

Making Universities More Entrepreneurial

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Pressures to be more entrepreneurial

- Governments around the world want to see return on university research investments
- Development agencies see universities as drivers of local and national economies
- Industries desire university collaboration in R & D; technology transfer
- Communities desire social benefits of university innovations
- Universities want to recruit, reward and retain creative staff and/or raise funds

Barriers to entrepreneurship

- Corporate culture
 - ◆ Needs to support commercialisation and other efforts to improve economic and social well being of society
- Lack of promotion/rewards for faculty
- Lack of commercialisation expertise
- Poor industry and/or community relations
- Questionable financial returns

Commercialisation activities

- Contract research
 - ◆ Bulk of most universities' commercial income
- Licensing of patents
- Spin-off companies
- Incubators
- Technology parks
- Internships

Social entrepreneurship

- Student research projects & internships
- Community service
- Free clinics
 - ◆ Medical and dental
 - ◆ Business
 - ◆ Counselling
- Collaborations, sponsorships & scholarships
- Open lectures, public events, conferences

Why Engage in Commercialisation?

University of Michigan President ,Mary Sue Coleman, said in 2005:

“Many people are often confused about why we are interested in technology commercialization, in nurturing start-up companies, and in facilitating more patents and license agreements. It is not about the promise of future revenues that might be generated from this activity...It is not about the money. ...

Technology transfer must serve our core mission: sharing ideas and innovations in the service of society’s well-being.”

Public policy drivers

In 2007 the Australian Productivity Commission said:

“... [the] policy framework for universities should be focused on maximising the social return from public investment in R&D through the transfer, diffusion and utilisation of knowledge and technology. The pursuit of financial returns from the sale or licensing of intellectual property, and the creation of university spin-off companies, while important pathways in their own right, should not be to the detriment of this overarching objective”.

Public policy drivers

In 2002, the Australian Department of Science, Education and Training said the four non-financial reasons to engage in commercialisation are to:

- Facilitate the commercialisation of research for the public good;
- Promote economic growth;
- Forge closer ties to industry; and
- Reward, retain and recruit faculty and students.

Areas of University Technology Transfer & Commercialisation (TT&C)

- Approx 50% is in life sciences
- Approx 35% is in electronics/ICT and physical sciences
- The balance is everything else

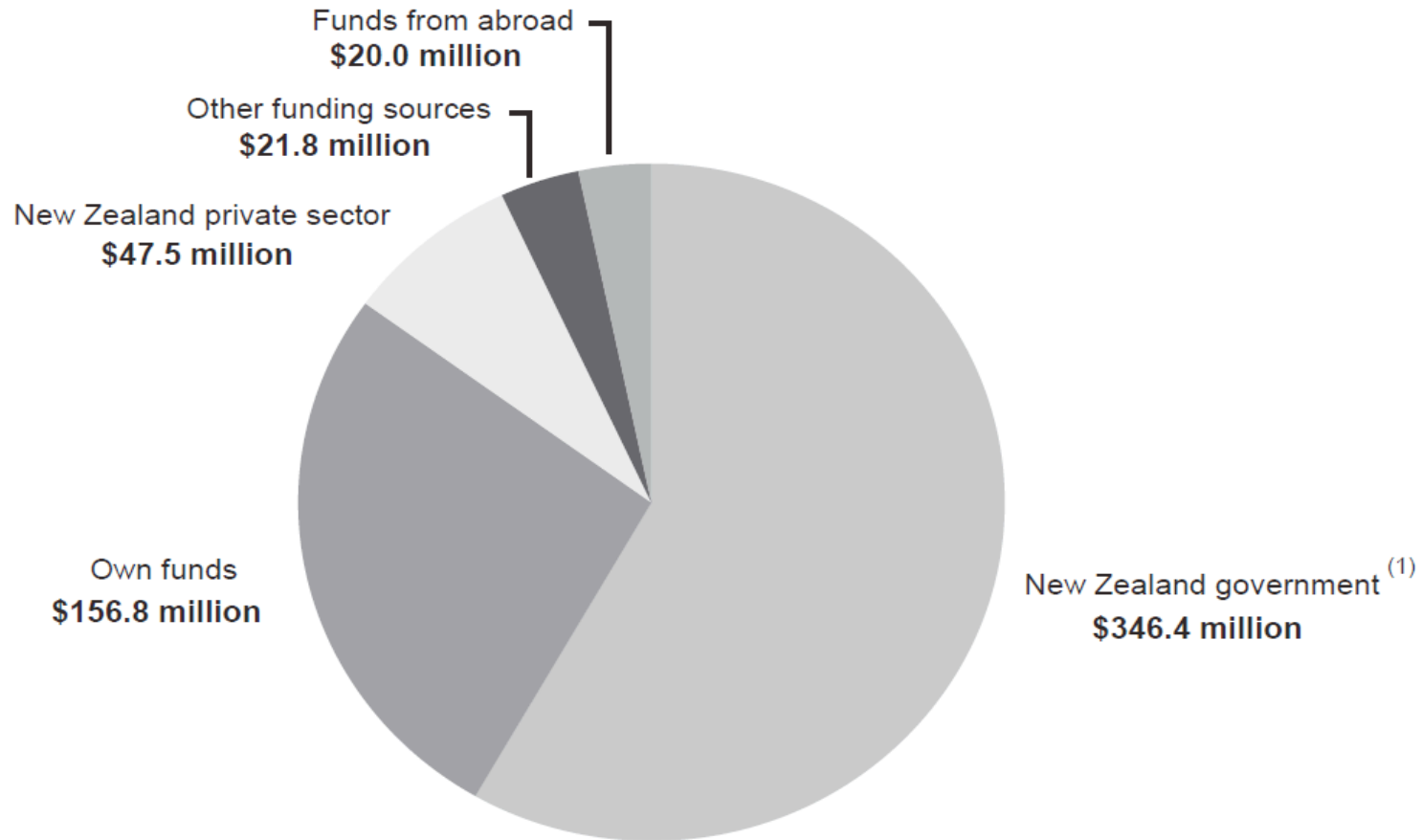
Sources of Research Funding

Statistics New Zealand data for 2006 data were:

- Total research and development (R&D) expenditure was \$1,826 million, a 10 percent increase since 2004
- Business sector R&D expenditure was \$763 million, up 12.7 percent since 2004
- University sector R&D expenditure grew 13.6 percent to \$593 million
- Government sector R&D expenditure grew 1.8 percent to \$469 million
- The major funding for all R&D was from government and business sources. Government funded \$785 in 2006, up 8.0 percent from 2004, while business funded \$753 million, up 18.6 percent from 2004. Ninety-five percent of all R&D was domestically funded in 2006.

Source of Funds for Higher Education Research and Development

2006 reference year



(1) Includes New Zealand government research contracts and funds from the Tertiary Education Commission (TEC). TEC funds include those from performance based research funds.

Economic Contribution - USA

Contribution to the United States economy in 2005 was estimated by AUTM to be at least:

- \$42 billion plus in R&D expenditures at US academic centres
- 4,932 new licenses signed in 2005
- 28,349 current, active licenses
- 527 new products introduced into the market in 2005
- 3,641 in the 8 years from FY98 through FY05
- 628 new spin-off companies created in 2005
- 5,171 new spin-offs since 1980

Performance is Concentrated

United States

Of \$1,593 million in licensing income reported for the 2005 year across 153 universities in the US:

- Almost half (\$720 million) is attributable to 2 universities;
- 70% is attributable to 11 universities; and
- 78% to 16 universities

Social Contribution

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Social Contribution

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Economic Contribution - Canada

Contribution to the Canadian economy in 2005 was estimated by AUTM to be at least:

- Over \$4.2 billion in R&D expenditures at 36 Canadian institutions;
- 565 new licenses and options signed;
- 1,433 invention disclosures and 685 patent applications (an increase of 20% over 2004);
- 37 new spin-off companies created; and
- Licence income of \$52,863,816.

Performance is Concentrated

Canada

Of \$52.9 million in licensing income reported for the 2005 year across 36 (of 92) universities in Canada:

- Over half is attributable to 2 universities; and
- 70% is attributable to 5 universities

Note: of the \$4.234 billion in research expenditure reported for the 2005 year across 36 universities, almost two-thirds (\$2.764 billion) is attributable to just 9 universities.

Economic Contribution - Australia

Contribution to the Australian economy in 2004 from publicly-funded research commercialisation was estimated as:

- \$3.4 billion in research expenditures at universities
- Income from licenses, options and assignments of over \$59 million
- Contracts and consultancies worth almost \$900 million
- Equity holdings valued at almost \$185 million
- Institutions estimated returns from new businesses were in the order of \$3 billion in 2003 and \$4 billion in 2004
- The cost to institutions of conducting research commercialisation activities was almost \$70 million

Performance is Concentrated

Australia

Of \$34.5 million in licensing income reported for the 2004 year across Australia's thirty-nine universities:

- 39% is attributable to 1 university;
- 58% is attributable to 2 universities; and
- 77% is attributable to 4 universities

Of \$3,470 million research funds expended by universities :

- 63% went to the Group of 8 research-intensive universities

Social Contribution

Australia

Appendix One

<i>Case studies of ARC-funded research projects</i>	76
Cochlear Limited	76
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VentrAssist™	78
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Radiata	80
Quantitative Phase Technology	80
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Economic Contribution - NZ

Contribution to the New Zealand economy in the period 2003-2006 from university commercialisation was estimated by a UCONZ survey as:

- Commercialisation activities yielded of \$1.2 billion dollars, with income now at \$350 million a year
- 736 new invention disclosures were received by university commercialisation offices
- 303 new patents were applied for and 97 patents were granted
- 156 licences were issued
- Technology licensing revenue over \$10 million from 210 active licences in 2006
- Contract research revenue increased from \$201 million in 2003 to \$275 million in 2006
- 29 new start-ups were formed, with a total of 44 operating in 2006
- Full-time staff employed by start-ups has grown from 198 to 363
- Over \$155 million of capital raised for start-ups

Performance is Concentrated

New Zealand

- Little publicly available data on commercialisation performance of individual universities
 - UCONZ (technology transfer offices association) does collect some data but aggregates this and does not disclose individual results

Factors Influencing TT&C Performance

- University commercialisation structure and processes;
- Incentives for research staff to engage in commercialisation;
- University culture and support for entrepreneurship;
- Early stage financing and venture capital;
- Quality and depth of linkages between universities and industry;
- Intellectual property;

Influences (cont).

- The role played by joint research centres;
- The characteristics of local industry;
- Industry clusters;
- Intermediaries in the commercialisation process;
- Technology parks and incubators;
- Smaller and regional universities;
- The role of government.

Conclusions:

How to make NZ universities more entrepreneurial?

- Knowledge about the organisational cultures, and commercialisation and social development policies and practices of NZ universities is limited, therefore we are:
 - Conducting case studies of all 8 universities
 - Surveying stakeholders' perceptions of the drivers & outcomes of commercialisation in all NZ research institutions

Conclusions (cont.)

- Overseas studies suggest that the key drivers of university entrepreneurship are likely to relate to:
 - Culture (e.g. role of the institution in society, entrepreneurial orientation)
 - Strategies and structure (in particular senior management support)
 - Resources (e.g. systems, expertise, networks)
 - Rewards
 - Success
 - Environment (e.g. location, industry infrastructure)