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Inquiry into increasing the value added to Australian raw materials - industry case studies - submission from Professor Peter B. Hoj , Director of The Australian Wine Research Institute

Summary

It is assumed that the task for the Standing Committee on Industry, Science and Resources is - based on significant evaluation of large datasets - to provide pointers to initiatives which could enhance Australia's ability to value add. It appears to this writer, **that this objective forms an integral part of the broader quest to secure a more innovative culture in Australian industries as part of a seamless innovation system and to enhance our image in overseas markets through a stronger national marketing effort.**

Government cannot pick winners in this regard. The roles of government are to support such developments by putting in place enabling initiatives and infrastructure, and to ensure that national political and economic developments secure a strong base from which industries can enhance value addition and grow their activities. **A long-term sustained culture change amongst researchers and industry participants combined with an enhanced investment in infrastructure, education and R&D forms an integral part of the base from which society will obtain further prosperity and it would appear that this is a profitable strategy to indirectly secure value addition to Australian raw materials, particularly if combined with enhanced marketing activity in key international markets.**

Value adding: innovation, product quality and product image are essential drivers for value adding

Innovation: Innovative behavior is an absolute requirement for effective value addition to raw materials. Culture changes and sustained investment in infrastructure, education and research are prerequisites for an enhancement of innovative behaviour.

Exploding a myth 1: It is commonly assumed by many that innovation activities are confined to 'cutting edge' rocket science leading to completely new insights. However, innovation should more appropriately and simply be defined as 'new approaches' to achieving outcomes in a smarter fashion. For example, the introduction of electronic means to transfer data from an analytical laboratory to a customer via e-mail instead of previously paper-based methods constitutes innovation in the context of the analytical service provider. In the case of a perishable export commodity which, for argument's sake, requires an export certificate, the faster procedures associated with the electronic delivery of results will allow the product to arrive at the export destination sooner and with a longer shelf-life at the point of sale. From the importer's point of view, he/she

would have acquired a product of higher value and would, therefore, be likely to pay a higher price to the exporter.

Exploding a myth 2: Innovation is largely confined to highly technical products such as new vaccines, new engines etc. In my view there is no such thing as a 'low technology industry' but rather industries in which the participants have elected not to employ innovation and high technology, because they traditionally have been able to survive in their old mode. For example, viticultural practices in Europe have largely remained unchanged for a century, *albeit* with a total EU subsidy alleged to be in the vicinity of \$2 billion per annum, whilst modern Australian viticulture, without subsidies, now employs sophisticated soil monitoring, computer analyses of weather patterns for spray strategies, aerial spectroscopy for land management etc. In the future, super-fast computing may allow sorting of individual grapes based on set quality specifications.

In line with the views expressed above, the central assumption by the writer of this submission is that increased expenditure on innovation and innovative behaviour, including education, is a key and perhaps the single most important prerequisite for further value adding to Australia's raw materials.

Observation 1: Whilst government expenditure on R&D in Australia compares relatively well with that of other OECD countries, the business expenditure on research and development (BERD) in Australia is very low by international standards. The recent National Innovation Summit and the kilograms of papers developed in association with this worthwhile event have clearly documented the current state of affairs and a number of initiatives which may change the BERD from its current -0.35% of GDP to a more internationally competitive figure of - 1.0% of G13P. It would be futile to recite the text of the NIS papers and outcomes. Sufficient to say, it is a generally held view that the abysmally low BERD can be changed only through a culture shift amongst both business and research provider communities. *The drivers for such changes should be financial incentives and an enhanced investment in education of our workforce.*

Financial incentives: The Government's recent change to the capital gains tax legislation is a welcome boost to innovation, particularly where venture capital is required. On the other hand the recent reduction of the R&D tax concession from 150% to 125% is likely to be detrimental to BERD - at a time where Australia appears to be falling further behind the first world in regard to BERD and patenting activity. It is acknowledged that some tax concessions can be open to misuse, but it is nevertheless believed that some augmentation of tax driven incentives are called for. The Canadian government has apparently introduced a system of tax credits for innovative firms and this could well be adopted here.

Culture changes: The mindset of whole industry sectors needs to be changed in relation to pursuit of excellence and generation of a desire for constant innovation in a climate where innovation through R&D is seen as an essential investment. For this to happen, the country must stop the decline in funding of higher education institutions and industry sectors must to a larger degree share pre-competitive burdens of R&D in a framework set by a whole-industry plan developed by industry for industry.

Based on some 120 recommendations formulated at the recent National Innovation Summit in Melbourne, four recommendation-clusters have been formed. One of the 'recommendation - clusters' defined by the Innovation Summit Implementation Group is that of changing the culture in regard to adoption of an innovative mindset. To achieve this, in the view of this author, at least two distinct sets of activities are required *viz* -

1. The long term goal of changing the culture through our youth by modulating school and institutional course curricula to emphasize the prosperity that flows from innovative behaviour.
2. The shorter term goal of changing business culture through a mix of publicity, financial incentives and direct presentations.

Ad 1: It is hypothesized that pursuit of activity set #1 is readily achievable and almost certain to give outcomes. The reason for this is the availability of tangible drivers such as government funding to educational providers and/or other incentives/disincentives. Whilst the gestation period might be relatively long, one would almost certainly see tangible outcomes within a period of five to ten years. The necessary justification for such initiatives has already been formulated in various PMSEIC papers and in the 'New Knowledge' paper (Dr Kemp). It is timely to now develop an action plan to achieve this change of curricula across our educational structures. A plan should be formulated and rather than pushing for change across a very broad front, implementation is sought in steps. One could envisage starting with postgraduate courses and development of a national skeleton of an appropriate subject. This subject could then be modulated to suit specific circumstances in individual institutions. Whilst this development should happen within the framework of a plan for the whole of our Institutional scene, and it is time for a high level working group to outline a strategic plan for how this can be achieved. Such a plan should contain specific implementation measures, define the personnel responsible and state timelines as well as financial implications.

It is almost certain that Institutional personnel will be influenced by the students exposed to a 'new' dimension of science and, therefore, in some respects be forced to change their outlook simply because of the expectations imposed by their customers. Hand in hand with this initiative, a change of promotion and other incentives within institutions will have a synergistic effect.

As a follow up to such changes to educational schemes, a fellowship scheme could be implemented to allow Australian graduates to spend time in overseas innovative companies to further their training in practices leading to commercialisation of the science. Properly formulated, such fellowships could involve a partnership between an Australian firm and an overseas firm with a requirement for the overseas posting to be followed by a posting in an Australian entity. This concept could enhance links with overseas innovation systems and the dual posting element is not new, as it has been implemented for some NH&MRC awards, such as the CJ Martin fellowships. In the longer term, our curricula in schools must also be changed and teachers be given the appropriate training to be able to transmit to students the importance and joy of undertaking innovative activity. These issues have been dealt with *in extenso* in papers prepared by a working group chaired by Mr Tim Beasley and presented to PMSEIC (see www.isr.gov.au/science/pmseic/pmseic.html). In the end, there is no substitute for education in an environment that emphasises the need for continual innovation to stay competitive. Any other scheme with very specific activities/sectors in mind are likely to run out of steam.

Ad 2: A lot has been said about all this in numerous background papers, including those presented at the National Innovation Summit. Apart from tax and other economic incentives, the drivers for change of business culture are much harder to define. Substantial papers have been written about this in the background papers to the National Innovation Summit.

Marketing

Value addition to Australian raw materials already happens in many sectors. Grapes for example, are harvested and sold by grapegrowers to winemakers at an average price of -\$600 per tonne. The winemakers subsequently transform a tonne of grapes into wine worth - \$3000 in the export market. The export value of Australian wine can be enhanced further through sophisticated marketing and it could be argued that Australia as a nation is not value adding enough by enhancing the image of its products through trade offices, trade fairs etc. A case for enhanced marketing of our nation and its products is called for. Government clearly has a role to play here whilst observing its obligations under various WTO regimes.

And one last word:

One of the most valuable raw materials available to society is clean water. It is clearly demonstrated that various agricultural practices differ by an order of magnitude in the value addition to this commodity. Some industries are hampered in their ability to expand, despite a willingness to pay up to \$1,000/ML, of water whilst other agricultural practices will enjoy very cheap access to water whilst value adding less than \$ 1 00/ML of water used. Action to clearly price water realistically and make it accessible on that basis to the industries most capable of adding value to this commodity is clearly warranted despite the political difficulties this might pose.

Appendix:

Much has been written about the recent success of the wine industry and its ability to consistently value add to grapes in order to sell a much liked commodity - wine. It is believed that the example set by the wine industry is an important one. The author of this submission recently convened a working party which reported to PMSEIC in November 1999. The full text of this report - *'The Australian Wine Industry - Success through innovation'* can be found at www.isr.gov.au/science/pmseic/pmseic.html. As some of the findings and recommendations from this report appear relevant to the present inquiry, they are reproduced below.

Finding 1

The wine industry has put in place structures ensuring the formation of collective views and collective action. This has been achieved through robust 'user-pays' structures which seek to build and protect the brand name "*Brand Australia*". The industry is dependent on a partnership with Government in which statutory regulations provide an environment which dictates the further development and protection of "*Brand Australia*". This further development of a credible "*Brand Australia*" will be dependent on technology and a culture of learning and experimentation. It is recognised that not all types of products lend themselves to the - "*Brand Australia*" concept. Importantly, "*Brand Australia*" promotion should facilitate, not hinder or replace companies' own brand promotion. A strong sense of "How can we do it better?" rather than "That's the way it's done" exists in the Australian wine industry. While heritage is important to the marketing of its products, the Australian industry does not tend to embody heritage in the way wine is made. In fact, a "heritage of innovation" has become a point of differentiation for Australian wine.

Recommendation 1

Industries should review, establish and manage pre-competitive sharing of user-pays industry programs and structures where appropriate for the benefit of building and maintaining the integrity of "*Brand Australia*". The concept of building a credible "*Brand Australia*" should be backed by technology and expanded across industries with complementary products, for example wine, food and tourism, as the performance of the brand in one sector can affect the brand in another sector.

Finding 2

The unified nature of the Australian wine industry has allowed it to develop a comprehensive plan for growth in which a high degree of ownership has developed collective action. This plan is a main source of envy and the unlikelihood of being able to implement similar strategies in other countries, due to the lack of industry unity, will remain a competitive advantage. The availability of a plan, with innovation as its distinct focus, means that the focus of the industry is retained even when personnel changes.

Recommendation 2

Using the mechanisms to form collective views and actions, industries should, with Government encouragement, formulate strategies for their further development. Such strategies, which ideally would have a time horizon of approximately 20 years, should integrate production, innovation, marketing, competitor analysis and market opportunities, and further identify the requirements for Government to provide a positive investment climate and to facilitate infrastructure development.

Finding 3

The wine industry has been well served by two key providers of education and very strong links with industry are evident both in teaching and research efforts. The CRC program has also helped produce high-quality postgraduates. A free-market approach to the establishment of additional courses will undoubtedly suffer from the lack of critical mass in some instances and diminish industry's ability to interact/contribute/influence education outcomes effectively. It is considered that the interaction of the educators with industry will introduce an application and innovation focus to the educational outcomes, and also ensure that employees can receive skills upgrades in a timely fashion. As a fundamental prerequisite, industry must be encouraged to more actively participate in the education process to secure a suitably qualified workforce. In the longer term, industry will suffer from the lack of a coordinated approach to education and training.

Recommendation 3

Government, industry, and institutions must, through appropriate reference groups, critically review the best approach to deliver optimal education for students wishing to enter defined target (primary) industries and professions. Specifically, the issue of facilitating cross-institutional provision, postgraduate coursework attendance, industry participation and non-traditional modes of delivery, should be investigated. The review must also consider how the flow of PhD trained personnel into primary industries can be accelerated through improving the attractiveness of PhD graduates to industry. This may initially involve a funded facilitation scheme.

Finding 4

The interaction between the wine industry and researchers in Australia is very strong and is a main driver for successful innovation. There is a sense of common purpose and the realisation by researchers, that relevant research outcomes are the drivers for industry's willingness to enhance research and development levies, create a win-win situation. In this regard, the presence of strong strategically focussed industry organisations such as the Winemakers' Federation of Australia is crucial to sustain the industry's research and development push. Evaluation and funding of industry-linked research in the wine industry typically incorporates a credible and real 'two-way' technology diffusion path. This research should be both informed and endorsed by industry priority reference groups. Even better outcomes would be ensured if barriers to interaction between researchers and industry were removed whilst facilitating structures should be put in place. Furthermore, government must recognise that market failure frequently exists with respect to industry research and development. This is evident in the wine industry which has many small operators with high risk and high costs in some research areas. A case is made for sustained government investment in research and development in the long term. The example set by the Grape and Wine Research and Development Corporation, which linked its research and development planning to industry planning, is laudable.

Recommendation 4

Government, industries and research providers should identify mechanisms to form long term links between researchers and target industries. These should be both in relation to identification of research needs and the implementation of research results to provide commercial outcomes. Such mechanisms include promotions criteria, funded staff exchange, intellectual property rights, and industry reference groups. The short-term nature of some research grants is not conducive to planning and building of lasting relations between research providers and industry. Provision should be made to

introduce longer finding cycles to research providers/industry partners with a good track record and to further strengthen research through the Rural Research and Development Corporations and Cooperative Research Centres.

Finding 5

Innovation is a global phenomenon. Australian winemakers and viticulturists travel widely, ensuring that ideas are "harvested" from all over the globe. Industry personnel are also avid readers of the literature, often applying new knowledge from overseas before it is adopted in the country in which it originated. Mechanisms to capture overseas innovation and evaluation in an Australian context must be developed and encouraged. 'Copying' and evaluating known principles can be a particularly rapid and relatively cheap way to innovation and economic growth. Restrictive criteria or funding of research and development activities will often prevent funding for such 'ordinary' activities to flow through.

Recommendation 5

Research agencies and industry must enhance existing schemes, and where necessary develop new schemes, to ensure that Australian industries have access to the total pool of global innovation through benchmarking, exchange schemes and formation of funded international links.

Finding 6

Many of the most important innovations stem from outcomes of basic research and will be adopted by strategic researchers only if the latter have achieved appropriate training in a quality research environment.

Recommendation 6

Government must continue to recognise that basic research is fundamental in a knowledge driven economy. Institutions must, however, demonstrate that their researchers and educators have an understanding of the path to application of research outcomes and integrate such knowledge into the training of their graduates. Specifically it is recommended that all PhD programs must include components that familiarise the students with the essential steps and satisfaction to be gained from bridging the gap between the science and its application.

Recommendation 7

In recognition of the increasingly multidisciplinary nature of research and development as well as the cost-effectiveness of sharing resources, governments must strongly encourage the development of research clusters and the development of shared visions and plans for such clusters. Industry specific research institutes should almost certainly be co-located with other research and educational providers.

Yours sincerely

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