Science Industry Australia

SCIENCE INDUSTRY AUSTRALIA INC.
SUBMISSION TO THE
DEPARTMENT OF INDUSTRY, TOURISM AND RESOURCES
INDUSTRY STATEMENT: GLOBAL INTEGRATION

1. Executive summary

Australia's science industry competes strongly in the global niche markets of scientific equipment such as spectrophotometers, chromatography and laboratory automation equipment, clinical diagnostics and laboratory-based analytical services used for the measurement, analysis and diagnosis of physical, chemical and biological properties of matter.

Being well integrated with the global supply chains of multinational companies, its larger manufactures export up to 95 per cent of their production, and some 80 per cent of Australia's production of science related goods are exported to United States of America, European Union and North Asia. The main markets for its analytical services are New Zealand, Asia, European Union and the Americas.

The Science Industry Action Agenda (SIAA), now in implementation, provides the strategic framework for industry-led initiatives aimed at growing the industry by leveraging its strengths and addressing impediments. The SIAA is focusing the industry's resources on realising the industry's 2015 vision of exporting more than $3 billion and generating revenues of more than $5 billion annually by:

- Commercialising more Australian publicly funded research;
- Growing exports;
- Improving product and service quality;
- Attracting and retaining a skilled and flexible workforce; and
- Improving the industry's internal and external linkages.

Institutional impediments to the science industry realising its vision that require attention by government are:

- Innovation policy reform including
  - Improving the alignment of publicly funded research with market needs;
  - Improving Australian science industry access to Australian publicly funded research by closing the 'innovation gap' and greater engagement by publicly funded research agencies with industry;
  - Improving the access of larger science companies (with annual group turnover more than $50 million) to innovation support programs such as Commercial Ready;
  - Enhancing inter-firm collaboration, including greater international engagement; and

- Facilitation of international technology-based collaboration;
- Regulation reform to harmonise Australia's national regulatory framework internally, and aligning it with international best practice; and

- Improving the supply of skilled labour to the industry.

Background

2. Introduction

On 10 July 2006, the Minister for Industry, Tourism and Resources, the Hon Ian Macfarlane MP, announced the Government's intention to release its new industry policy statement in 2007. The new industry statement will set the policy directions to maintain the country's present economic momentum over the next 20 to 30 years in a new era of true globalization, communications advances and the need for industry sectors to become part of global supply chains. This follows the Government's 1996 industry statement *Investing for Growth*.

To inform the formulation of the industry statement, the Government has released the discussion paper *Global Integration* and has called for submissions by 31st August 2006 on issues including:

- Global integration;
- International competitiveness;
- Innovation; and
- Investment

3. The Australian science industry

The science industry is defined as research and development, design, production, sale and distribution of laboratory-related goods, services and intellectual capital used for measurement, analysis and diagnosis. This definition represents the value chain for the science industry.

Measurement matters. Australia's science industry is a key enabler of many other industries. It produces high value-added export products such as spectrophotometers and laboratory automation equipment. Its laboratory related equipment and services enable the measurement and identification of very small quantities of materials to ensure the quality of our food, water, air, environment, health and many other aspects of our daily lives. Its products and services are used by a diverse range of industries such as agri-food, resources, environmental monitoring, manufacturing, medical and health care, research and development and education.

4. Science Industry Australia Inc – the science industry peak body

Science Industry Australia Inc. promotes the interests of its members involved in the manufacture and/or marketing of scientific products, laboratory technology and research services in Australia. Its members are responsible for more than half the science industry's exports and a significant proportion of science-related imports.

Issues

5. The Australian science industry

Australia's science industry is well integrated with the global market and the supply chains of multinational companies. Its larger science manufacturing companies export up to 95 per cent of their production. Their scientific instruments, clinical diagnostics and laboratory related services are globally recognised as the best available and are used extensively by the world's leading companies. Around 80 per cent of Australia's production of science related goods is exported to the United States of America (USA), European Union and North Asia. In contrast, 82 percent of laboratory related services production was sold in Australia.

The science industry's products and services underpin the success of Australia's manufacturing industry, and our resources, agriculture and environment industries.

The industry exports much of its production, with the larger makers of scientific instruments and clinical diagnostics such as SGE International, Varian, Vision Biosystems and Thermo Electron Clinical Chemistry exporting in excess of 95 percent of their production to the USA, the European Union and North Asia.

Some of the leading global science industry manufacturing companies are Abbott Diagnostics, Applera, Agilent Technologies, Beckman Coulter, Bio-Rad Laboratories, Eppendorf, Merck, Mettler Toledo, Perkin Elmer, Promega, Qaigen, Roche Diagnostics, Shimadzu Scientific Instruments, Thermo Electron Corporation, Waters Corporation and Varian. These companies have distribution outlets, service delivery operations, and in some instances, such as Varian and Thermo Electron, production facilities in Australia.

Significant Australian companies with international operations engaged in providing laboratory related services include Amdel Pty Ltd, Australian Laboratory Services Pty Ltd, Gribbles Group and Sonic Healthcare Ltd.

Australia’s total domestic market for scientific equipment and laboratory-related services was estimated to be $6 billion in 2002/03. Total employment in the industry was approximately 47 000.

Manufacturing production was $930 million, exports $670 million, imports $2820 million and employment 8 000. Services production was $3070 million, of which exports were $110 million, and employment was 39 000. Australia’s publicly-funded researchers also provided significant services to the industry. Australia’s scientific product manufacturers produced $260 million of the $3 billion domestic market for scientific products.

Australia's science industry outperforms many other industries in terms of its growth, innovation, exports and workplace excellence.

In 2002/03 this knowledge intensive and export oriented industry was growing at an annual rate of 10 per cent. Its manufacturers invested 7.9 per cent of their turnover in R&D, which was 10 times Australia's manufacturing industry average. This is consistent with high performing manufacturers in Canada and United Kingdom. Its laboratory related services companies invested 5.9 per cent of their turnover in R&D. Almost 50 per cent of the industry's workforce had a university degree, and the industry spent more than 5 per cent of its turnover on training. It is estimated that 98 percent of companies in the science industry are SMEs which contribute 50 percent of the industry's exports. The balance comes from the larger science companies.

In February 2004, the Australian Government announced an Action Agenda for the science industry. The Department of Industry, Tourism and Resources and the Department of Education, Science and Training collaborated jointly with Science Industry Australia Inc to develop the SIAA and are continuing this collaboration in its implementation.

In launching the Science Industry Action Agenda (SIAA) and its report *Measure by Measure* on 31 August 2005, Industry Minister Ian Macfarlane said:

'Australia's science industry punches well above its weight. It is outperforming many other sectors in its commitment to innovation, exporting and workplace excellence. And it is the kind of industry that Australia needs more of if we are to maintain our international competitiveness.'

To achieve its 10-year vision to 2015 of being export oriented and recognised world wide for its quality, innovation and commercialisation of leading edge technologies, the priorities of the SIAA are to:

- Commercialise more Australian innovation;
- Grow exports;
- Improve quality;
- Progress regulation reform;
- Attract and retain a skilled and flexible workforce; and
- Improve the industry's internal and external linkages.

The science industry recognises that global integration is a major factor in its success. However, few of Australia's science companies are 'born global'. Like many other Australian companies, the majority begin their existence with a focus on the domestic market and commence exporting once they expand beyond the capacity of the Australian market to absorb their products or services. As the science industry grows, its SMEs will have to develop their skills in global engagement. Underpinning this expansion will be the need for growth companies to be flexible and imaginative in implementing new strategies to deliver value to customers worldwide.

6. Global integration issues

The key issues affecting the science industry's ability to increase its global engagement are:

- Accessing to global supply chains and overcoming a lack of contacts and knowledge in SMEs;
- International technology-based collaboration; and
- Better use of Australians/Australian institutions based overseas to assist in developing linkages.

6.1 Access to global supply chains

Australia is estimated to be one percent of the global market for science-related goods. The global market in 2002/03 was estimated to be around A$95 billion, and the market for science-related services is estimated to be at least as large as the market for science-related goods. The USA was the largest producer and consumer of scientific equipment with around 50 per cent of the world market. The chief competitors of the USA were the European Union and Japan, who together accounted for over 30 per cent of global production and consumption. Germany was the largest export market in Europe, and Japan was the largest market in Asia. The USA imported mainly from Japan and Germany.

The SIAA has developed an export strategy which aims to increase science industry's volume of exports as well as its number of exporters. The strategy leverages on government programs and focuses on convincing SMEs to export, enhancing their management and entrepreneurial skills, improving the desire/resources/know-how to do global licensing of intellectual capital, and the targeting of small companies in need of export assistance.

To encourage science industry SMEs to export, the export strategy proposes:

- Ensuring SMEs are aware of current assistance available such as TradeStart, EMDG, COMET and trade fair and mission grants in each state;

- Enhancing assistance to enable SMEs focus their energies. Currently Austrade has no specialist for the science industry. Science Industry Australia will work with Austrade to increase assistance to the industry;

- Bringing representative buyers/customers to Australia to meet and brief potential and current exporters;

- Collecting and publicising success stories and key success factors to build confidence and boldness to encourage beginning and continuing exporters;

- Encouraging science industry companies to apply for export awards; and

- Working with science industry companies to identify emerging needs, developing solutions and implementing them.

To improve the desire/resources/know-how to license intellectual capital globally, the export strategy proposes:

- Continue to bring experts from overseas to provide training in how licensing deal work and promote the science industry;

- Provide more knowledge and assistance to facilitate licensing and build awareness that there is a place for this where Australia does not have the capacity to fill the gap; and

- Promote the establishment of more research collaborations and facilitate business topic focused networking.

To ensure that these strategies are focused towards those companies most in need, Science Industry Australia is collating a list of companies in the industry.

6.2 International technology-based collaboration

With Australian and Victorian Government support, Science Industry Australia led 22 companies to PITTCON 2005 in the USA. Pittcon involved concurrent conferences and a large exhibition. Australian Government support was provided through the former Innovation Access Program.

Through funding received, Science Industry Australia participated in the Victorian Government's Industry Capability Mission to Germany and Switzerland in April-May 2006.

With assistance from an Australian Government International Science Linkages grant, Science Industry Australia led five research groups and a spin-out company from Macquarie University to attend the international exhibition Analytica 2006. The research groups were Fluorescent Applications in Biotechnology and Life Sciences, Queensland University of Technology, RMIT, Australian Proteome Analysis Facility and Victorian Institute of Chemical Sciences. Analytica 2006 is the world's largest trade show for solutions in the analysis, laboratory-technology and life-science sectors. The mission promoted increased collaboration between Australian researchers and international companies/researchers and expose Australian researchers to commercial interests.

The outcomes of the two missions were:

- Increased collaboration with international researchers (in academia and industry) in the science industry field;

- Possible inward investment in showcased and other research programs;

- Showcasing of Australia's superior science, technology and innovative capability;

- Creating greater science industry awareness in a global context;

- Creating greater commercial awareness amongst Australian researchers attending Analytica and encouraging and motivating them to do more work in the lab technology space;

- Assist attending Australian and EU manufacturers with the need to partner with Australian research entities to enhance their innovation capacity.

Science Industry Australia strongly supports the Australian Government's continuation of government assistance for such missions and recommends that the Government adopt a 'Team Australia' approach to promote the capabilities of the Australian science industry internationally such as has been done to showcase Australia's innovative defence and security technology capabilities and solutions for the Joint Strike Fighter Program.

6.3 Better use of Australians/Australian institutions based overseas to assist in developing linkages

The science industry is currently exploring opportunities to collaborate with Australians and Australian institutions based overseas however the current focus is on improving the linkages domestically which will have a flow on effect of creating better linkages overseas.

Invest Australia facilitates inwards investment for specific major investment projects with a value of over $50 million. If a foreign company wants to establish a manufacturing or service operation in Australia, Invest Australia can assist it with a variety of solutions tailored to the business' needs. These include: information on Australia's industry capabilities; guidance through the regulatory and approval processes; and connecting it with the right industry and Government contacts.

7. International competitiveness issues

Significant impediments to the science industry maintaining its international competitiveness are:

- Regulation issues, particularly those identified through the Action Agenda process;
- Quality of products and services;
- Acquisition and retention of a highly skilled workplace; and
- Adequacy of business management skills and capabilities.

These issues are common to many Action Agendas. In particular, the smaller high technology industries with Action Agendas such as Science Industry, Medical Devices, Electronics and Advanced Manufacturing are faced with building the critical mass necessary for them to adequately represent their common interests such as the 'Team Australia' approach does.

Some high level coordination already occurs, but an opportunity exists for more to be done to improve the coordination of the requests to government by the high technology industries. Currently, DITR coordinates 'whole of government' issues such as innovation, regulatory reform and skills. There is some joint membership of industry representatives on the implementation groups (steering committees) of similar Action Agendas, for example, a member of the SIAA Implementation Group is also a member of the Medical Devices Action Agenda Implementation Group. Also, the Victorian Government has for some time seen the smaller high technology deserving of attention. It developed a strategy for encouraging the growth of these industries in Victoria, and organised an Industry Capability Mission to Europe in April-May 2006. It is noted that as part of its post-implementation strategy, the pharmaceuticals industry has formed the

Pharmaceuticals Industry Council to be the peak body of peak bodies in the industry to coordinate issues of common interest across the industry.

7.1 Regulation issues, particularly those identified through the Action Agenda process

As a global industry, the science industry's local manufacturers not only sell into many foreign markets, they also sell into effectively nine separate Australian markets delineated by regulation barriers created by Commonwealth, state and territory jurisdictions. The science industry's importer/distributors are faced with the same regulatory impediments.

The science industry recognises that a strong regulatory framework that operates seamlessly with the relevant international regulations and standards is essential to preserve public trust and support trade in the industry's products and services.

However, the way governments develop and implement regulatory requirements often add to business input costs without any clear rationale or net national benefits. For example, certain chemicals, precursors for drugs and explosives, and therapeutic substances, must be registered, even when they are used in small quantities. These regulatory burdens are increased further in areas in which there is no national harmonisation of regulations, so that different registrations or other requirements may be encountered when working across jurisdictions.

The challenges and imposts to the science industry are epitomised by the plethora of regulatory agencies and associated regulatory requirements.

As an example, chemicals are subject to requirements at federal, state/territory and local government levels through legislation relating to drug precursors, labelling and transport, poisons scheduling, refrigerant licensing, Materials Safety Data Sheets, Occupational Health & Safety, radiation, anti-terrorism, trade measurement and business licensing.

In many cases there is no threshold level for regulatory compliance. Thus the science industry, which in general includes suppliers of small to medium quantities of high purity chemicals (often less than one gram), is regulated to the same or similar extent as a bulk supplier of tonnes[1] of chemicals.

The Australian science industry through the SIAA, aims to progress further the harmonisation of Australia's regulation and standards relevant to the industry across Australian, state and territory governments, and to align them with relevant international ones. It will achieve this by working with government, other industry bodies and international regulatory reform initiatives, and shape regulatory reform proposals that will bolster the industry's growth.

To this end, the science industry has made a number of submissions to the government regulation reviews with the aim of influencing the policy settings. The reviews include Commonwealth Parliamentary inquiry into Harmonising Trade Regulations of 2005; NSW Government regulation inquiry of 2006; and Commonwealth Regulation Taskforce of 2005. Further details of regulation issues and possible solutions are in **Attachment A.**

[1] Such suppliers are usually represented by Plastics and Chemicals Industry Association (PACIA), although there is some cross membership

7.2 Quality of products and services

Multiple markets, both domestic and international, impose a variety of quality standards and requirements upon manufacturers. Internationally recognised quality accreditation standards such as ISO 9001:2000 Quality Management Standard seek to redress this situation by imposing a standard set of quality management guidelines across all jurisdictions that individual companies can be accredited to.

On the whole Australian manufacturers in the science industry have a high level of compliance with these international standards and readily adopt their prescribed methods of installing, implementing and managing a comprehensive quality management system and methodology.

However, to keep this issue in 'front of mind' for the science industry the SIAA has developed a quality improvement strategy and Science Industry Australia is to join the Australian Organisation of Quality to assist the industry to capture benefits of the organisation.

7.3 Acquisition and retention of a skilled workforce

Surveys of the science industry indicate that the industry has shortages of laboratory technicians, technical trades, chemists, mechanical and software engineers, sales and management staff. The science industry is a knowledge-intensive industry that is heavily reliant on its human capital to create its competitive advantages and respond to emerging opportunities. Almost 50 per cent of its workforce has a university degree, and the industry spends more than 5 per cent of its turnover on training.

SIAA initiatives to increase the supply of skilled staff focus on improving the industry's profile as a potential employer and improving the content of course curricula. The SIAA has contributed to the Government's initiatives such as the National Skills Shortages Strategy (NSSS) and is leveraging on Government initiatives such as the NSSS Science Careers Project, Careers Network, and Local Community Partnerships.

Of particular concern to the industry is that while science graduates possess good theoretical knowledge, they do not have sufficient practical skills, and require further practical training to be job-ready. Even the industry's sales staff must have a high level of knowledge and understanding of science and the equipment.

Another feature of science graduates and migrants with science engineering and technical skills is their lack of and/or limited verbal and written English communication skills. This limitation can make them unemployable.

Encouraging students to undertake courses in science and engineering will provide the industry with a suitable supply of human capital essential for its global competitiveness. We note that the Australian Industry Group has recommended that science and engineering undergraduate programs should be a national priority for concessional HECS eligibility. Designating science and engineering as national priority areas, exempt from HECS fee increases, in a similar way to nursing and education, would assist in encouraging students to take up science and engineering at university.

7.4 Adequacy of business management skills and capabilities

To enhance the managerial and entrepreneurial skills, the export strategy proposes:

- Building a mentoring program staffed by returned expatriates and retired industry achievers for SME science industry leaders who actively support growing exports;
- Providing active assistance (financial and other) for CEOs actively trying to grow science industry exports to receive management training in Australia and overseas;

- Offer periodic 'learning journeys' where companies can travel together as part of a group and learn from each other. Look at and meet with knowledge and skill sources both in Australia and overseas;
- Organising world class speaker seminars focused on the hot issues/skills for our target leaders; and
- Assisting with the choice of starting market where needed.

8. Innovation issues

The science industry is a knowledge-intensive global industry that relies heavily on its investment in research and development and innovation more generally to provide a continuous supply of high value-added world-competitive products, processes and services. This investment must continue for the industry to remain globally competitive.

With the growth in off-shoring of low technology manufacturing, Australia is now more than ever reliant on the development of the local science industry to support the vibrant growth of high technology manufacturing here. A current underpinning research direction is the development of “lab on a chip” measurement devices that will take a low-volume high-value production to high-volume low-cost with the potential to spawn a new industry in Australia. Supporting the emergence of this technology are global security issues and the need to have cheap, mobile devices that can check for all types of contaminants.

Australia has a comparative strength in its high quality basic research. However, not all of this research will necessarily be of interest to the Australian science industry. Australia’s quality basic research gives us entrée to access foreign basic research, which may be of interest to the Australian science industry.

For the science industry to take advantage of Australia's global research expertise, government programs require more flexibility to enable such engagements.

The SIAA identified the main institutional impediments to the effective development and commercialisation of intellectual property from research as:

- Poor alignment of public research with science industry needs, and poor interaction between the industry and researchers;

- Lack of mobility for university and PFRA researchers to transfer between academia and business. Once a researcher has left academia in Australia it is nigh on impossible for them to return to continue fundamental research activities that support their business activities. In the US the dual role of Prof./CEO is commonplace;

- Costs of transferring intellectual property (IP) from researchers to industry which impedes greater capitalisation; and

- Eligibility requirement of some Australian Government R&D support programs that exclude larger science companies.

To improve the alignment of publicly-funded research with market needs, the SIAA's initiatives include:

- Improving communication and understanding between the industry and researchers;

- Facilitating greater collaboration between science companies and commercialisation intermediaries; and

- Raising the industry's awareness and use of the available support measures, such as those of the Australian Government's *Backing Australia's Ability* initiative, which complements the science industry's initiatives.

The SIAA has developed and is implementing a strategy for improving the industry's engagement with universities and publicly-funded research agencies (PFRAs).

Regarding the costs of transferring IP from researchers to industry, the science industry notes that CSIRO has made significant progress with the introduction of standardised plain-English agreements. Regarding the obligatory requirements for government's R&D support programs, the science industry has made a number of submissions to the government and parliament.

Science Industry Australia sees further opportunities in the area of innovation through:

- Greater capitalisation on public sector research to increase competitiveness;
- Inter-firm collaboration, including greater international engagement to improve innovation performance;
- Building the capacity of firms to innovate;
- Improve technology diffusion, especially for technologies developed offshore; and
- Role of government in facilitating non-technological innovation.

8.1 Greater capitalisation on public sector research to increase competitiveness: reducing the innovation gap

An 'innovation gap' exists between the research side of Australia's innovation system and the commercial side which impedes the effective and efficient flow of ideas from public researchers to industry. In so doing, the 'innovation gap' impedes the full realisation of economic benefits from Australia's significant investments in R&D and innovation. The 'innovation gap' arises from the research outputs from universities and PFRAs not being adequately developed to the point of being 'investment ready'.

To improve the flow of ideas across the 'gap' to the Australian industry, the science industry is collaborating with commercialisation intermediaries and peak bodies in the research sector to develop a set of framework guidelines for a proof of concept metric.

These guidelines are aimed at assembling the evidence necessary to demonstrate the technical and commercial viability of a research idea to potential investors. The metric would, if implemented appropriately by universities and PFRAs, encourage researchers to develop their ideas to a stage where they are of more interest to industry, particularly Australian industry.

The guidelines would enhance the role of the commercialisation arms of universities and PFRAs. The proof of concept metric would work backwards through the research supply and value chains to provide a clear framework for the activities of research faculties and researchers and to increase their focus on market needs.

The proof of concept metric work builds on the substantial research by the Department of Education, Science and Training into commercialisation metrics.

The Government provides support for proof of concept work on the research side of the innovation system through schemes such as NHMRC's Development Grants. The Commercial Ready scheme provides support to industry for proof of concept work. Science Industry Australia notes, and endorses the intent of Recommendation 13 in the report of the recent Parliamentary inquiry *Pathways to Technological Innovation* which states:

The Committee recommends that the Australian Government introduce a funded proof of concept scheme, based on the Group of Eight Innovation Stimulation Fund proposal and providing the following for university research projects with high potential for commercial outcomes:

- *matched Australian Government and university funding investment in the suggested ration of 3:1;*
- *a maximum funding per project of $100,000; and*
- *funded for an initial three year period to a maximum Australian Government investment of $45 million.*

Any such funding scheme would need to be outcomes focused.

Universities and PFRAs engage in the commercialisation of their ideas with government support through start-up and spin-off companies. This can act as an impediment to the flow of ideas to established companies in industry. Such companies are likely to be better equipped to commercialise research IP provided there is adequate evidence of the commercial potential of the idea.

Start-up and spin-off companies have a low survival rate. This is due in part to the lack of managerial expertise of the researchers who create the companies, the lack of adequate finance to develop, produce and market the product, process or service, and the attractiveness of cashing out the IP. These factors can lead to the IP being acquired by foreign interests, effectively creating a loss of the national benefits from Australia's public investment in the research and development of the idea.

To this end, the science industry endorses the intent of Recommendation 14 in the report of the recent Parliamentary inquiry *Pathways to Technological Innovation* which states:

The Committee recommends that the Australian Government implement additional support mechanisms to specifically assist the progression of innovation through pathways other than the formation of start-up companies.

Cultural issues at the organisational and researcher level in universities and PFRAs impede the transfer of research IP to industry. These are more than adequately explained in the evidence and report of the recent Parliamentary inquiry *Pathways to Technological Innovation*. To encourage greater collaboration between universities and the private sector and develop positive pressures for cultural change, the science industry endorses the intent of Recommendation 11 in the report of the Parliamentary inquiry *Pathways to Technological Innovation* which states:

The Committee recommends that the Australian Government request the Business Industry Higher Education Collaboration Council to examine and develop the business case for third stream funding to universities.

Third stream funding need to be outcomes focused with deliverables to ensure that universities did not redirect the funding into other activities.

8.2 Inter-firm collaboration, including greater international engagement

Government has a range of generic and specifically targeted programs to improve Australia's innovative performance. On the research side of Australia's innovative system, programs such as Cooperative Research Centres, NHMRC Development Grants Scheme, InnovationXchange promote collaboration between researchers and industry. On the industry side, programs such as COMET, Commercial Ready, Innovation Investment Fund, Pooled Development Funds, Pre-Seed Fund and Research and Development Corporations promote inter-firm collaboration with the intention of improving innovation performance.

Some 80% of all scientific products used in Australian manufacturing, education, research and healthcare are imported products. Considering the huge diversity of science products available for use in a laboratory environment, this percentage is not likely to change significantly in the future. That is not to say, that the size of the domestic market (and for that matter the international market) for science products, is not growing: it is particularly so in Australia. This offers promise for Australia's emerging high technology industries which are key users of science products as enabling technology. These high technology industries are likely to offer long term sustainable jobs in Australia.

The SIAA has been developing a program called “Reverse Distribution”. Its focuses on local importers of science products locating intellectual property from Australian universities and other research agencies and make this technology available to their international partners who are manufacturers. This IP then moves out into world markets speedily in finished products. In many cases, the local IP generators are contracted to further develop the technology. In some cases, the IP might exist in SME’s who do not have the ability to access international markets with their products.

The “reverse distribution” program is still under development.

8.3 Building the capacity of firms to innovate

Science Industry Australia recognises that many assistance measures are available from government to address its impediments to growth. The SIAA implementation plan has a number of initiatives that will assist with raising industry's awareness, including those driven by the science industry's peak body, Science Industry Australia. Nevertheless, the industry's lack of awareness of government support offerings remains an issue. The existence of the government website www.business.gov.au is a good initiative, and Science Industry Australia actively promotes the existence and value of this website to its members.

Science Industry Australia has previously expressed the industry's concern at the relatively low turnover cap of $50m for the Government's Commercial Ready program which is attractive to many science industry companies. We are most please to not that on 24 August 2006, Industry Minister Ian Macfarlane announced the raising of the turnover cap to $100m. Whilst this does not provide access to the program for Australia's largest science industry companies it is a most welcome policy development.

The Government’s R&D Tax Concession Scheme provides larger companies with support for their innovation activities. It provides a tax concession for eligible expenditure of 125 per cent, and up to 175 per cent certain other conditions. However, the likely benefits from the program have been eroded, particularly by the high administration and compliance costs.

To quote one firm in the Australian Industry Group’s “Manufacturing Futures” report:

> *“We’ve just finished an R&D Start Grant and the cost of applying for that was horrendous not in terms of having to pay for applying but in terms of the documentation required and the absolute finite detail that was applied.”*

Some of the administrative burden in applying for grants, is required to demonstrate ‘additionality’, that is that the R&D would not be undertaken without the grant. As the Productivity Commission’s own work demonstrates, determining ‘additionality’ is very difficult and the additional costs associated with this reduce the value of the grants. It is not clear why the simple assumption cannot be made that if the cost of R&D is reduced, more will be undertaken. This would enable government R&D support to be allocated to the best ideas/projects, just as ARC and NHMRC grants are awarded to the best applicants without regard to ‘additionality’.

To improve Australia's innovation performance and global integration, Science Industry Australia endorses the intent of Recommendation 15 in the report of the recent Parliamentary inquiry *Pathways to Technological Innovation* which states:

The Committee recommends that the Australian Government assess the revenue implications and potential economic returns of extending the R&D Tax Concessions eligibility to include Australian based subsidiaries of multinational companies.

It also endorses the intent of the following portion of Recommendation 17 in the report of the recent Parliamentary inquiry *Pathways to Technological Innovation* and proposes that:

The Australian Government review the effectiveness of the Commercial Ready Program by 30 June 2007, giving particular consideration to the following program amendments:

- *extending the eligibility to Australian based subsidiaries of foreign owned companies.*

Various R&D support agencies of the United States of America Government offer staged assistance for the development scientific instruments. Smaller grants are provided for the various stages and if the project proponent demonstrates their project to be viable, the government supports it to the next stage. This is enabled by a streamlined assessment and approval process and a risk management approach. Value and national benefits are generated by enabling resources to be allocated to initiating the project, rather than having them consumed in a complex and time consuming application process.

If the Australian Government were to redesign its program design and application processes, the objective would be to create a selection process with a lower administrative overhead that still ensured the integrity of expenditure of public money and managed the risks. A pilot program could be conducted and evaluated to determine the appropriate settings for the program control mechanisms.

With the internationalisation of Australian industry, and industry's greater use of open innovation, government should provide additional support to encouraging international linkages between manufacturers and offshore R&D. The Australian Industry Group's "Manufacturing Futures" report supports this and states:

"…remaining globally competitive requires industry to make better use of global supply chains. This extends not only to maximising supply efficiencies in the production process, but also in taking advantage of global human resources, including innovation expertise."

Australia has a comparative strength in its high quality basic research. However, not all of this research will necessarily be of interest to the Australian science industry. Australia's quality basic research gives us entrée to access foreign basic research, which may be of interest to the Australian science industry. However, for the science industry to take advantage of this global research expertise, government programs require more flexibility in facilitating such engagements. Providing support for international collaboration, and other measures such as trade shows, will provide additional assistance for science industry companies to seek and use opportunities to access relevant foreign R&D.

8.4 Improving technology diffusion, especially for technologies developed offshore

Of critical importance to Australian science industry manufacturers is the need to keep pace (or preferable surpass) technological innovations that emanate from the world's leading manufacturers and research organisations. This is presently partially achieved by local industry funding specific product development projects that might lead to greater uptake of Australian-supplied IP, components, sub-systems or whole units in larger systems; by funding jointly or solely, overseas research projects or by identifying new innovations at the research level by attending international conferences.

On the local front, should the science industry consortium that has submitted an Industry Cooperative Innovation Program grant be successful, it is hoped that the Stream A application will scope out a proposal for a Stream B application, that might lead to the successful design and development of new platform technologies that might replace existing analytical technologies with biotechnology-based solutions.

In March 2005 and again in April 2006, the Science Industry Australia took groups of researchers or early stage commercialisers of scientific technology to PITTCON 2005 in USA and Analytica 2006 in Germany with the purpose of presenting their technology to researchers and manufacturers alike. These actions have lead to ongoing research or product development liaison thus expanding technology diffusion.

END

Regulatory imposts on the industry

The economic cost of complying with regulations is a key determinant of national competitiveness and the investment environment for businesses. Regulatory compliance involves direct costs, indirect costs and opportunity costs. The science industry is dominated by SMEs (estimated to be up to 98 percent of companies in the industry), each of which has few senior managers. With such limited resources available to drive the company's success, having their resources consumed attending to often complex regulatory issues reduces the resources available for the productive strategic activities of driving product development/innovation, increasing productivity, marketing, securing investment and exploring export opportunities.

This has relevance within the Australian science industry, as the major proportion of companies in the industry are SMEs. When the lower critical mass of senior managers in such SMEs is taken into account, the opportunity costs associated with undertaking compliance and associated activities (e.g. keeping abreast of changes across Commonwealth, state/territory and local government regulations) becomes relatively large and a majority contributor to the total economic cost of regulation for a given business.

A recent international comparative review[2] noted that there is universal acknowledgement of the difficulty of determining true compliance costs. Australia is no exception. What is known, however, is that SMEs bear a relatively higher burden of costs than larger businesses. As an example, SMEs with up to 20 employees were reported to incur direct costs that are at least 35 per cent higher than for the largest firm.

An excellent starting point for implementing regulatory reform would be initiatives develop and implement a consistent regulatory costing regime that could be applied across Australia's three levels of regulatory authorities. It is noted that the Australian Government has introduced a costing tool to assist in determining the cost of regulation.

Regulation, or more precisely the development of regulation, is guided differently by each of the partners to the Council of Australian Governments (COAG). One common thread is COAG's 'Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial and Standard-Setting Bodies – amended 2004'.

There are acknowledged deficiencies within the COAG document which attempts, but fails, to be a panacea for all national regulation / standard setting. The case study below provides an example where there has been national (i.e. Commonwealth / state / territory) agreement to a particular course of action (in this case controlling access to drug precursors) yet individual states / territories have generated their own parochial lists of candidate chemicals.

This type of 'national' variation should be managed through the COAG process, i.e. a tightening of the COAG principles and guidelines document, to minimize the economic burden on businesses that operate nationally.

In addition to the COAG document, governments across Australia including New South Wales (NSW), have produced guidance/principles documents that are of varying usefulness and quality. Unfortunately, most of these documents are somewhat dated and do not reflect international best practice. For example:

- Reference is not made to appropriate/relevant best practice risk analysis/risk management/risk assessment methodologies. The risk assessment process should be the prime decision criterion for the implementation or otherwise of regulation and the type/level of regulation implemented.

[2] Regulatory Burdens of Small Business: A Literature Review (2002) Chittenden F, Kauser S, Poutziouris P. Manchester Business School

- Risk can never be zero, and therefore the notion that some risk has to be accepted is not explicitly stated. Instead the default appears to be that any risk requires regulation. Regulators should to grasp the nettle and provide some strong guidance in this area.
- The guidance stops at the implementation phase, whereas the operation aspects of regulatory programs, e.g. the day-to-day interpretation of regulations, is probably the largest area of angst (and therefore cost) of many SMEs. Although the ultimate solution to this problem requires a cultural change within regulatory agencies there is a corresponding need for elaboration of guiding principles.

Changing dynamics of international reforms

Many governments are implementing new strategies and new forms of regulatory and non-regulatory instruments to reduce the compliance costs of achieving public policies. These reform strategies and instruments should, when properly implemented, reduce regulatory costs and achieve improved policy outcomes. Science Industry Australia supports the overall thrust of a number of recent international strategies designed to decrease the overall economic burden of regulations. These include:

Reduction of current (and future) compliance costs. The so-called 'Dutch Model' has been invoked by several economies as an appropriate means to drive a reduction in the economic cost of regulation. The approach has three components:

- measurement of the burden using a standardised approach;
- political commitment to a reduction target; and
- an organisational structure that provides incentives to achieve that target.

Simplification of regulation. This could be through:

- deregulation (removing regulations);
- horizontal consolidation of existing regulations to improve transparency and understanding; and
- vertical rationalisation to replace a variety of sector specific regulations with an over-arching regulation.

A 'One in, One out' approach to new regulation. This assumes that, with few exceptions, the total number of regulations under one agency stays constant, or actually decreases over time. This approach forces individual regulators to prioritise between proposed regulations, and simplifying and removing existing regulations.

Cultural change. This is required both at the stage of developing regulations, particularly with a 'One in, One out' approach, and at the implementation (compliance/enforcement) stage. It is the experience of Science Industry Australia members that 'over zealous' black and white implementation of regulations is a major component of the angst and therefore opportunity cost of most regulations. Those charged with drafting regulation, implementing regulation and enforcing regulation should become more aware of, and responsive to, the impact of the detail of their regulations at the SME level.

Regulatory governance. The shift away from the process of regulation to higher concepts such as effectiveness, timeliness, cost-efficiency, transparency and accountability is occurring across developed economies including Australia. This process is to be commended and should be expedited as it should bring many of the reforms necessary to relieve cost-of-compliance concerns across the science industry within Australia.

Risk analysis. There have been a number of major developments in the application of risk analysis and its components (risk assessment, risk management, risk communication) in the past ten years. This includes:

- an internationally accepted standard developed by Standards Australia (AS4360:2004);
- the wider application of qualitative risk assessment tools where quantitative data is difficult to obtain or cannot be generated;
- the acknowledgement by government and industry of the need to communicate risk in a timely and open fashion in order to counter wrong or misguided perceptions; and, importantly
- the use of risk assessment across ALL aspects of the regulatory process, e.g. design of enforcement programs, setting of thresholds, etc.

Rationalisation of regulators. As an outcome of the 2005 Hampton Review, '*Reducing administrative burdens: effective inspection and enforcement',* the United Kingdom government has moved to reduce 31 regulators to seven thematic bodies. There are similar opportunities available within the Australian context where, for example, up to five federal agencies are involved in regulating the importation of certain goods. Not only does this result in the need for multiple fees, there is time-consuming replication of information. A 'one stop shop' for all regulators (federal or state), or at least, a single form/point of contact can be justified as a means of decreasing the economic cost of compliance.

Improved regulatory oversight. Within NSW, the Legislation Review Committee (LRC) has the task of deciding on the appropriateness of subordinate legislation, ie regulations. The approach it takes uses fairly blunt instruments compared to international best practice. The role and functions of the LRC needs to be either strengthened or strengthened and transposed into another body in order to become best practice. The UK approach provides some guidance here where one agency is now involved in developing standardised guidance for regulatory bodies whereas a separate agency has responsibility for ensuring compliance with these standards, ie a separation of powers.

The role of the Council of Australian Governments

COAG has produced and recently amended (2004) a document entitled *Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial Councils and Standard-Setting Bodies*. This document provides guidance for the two major levels of government to develop regulations that are appropriate, taking into account economic, environmental, health and safety concerns, and minimise inconsistencies across state/territory boundaries.

Although the intent of this document is relatively clear, ie standardisation of regulations across Australia, adherence during both development of regulations and their implementation/enforcement can be variable.

There is usually inter-governmental consultation and therefore standardisation on what are deemed to be major regulatory changes—an example of relevance to the science industry is the controls on the use of ammonium nitrate, a potential agent of terror. However, the detailed changes to the relevant state/territory regulations; such as requirements for labelling, paperwork trails, reporting, monitoring and implementation dates, are far from standardised. In some cases other minor changes are laid on top of previous minor divergences to create larger divergences, thus increasing the burden on industry to maintain up-to-date and compliant with (each) state/territory requirements.

This scenario of high-level adherence to standardisation and low level divergence is common, if not universal in some areas of regulation. Similarly, states/territories invariably invoke different enforcement/compliance regimes, often at the whim of regional offices or even individual officers. It is obvious that the concept of one-country-one-standard does not percolate much below the high level regulatory decision makers. The chain of accountability for regulatory reform and standardisation should be lengthened to include lower levels within regulatory agencies, accompanied by a relevant awareness campaign for relevant regulators and enforcement officers.

The further minimisation of inter-governmental differences in current regulations, and developing and ensuring compliance with regulations, should be one matter to be addressed by a high level COAG working party. The Canadians, who have similar inter-governmental issues to those in Australia, acknowledged the crucial role that inter-governmental standardisation plays in driving regulatory reform in its 2004 report "Smart Regulation". One recommendation coming from this report was the establishment of an inter-governmental working group on regulatory reform in order to drive the standardisation/harmonisation process. We understand this working group is well advanced in the Canadian context. We note that COAG has recently established a ministerial taskforce to develop measures to achieve a streamlined and harmonised system of national chemicals and plastics regulation. Science Industry Australia fully support this initiative.

Action imperatives

The Science Industry Australia believes that the overall economic cost of regulation within Australia can only be lowered through a package of initiatives and that this package should reflect current international initiatives and best practice. There does not need to be a reinvention of the wheel, simply an adaptation of international and national best practice models. These should include:

- Elaboration of a standardised cost model within the Commonwealth and state / territory regulatory frameworks
- Updating of any guides and / or adoption of best practice guides from other jurisdictions
- Updating and expansion of the COAG principles and guidelines (including stronger buy-in by the states / territories)
- Adoption of the three stage 'Dutch Model'
- Adoption of the UK 'One in, One out' approach
- Development of better guidance for those charged with the implementation of, and ensuring compliance with, regulations
- Increased awareness training of regulators and compliance officers of the potential sequelae of badly framed and badly enforced regulation, cultural change
- Adoption of a stronger regulatory governance framework within regulatory agencies
- Adoption of a stronger risk analysis / risk management framework within the RIS process
- Rationalisation of regulators where possible
- Strengthening of the oversight of regulation setting
- Increased use of mutual recognition arrangements within Australia and internationally
- Use of single issue high level taskforces to address regulatory "hotspots"[3]

[3] An example is the recent COAG decision to establish a ministerial taskforce to address regulation of chemicals and plastics

A Case Study to Illustrate State Challenges

In the early 90's the Plastics & Chemical Industry Association (PACIA) and the Scientific Suppliers Association of Australia (SSAA – now SIA), together with the NSW Police Service, developed a Code of Practice to protect against the diversion of chemicals into the illicit production of drugs. The adoption of this code by the Science Industry and the Chemical Industry dramatically reduced the supply of drug precursor chemicals to clandestine laboratories, so much so that the criminals diverted their attention to sourcing pseudoephedrine compounds from pharmacies by way of cold tablets.

The Code includes three categories of chemicals, with Category 1 chemicals only being sold to account customers and only after an End User Declaration (with detailed ID provided) was provided by the buyer. The Code is updated every few years after input from stakeholders.

Over the last few years, each jurisdiction across Australia, including NSW, has seen fit to add or subtract compounds at their pleasure to these categories. Some of these changes are now embodied in legislation, some in regulation and some still to be legislated.

Both PACIA and the SIA serve on the National Working Group on the Diversion of Precursor Chemicals (NWGDPC) which meets quarterly under the patronage of the Attorney General's department. PACIA serve on the IGCD Scheduling Working Party on Controlled Substances (IGCDSWGCS).

At the October 2005 9th National Chemical Diversion Congress in Darwin, PACIA and the SIA made pleas for a return to 1996 COAG principles and guidelines. We were successful in having the Congress accept the following resolution:

- Task one of the two multi-stakeholder committees established under the Ministerial Council on Drugs Strategy to develop a workable, cost effective national model regulation focused on preventing diversion of chemical precursors
- Industry, government and law enforcers could work in partnership to:
    - develop a national model regulation in full compliance with COAG Principles, subject to public comment and RIS processes, and
    - support consistent implementation and promote high level compliance with all obligations
- Chemical Industry fully supports the Federal Government commitment to "promote a consistent and coordinated national approach to policy development and implementation in relation to all drugs issues"

We are able to provide an electronic copy of the variances if it would assist the review.

Maybe we will make progress via NWGDPC. Without model regulation, we are not convinced that we will make adequate progress in this forum. Even with model legislation/regulation, we see variances between States in many areas including weights & measures trade regulation.

In summary, we see a failure in adoption and adherence to COAG principles as being present in this and similar types of instances.

Comment & Observations on the above

The Science Industry Action Agenda (and other Action Agendas) seek a commitment to COAG principles, improved governance & accountability, efficient and cost-effective regulation with national uniformity.

Lack of conformance to COAG principles results in:

- Inefficient regulatory systems imposing inappropriate costs

- Complexity and inflexibility impeding innovation and growth
- Inconsistencies and overlapping responsibilities between agencies and across jurisdictions
- Complexity and inconsistencies undermine industry compliance

We believe the variances from COAG principles goes to the lack of training, awareness and appropriate regulatory impact analysis being undertaken with legislative drafting by Attorneys General departments in the States and Territories.