not going to solve Australia's foreign debt problem or its trade imbalance.

We have to become a smart and innovative country and develop a manufacturing base that is world competitive. That requires following those successful overseas models and developing private sector commercial research centres.

15.0 ANNEXURE

1. Comparisons of R&D Expenditure to Exports in ETMs. Japan & Australia
2. Developing Commercial Research
3. **"STANCE":** Japanese Industrial Exchange Group visit to SBTC
4. Light Globe ad. 15/10/94
5. Email 18 Feb 2005. State Development. Simon Hemli
6. Dr Andrew Refshauge. NSW Deputy Premier. Letter dated 4 March 2005

ANNEXURE 1:

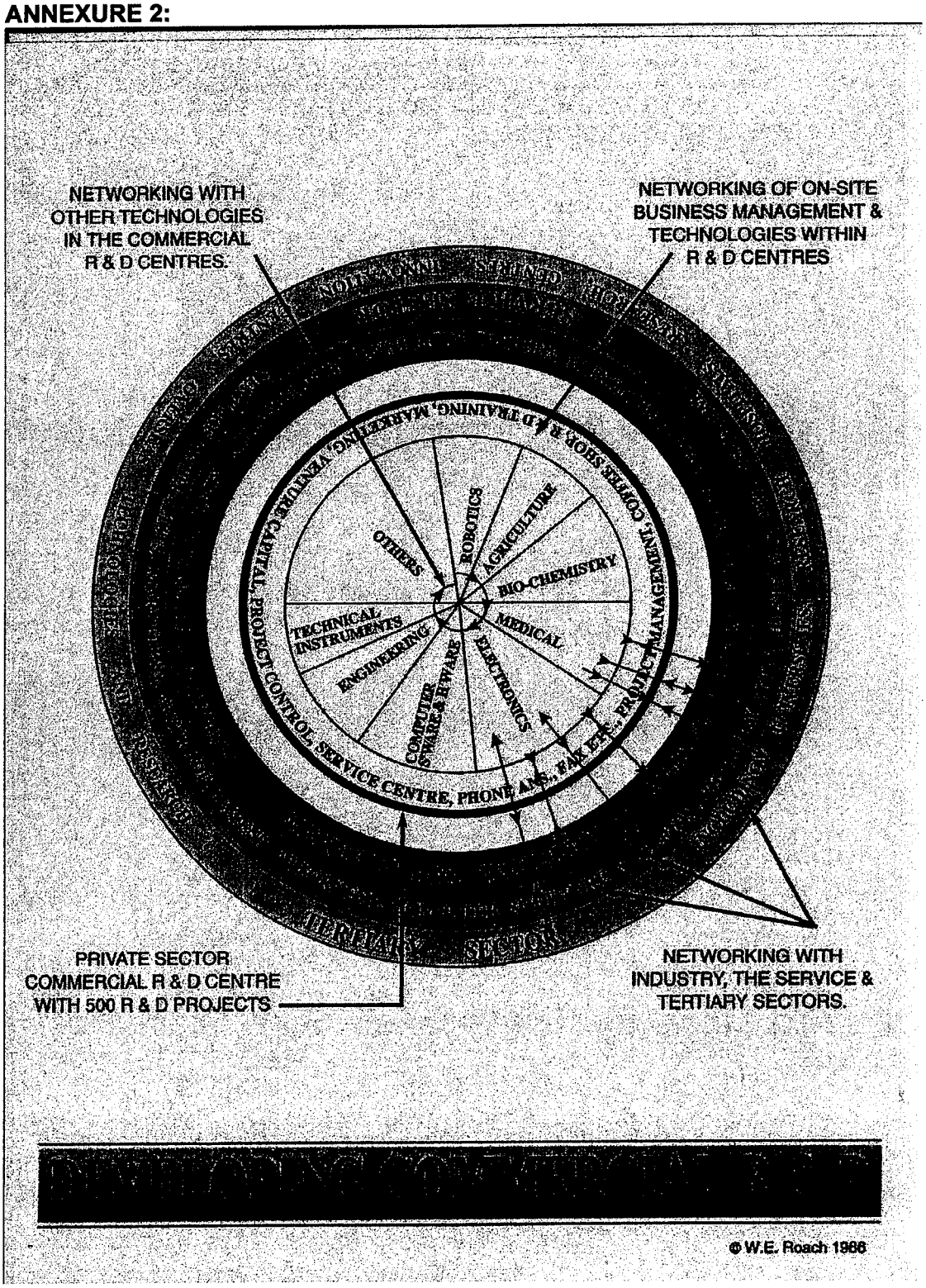
COMPARISON OF R&D EXPENDITURE TO EXPORTS IN ETM'S REQUIRING ON-GOING R&D IN JAPAN & AUSTRALIA

	EXPENDITURE ON R&D (Billions A$)	EXPORTS OF ETMs* (Billions A$)	EXPORTS OF ETMs / $ EXPENDITURE ON R&D	EFFICIENCY OF R&D RESULTING IN EXPORTS
				2.92 / 0.49 = 5.96
AUSTRALIA	11.03 (90% of 12.25) ■	5.45 (30% of 18.164) □	$0.49	JAPAN IS 6 TIMES MORE EFFICIENT THAN AUSTRALIA+#¥
				12.08 / 1.02 = 11.84
AUSTRALIAN GOVERNMENT	5.32 (90% of 5.915) ■	5.45 □	$1.02	JAPANESE GOVERNMENT IS 12 TIMES MORE EFFICIENT THAN AUSTRALIAN GOVERNMENT + # ¥
				4.12 / 1.01 = 4.07
AUSTRALIAN BUSINESS	5.38 (90% of 5.979) ■	5.45 □	$1.01	JAPANESE BUSINESS IS FOUR TIMES MORE EFFICIENT THAN AUSTRALIAN BUSINESS # ¥
CSIRO: 2002, 2003, 2004	R&D appropriation. Mean for 2002, 2003, 2004	Sale of IP & Shares. Mean for 2002, 2003, 2004.	Income return per $ of R&D appropriation by Australian Government.	12.08 / .0065 = 1816
	$606.8 million	$4.05 million	$0.0065 (0.65 cents)	JAPANESE GOVERNMENT IS 1800 TIMES MORE EFFICIENT THAN AUSTRALIAN GOVERNMENT **

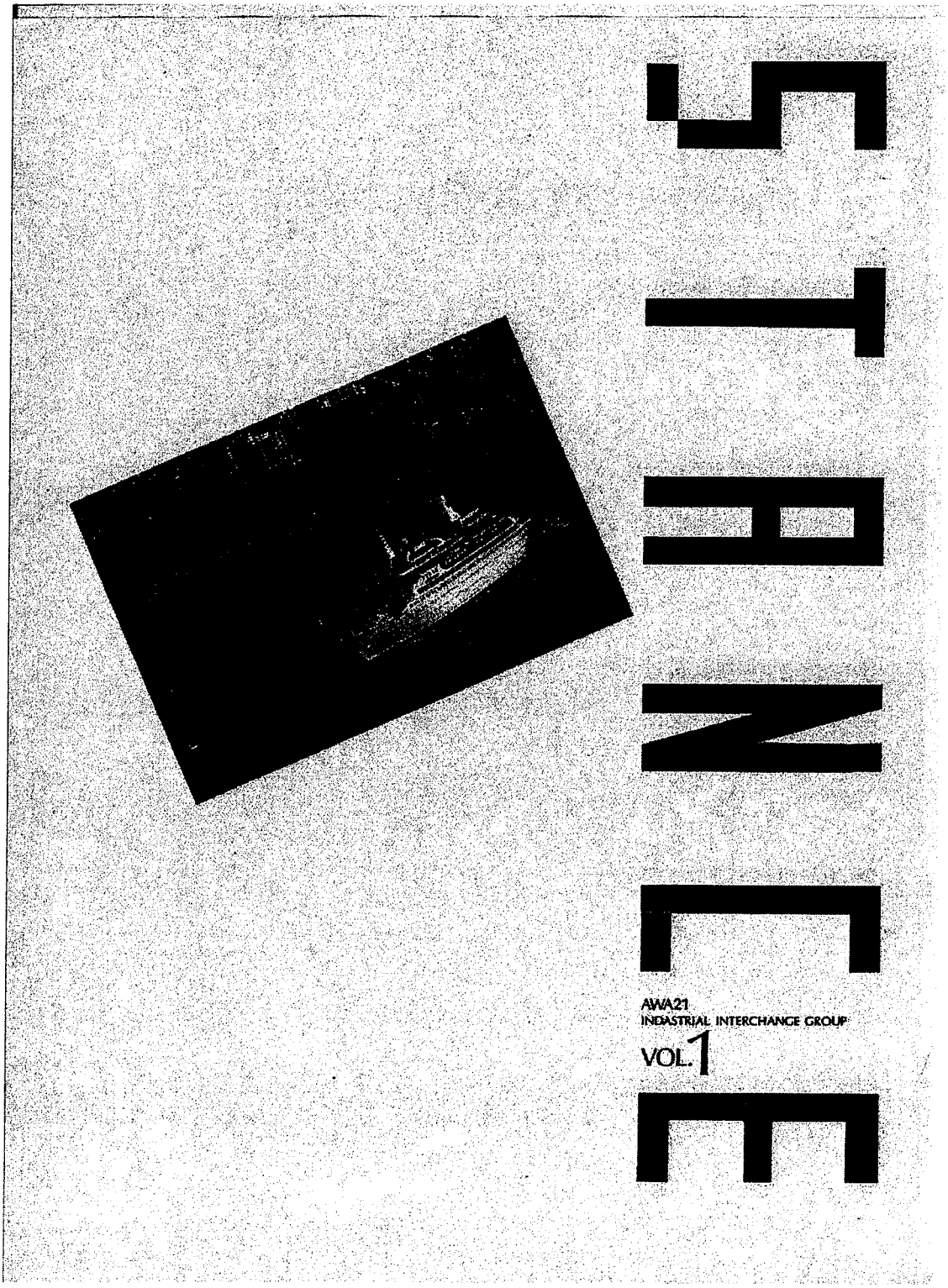
Key: * ETM - Elaborately Transformed Manufactured Goods.
■ 10% allowed for agricultural R&D. Approximation only.
□ % of ETMs requiring on-going R&D. Approximation only.
+ Japanese Government spends large proportion of its R&D in private sector.
# Japanese R&D clustered in private sector commercial research centres.
** Japanese Government does not commercialize R&D in Government-run research institutions.
¥ Australia has NO private sector commercial research centres. Refer to "Roach CRC Study 2005".

Source: Statistics obtained from; OECD, Australian Bureau of Statistics, CSIRO 2002/3/4 Annual Statements.

ANNEXURE 2:


NETWORKING WITH OTHER TECHNOLOGIES IN THE COMMERCIAL R & D CENTRES.
NETWORKING OF ON-SITE BUSINESS MANAGEMENT & TECHNOLOGIES WITHIN R & D CENTRES
ROBOTICS
AGRICULTURE
BIO-CHEMISTRY
MEDICAL
ELECTRONICS
COMPUTER SOFTWARE & HARDWARE
ENGINEERING
TECHNICAL INSTRUMENTS
OTHERS
PRIVATE SECTOR COMMERCIAL R & D CENTRE WITH 500 R & D PROJECTS
NETWORKING WITH INDUSTRY, THE SERVICE & TERTIARY SECTORS.
© W.E. Roach 1986

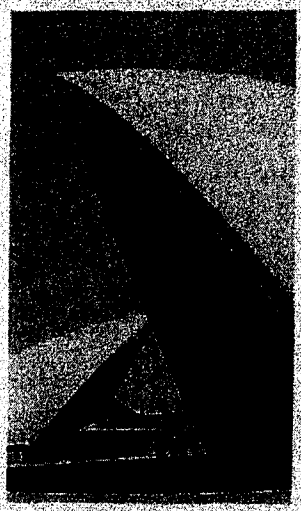
ANNEXURE 3:



2

ごあいさつ

会長　佐竹 好幸



"AWA 21" "共に考え共に行動し、21世紀に向けて研鑽ろう!" 12名が勉強会をはじめて4年経過した節目の時に、全員が海外研修を行い、又小さいながらも国際交流も行えたことは非常に嬉しい限りであります。一人の欠席者もなく、全員が参加し、又全員が元気で過ごせたことは喜びと共に、大きな意義があると信じています。

個々の企業は、それぞれの責任で守り発展させて行かなければならない。今回11日間、海外で視察を共にし、勉強し遊んで又学んできたことが、必ずこれからの個々の企業の経営に何等かの刺激を与えずにはおかないであろうと思います。

これを機会に、お互いに更なる研鑽を重ね、会員企業のますますの発展を祈念する次第であります。

尚今回の研修旅行に際して、JETORO 徳島所長の服部克巳様をはじめ、愛媛経済国際化センター・チーフアドバイザーの真井宏様には事前のレクチャーを頂き、又ニュージーランド オークランドでは伊藤忠商事㈱の鶴島孝保様、オーストラリア ゴールドコーストでは、㈱穴吹工務店 常務台田智宏様、現地部長・上原敏様、シドニーではJETORO 所長 田代恵有様、次長 伊達芳昭様、又SYDNEY BUSINESS & TECHNOLOGY CENTER Managing Director のTED ROACH 様をはじめ、多くの方々の御配慮を頂きましたことを厚く御礼申し上げます。

藤崎役団長、福井七五三夫副団長には出発前から、解団するまで、企画をはじめ、旅行中の細部にまで配慮頂き、無事研修旅行を終えることが出来ました。ここに深く感謝を申し上げまして、ご挨拶とします。

3

SYDNEY BUSINESS AND TECH NOLOGY CENTER

奥谷亮・藤崎稔・片山毅

豪州特有の強い日射の中、バスはシドニー郊外の軽工業地区にあるシドニー商業技術センターに到着した。当センターはジェトロ（JETRO）シドニー事務所の紹介により見学させていただくことになった民間経営のインキュベーターである。

ローチ社長初め皆様の歓迎をいただき、本部事務所の2階でなごやかな雰囲気の中、当センターの説明をいただいた。

ザ・シドニービジネス&テクノロジーセンター

ローチ社長は元来発明家であり、過去多くの発明を考案したがそれを商品化してくれる企業がオーストラリアにないため、自分で発明を商品化するためにこのセンターを創立したという情熱家である。オーストラリアの研究者の研究発表数は人口比率で見た場合、世界先進国と比較しても抜きんでており、これら多くの研究の成果が自国内で商品化されればすぐれた工業国に成り得ると考えられている。当センターは2階建ての複製工場を41区画経営し、完成時には53区画になる予定である。小企業の立ち上がり時期はすべての経費を節減する必要があるため、本部建物内にセクレタリーサービス、事務処理、経営サービスができるようにスタッフ、コピー、タイプ等の事務機を用意している。小企業の立ち上がりで最もむつかしいのは商業開発（商業化）であり、このためマーケッティングの補佐ができるようにマーケッティングコンサルティングの機能も有している。この商業開発、販売活動というのは、新事業展開の中で最もむつかしく、かつ重要点であるのでもっと詳細に内容について聴きたかったが、現時点では十分に機能していない様子で核心をついた説明は得られなかった。ただ新しく開発された製品は要望により、当センターと共同販売を行う場合もあり、また関連業者に対し出資する場合もあるようである。

米国におけるスモールビジネスの成功率は85%もあるが、オーストラリアのそれは20%程度で、80%は失敗している。これは米国ではインキュベーターからの適切なアドバイスが得られることによる。これはオーストラリアでは、スモールビジネスに対する経営と商業化に対する適切な援助組織ができてないことにより発生している現象であると説明された。そのため当センターでは全員がビジネス思考を持ち、いつでも黒字で運営できるようにマネジャーがアドバイスを行っている。またセンター内には食堂があり、ここではセンター内の人々が自由に話し合いを行い情報交換をしている。

当センター開設にあたり政府や経済機関に援助を申し入れたが現時点では一切これ

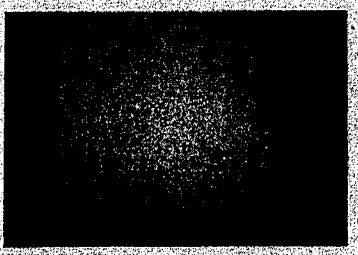
ら機関からの援助は得られていない。このため工場ユニットの一部は販売し、センターの運営経営を行っている。しかしこのセンターのインキュベーターの概念に共感する良い企業のみを対象として販売しているとのことである。将来は当センターを農業、生化学、医学、エレクトロニクス、コンピューター、機械、技術教育、ロボット等の先端技術の研究開発の中核組織としていきたいとローチ社長は情熱的に説明してくださった。

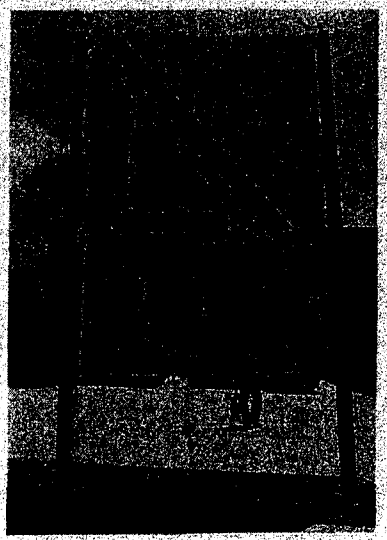
朝10時に始まったローチ社長の説明と質疑応答は12時まで続きその後ひきつづきセンター内の見学をした。中央に幅広い2車線の道路をはさみ2階建ての工場ユニット群は整然と並び、緑地帯の植え込みも良く管理されており、環境整備は良好である。ある工場内を見せてもらったが、1ユニット内に3企業が入って複合的な経営を行っている様子である。日本から輸入したミシンを特殊目的にアレンジする会社、それを使って縫製を行う会社、製品を販売する会社というように結合した三企業で利用していた。

オーストラリアの特質であるのか、オーストラリア人（オージー）は働く事があまり好きでなく「仕事は少なく遊びは多く長く」という感じで、各企業も日本のように毎年の増収・増益にこだわらず会社を大きくして、忙しく働いて金もうけをしようという感じが見られない。小さな規模で楽しい人生を送るだけの収入があればそれで良いという価値観が強いようである。そのため当センター内で事業を行い、成功して他に大きな事業所を構えるということはなく、この広さの工場、事務所で十分の様子である。おどろいたことに我々のミーティングの中に地区労働組合の幹部が参加していたことである。オージーの労働者は勤労意欲が低く、時間外勤務などもっての他で、アパート、小売店の土日休みは労働者が得られないから休みになっているとの皆。このミーティングに労働幹部が出席していたのは、働きバチ日本の中小企業の社長達が労務問題に関していかなる非常識な質問をするのか、聴きに来ていたのではと思われる。あるいはオージー労働者の代弁者として参加されていたのではと考えられる。

立食昼食会の後、当センターを出発したのは午後2時であった。産官学の支援の下に経営されるインキュベーションに較べ、ローチ社長の御一人の情熱と努力の下に経営される当センターは決して十分なものとは見えないが、今後の発展と充実を確信して当センターをあとにし、シドニーのウォーターフロント計画の成功例であるダーリングハーバー視察に向かった。

なお当センター視察に御尽力いただきましたJETROシドニーセンターの方々に深く御礼申し上げます。





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SYDNEY BUSINESS & TECHNOLOGY CENTRE

シドニー企業化技術センター（S.B.T.C）は企業化インキュベーターとして設計された。インキュベーターは新規企業や"日の出"となる新製品をもたらす国の製造業基盤を提供することを条件とする面をもつ。

組織及び位置づけ

オーストラリアは革新的なアイデアを創り研究論文を発表することで世界のリーダーであると認められている。しかし、その革新的なアイデアや研究開発論を企業化することではOECD諸国の中では下位に位置している。

1986年連邦政府はカメロン・マクナユラにより西シドニー先端技術開発戦略と呼ばれる研究をまとめた。この包括的なレポートは、スウェーデン、日本、米国、英国、オーストラリア各国の企業化研究の発展状況を比較するものであった。このレポートは、オーストラリアの主な弱点が次の点にあると結論づけている。

1. 技術開発過程の鍵を握る参加者と戦略的ネットワーク（の形成）を結ぶ通信（網）
2. 企業化研究開発技術をもつ起業家（事業家）の不足
3. 民間部門の研究・開発の不足
4. インキュベーター施設及びそれをつくる事業家（起業家）の不足

オーストラリアの落ち目にある製造業基盤に数年たずさわったあと、1980年、私が結論したことはオーストラリアが新製品を開発すること、さらに、これが企業化インキュベーターによってもたらされる支援の網の目によって最高に達成されるということであった。S.B.T.C.の敷地は念入りに選定され、シドニーの製造業分の馬てい型のベルト地帯の中心部に位置していると考えられる。

デザイン（構想）

S.B.C.T.は、完成時53の工場を傘下におさめる。そのうち研究又は企業化開発プロフェクトは10に達する。私は1980年代初期から引き続き、政府や民間企業部内の支援を受けるため努力してきたが、成功していない。近い将来もこれは実現しそうにないことは明白であり、センター自体は現金化がいつでも可能になる(Stava titled)単位のものとして設計されている。

センターの独自性を保つため、強力なcovenant(担保権)が、企業化インキュベーターに強い関心のある産業（企業）を引きつけるため、（センターの）資産に設定されている。企業経営施設、セミナー室、事務室、喫茶室もこの設計の中に含まれている。

SYDNEY BUSINESS & TECHNOLOGY CENTRE

SYDNEY BUSINESS AND TECHNOLOGY CENTRE

The Sydney Business and Technology Centre (S.B.T.C.) has been designed as a "business incubator".

"Incubators" have a range of features which are required in order to provide the manufacturing base of a country with both new start-up businesses and [illegible] products.

HISTORY AND LOCATION

Australia is recognised as being a world leader in producing innovative ideas and publishing research papers. However it ranks at the bottom of the O.E.C.D. countries in commercialising innovation and research.

In 1986 the Federal Government commissioned a study called "Advanced Technology Development Strategy for Western Sydney" by Cameron McNamara. This intensive report compared the development of commercial research in Sweden, Japan, United States, UK and Australia. It concluded that Australia's major weaknesses were:

1. Communication (networking) between key participants in the technology development process and the formation of strategic networks.
2. Shortage of entrepreneurs with commercial research development skills.
3. Lack of private sector research and development.
4. Shortage of incubator facilities and entrepreneurs to build them.

In 1980 after many years of concern at Australia's declining manufacturing base, I came to the conclusion that Australia needed to develop "sunrise products" and that this was best achieved through the support network offered by "business incubators".

The site for the S.B.T.C. was selected carefully and considered desirable as it is located in the centre of the horseshoe shaped belt of Sydney's manufacturing industries.

DESIGN

The S.B.T.C. when complete will incorporate 53 factories, each capable of taking up to 10 research or business development projects. Three stages comprising 41 factories have been completed. Stage 4 involving 12 factories will finalise the development.

I have tried unsuccessfully since the early 1980s to attract Government and business sector support for the S.B.T.C. and as it was obvious that this would not be forthcoming, the Centre was designed as strata-titled factory units so that some could be sold to ensure a positive cashflow. To protect the Centre's identity, a strong covenant has been placed on the property to only attract industries sympathetic to the "business incubator" concept.

Business Management facilities, a seminar room, a secretarial service and coffee shop have all been included in the design. The following diagram illustrates the support network system I envisage operating when the centre is complete.

SUITE 3, [illegible] EASTERN ROAD
[illegible] NSW [illegible] AUSTRALIA
TELEPHONE [illegible] FAX [illegible]

16

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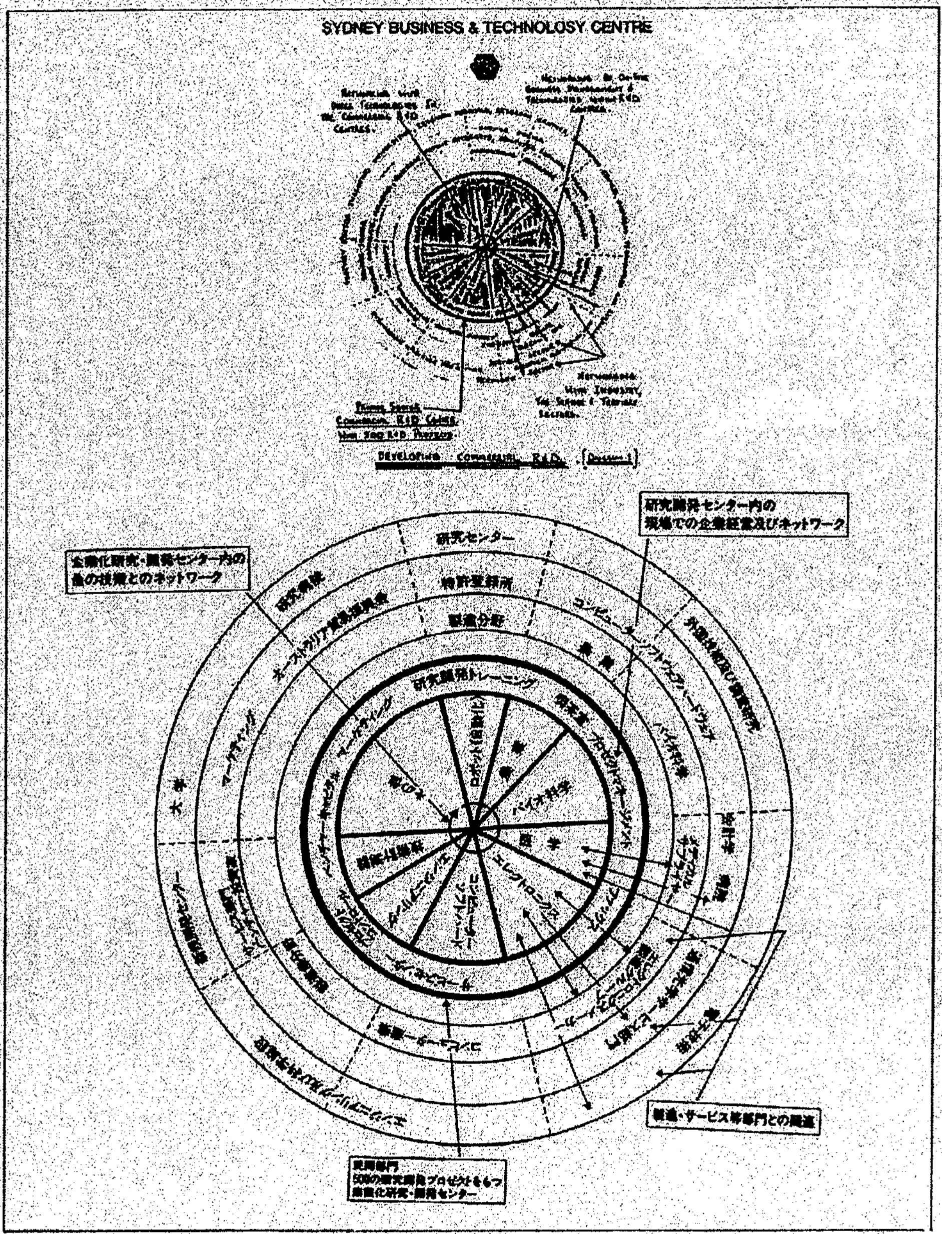
SYDNEY BUSINESS & TECHNOLOGY CENTRE
研究開発センター内の現場での企業経営及びネットワーク
研究センター
特許登録所
産業分析
研究開発トレーニング
バイオ科学
製造・サービス等部門との関連

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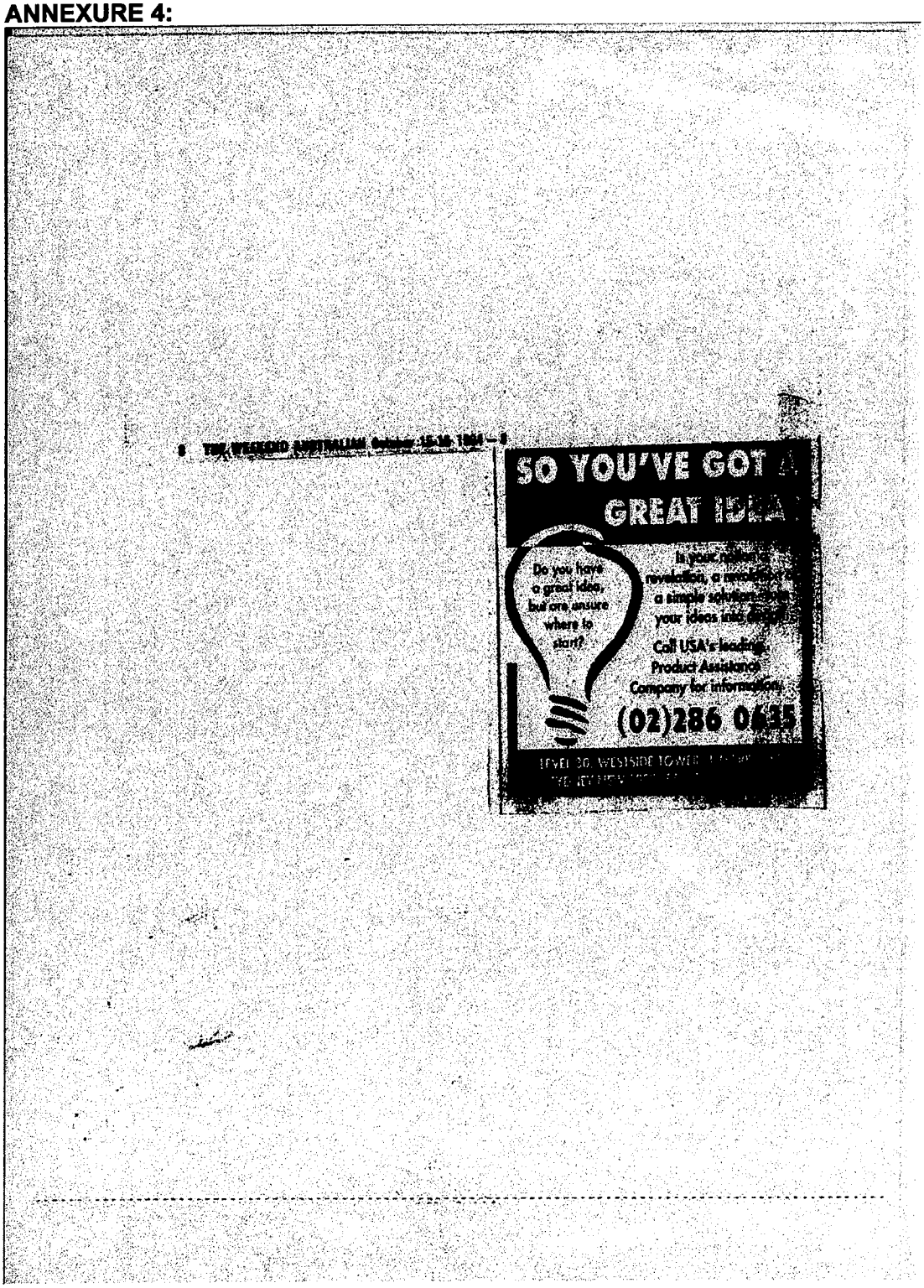
ANNEXURE 4:


SO YOU'VE GOT A GREAT IDEA
Do you have a great idea, but are unsure where to start?
Call USA's leading Product Assistance Company for information.
(02)286 0635

ANNEXURE 5:

Ted Roach

From: Beverley Firth [Beverley.Firth@business.nsw.gov.au]
Sent: Friday, 18 February 2005 1:18 PM
To: tedroach@roachindustries.com.au
Subject: Re: Developing industry through commercial research centres

Simon Hemli in Industry Division is writing or has written a Ministerial on this. Roach is essentially a property developer. The Feds did/do provide funding to community organisations to build incubators, suspect Roach did not meet the criteria of "community group". However, the Feds have been tweaking their programs so perhaps he is now eligible. We would never fund bricks and mortar. Don't speak to Roach without talking to Simon. His number is 9338 6648.

Best wishes
Bev

>>> "Ted Roach" <tedroach@roachindustries.com.au> 17/02/2005 6:29:20 pm
>>>
Bob,

Our company developed the Sydney Advanced Technology Centre, a 53 factory complex, at 2 Railway Parade Lidcombe. It was described by Garry Glazebrook in a report titled "Advanced Technology Strategy Study For Western Sydney" as the key to developing industry in the Western Sydney region. We completed the centre but had difficulties with the State and Federal Governments which were opposed to the private sector being involved in the area. However they both assure me this attitude has changed.

I have been involved in this area for the past 20 years identifying the successful structures overseas for Commercial Research Centres, incubators and Innovation Centres. I initiated through the LGA a motion which led to "start-up business incubators" being constructed all over Australia. As President of the Inventors' Association of Australia and on the State Committee of the Small Business Association I tried to encourage the development of private sector driven commercial research centres. I am also involved in my own commercial research projects.

We have recently submitted a proposal to the State Government for the development of a Commercial Research Centre.

We would be very interested in having discussions concerning any developments in the area in Western Sydney.

Ted Roach

Managing Director

email: tedroach@roachindustries.com.au

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ANNEXURE 6:

NEW SOUTH WALES

DEPUTY PREMIER
MINISTER FOR STATE DEVELOPMENT

S13665

Mr Ted Roach
Managing Director
Roach Industries Pty Ltd
4/21 Hunter Street
HORNSBY NSW 2077

Dear Mr Roach

I refer to your recent letter regarding your proposal for NSW Government financial involvement in the development of private sector commercial research centres, and your request to meet.

The Government supports the commercialisation of scientific research and actively facilitates the development of research and implementation centres in NSW.

I understand that officers from the Department of State and Regional Development have met with you to discuss your plan, and that they have advised you that funding is not available to support the private sector development of research and commercialisation centres you propose.

I have also been advised that you have accepted an offer from the Department for facilitation assistance to advance your project proposal regarding the Kangoo Road Precinct, Mt Penang Parklands in Gosford. If you require further information or wish to access these services, please contact Mr Steve Hogan, Senior Manager, Industry Division on (02) 9338 6630.

Thank you for informing me about your proposal and I wish you all the best with your endeavours.

Yours sincerely

Andrew Refshauge MP
Minister for State Development

- MAR 2005

DEPUTY PREMIER, TREASURER, MINISTER FOR STATE DEVELOPMENT, MINISTER FOR ABORIGINAL AFFAIRS