

Background to the Centre's Research on Innovation in the Biotechnology Sector

The United States Studies Centre Research Program on Innovation, funded by the Merck Foundation, undertook two comparative research projects in 2009-10 on the development of the biotechnology industry in San Diego and three Australia capital cities.

The broad purpose of the research program on innovation is to learn from the experience of innovation in the United States in order to improve the environment for innovation and the commercialisation of new ideas in Australia.

Innovation in Australia and the United States

The similarities and differences between Australia and the United States in their scientific infrastructure and overall innovation performance can be summarised briefly as below. A more detailed comparison can be found on this website in the report, *Innovation in America*, by Thomas Barlow.

Similarities

- High innovation in services sector
- Similar level of R&D investment relative to GDP in government agencies, universities and non-profit research institutes
- Similar discipline mix in R&D:
 - 56% in biosciences;
 - 26% in physical sciences;
 - 10% in social sciences;
 - Australia is underweight in engineering & technology
- High quality of basic science
- High immigration rate

Differences

- Small national market in Australia:
 - US GDP in 2008 was \$14,264 bn (23.5 % of world GDP) , whereas Australia's was \$1,010 bn (1.7 %)
- Clusters are well developed in US; much smaller & less concentrated in Australia
- Lower expenditure on education overall and on tertiary education in Australia and little private higher education
- Less focus on basic research in universities than in the US
- Australian per capita **business** spending on R&D amongst lowest in OECD and lower than many US states
- Fewer scientists, engineers than US; but lower cost
- Less developed venture capital market
- Lesser achievement orientation in Australia, more egalitarian

San Diego relative to three Australian capital cities

The reasons for the focus on biotechnology clusters in the first phase of the program, and on San Diego relative to three Australian capital cities are:

- Clusters are a basic feature of any national innovation system
- Comparative study of cluster formation can reveal areas of difference and potential for change
- Biotechnology is important: it accounts for high and growing share of employment and health spending is growing fast in developed world, coupled with opportunities for biotech innovation in agriculture, green energy and materials
- The majority of innovations in biotech originate in start-up companies rather than in mature pharmaceutical companies

San Diego is a useful comparator to the Australian cities because:

- Biotechnology has grown rapidly from a low base
- The area did not have the advantage of a major private university but had developed with the leadership of the state-funded University of California San Diego.
- There was a highly developed industry-government-university partnership
- The business structure included a mix of start-ups and medium-scale corporations
- Its population is comparable with that of the larger Australian capitals

San Diego had also evolved markedly over time, from its initial dependence on hospitality and tourism and the US military, through the development of logistics, power generation, analytical instruments, education, communications and information technology, to biotechnology, pharmaceuticals and medical devices.

Two papers from this program have now been published and are available on the Centre's website:

Development of the San Diego Biotechnology Cluster

By Professor Mary Walshok and Dr. Nathan Owens, Global CONNECT, University of California San Diego

Biotechnology Clustering Study

By Dr. Thomas Barlow, Principal Barlow Advisory, Research Associate, United States Studies Centre

The two research projects were presented to a group of experts at a working meeting in June 2010. A list of participants is attached.

List of participants at June Working Group Meeting

USSC Committee on Innovation

Mr. David Anstice (Chairman), previously Executive Vice President, Strategy Initiatives, Merck & Co. Inc., currently Chairman of the University of Sydney USA Foundation and director of CSL Limited;

Professor Peter Andrews AO, Queensland Chief Scientist, Chairman of the Queensland Biotechnology Advisory Council, co-founder of Queensland's Institute for Molecular Bioscience;

Mr. Bruce Kean AM, former CEO Boral Ltd, Chairman, ATSE Clunies Ross Foundation and director, Neuroscience Victoria Ltd;

Hon. John Olsen AO, Deputy Chairman & CEO of AAA Ltd., former Consul-General in New York and former Premier of South Australia;

Professor Bruce McKern. Director of Research Program on Innovation, Professor of International Business, University of Sydney, Visiting Fellow, Hoover Institution, Stanford University

Other participants

Dr Thomas Barlow, Principal, Barlow Advisory; Research Associate, USSC

Ms Kiara Bechtha-Metti, Executive Manager, Agribusiness, Commercialisation & Equity Portfolio, CSIRO Operations

Hamish Hawthorn, Chief Executive Officer, ATP Innovations Pty Ltd, technology business incubator owned jointly by four Sydney universities

Dr. Greg Horowitz, Executive Director, Global CONNECT, University of California, San Diego (by phone)

Ms. Narelle Kennedy, CEO, Australian Business Foundation

Dr Peter Malloy, Principal, Aquarius Consulting; founder of several start-ups and former CEO of Biota, former head of Strategic Marketing for Asia-Pacific and Latin America for Pharmacia & Upjohn. (by phone)

Dr. Matthew Morell, Theme Leader, Future Grains, Food Futures Flagship CSIRO

Dr Nathan Owens, Global CONNECT, University of California, San Diego (by phone)

Dr John Parker, CTO for Implant Systems, NICTA. Former CTO of Cochlear.

Michael Quinn, Managing Partner, Innovation Capital. Director of ResMed, co-founded Memtec and Chairman of the New South Wales Entrepreneurship Centre Ltd.

Don Scott-Kemmis, Senior Fellow, Australian Centre for Innovation and International Competitiveness, Faculty of Engineering, University of Sydney

Professor Michael Vitale, Director, Monash Asia-Pacific Centre for Science and Wealth Creation, Monash University