NEW ZEALAND BIOTECHNOLOGY INDUSTRY GROWTH REPORT 2008

SUMMARY

INTEGRATE ENABLE LEAD ADVOCATE

MINISTRY OF RESEARCH SCIENCE + TECHNOLOGY

TE MANATŪ PŪTAIAO

New Zealand TRADE & ENTERPRISE

MINISTER'S FOREWORD

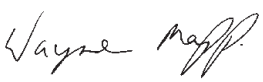
New Zealand's future productivity is built upon our innovative ideas in the biological sciences. This New Zealand Biotechnology Industry Growth Report is an in-depth and independent look at the biotechnology industry in New Zealand and how it has progressed in the two years since the original study in 2006. It shows the important developments in the biotechnology sector and identifies some exciting new trends.

The world faces significant challenges as we go forward into the future in economics, the environment, human health, and in our ability to meet ever-growing global food and fuel needs. Continuing growth in the biotechnology sector is imperative as we attempt to tackle some of these challenges and work towards creating a sustainable bioeconomy.

New Zealand has a strong history as an innovator, particularly in the biological and agricultural sciences. Our leading-edge technologies in these sectors are world-renowned and their profile has continued to grow in the last few years. As this report highlights, Government remains a strong supporter of this flourishing industry, investing almost $250m across the biotechnology sector.

This report shows the growth in the industry between 2005 and 2007 with the total number of organisations engaged in biotechnology activity increasing by 33%. Along with this came a growth in employees in the biotechnology sector of 78%. Net profit of the core biotechnology sector has more than doubled in the last two years and total core sector income grew by 23% from 2005. This is a significant rate of growth.

I hope you enjoy reading this in-depth and independent examination of the last two years developments in New Zealand's growing biotechnology sector. Biotechnology has made and continues to make a major contribution to increasing our productivity and ultimately our prosperity.



Dr Wayne Mapp
Minister for Research, Science & Technology

NZBIO FOREWORD

Welcome to the second New Zealand Biotechnology Industry Growth Report.

Since the inaugural report was published in 2006 New Zealand's biotechnology industry has made steady progress in many key areas and we are delighted to see the sector is continuing to build on its solid foundation.

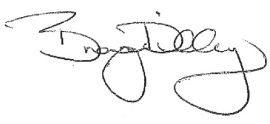
This is evidenced by the increased number of companies and people employed by the biotechnology sector, greater company expenditure and in some cases, greater income.

This report also shows an increase in biotechnology sector exports and a growing international profile for many of New Zealand's biotechnology companies, as local firms launch their products and become established in global markets.

As the industry organisation for New Zealand life science companies NZBIO has seen a rapid maturing in the local biotechnology sector. This is driven in part by exposure to international markets and increasing commercial expertise within companies and from the industry's professional service providers.

New Zealand's biotechnology industry may be small in comparison to those of bigger countries and more established markets, but in terms of capability and expertise we are in many cases second to none. At a global level this industry has some unique challenges and also significant potential to contribute to a stronger, healthier and greatly enhanced future.

I would like to thank the Ministry of Research Science & Technology, New Zealand Trade & Enterprise and LEK Consulting for their support and input in preparing the second NZ Biotechnology Industry Growth Report. We trust you will find it useful and interesting reading.



Bronwyn Dilley
NZBIO Chief Executive

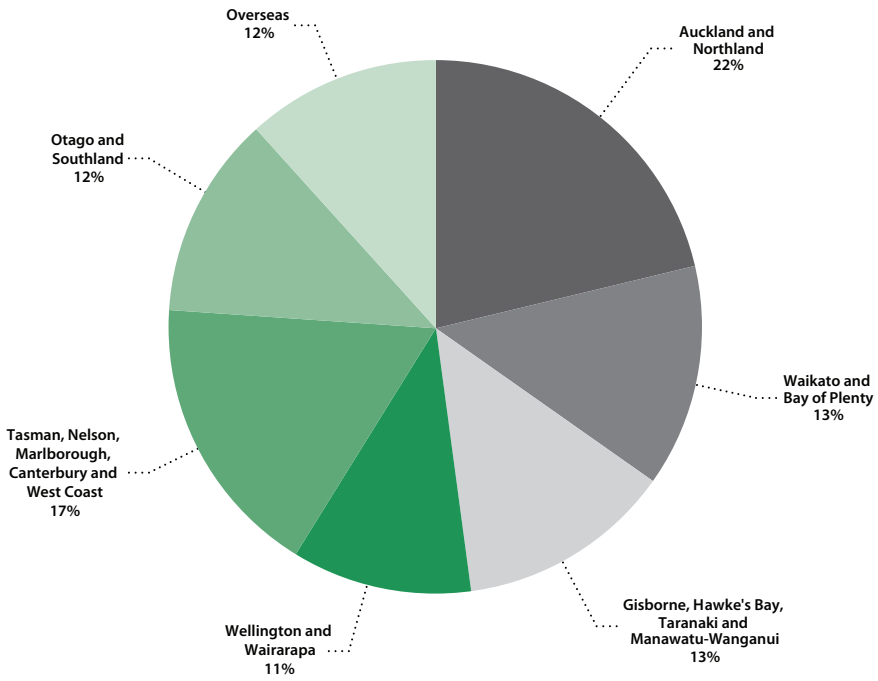
OVERVIEW

The New Zealand Biotechnology Industry Growth Report 2008 is the second report in a biennial series, following the publication of the inaugural report in 2006. The 2006 report has been used as a baseline from which to measure the progress of the industry, with the 2008 report focusing on changes in the industry since 2006.

Biotechnology organisations in New Zealand are active in applications as diverse as human health, agbiosciences, medical devices, industrial biotechnology and food biosciences. Agricultural biotechnology continues to maintain a dominant position. Of 168 biotechnology companies surveyed in 2007, over 100 stated at least some involvement in agbiosciences.

Geographical segmentation of the core sector employees illustrates that biotechnology work is being undertaken throughout New Zealand, with 22% of staff in the Auckland region and approximately 29% in the South Island.

Regional Use of Biotechnology 2007
(% of Total Organisations Active in Biotechnology)



Source: Statistics New Zealand

With thanks to L.E.K. Consulting

SECTOR GROWTH AND DEVELOPMENT

New Zealand's biotechnology sector has experienced accelerated growth since 2005. Analysis of growth over time shows that the sector continues to build critical mass along a virtuous circle of supporting dimensions - the number of organisations, their employment, expenditures and income.

The total number of organisations engaged in biotechnology activity increased 33% from 2005 to 2007. There are now 168 identified organisations involved in biotechnology in New Zealand. The majority of this recent growth has come from small focused biotechnology companies, consistent with a vibrant industry in strong growth mode creating and building new companies.

The core category of biotechnology companies (comprised of companies focused on the production of biotechnology goods and services) on which this report is based also exhibited tremendous growth in employee numbers. Core sector biotechnology employees increased by 78% between 2005 and 2007, the greatest increase being amongst the technical and trade qualified employees.

Total core sector income grew by 23% p.a. from 2005 up to $276m, and the net profit of the core biotechnology sector has more than doubled in the last two years.

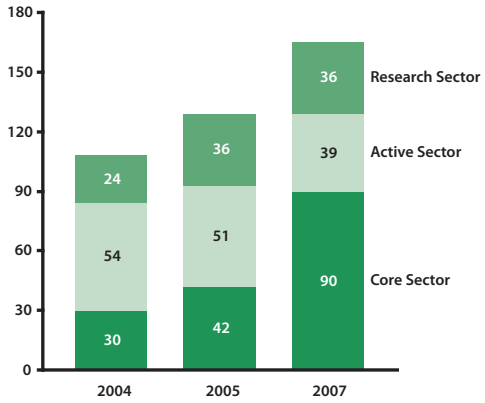
Public company performance was mixed during the period. While some publicly listed companies continued to perform strongly, returns for smaller public biotechnology companies were mixed, reflecting the turbulent economic period worldwide.

The biotechnology industry is continuing to make significant contributions to New Zealand's national economy. Export revenues grew by over 35% p.a., as New Zealand organisations continued to increase their exposure internationally.

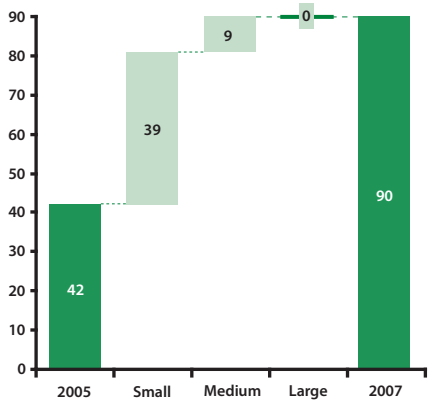
The biotechnology industry has also made wider economic contributions: a recent Business and Economic Research Ltd report showed that for every one full-time equivalent job in the biotech industry, a further 2.41 jobs are created in the national economy.

The major constraints for the biotechnology industry remain access to capital and the challenge of recruiting suitably qualified and experienced staff.

Number of Biotechnology Enterprises by Sector (2004-2005)



Growth in Number of Core Sector Organisations by Size



Note: Number random rounded to base 3
Source: Statistics New Zealand

SECTOR FUNDING

Data available for core sector biotechnology companies shows of the $250m in core sector expenditure in 2007 "own funds" accounted for over 85%. Own funds includes external funding received from both public and private investment markets.

Government investment in the sector has increased with research funding of almost $250m across various areas of the biotechnology industry, up from $200m in 2005. Public funding is available through a variety of agencies and departments, including the Foundation for Research, Science and Technology (FRST), Health Research Council (HRC), Royal Society of New Zealand (RSNZ), New Zealand Trade and Enterprise (NZTE), and the Tertiary Education Commission (TEC).

Recipients of Government funding have changed subtly since the 2006 report. Crown Research Institutes and universities are still the greatest recipients of Government funding for biotechnology, and have increased their share to 81% of funding in 2007, up from 72% in 2005. This reflects the commonality between the early stage focus of these funds and the focus of the public sector and higher education organisations.

Government Funding: Record Investment in 2008

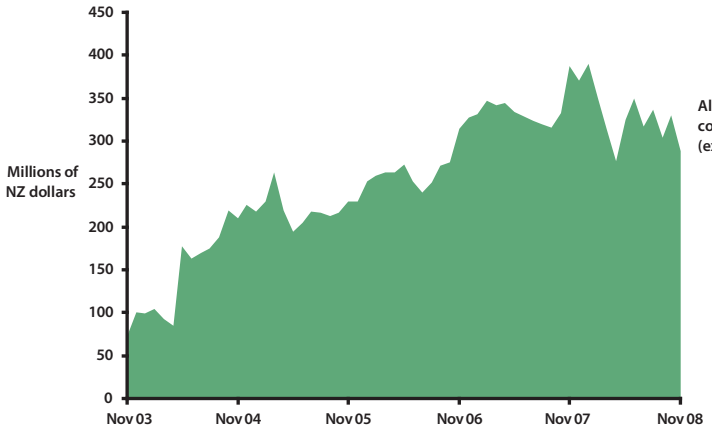
The Foundation for Research, Science and Technology approved a record $785 million in contracts with more than two dozen research organisations in its main 2008 investment round.

The 96 contestable contracts were with 24 organisations including Crown Research Institutes, universities, other research organisations and private companies, over time periods ranging from two to six years.

A further 17 contracts were negotiated with seven CRIs and two universities under the Stable Funding Environment initiative. These are worth up to $43 million in their first year and up to $347 million in their lifetimes.

Publicly listed biotechnology companies have also matured over the past two years. There were no new listings during this period, but listed companies continued to raise public funds through secondary offerings, which increased in size since 2006. Over $100m was raised for the sector from large secondary

Total Market Capital of Listed New Zealand Biotechnology Companies on NZX and ASX (November 2003 - November 2008)



	CAGR% (to November) (2003 - 06)	(06 - 08)
All biotechnology companies* (excl. FPH)	63.3	(4.3)

Note: * Excludes ICPBio (formerly APH)
Source: DataStream, NZX, ASX

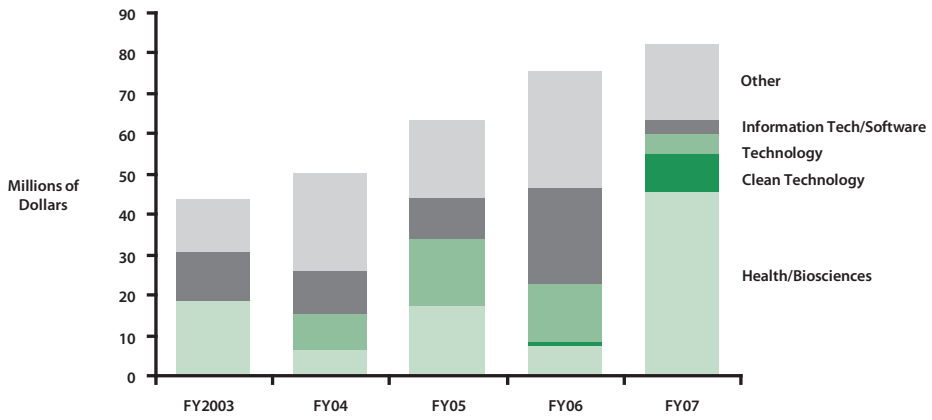
offerings alone. Total equity invested in publicly listed biotechnology companies has grown strongly over the last five years, representing investor interest in the sector even as stock prices underperformed.

Notable capital raisings include Comvita raising $11.5m in 2007 to partially fund its acquisition of Olive Products Australia; Pacific Edge Biotechnology raising $5.2m to carry the company through to the launch of the first product on to the market; and Living Cell Technologies raising $15m over six months to support its type 1 diabetes Phase I/IIa clinical trials in Russia and New Zealand. Living Cell Technologies also listed on the International OTCQX in 2008 and began trading in the United States, making it the first NZ based company to do so.

Venture capital and private equity investment has soared since 2005. VC and PE investment in biotechnology in 2007 encompassed 23 deals representing an investment of almost $67m, more than triple the investment of 2005. Human health and food related areas of biotechnology have become the largest areas of venture capital funding over the last two years with over 30 deals completed in these areas alone.

Venture Capital and Private Equity funding for biotechnology in New Zealand has been increasing, following wider business trends as the private equity sector matures in both New Zealand and Australia. Total Private Equity and Venture Capital investment in New Zealand across all sectors expanded from $386m across 80 deals in financial year 2005 to $1,225m across 85 deals in 2007.[1] This growth occurred through an increase in the number of Venture Capital deals and a dramatic increase in the average size of Private Equity deals.

Venture Capital Sector Investment (FY2003 - 2007)



Source: **The New Zealand Private Equity and Venture Capital Monitor 2007**

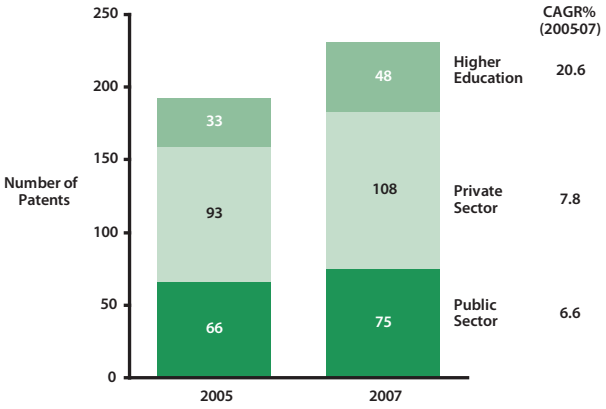
The majority of funding raised in 2007 went towards human health applications, where the deals were considerably larger than the average deal. There were a total of 18 human health deals across 2006 and 2007 while the food biosciences area was also popular contributing 13 deals. In the last two years there have been no industrial technology deals and a single medical devices deal.

TECHNOLOGY, PATENTS & PRODUCTS

Many of New Zealand's companies and industries rely on biotechnology-derived innovation to improve and/or differentiate their business. One of the most common measures of growth in innovation and product development is the number of patents granted.

New Zealand biotechnology patent volume has grown at 9% p.a. since 2005 with 230 patents granted in the last two years. Within OECD countries, New Zealand has dropped from 7th to 12th measured by patents per capita, however New Zealand remains significantly above the median nation. On the international scene New Zealand has demonstrated a specialisation in patenting biotechnology relative to innovation in other fields.

Number of Biotechnology Patents Granted
(Within previous two years)
(2005, 2007)



Note: Random rounded to base 3
Source: Statistics New Zealand

This is indicative of a continued substantial increase in the level and quality of innovative research being undertaken in New Zealand combined with increasing awareness of the benefits of investing in IP protection for research with potential commercial value. While the public and private sectors both recorded increase rates of over 6% p.a., the most growth was recorded in the higher education sector, where granted patents grew at over 20% p.a.

The New Zealand biotechnology sector is growing in productivity as increasing numbers of companies are able to create, improve and introduce new products. Approximately 75 biotechnology organisations released new or significantly improved products or services over 2006-2007.

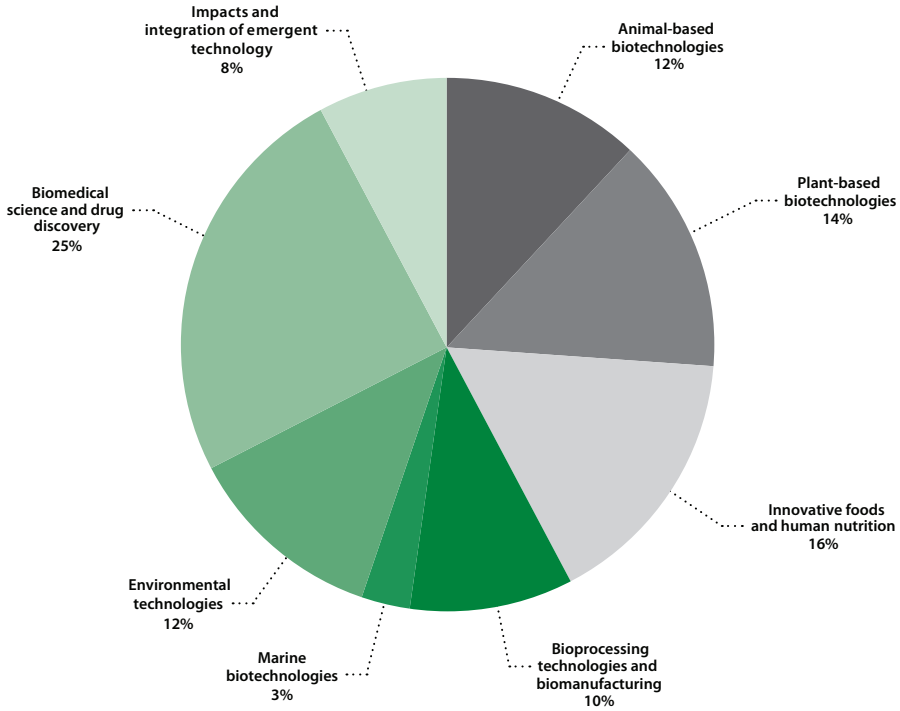
Examples of successful organisations developing new technologies include:

- Victoria Link, the Malaghan Institute of Medical Research, Industrial Research Ltd and Grow Wellington working together to develop a vaccine against cancer
- Meat & Wool New Zealand and AgResearch participating in an international project to map the sheep genome
- Aquaflow Bionomic Corporation producing 'green-crude' from its proprietary processes which convert wild algae to next generation fuels.

Many companies are focused on the evolving applications for biotechnology to meet the challenges of the new bioeconomy, including in:

- Clean/green technologies: Lanzatech Ltd and their proprietary ethanol production processes from industrial waste flue gases, and Biodiesel Oils Ltd with their commercial manufacture of biodiesel from oil
- Climate change: PGG Wrightsons Ltd and their advanced grass cultivar development programmes for future-proofing grasses against warmer global temperature
- Agricultural productivity to meet rapidly growing global demands for food: Agriseeds Ltd and associates with their advanced yield (AYT) and National Forage Variety Trials (NFVT), and Livestock Improvement Corporation with their programme to obtain cattle genotypes with better feed conversion efficiency.

Area of Biotechnology Application 2007



Source: Statistics New Zealand

RESEARCH INSTITUTIONS

New Zealand's research institutions play a critical role in the continued growth and development of New Zealand's biotechnology sector. Significant levels of high quality biotechnology research are conducted by New Zealand's eight Crown Research Institutes and across the higher education sector.

The amount of expenditure on biotechnology by research institutions, the number of employees, and the number of institutions engaged in biotechnology activities has remained relatively constant over the period.

However, an increase in the number of postgraduate degrees awarded in biological science and health indicates a high level of interest within the universities for biotechnology related research. Approximately 700 related postgraduate degrees have been awarded in each of the last three years of data (2004-06), up from around 500 in 1999.

A number of business incubators complement the research institutions by providing a variety of support structures as well as physical premises as an important stepping stone towards commercialisation for many of the emerging biotechnology companies.

New Zealand's research institutions continue to make a number of significant contributions in the field of biotechnology. Examples include:

- A new state of the art centre for the production and innovation of omega 3 oil emulsion with enhanced bioavailability was opened in Marton through a collaboration between Massey University, the Riddet Institute, and Speirs Nutritionals
- Collaboration between IRL and Victoria University to passively monitor the heartbeat of unborn babies. The research aims to create technology that separates foetal heartbeats from interfering sounds such as the mother's heartbeat, helping to reduce the need for repeated use of ultrasound on unborn babies
- The Malaghan Institute of Medical Research's cancer vaccine platform was expanded in 2008 to include clinical trials against brain tumours (glioblastoma multiform)
- The Masters in Bioscience Enterprise programme at the University of Auckland is an innovative cross-facility programme working closely with industry to produce commercially-savvy science graduates.

PUBLIC POLICY

The New Zealand Government continues to be a strong supporter of the biotechnology sector, providing funding to the private sector, public sector and higher education sector through a number of funds.

In addition, Government funding includes several initiatives designed to achieve broader industry goals such as the growth of a vibrant venture capital sector and the promotion of trans-Tasman collaborations.

Tax legislation is becoming more favourable to biotechnology companies and investors, largely due to changes in allowances for carrying forward losses and proposed changes for taxation of foreign based investment.

The Ministry of Research, Science and Technology produced the Biotechnology Research Roadmap in March 2007. This document clearly sets out the Government's future research directions for biotechnology. A Food Research Roadmap is also under development.

REGULATION

Strong public interest in biotechnology issues results in the need for a constant focus on transparency and best regulatory practice. A number of regulatory bodies govern the research and commercialisation of biotechnology related products, including the Environmental Risk Management Authority, the Gene Technology Advisory Committee and Food Standards Australia New Zealand.

Regulation plays an important part in the direction and development of the biotechnology sector, in particular in the following areas:

- Importation and development of "novel" foods
- Research involving genetic modification, other new organisms and hazardous substances
- Development and use of human medicines, therapeutics and medical devices.

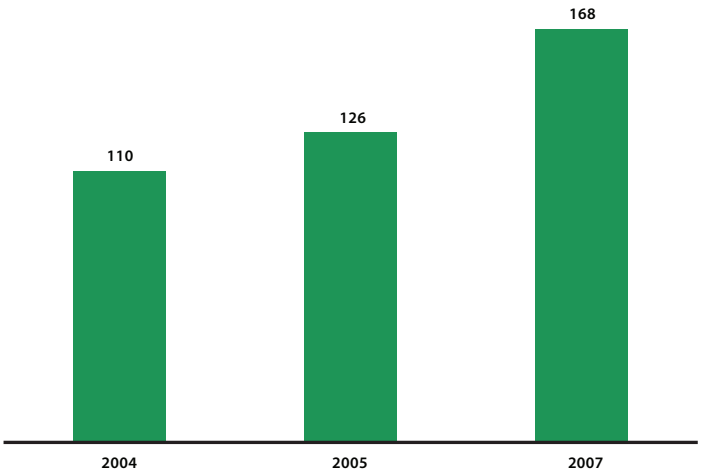
NUMBER OF ORGANISATIONS

Growth in the number of organisation has continued strongly since 2005. The 2007 Statistics New Zealand Biotechnology Survey, which captures the vast majority of relevant organisations, encompassed 168 organisations involved in biotechnology. This represented an increase of one third since the 2005 survey, where 126 organisations were identified.

The latest data show this growth has been driven primarily by the formation of new core biotechnology firms. The vibrancy of the industry is reflected in the growth of small core sector companies where growth was the strongest. This provides positive evidence that the regulatory and funding mechanisms are supportive of new company formation.

The core sector, focused on the production of biotechnology products, is dominated by smaller enterprises. By contrast, the research sector is more heavily weighted toward larger organisations, with approximately 75% of enterprises having more than 100 employees.

 # Organisations Active in Biotechnology



Source: Statistics New Zealand

DEFINING EVENTS

A number of important events have occurred within New Zealand's biotechnology sector over the past several years. These milestones reflect the expansion of the sector along a number of dimensions, including funding, collaborations and strategic initiatives.

2003

- Biotechnology Taskforce Report published that outlines major goals and initiatives for developing the sector
- CER (Closer Economic Relations) biotechnology discussions held to establish the framework for increased Trans-Tasman collaboration

2004

- Australia New Zealand Biotechnology Partnership Fund (ANZBPF) was initiated with an original investment of $12 million
- Creation of a single industry body, NZBIO
- Proacta secures international funding from GBS Venture Partners, Genentech and Roche
- Three biotechnology companies list or raise funds on NZX and one lists on the ASX

2005

- Sector expenditure exceeds $640m
- BioPacificVentures closes $150m fund with international participants including Inventages and Nestlé
- Three companies raise funds on the ASX, including two IPOs
- As part of the New Zealand Venture Investment Fund (VIF), $40m Seed Co-Investment Fund (SCIF) formed to support investment into small to medium sized businesses
- IRL received further recognition of the value of its technology through BioCryst's significant deal with Roche in 2005. This was followed by BioCryst's deal with Mundipharma in 2006

2006

- SciTech index created by NZX to recognise and promote science and technology companies
- The Government expands the Venture Capital Fund by an additional $60m, bringing the total fund to $160m. This is part of the New Zealand Venture Investment Fund (VIF)

2007

- The total number of organisations engaged in biotechnology activity increased 33% from 2005 to 2007
- The number of employees in core sector biotechnology has increased by 78%, the greatest increase being amongst the technical and trade qualified employees
- Total core sector income grew by 23% p.a. from 2005, while the net profit of the core biotechnology sector has more than doubled in the last two years
- Venture capital and private equity investment in biotechnology in 2007 is more than triple the investment in 2005
- Patent volume has grown at 9% p.a. since 2005 with 230 patents issued in 2007

2008

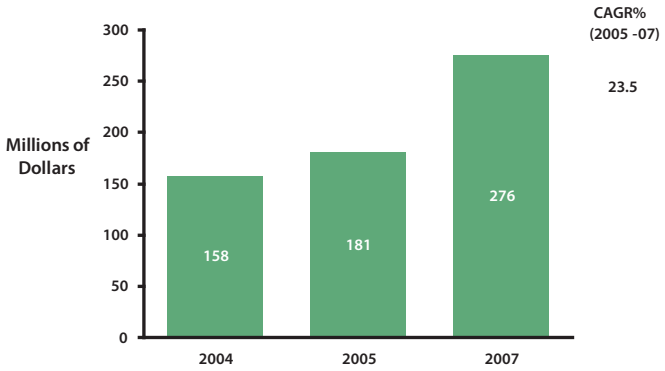
- Export revenues grew by over 35% P.A
- Government investment increased with research funding of almost 250M across various areas

FINANCIAL INDICATORS

Analysis of the financial results of the core sector illustrates a buoyant industry experiencing rapid growth. The increasing maturity of the industry is demonstrated by its increasing profitability while at the same time there is a wealth of newer companies being formed.

In 2007, the 90 core biotechnology enterprises generated a total income of $276m, significantly greater than the $181m income generated in 2005, which represents a strong 23% compound annual growth rate (CAGR).

Core Biotechnology Sector Income



Source: Statistics New Zealand

At the same time, the average income per company has declined from $5.3m in 2004 to $3.1m in 2007. This reflects the emergence of new, small companies in the core sector that are still early in their journey towards commercial profitability.

Core sector biotechnology expenditure has grown strongly over the past three years from $153m in 2004 to $250m in 2007, an increase of more than 21.6% p.a. Comparison with core sector income growth indicates that expenditure has grown at a slightly slower rate than income (approximately 2 percentage points more slowly).

Profitability goals differ according to the type of business. Where public sector organisations generally match income to expenditure, private sector organisations are profit-oriented and provide a return to shareholders and investors.

There are currently 9 biotechnology companies listed on the NZX and an additional 4 New Zealand biotechnology companies listed on the ASX. Total equity invested in publicly listed biotechnology companies has grown strongly over the last five years, representing investor interest in the sector.

The average profit for core biotechnology companies in 2007 was $0.29m which has grown at over 20% from $0.17m in 2004. While the average profit is positive it should be noted that the median biotechnology organisation expends $0.2m more than it earns.

EXPORT REVENUE

Revenue from exports of core sector biotechnology goods, services, processes and knowledge has increased from $56m in 2005 to $104m in 2007. Overall the data indicates biotechnology's contribution to the New Zealand economy is substantial and growing, with an annual increase of 36% p.a. over the last two years.

The proportion of export revenue compared to total sector income has also increased significantly, with 24% of total revenues derived from export sources in 2005 compared to over 27% in 2007. Companies such as New Zealand Pharmaceuticals which are almost entirely focussed on exporting goods have successfully entered a wide variety of markets around the world.

Core Biotechnology Export Revenue (2004 - 2007)

Note: All data random rounded to base 3
Source: Statistics New Zealand

WIDER ECONOMIC CONTRIBUTION OF BIOTECHNOLOGY

The biotechnology sector plays a critical role in contributing to and influencing numerous aspects of New Zealand's economy, including the development of companies and employment opportunities, value-add in terms of enabling more efficient and competitive industries and improving the quality of life and security of New Zealanders.

In a recent NZTE-commissioned report[2] on economic multipliers for New Zealand's biotechnology sector, BERL Economics established that:

- For every $1 million in direct output (spending) in the biotech industry, a further $1.03 million in gross output is created throughout the economy, for a total output of $2.03 million
- For each $1 million of direct GDP that flows through the economy, an additional $950,000 in GDP is generated, for a total of $1.95 million. Put another way, the total multiplier for GDP in the biotech industry is 1.95
- For every one full-time equivalent job in the biotech industry, a further 2.41 are created in the national economy. This equates to a total multiplier for employment in the biotech industry of 3.41.

It should be noted that the multipliers presented in the BERL report were conservative compared with figures published overseas, but are within the same range.

New Zealand biotechnology companies are starting to make significant deal flows in offshore markets, which is being fed back to the local economy. Data collected from NZTE-led BIO 2007 and 2008 trade missions to the USA, indicated that 32 deals worth a total of $21.5 million were successfully negotiated by the New Zealand biotechnology companies. This represents a significant value of over $670,000 on a per deal completed basis, with most of the proceeds flowing back into the New Zealand economy as well as leading to a strengthening of the biotech companies and sector as a whole.

Local venture capital has also supported the biotechnology sector adding over $55 million in investment into the local biotech sector.

Foreign Direct Investment (FDI) into the New Zealand biotechnology sector is also enhancing the contribution of this sector to the overall New Zealand economy. There has been an upward trend in FDI activity over the 2006-2008 period including significant contributions in the area of Animal Based Therapeutics (ABT) for use in medical/healthcare applications.

Throughout the Asia-Pacific region food and agricultural biotechnology have enjoyed significant economic growth and are the second largest sub-sector in this region.

The increasing contribution of biotechnology to New Zealand's economy is mirrored by trends seen in USA, Asian and European markets where the biotechnology sector continued to grow in a range between of 9-12% and integrate itself as an important asset and contributor to the countries' economies. Significant sub-sector growth in medical/healthcare has also been an increasing trend noted in these markets.

2 Business and Economic Research Ltd (2009) Multipliers for the Biotech and biotech-active industry in New Zealand. BERL report #4687.

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