

## Effective networks the key to success

For many the concept of nanotechnology is the name given to their Apple Ipad that can hold ever increasing numbers of songs, films and photos. Yet, in America nanotechnology is the largest federally funded science initiative since the country put a man on the moon. This reflects the significant opportunities provided by this enabling technology in the fields of research, development and new commercial products.

Nanotechnology is the precision engineering of materials at the scale of  $10^{-9}$  metres and emerged only in the last 50 years, as with new developments in Scanning Electron Microscopes scientists became aware that at this scale new functionalities can be obtained, resulting in products, devices and processes that are able to transform various industries.

While the science at the scale of 10 hydrogen atoms may be baffling, it's the economics behind these efforts that make sense. Back in late 2004, a report by New York based research firm Lux Research forecast

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that the global value of goods incorporating nanotechnology could be as high as US\$2.6 trillion, with international demand for two million direct and seven million indirect employees. Lux has since updated its forecast upping the value to over US\$3 trillion. In Australia, Queensland Chief Scientist Professor Peter Andrews has estimated that the value of nanotechnology for Australia could be as high as \$60 billion, employing some 250,000 Australians.

Nationally and internationally, Australia has a strong reputation for research and development, innovation and entrepreneurial endeavour. So are we a serious player in this revolution that some predict could be incorporated into around 15% of all products in a few years from now?

There are promising efforts. Australian nanotechnology research has already led to product applications by delivering breakthroughs in key areas of climate change, energy, medicine, consumer goods as well as applications for sectors including mining, manufacturing, health care, construction, automotive and chemicals.

Australia's commitment to research in nanotechnology is strong and we have world leading researchers operating in excellent infrastructure facilities through both universities and publicly funded research institutes. Australian research especially in materials, nano-bio (medical), electronics and photonics and energy and environment are strong. In terms of research and infrastructure, funding from the Federal Government especially has been strong. However, the transfer of research into consumer products and knowledge transfer related to nanotechnology has not been funded. As a result, take-up of nanotechnology by industry has been slow, a view supported by a report released in February 2010 by the Australian Academy of Science (AAS), which analysed the state of nanotechnology in Australia based on qualitative and quantitative research during 2009.

The Nanotechnology in Australia Trends, Applications and Collaborative Opportunities report demonstrates that although Australia continued to grow its international research reputation in the nano-field, "the most significant issue identified was the need to increase the number

of collaborations between different types of organisations, particularly collaborations between universities/institutes and industry/business, and between universities/institutes and government research organisations".

Accordingly, a key recommendation addresses the need for long term funding to be allocated by the Australian Government to an integrated nanotechnology network that simultaneously represents the needs of research and industry, and which is supported according to typical innovation development timeframes.

At the Australian Nanotechnology Alliance (ANA), the peak body for nanotechnology in Australia, we agree wholeheartedly. The ANA is based on a triple helix business model in which the key stakeholder groups (research, industry and government) are encouraged to interact and collaborate. While the model has worked quite well, adequate resourcing is becoming critical, especially when the majority of businesses that need to become aware of the technology are in the small and medium category.

I acknowledge the argument that business associations and networks should be self-sufficient. However, this should not be expected in the case of an enabling technology that has reach and application for every single industry within Australia!

The Nanotechnology community is very aware of the importance of having a network that can bring those links from research into industry both domestically and internationally. Since the cessation of the federally funded Australian Office of Nanotechnology almost two years ago, the ANA and other materials science networks have been patiently waiting for the Government's next move. Finally, in February the Innovation Minister Senator Kim Carr also announced the much awaited National Enabling Technologies Strategy (NETS).

In financial terms NETS offers \$38.2 million over four years, with already \$18.2 million earmarked for the National Measurement Institute. This leaves \$10.6 million to support policy and regulatory developments, and \$9.4 million for public awareness and community engagement.

ANA support the idea that project money is available for engagement activities, and we shall be submitting a number of proposals looking at innovative ways to encourage companies (regardless of their size) to look at utilising materials science in their production processes.

The launch of NETS coincided with Australia's premier nanotechnology conference *The International Conference on Nanoscience and Nanotechnology* (ICONN) and in the discussions there was a general feeling that NETS could deliver one of the missing pieces to the nanotechnology and materials science eco-system, and deliver a number of significant projects rather than a large number of small projects that will not consolidate existing activities.

With the tremendous research and infrastructure structures that Governments at all levels have developed, it would be a terrible shame if as a result of lacking resourcing we cannot build the collaborative links necessary in this new technology sector for getting the research to commercialisation.

