2. INDUSTRY

All sectors of the economy benefit from investment in research and development (R&D). In some areas, such as Australia's traditionally strong mining and agricultural sectors, private sector R&D contributes strongly to the value added to primary products, with consequent contribution to export income.

There are many small to medium size enterprises in areas of high technology that are leading the resurgence in exports and could potentially benefit from further investment in R&D. Some high value-added exports such as pharmaceuticals, by virtue of their low transportation costs, are particularly suited to Australia's comparative geographic isolation. Another important export market involving significant scientific input is 'green technology', where Australia has a real chance of becoming a world leader in responsible environmental management.

In total, the Australian commitment to R&D (1.56% of GDP in 1992/3) is 15th amongst OECD and related countries, lagging behind countries such as Sweden (3.11%), USA (2.81%), France (2.40%), the UK (2.12%) and Belgium (1.67%). While Australia ranks very highly in government R&D expenditure at 4th amongst these countries, behind only Sweden, Finland and Norway, it ranks poorly in industrial R&D at 18th. Australia's investment of 0.69% of GDP in 1992/3 in industrial R&D is ahead of only Ireland (0.67%), Singapore (0.49%), Spain (0.47%), New Zealand (0.28%), China (0.19%) and India (0.18%) and well below that of countries such as Japan (2.06%), Switzerland (1.88%) and South Korea (1.38%). Australia's investment in industrial R&D and our international patent portfolio are growing at one of the highest rates in the OECD, albeit from a relatively low base.

However, it is undeniable that Australia's overall private sector R&D performance is abysmal by any international comparison. This fact must be recognised by industry and government. Measures must be implemented to ensure that a cultural change occurs in the Australian economy, whereby Australian industry is enabled to exploit the opportunities created by a strong private sector R&D effort and by stronger links with government and university research programmes.

2A. A CULTURAL CHANGE IN INDUSTRY

Industry must learn that scientific research and development, like innovation in business and industry, proceeds largely by continuous incremental improvements with very occasional strategic leaps. Therefore commitment to long term programmes of research is required. Industry must acknowledge that expenditure on industrial R&D in Australia is well below world's best practice. No matter how well an innovative enterprise is managed, its ability to compete with the world's
best is dependent on the quality of its R&D and the skills of its workforce.

There is a pressing need for a high level of scientific and technological literacy in the boardrooms and senior management of the private and public sector in Australia. The ability to utilise innovative opportunities is largely based on an understanding of the underlying science and technology. Thus scientific and technological literacy is essential if we are to take advantage of innovation, enhance our standard of living, and compete successfully with other advanced nations.

A recent report commissioned by NBEET, 'Science and Technology Issues in Management Education', recommended that a "long-term aim should be for science and technology issues to permeate much of the general management curriculum as part of the infusion of a more innovative ethos", and "to encourage the development and offering of MBA electives which focus on science and technology issues".

The NBEET report, 'Science and Technology Education: Foundation for the Future', noted that "of the twenty people who comprise the top level of management in three large Australian companies - BHP, CRA and CSR - thirteen have science degrees". Unfortunately, once people reach the top levels of management they are perceived as business people rather than as trained scientists. This perception should be corrected.

Policy 2.1 Companies should be better informed about science and technology issues and should encourage/employ a higher representation of scientifically and technologically literate people in their senior management.

Action 2.1.1 FASTS will lobby industry to give higher representation of scientists and technologists on their company boards and to report on the role of scientists and technologists in their management structure.

Action 2.1.2 FASTS will call for the cost of appointing new company board members who possess higher degrees in science and engineering to be an allowable R&D expense during the member's first term of service.

2B. INCENTIVES FOR PRIVATE SECTOR R&D INVESTMENT

The success of incentives such as the current 150% tax deductibility for private sector R&D must be recognised. There are strong arguments for its continuation and enhancement to meet the changing taxation structure. It is essential to maintain Government R&D spending in both the public and private sectors at a level comparable with that of our competitors. Singapore, whose industrial R&D investment is even lower than that of Australia, has introduced a tax incentive scheme to stimulate industrial R&D similar to Australia's scheme but at a rate of 200%.

The government should clearly account for the money it now puts into encouraging private sector R&D via the Industrial Research and Development Board. The tax revenue foregone in the 150% R&D investment allowance and the R&D syndicate schemes alone is of the same order as that put into CSIRO, i.e. more than $400 million per annum. In addition, there is a myriad of other schemes funding industrial R&D directly. The tax foregone under the above measures must be carefully monitored and balanced by positive outcomes in the industrial sector, with increased revenue accruing to the government, as has been experienced with the Factor F scheme.

FASTS recognises that such schemes require the investment of scarce taxpayers' funds. However,
there will be a much greater cost if we do not make additional efforts to stimulate Australian industry to use science and technology more effectively! Already there is a danger of encouraging industry to adopt a 'dole mentality' with respect to industrial R&D. To avoid this, the cultural attitude of industry towards R&D must change.

Australian industry must strive to become more competitive with that of other OECD countries. Most countries with which Australia strives to be compared are improving their industrial performance; Australia must improve at a faster rate in order to catch up. We must work 'twice as clever' as our competitors.

**Policy 2.2 The level of industry investment in research and development should be at least equal to that of our comparable OECD and APEC countries.**

**Action 2.2.1** FASTS strongly supports an increase in tax deductibility, to 200%, for R&D investment, in order to allow for structural changes in the taxation system and to maintain industry incentive for R&D investment.

It is essential that Australian innovations in scientific research and development are used for the economic, environmental and social benefit of Australia and are protected from undue exploitation from outside agencies. Australian scientists and technologists must protect their intellectual property via the patent system and by appropriate strategic alliances with industrial partners.

**Policy 2.3 Protection of our intellectual property is as vital as its discovery and development.**

**Action 2.3.1** FASTS will lobby for patent costs to be included as an allowable R&D expenditure for tax purposes.

**2C. VENTURE CAPITAL FOR RESEARCH FUNDING**

Increased involvement of the major financial institutions in funding private sector R&D is vital. Patient venture capital invested in private sector R&D is a valuable, but sadly lacking, commodity which is needed to aid Australia's increased international competitiveness.

We must encourage increased availability of venture capital funds for science and technology development. This could be achieved by attracting the financial sector with incentives such as a 200% tax deductibility for interest and dividends earned by investors in trusts and funds set up specifically for investment in R&D and high technology.

Government purchasing is another very important factor in this area. The highly successful Factor F scheme also represents an excellent investment of taxpayers' money, and may result in Australia becoming one of the very few net exporters of pharmaceuticals.

The R&D syndicate scheme is a very important incentive because it brings scarce venture capital into high risk R&D in the private sector. This scheme has recently been reviewed favourably by the Bureau of Industrial Economics. A number of financial institutions are showing great interest in the R&D syndicate scheme, but unfortunately the scheme has received rather obstructionist signals from the Australian Taxation Office. The ATO must alter its policy in order to encourage industrial R&D.

**Policy 2.4 R&D Syndication should be available to Australia's best research teams who work in the public and private non-profit sectors on an equitable taxation basis compared to the**
private sector. Investors should find it equally tax effective to invest in R&D carried out by non-profit organisations in syndicates with industry partners, as it is when carried out completely in the private sector.

**Action 2.4.1 FASTS will lobby for approved public and private non-profit research teams to be included equitably in R&D Syndication.**

**Policy 2.5 There should be increased availability of funds for R&D, and a changed attitude towards high risk, high technology projects is needed in the venture capital market in this country.**

**Action 2.5.1 FASTS will call for a 200% tax deductibility for interest and dividends earned by investors in trusts and funds set up specifically for investment into R&D and high technology projects, and will support a liberalisation of tax laws for the R&D syndicate scheme.**

**Action 2.5.2 FASTS will lobby for a percentage of superannuation funds to be available for investment in R&D as 'patient venture capital' under an appropriate scheme that spreads the financial risk and long term benefits for investors.**

**2D. INFORMATION AND TECHNOLOGY TRANSFER LINKS BETWEEN PRIVATE AND PUBLIC SECTORS**

The transfer of information and technology from fundamental and applied research in government and university laboratories to private industry is the vital link which needs careful consideration in any national economic strategy.

In the past, major Australian discoveries or inventions have repeatedly been allowed to wither, or have been hijacked offshore due to indifference from, or ineffective transfer to, Australian industry. This situation must cease.

Mechanisms such as the Cooperative Research Centres (CRCs) show promising results in encouraging links between the public and private sectors, and their impact should become increasingly evident over the next few years. Such links must be strengthened and made more effective if Australia is to reap the benefits of its high quality scientific research. Steps must be taken to ensure proper accountability in these complex organisations which integrate the inputs of many partners. The distribution of intellectual property rights should reflect the relative contributions of the partners.

State, as well as Federal, governments have important roles to play in stimulating links with the private sector. The Queensland Government has benefited by providing infrastructure to attract research-based enterprises associated with large multinational companies. The Victorian Economic Development Corporation has also been successful in starting up and supporting high technology companies. The support of the South Australian Government for the MultiFunction Polis, and state government funded technology parks are other important examples.

**Policy 2.6 FASTS supports the nurturing of effective, long term links between university/government sector research and private enterprise, to enable technology transfer that will capitalise on our world standard research activities.**

**Action 2.6.1 FASTS will support the continuation of the CRC programme after appropriate review;**
will call for the necessary support to be provided for all top ranking applications to be funded by the ARC Collaborative Grants scheme; FASTS will support the establishment of a Joint Enterprise Research Funds matching grants scheme for CSIRO and other government research organisations with industry collaborations; FASTS will call for an increase in the time scale for collaborative industry research funding to mid-long term projects (10 years or more).

More scientists, technologists and engineers should be appointed to the boards of private companies. The tax relief (200%) proposed above for the first term of office is intended to encourage this. Provision should be made for the holding of joint positions in research organisations and on company boards, but conflict of interest provisions must be stated clearly. In some areas, such as geoscience, the transfer of scientists between public and private sectors is relatively common. Career paths that allow this type of interchange must be expanded if we are to achieve the cultural change in the perception of science which is required for maximum realisation of the benefits of science and technology.

Policy 2.7 There should be greater mobility of personnel between government, university and industry sectors, particularly in research and technological management.

Action 2.7.1 FASTS will call for incentives or funding assistance for reciprocal arrangements which encourage mobility of skilled scientists and technologists between industry and relevant government or university institutions; lobby for the removal of impediments to the mobility of personnel, e.g. by improving the portability of superannuation funding.

R&D Syndicates involving public sector research teams and industrial partners should be encouraged via the measures indicated above in Policy 2.4.

2E. SMALL TO MEDIUM ENTERPRISES

While mechanisms such as the CRCs help innovative firms to network and combine to focus their efforts, the competitive advantage of individual enterprises is often diluted. It is important to get an appropriate balance between the competitive drive of individual enterprises and the cooperative push of collaborative enterprises.

We should encourage industries that have a special common interest to set up research funding bodies, via voluntary sector levies, to consider specific research proposals from universities, government and private organisations. These research proposals should be for work in generic areas of interest to the industry, and not for direct applications which may have proprietary interest. This would be a particularly important innovation for small to medium sized enterprises, which on their own cannot perform R&D requiring a high level of investment.

Policy 2.8 Provision must be made for the R&D needs of small to medium sized enterprises to enable them to benefit from advances in scientific research and high technology.

Action 2.8.1 FASTS will strongly support the establishment of voluntary industry sector research bodies funded by internal sector levies; support the extension of the R&D syndicate scheme, which at present is limited to enterprises performing at least $1 million worth of research, to allow the participation of more small and medium enterprises; call for subsidising of initial approaches to university and government research organisations, to encourage small businesses to seek R&D assistance.