



**VICTORIA  
UNIVERSITY**

**A NEW  
SCHOOL OF  
THOUGHT**

## **INPUT FOR THE DEVELOPMENT OF THE NATIONAL ENABLING TECHNOLOGIES STRATEGY (NETS)**

**SUBMITTED TO:**

Mr Vern Lim

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## **PURPOSE**

The purpose of this discussion paper is to follow up and document some of the ideas discussed between the author and Mr Vern Lim during recent telephone conversations in response to his request for input into the development of a new **National Enabling Technologies Strategy (NETS)**.

Specifically, the focus of this discussion paper will be to provide a broad overview of what we perceive to be the key issues and challenges that NETS need to address, as well as how we believe that Victoria University could work with DIISR and other key stakeholders to achieve a successful implementation of NETS.

## **INTRODUCING VICTORIA UNIVERSITY**

Victoria University is a multi-sector university that provides high quality higher and vocational education to students from a diverse range of backgrounds. It has multiple campuses and sites across the Melbourne CBD and the city's western suburbs, spanning eight local government areas within Melbourne. Victoria University also conducts offshore programs with institutional partners throughout Asia and Europe. It has a number of research centres and institutes, and the acknowledged research strengths of the University include active living and elite performance; social inclusion, cultural diversity and wellbeing in the community and workplace; sustainable tourism; technologies for a sustainable environment; and telecommunications, micro-electronics and sensor technologies.

Further information is available in the attached booklet *Introducing Victoria University*.

## **ISSUES & CHALLENGES**

We believe that there are a number of strategic issues and underlying conditions that are, and will continue to impact on the development and growth of enabling technologies such as biotechnology and nanotechnology in Australia. While recognizing that some of these issues are very complex, there are a number of key factors to be considered in the context of future policy development and implementation. Hence, a 'systems' approach to the development of enabling technologies can be considered. The seven factors that appear to be most significant with respect to future policy choices are:

- ▶ Education and skills
- ▶ Leadership
- ▶ Investment
- ▶ Research and development
- ▶ Community and society

- ▶ Collaboration
- ▶ Market and product development.

**Education and skills** concerns the presence or absence of education and skills programs in primary, secondary, vocational and tertiary institutions that are attentive to enabling technologies. This factor also relates to the extent to which learning programs are linked to the needs of the workplace, ensuring a balance between theory and practical content.

Australia already has a good range of general science and engineering courses and more specific biotechnology and nanotechnology courses available at secondary and tertiary levels. The secondary education nanotechnology initiative at St Helena Secondary College in Victoria provides an outstanding base, which is currently being converted into a national curriculum. However, the largest gap appears to be education and skills development for the executives, tradespeople, educators and policy makers who have left the education system, but now make up the bulk of the leadership, managers and operators in industry, government and education. Future initiatives should be focused at both vocational and higher education levels to address these gaps. Research may be required to quantify future workforce requirements in various industries that are deploying enabling technologies. Additionally, resources should be deployed to assist educational and training institutions to develop relevant curricula at all levels to prepare individuals for what are commonly referred to as 'green jobs'.

**Leadership** refers to the extent to which individuals or groups are championing and advocating the cause of enabling technologies and pioneering the way forward. It includes leaders in government, industry, research and academia.

Leadership regarding enabling technologies to date is viewed as fragmented and relatively ineffective. Hence, the recent initiative of the Federal Government to develop NETS and consolidate previous efforts is a welcome step. Academia can provide additional and independent leadership, particularly with respect to controversial issues such as safety and regulation. Furthermore, key national industry bodies have a leadership role to play with respect to educating their constituents about the opportunities available to enhance their respective competitive advantage via the adoption of enabling technologies in their products and services.

**Investment** comprises venture capital, grants and all forms of financial support to developmental activities related to enabling technologies.

Investment is widely considered to be currently insufficient to meet all potential developmental activities related to enabling technologies. This is a highly complex issue with no easy solutions. One approach of NETS may be to position Australia as a 'niche' player globally with respect to enabling technologies, and focus investment decisions in specific areas of existing strength.

**Research and development (R&D)** describes the level of activity in searching for and uncovering new applications for enabling technologies. The two are considered as an

inseparable pair as research that does not result in tangible outcomes that benefit society lacks an important component of worth and purpose.

Australia's R&D effort and investment to date is well engaged with enabling technologies. Additionally, several State Governments, notably those in Victoria and Queensland, have made significant investments over past years in biotechnology and more recently, nanotechnology programs, activities and related infrastructure. The comments made above regarding investment are equally applicable to R&D expenditure and industry.

**Society and community** relates to the extent to which Australia is aware of the role and importance of enabling technologies. This includes the accompanying community expectation that Australia has a rightful place amongst international practitioners in research, design, manufacturing, marketing and sales.

The efforts of Biotechnology Australia and the Australian Office of Nanotechnology (AON) to provide community education and raise interest and awareness in biotechnology and nanotechnology respectively are acknowledged. However, more needs to be done. One key area for consideration, and possibly research, is the social issue of equity as it relates to exclusion/inclusion or access to enabling technologies for all Australians. Additionally, work is required to quantify the current and future economic impact of enabling technologies on Australia's economy – while groups such as Lux Research in New York have estimated the global economic impact of enabling technologies, no such analysis has been done at a national level, yet this would be an extremely valuable input in strategy development.

**Collaboration** refers to the extent to which Australia is engaged at the local, national and international levels. It relates to quality as well as quantity.

While collaborative efforts are developing on a number of levels regarding enabling technologies, more is yet to be done. Further research collaborations need to be encouraged between Australia and overseas partners in order to leverage the global investment made by international governments in enabling technologies. Closer collaboration between Australian research organizations and industry, particularly SMEs is highly desirable. Finally, closer collaboration between the Federal and State Governments with respect to strategy formulation and implementation of programs related to enabling technologies will reduce duplication of activities and avoid unnecessary waste of resources.

**Product and market development** describes the commercialisation efforts and results. It recognizes the importance of product and market transactions to fuel broad interest, public and community support, commercial activity by retail and wholesale industries and support by government and regulatory authorities.

While Australia has an established biotechnology community and some application of nanotechnologies by industry, the adoption of enabling technologies by the Australian business community is far from widespread. There is clear role for the Australian research community to facilitate knowledge transfer of enabling technologies to relevant industry partners. Furthermore, concerns regarding OH&S, safety and regulatory issues have not been adequately addressed and developments in these areas have lagged the technological developments.

## **ROLE OF VICTORIA UNIVERSITY**

Victoria University believes that it is one of a number of stakeholders who can make a key contribution to the development and implementation of NETS.

As a dual sector educational institution, Victoria University is well positioned to develop and provide a range of programs to meet the future workforce needs of organisations adopting enabling technologies from certificate to PhD level.

Current Victoria University R&D efforts related to enabling technologies are focussed on water and medical sensors and devices. Victoria University is open to further collaborative opportunities and commercialising its research outputs.

With respect to society and community, Victoria University's Institute for Community, Ethnicity and Policy Alternatives (ICEPA) has a number of academics which specialise in social inclusion/exclusion who could be utilised in policy development, community education, knowledge sharing or research into the societal impacts of enabling technologies. Furthermore, the Centre for Strategic and Economic Studies (CSES) in the Faculty of Business and Law is well positioned to undertake economic modelling and analysis as well as foresighting activities. The CSES has previously undertaken consultancy activities for the State Government of Victoria with respect to small scale technologies.

## **NEXT STEPS**

Victoria University is ready to engage in dialogue and activities related to the implementation of NETS that are congruent with its vision and mission. At the invitation of DIISR, the author will attend the forthcoming NETS roundtable to be held in Melbourne on 18 August 2009.

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*About the author:* Tina Rankovic is currently the Director Innovation and Commercial Development at Victoria University in Melbourne. In 2006, Tina was appointed the inaugural Chief Executive Officer of the Australian Nano Business Forum (ANBF). In this role, she co-authored the state's *Nanotechnology Statement* at the request of the Department of Innovation, Industry and Regional Development and convened a national workshop, as part of a global initiative, to develop a voluntary Code of Conduct for the responsible development of nanotechnology ('Responsible NanoCode'). Prior to this, Tina was the Director, Commercialisation - Life and Physical Sciences for Monash Commercial where she was responsible for the commercialisation of intellectual property arising from the Faculties of Medicine, Nursing and Health Science (Clayton campus), Science, Engineering and nanotechnology at Monash University. Before joining Monash Commercial, Tina was the inaugural Head of Commercialisation at the Baker Heart Research Institute from 2002 to 2005.

Tina's undergraduate qualifications are in applied science. Additionally, she holds a Graduate Diploma Management from the Royal Melbourne Institute of Technology and a Master of Business degree, majoring in innovation and marketing management, from the Australian Graduate School of Entrepreneurship at Swinburne University of Technology.