

An Advanced Skills Action Plan

FOR RESEARCH, SCIENCE + TECHNOLOGY

AN ADVANCED SKILLS ACTION PLAN
FOR RESEARCH, SCIENCE + TECHNOLOGY

ATTRACT, RETAIN & DEVELOP
TOP-PERFORMING PEOPLE IN
RESEARCH, SCIENCE + TECHNOLOGY



▣ Minister's Foreword

World-class science requires world-class people. New Zealand's research, science and technology (RS&T) success stories are a testament to the quality of the people that work in our research organisations and businesses – to their creativity, ingenuity and drive.

Recent improvements to New Zealand research, science and technology have focused on strengthening the system and the research organisations that lie at its heart. We have increased the stability of science funding to boost our essential science capabilities, strengthened the performance of our tertiary education institutions, and invested in major research infrastructure projects. This Advanced Skills Action Plan for Research, Science and Technology (ASAP) will augment the effects of these system-wide initiatives through a series of actions and initiatives that support and celebrate the critical role of talented individuals and teams. As such, the ASAP forms an important part of the government's overall strategy for RS&T: *From Strength to Strength: Government's Agenda for Research, Science and Technology*.

The ASAP focuses on New Zealand's ability to attract, retain and develop top people in research, science and technology. I have noticed that discussions of science careers often focus on the 'retain' part of the equation; many scientists can relate anecdotes of young and talented colleagues who have left to take up opportunities overseas. Although it is true that many New Zealanders head offshore for a portion of their career, for most this represents a very positive opportunity to gain exposure to new international developments in their field, and build valuable connections and networks. It is vital that we nurture talented people and provide opportunities for them to grow their careers within New Zealand, but it is also important that we acknowledge and support the development opportunities that overseas work experience can offer. In fact, the data in this document suggests that New Zealand benefits considerably from international RS&T mobility – in recent years our net migration statistics show more science professionals arriving than leaving. Foreign-born workers make up a significant part of our RS&T workforce, and I expect that they will continue to do so. We must ensure that New Zealand remains an attractive destination for top overseas talent and not just for the often-cited 'lifestyle' reasons.

The ASAP identifies a number of components that need to be present in the New Zealand workforce if we are to continue to improve our RS&T performance. One of these components is that RS&T careers need to be attractive to a broad range of people. Science careers are changing, and it is important that we continue to move beyond the traditional image of a man in a white coat, working at a laboratory bench. If we want a sustainable workforce for the future, it is critical that people from a wide range of backgrounds, with a wide range of skills, abilities and preferences, can aspire to a career in New Zealand RS&T.

Many individuals and organisations from the RS&T sector have contributed to the development of this document, through participation in the evaluation and submission phases. I welcome their contributions and thank them for their efforts. If we are serious about boosting the attractiveness of New Zealand science careers, government, tertiary education institutions and RS&T employers must continue to work together. I look forward to our shared progress.



HON PETE HODGSON
Minister of Research, Science and Technology



▣ Contents

Minister's Foreword	Page 3
Note for Readers	Page 4
How was the Plan Developed?	Page 5
Introduction: an Investment in People	Page 6
The People in New Zealand's RS&T System	Page 10
Essential RS&T Skills for the Future	Page 17
Supporting Talented Individuals	Page 18
Maintaining the RS&T Workforce	Page 22
Developing Skills	Page 25
Providing an Enabling Culture	Page 27
Next Steps	Page 31

NOTE FOR READERS

This *Advanced Skills Action Plan for Research, Science and Technology (ASAP)* sets out a series of actions and initiatives to improve New Zealand's ability to attract, develop and retain top-performing people in RS&T. These actions have been developed based on an evaluation of current support for people and careers in RS&T, and input from sector stakeholders and government agencies.

Within this document, the term 'RS&T' is used to refer to:

- research that generates new knowledge, products, processes and services, also known as R&D
- scientific advice in support of planning, decision-making and the transfer of overseas knowledge to New Zealand
- scientific monitoring and data collection for research purposes or the shaping of advice
- development and maintenance of scientific and technological knowledge, skills and networks
- formulation of RS&T policy and evaluation of RS&T activities.

When referring to the RS&T workforce, this document uses the Organisation for Economic Co-operation and Development (OECD) definition of 'Human Resources in Science and Technology (HRST)'. This includes people who fulfil one or both of the following conditions:

- successfully completed education at the tertiary level in a science and technology field of study
- not formally qualified as above, but employed in a science and technology occupation where the above qualifications are normally required.

This definition, and its various sub-categories, are explained further on page 11.

While this definition is relatively broad, the main emphasis of the ASAP is on the subset of the RS&T workforce who are directly engaged in scientific R&D activities. This includes people employed in Crown Research Institutes (CRIs), Tertiary Education Institutions (including postgraduate students), central and local government, and private enterprises that conduct R&D. People engaged in wider knowledge-creating activities, such as research contributing non-scientific knowledge in the arts, culture and humanities spheres, are not a specific focus of the ASAP.

□ How was the Plan Developed?

This document was developed following a two-stage consultation process with the RS&T sector.

Stage One: Sector interviews

In early 2007, the Ministry of Research, Science and Technology (MoRST) conducted an interview-based sector survey, which evaluated the support currently provided to develop the skills of researchers in New Zealand. The evaluation addressed the following two questions:

- what is the extent and nature of current support for researchers in New Zealand?
- what sort of support do people perceive is necessary, and what are the gaps/overlaps in what is currently provided?

The Ministry interviewed over 125 people from 54 public and private sector organisations undertaking, or involved in, R&D. The people interviewed included researchers, management and researcher representative groups. The findings of the sector survey are covered in the document *Mapping of support for people in research, science and technology*, available on the MoRST website.

Stage Two: Consultation on ASAP discussion document

MoRST analysed the findings of the sector survey to identify areas where government intervention would be most useful. This led to the development of eleven options for potential inclusion in an Advanced Skills Action Plan:

- OPTION 1: Reduce the complexity of investment in RS&T scholarships and fellowships
- OPTION 2: Refocus and expand the investment in RS&T scholarships and fellowships
- OPTION 3: Implement a new RS&T leadership development programme
- OPTION 4: Track and support top RS&T talent
- OPTION 5: Provide time for creative exploration
- OPTION 6: Encourage more industry secondments from the RS&T sector
- OPTION 7: Facilitate more domestic networking
- OPTION 8: Increase the profile of international connectivity
- OPTION 9: Promote RS&T career flexibility
- OPTION 10: Explore new ways to improve the attractiveness of RS&T careers to Māori and Pacific peoples
- OPTION 11: Facilitate discussions around careers in the health research sector.

These options were explored through a public consultation process in December 2007 and January 2008. Submissions were invited through the MoRST website, and face-to-face discussions were also held with major stakeholders, including CRIs, universities, and other research organisations. A total of 49 submissions were received from the sector, with 18 from organisations and 31 from individuals. A comprehensive summary of the consultation findings can be found in the document *An Advanced Skills Action Plan: Analysis of Submissions Document*.

¹ Manual on the measurement of human resources devoted to S&T “Canberra Manual”
Organisation for Economic Co-operation and Development (OECD) (1995)



▣ Introduction: an Investment in People

Our RS&T system is, above all, an investment in people – those who are driven to be curious, to challenge existing ideas and, through the process of scientific research, produce and refresh our national pool of knowledge. These people and that pool of knowledge are critical assets. They provide a reserve of ideas that allow us to continually adapt, meet new challenges and grasp new opportunities. They act as a bridge between us and the far bigger pools of global knowledge we rely on. They also accelerate innovation and transformation in our firms and sectors, by driving advances in product development or service delivery, and supporting a culture of learning.

It is vital that the RS&T system has access to the advanced skills New Zealand will need to deliver all these things, now and in the future. The ability of the New Zealand RS&T system to attract, retain and develop top-performing people is therefore critical.

New Zealand competes in a global market for its RS&T workforce; we both gain and lose skilled workers globally. Whilst we have little influence over global supply and demand, government can work with the sector to influence the attractiveness of RS&T careers within New Zealand.

A number of critical components need to be present in the RS&T workforce to enhance New Zealand's ability to produce world-class RS&T, and enable us to remain globally competitive. These can be grouped into four general themes, as summarised in the diagram on the next page:

- 01 Supporting talented INDIVIDUALS
- 02 Maintaining the RS&T WORKFORCE
- 03 Developing SKILLS
- 04 Providing an enabling CULTURE

Ensuring these components are present will require joint commitment from government and RS&T employers. For example, while government can enhance rewards and create incentives for particular types of activity, employers are ultimately responsible for supporting individual career development, and creating an attractive work environment.

Government can influence the areas identified through a range of mechanisms. These include:

- direct investment in supporting individual researchers through RS&T scholarships and fellowships
- investing in funds with a specific role in supporting RS&T skill development (such as the Marsden Fund, or Centres of Research Excellence)
- general investment in research, science and technology (eg through the Foundation for Research, Science and Technology)
- funding provided directly to research organisations, which they can use to support capability development (eg CRI capability fund, Performance Based Research Fund)
- mechanisms that facilitate research-business connections
- initiatives that support the development of international RS&T linkages
- immigration policies that encourage and facilitate the migration of skilled people.

FRAMEWORK FOR ADVANCED SKILLS IN RESEARCH, SCIENCE AND TECHNOLOGY

OBJECTIVE TO ATTRACT, RETAIN AND DEVELOP TOP-PERFORMING PEOPLE TO WORK IN RESEARCH, SCIENCE AND TECHNOLOGY IN NEW ZEALAND

CRITICAL COMPONENTS



OUTCOMES NEW ZEALAND RESEARCH, SCIENCE AND TECHNOLOGY HAS THE PEOPLE AND SKILLS IT NEEDS TO:

- DRAW SUSTAINABLE VALUE FROM OUR BIOLOGICAL BASE
- RECOGNISE AND MANAGE OUR ENVIRONMENT AS AN ASSET
- SEED AND SUPPORT HIGH-TECH INDUSTRIES
- STRENGTHEN SERVICES FOR HEALTH AND SOCIAL WELLBEING

Direct investment in scholarships and fellowships has an important role in supporting and celebrating top talent, and ensuring RS&T careers are attractive to a broad range of people. Fellowships can also facilitate the development of technical skills and provide space for creativity. However, the number of RS&T workers receiving direct support through scholarships and fellowships is small compared with the number supported through general investment in research, science and technology and tertiary education. For this reason, it is likely that New Zealand's overall level of research, science and technology investment is a major driver of RS&T career attractiveness. Maintaining a diversity of funding opportunities is also important. Feedback from the sector suggests that funds that support the development of RS&T skills through investigator-initiated research, such as the Marsden Fund and Centres of Research Excellence, have an important role in providing space for creativity within the system.

In addition to the availability of RS&T funding, the policies used to distribute this funding also influence career attractiveness within the sector. For example, recent changes to increase the level of negotiated funding within the system will assist research organisations to plan and provide certainty to their staff. Many research organisations also use their core organisational funding to provide training and career opportunities to individuals. This means that policies that affect the level of core funding research organisations receive from government can also impact on RS&T career attractiveness.

Investment in secondary and tertiary education has a crucial role in developing skills, promoting awareness of RS&T career options, and ensuring RS&T careers are accessible to a broad range of people. Alignment of government investment policies for RS&T and education is important in ensuring the supply of RS&T skills matches the demand from employers. As a significant proportion of New Zealand's RS&T workforce is foreign-born, New Zealand's immigration policies also play an important role in influencing the supply of skilled labour.



New Zealand needs more globally competitive businesses that invest in and apply R&D, and partner effectively with public RS&T organisations. Submissions to the Ministry of Research, Science and Technology on the draft New Zealand Research Agenda² suggested that to achieve this, we need to bridge the different cultures of business and science. One of the most effective ways of achieving this is to create incentives and opportunities for the mobility of skilled people between research organisations and business. This may occur through secondment and training opportunities which target individuals, or as part of ongoing collaborative relationships.

International science linkages are a vital component of RS&T endeavours in New Zealand and a rapidly growing component of core research activity for many countries. International linkages and collaborative activity allow access to a wider range of facilities, resources, experts and expertise than might normally be available in New Zealand. These linkages allow New Zealand's own excellence in research to be showcased to the rest of the world, helping attract investment and top talent into the country.

Key players

Data in this section is taken from *Research and Development in New Zealand: A Decade in Review*.³

> TERTIARY EDUCATION ORGANISATIONS (TEIs)

TEIs, and particularly universities, play the lead role in training and developing the future RS&T workforce. They are also major RS&T employers, providing about 60% of the human resource input into R&D in New Zealand. In addition to their teaching responsibilities, academic staff are engaged in a range of basic and applied research, across a wide range of research areas. Recent initiatives that support and reward research excellence in the tertiary education sector (such as the Performance Based Research Fund, and Centres of Research Excellence) also benefit students through higher quality teaching and exposure to world-class research environments at early career stages.

> CROWN RESEARCH INSTITUTES (CRIs)

CRIs were established in 1992 with the primary purpose of undertaking research for the benefit of New Zealand. New Zealand's nine CRIs are major RS&T employers within New Zealand, particularly in the primary sector, and conduct mostly applied and targeted basic research. Compared with universities, CRIs have a higher proportion of full time research staff, and a higher research intensity.

> PRIVATE SECTOR

Business expenditure on R&D in New Zealand has increased steadily over the last decade, and the estimated human resource devoted to private sector R&D also increased - by 72% between 1994 and 2004. Researchers employed within the private sector are engaged in mostly applied and experimental R&D. The majority of business R&D effort is concentrated in large firms - the largest five R&D performers in New Zealand contribute almost 25% of total business R&D, and the top 10 about 35%.

² This document has since been retitled *From Strength to Strength: Government's Agenda for Research, Science and Technology*.

³ Ministry of Research, Science and Technology 2006, available at <http://www.morst.govt.nz/publications/a-z/t/decade-in-review/report/>

> RESEARCH ASSOCIATIONS

Research associations is a generic term for non-government research organisations. The majority are industry-linked research providers, which carry out a range of research and technology transfer activities, and receive the majority of their funding from industry levies mandated by legislation. The Building Research Association of New Zealand (BRANZ) and Dexcel Limited are examples of such organisations. Also included in this group are private sector organisations which rely on funding from corporate, charitable and contestable government sources, and focus on specific areas of science expertise. They include organisations such as the Malaghan Institute and the Cawthron Institute.

> CENTRAL AND LOCAL GOVERNMENT

Central and local government employ a large number of RS&T-qualified people. Some agencies, such as the Department of Conservation and the Ministry of Agriculture and Forestry, carry out their own scientific research, monitoring and data collection. Others perform regulatory roles that require scientific input, such as the Environmental Risk Management Authority, which approves applications to introduce hazardous substances or new organisms, or the Ministry of Economic Development, which regulates the intellectual property regime. While local government is traditionally thought of as an 'end user' of R&D, some agencies have significant capabilities in operational environmental science.

> SCIENTIFIC SOCIETIES AND ASSOCIATIONS

New Zealand has around 60 scientific and technological societies that represent, coordinate and promote the advancement of science and research within mainly disciplinary groupings. The Royal Society of New Zealand helps coordinate and represent these societies.



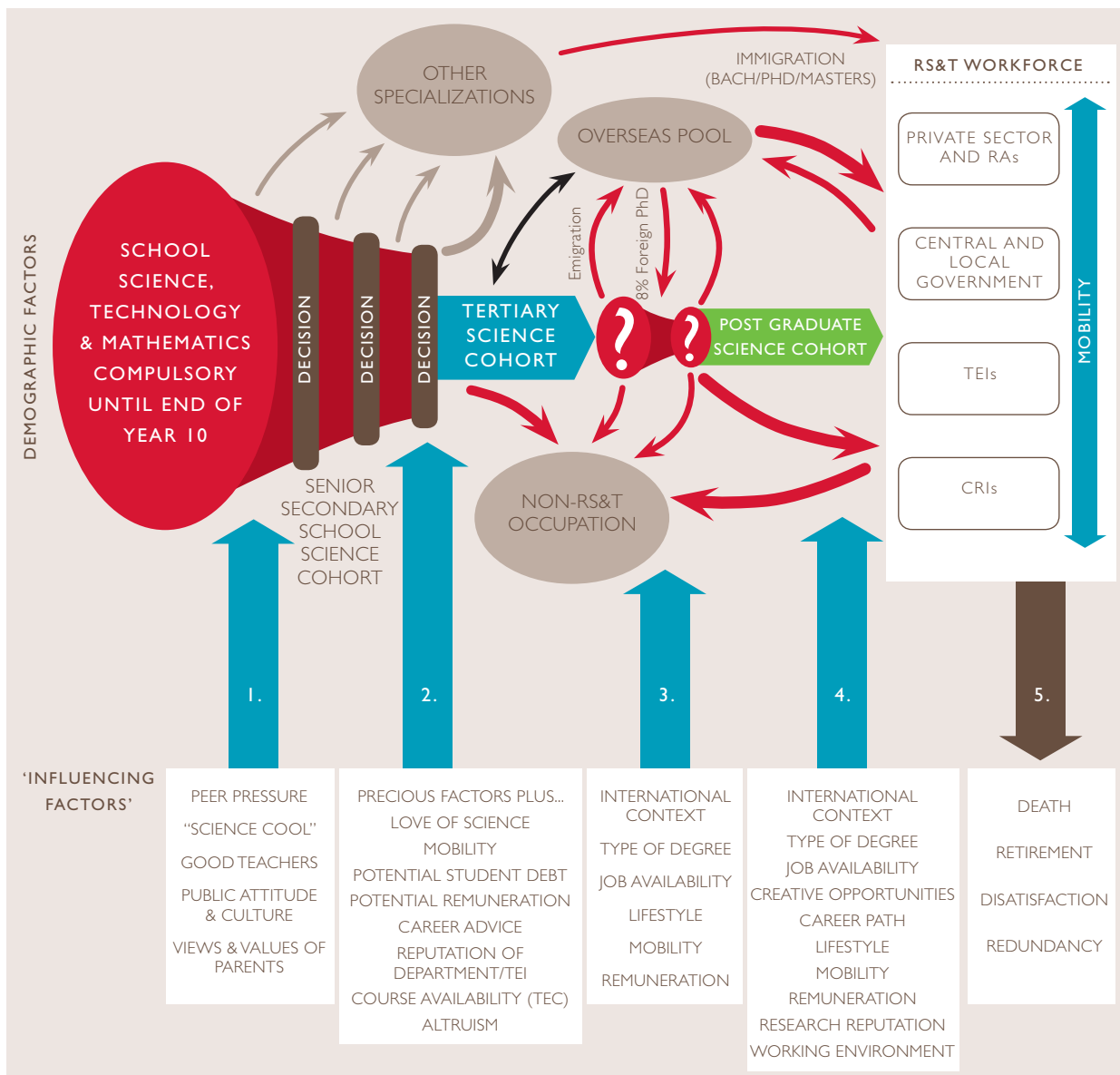
▣ The People in New Zealand's RS&T System

This section provides a snapshot of the RS&T workforce. The data is taken from the document *Research and Development in New Zealand – A Decade in Review*, the New Zealand R&D survey, and 1996, 2001 and 2006 Census data supplied by Statistics New Zealand.

Influences on supply

Influences on supply and demand of any workforce are very complex, particularly one as specialised and globalised as RS&T. Figure 2 illustrates this complexity.

NEW ZEALAND RS&T – SUPPLY AND DEMAND



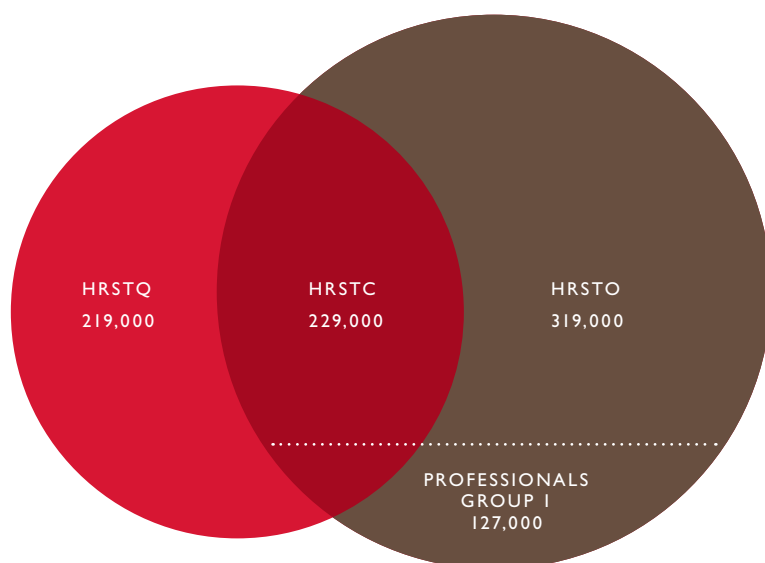
Definitions

Human Resources in Science and Technology (HRST) is defined by two parameters – qualifications (HRSTQ) and occupations (HRSTO):

- HRST Qualified (HRSTQ) are all ‘those who have completed education at the bachelor or higher level, irrespective of the course content’.
- University-level HRST occupations (HRSTO) include:
 - o Specialist Managers: managers of production and operation, finance and administration, human resources, sales and marketing, and advertising and public relations;
 - o Professionals Group 1: physicists, chemists, mathematicians, statisticians, computing professionals, architects and engineers, and health and life scientists; and
 - o Professionals Group 2: teachers and all other professionals.

Total HRST is the sum of the HRSTQ and HRSTO categories, with the overlap between them defined as the ‘core’ of HRST, or HRSTC. For the purposes of this chapter, we also refer to the subset of the HRSTO and HRSTC groups who meet the occupational criteria for Professionals Group 1. The various categories, and the numbers of people within each category, are shown in the diagram below.

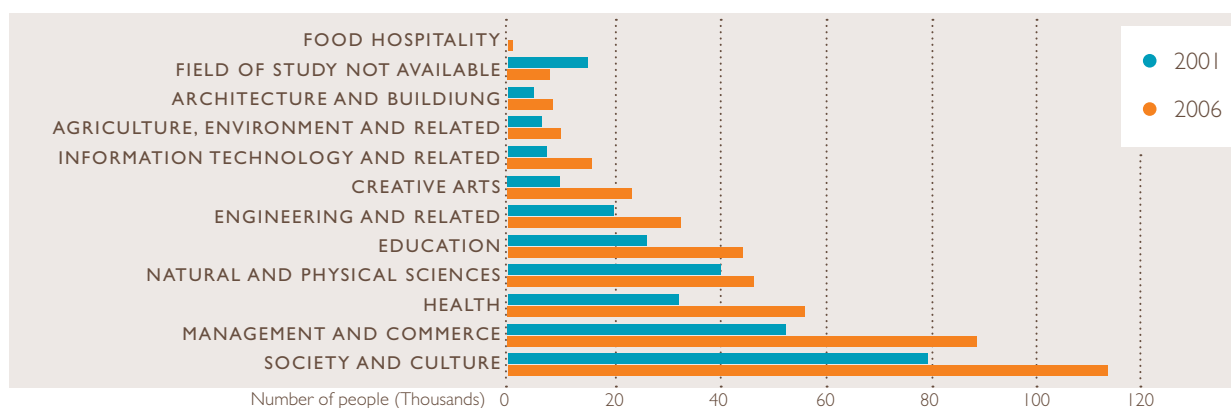
OVERVIEW OF HRST GROUPS, 2006



People with RS&T qualifications (HRSTQ)

Looking at the spread of university-qualified people (HRSTQ) within New Zealand, social and cultural studies is the most significant field of study – in 2006 approximately 114,000 people had their highest university level (bachelor or higher) qualifications in this field of study. The next most common fields were management and commerce (90,000), health (56,000), natural and physical sciences (47,000), education (44,000), and engineering and technology (32,000).

NUMBER OF PEOPLE DEFINED AS HRSTQ BY FIELD OF STUDY



When compared with 2001, there were increases in all specified areas. The areas with the greatest growth over the 2001-2006 period were creative arts (148%), information technology (120%), health (75%), architecture and building (74%), education (69%) and management and commerce (68%).

People in RS&T occupations (HRSTO)

Census data shows that the numbers of people in science and engineering occupations (Professionals Group 1) and specialist managers grew more strongly than non-RS&T occupations between 2001 and 2006 – achieving growth of 23 and 33 percent respectively, in this period, compared with around 17 percent for the workforce as a whole. In 2006 there were 127,000 people employed in science and engineering occupations within New Zealand.

Within this group of people in science and engineering occupations, there is a core group of people who undertake ‘research and development’ (R&D) activities. In the New Zealand R&D survey, R&D is defined as as:

‘creative work undertaken on a systematic basis in order to increase the stock of knowledge. It is characterised by originality, where investigation is a primary objective’.

R&D survey data shows that this group totalled over 23,000 people in 2006. The table below splits this figure out by highest qualification.

PERSONNEL INVOLVED IN R&D Source: New Zealand R&D Survey 2006.

FTEs by highest qualification. 2006 reference year.

QUALIFICATION	FTEs	PERCENT
PhD	3,591	15
Bachelor ¹	14,739	64
Technical and trade ²	1,710	7
Other qualifications	3,144	14
Total	23,184	100

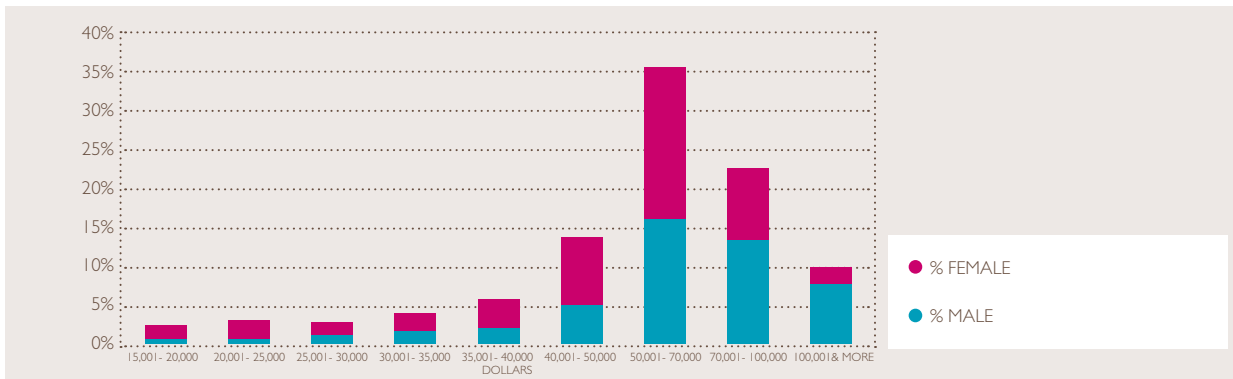
¹ Bachelor’s degrees or equivalent, and postgraduate qualifications other than PhD. All postgraduate research students in the higher education sector were included in this group.

² Technical and trade qualifications. eg NZ Certificate of Engineering or Science or NZ Trade Certificate

The graph below shows aggregated salary data for HRSTQ employed in the public RS&T sector (higher education and government). This shows that while women are well represented in the lower levels of the RS&T salary scales, the majority of people earning over \$70,000 are male.

INCOMES FOR HRSTQ AND BROAD HRSTO BY GENDER (SCIENTIFIC RESEARCH GOVERNMENT AND HIGHER EDUCATION SECTORS) 2006

Source: Census data

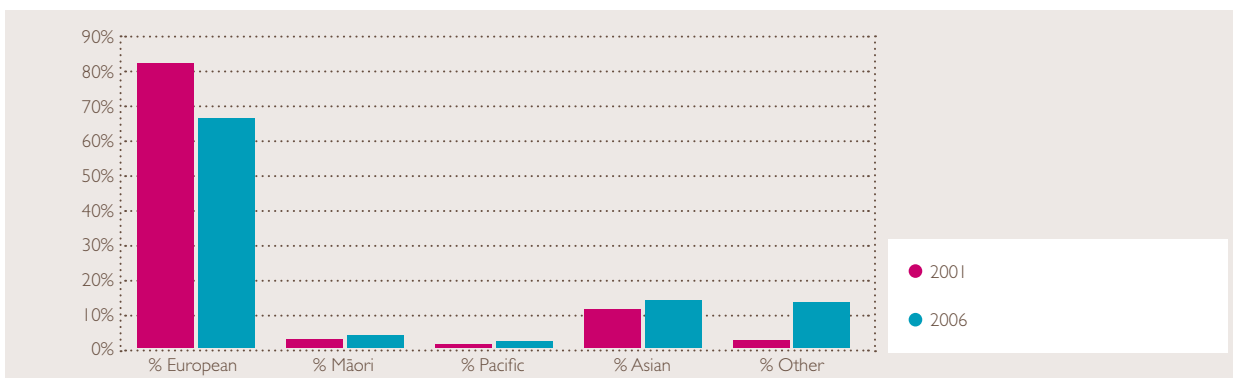


Ethnicity of people in RS&T

In the five year period from 2001 to 2006, there were increases in the numbers of people with university level qualifications and occupations for all ethnic groups. The relative proportion of people in ethnic groups other than European also increased. The apparent large increase in the ‘Other’ category that can be seen in the graph, is primarily an artefact due to the introduction of the new ethnicity category ‘New Zealander’ for the 2006 census – people choosing that category are now included in the ‘Other’ category. However, there were also modest increases in the proportion of 2006 Census respondents identifying as Māori, Pacific and Asian. People of Māori and Pacific ethnicity remain significantly under-represented relative to the proportion of these groups within the general population.

PROPORTION OF CORE S&T WORKFORCE (HRSTC PROFESSIONAL GROUP 1) BY ETHNICITY 2001-2006

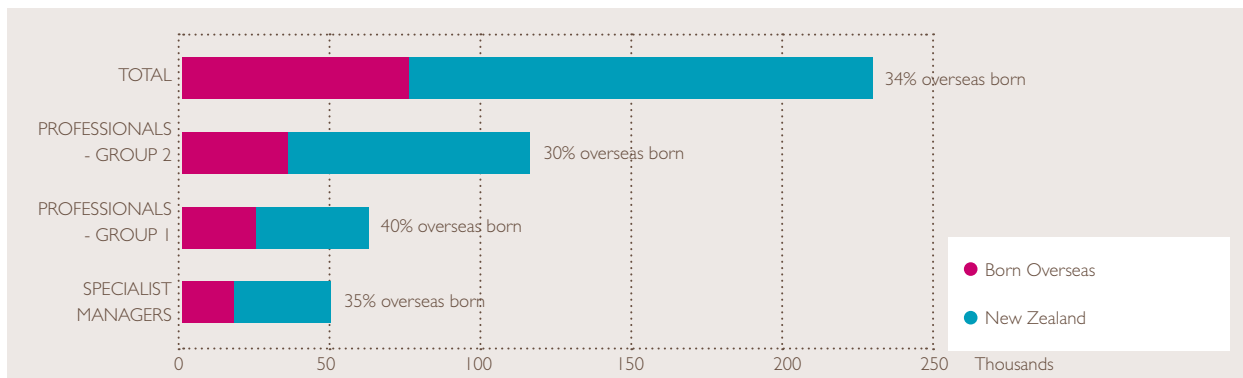
Source: Census data



Migration of people in RS&T

Migration is a very important source for the RS&T workforce. The graph below shows that in 2006, around 34% of university-qualified professionals and managers (HRSTC) were born overseas. The proportion is even higher for the core science and engineering group (Professionals Group 1), where 40% of people were born overseas. This has increased from 35% in 2001.

NUMBER OF PEOPLE WITH UNIVERSITY LEVEL QUALIFICATIONS AND OCCUPATIONS (HRSTC), BY OCCUPATIONAL GROUPING AND BIRTHPLACE, 2006 *Source: Census data*



The chart on the next page tracks migration between 1992 and 2005. It shows that:

- net migration for all three groups has been cyclical over the past decade
- there are currently more people with university level occupations arriving in New Zealand than departing
- the trend for scientists and engineers (Professionals Group 1) broadly follows that of all people with university level occupations, although the magnitude of the variations is less for this smaller group
- migration trends for the two skilled groups are also broadly similar to the total migrating population.

Although we have not tracked individual RS&T disciplines, the qualitative similarity in all three trends above implies that migration of people in university level occupations - including scientists and engineers (Professionals Group 1) - is at least partially influenced by factors that affect the entire population. Recent research suggests that family reasons, lifestyle, and global security are important for attracting people to New Zealand against the counter-pulls of better career and business opportunities, remuneration packages and the challenges of working overseas.⁴

⁴ K. Inkson et al (2004), Brain Drain to Talent Flow: Views of Kiwi Expatriates, Spring 2004, University of Auckland Business Review

NET PERMANENT AND LONG-TERM MIGRATION OF NEW ZEALAND, 1992-2005



Overall, the qualification levels of immigrants to New Zealand are higher than those of New Zealanders leaving to live overseas.⁵ Combined with net migration gains, this suggests that the overseas born will continue to make an important contribution to the nation's RS&T capacity.

⁵ ibid

▣ Essential RS&T Skills for the Future

The core objective for the Advanced Skills Action Plan is:

To attract, retain and develop top-performing people to work in research, science and technology in New Zealand

Government's role in the area of skill and career development is to enhance rewards, creating incentives for activity but not duplicating the good employer role of research organisations (ROs). For example, government can add national profile to awards and link initiatives at a national level through partnerships with the sector. To identify where government intervention would be most useful, the Ministry of Research, Science and Technology reviewed:

- the results of the sector survey, and public consultation on the ASAP discussion document
- a review of the performance evaluations that have been carried out over the past five years on Vote RS&T mechanisms which support skill development
- a review of relevant initiatives used by other countries to develop RS&T skills
- advice from Deloitte to provide an independent assessment of priority areas and possible policy options
- the Ministry's ongoing engagement with the RS&T sector.

This response has considered changes to the way government delivers support for scholarships and fellowships, career and workforce development, the development of RS&T skills, and system settings that may influence career attractiveness. The actions identified are based on the following key principles:

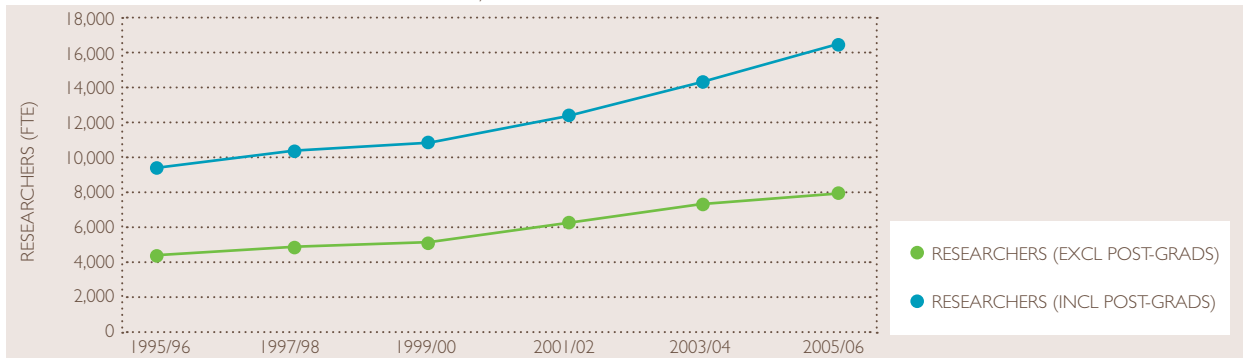
- Research organisations (ROs) retain core responsibility for researcher career and skill development as a part of their role to maintain a sustainable organisation, attract suitable employees and provide a culture of lifelong learning and development.
- Government funding enhances rewards, adding national profile to awards and providing for sector-wide and national good outcomes - creating incentives for activity but not duplicating the good employer role of ROs and linking initiatives at a national level through partnerships with the sector.
- Minimise the complexity of Vote RS&T support for skill development by having as few 'pots' of money as possible, with clearer entry points.



Personnel involved in R&D fall into three main categories: researchers, technicians and support staff. Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned. R&D survey data also shows that more than 70 percent of the R&D effort in New Zealand is provided by researchers, practically all of whom have tertiary qualifications. The graph below shows that the number of researchers performing R&D in New Zealand grew substantially in the ten years from 1996 to 2006.

TIME SERIES OF RESEARCHERS PERFORMING R&D IN NEW ZEALAND

Source: MoRSTA Decade in Review and New Zealand R&D Survey 2006



Gender of people in RS&T

Women are slightly more likely to hold a university-level qualification than men (in 2006, 53% of qualifications at bachelors level and above were held by women). However, the graph below shows that the majority of professionals engaged in core science or engineering occupations (HRSTC, Professional Group 1) were male (55% male to 45% female, out of a total of 63,000 people). This gap has narrowed significantly over the ten year period from 1996 to 2006 - in 1996 women made up only 29% of this workforce group.

PROPORTION OF CORE S&T WORKFORCE (HRSTC PROFESSIONAL GROUP 1) BY GENDER 1996-2006

Source: Census data



THEME

01

Supporting Talented Individuals

CHALLENGE: TO SUPPORT, CELEBRATE AND RETAIN TOP TALENT WITHIN OUR EXISTING RS&T WORKFORCE, AND PROVIDE OPPORTUNITIES FOR ONGOING DEVELOPMENT.

TOP TALENT IS SUPPORTED AND CELEBRATED – THE FORMS OF RECOGNITION ARE CHERISHED

Why this matters

The most important resource for the RS&T sector is its people. This is because RS&T is fundamentally an intellectual exercise where ideas and knowledge (whether codified or informal) are the intended output.

The single most significant potential barrier to realising the fruits of investment in RS&T is having adequate supply, or quantity, of human resources devoted to RS&T. The ability to attract and retain sufficient numbers of people into RS&T is critical to the sustainability of this sector. However, for New Zealand to produce world-class RS&T, we also need to ensure the workforce is high quality. This means recognising and rewarding top talent at all career stages, and energising our high performers through opportunities for creativity and discovery.

In practice, achieving this is likely to involve flexible support which is targeted at individuals and teams rather than the institutions within which they sit. For example, prestigious long-term fellowships can provide recognition and intellectual freedom to individuals with an outstanding track record, and allow for uninterrupted research time. Providing sufficient opportunities for creative, investigator-initiated research is also important.

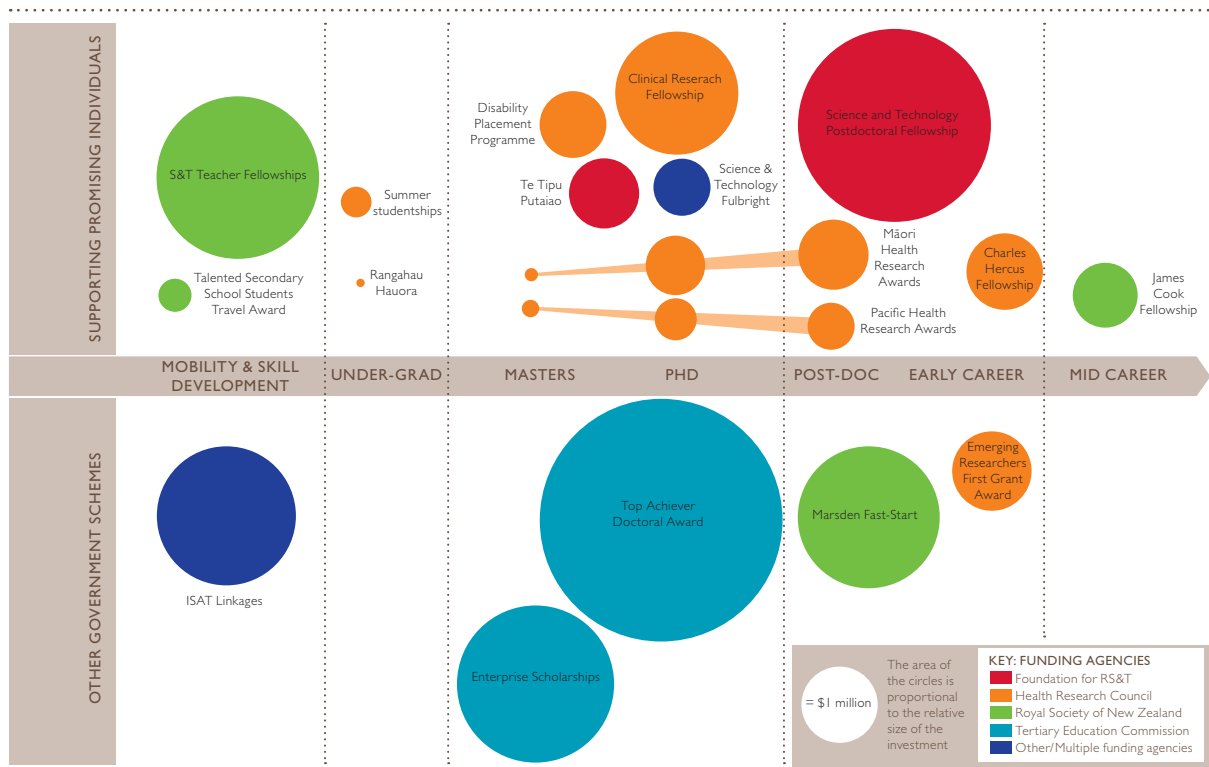
To maximise the contribution of our top individuals we also need to provide opportunities to network, collaborate, and transfer to different work environments, both within New Zealand and abroad. As much of our RS&T capability resides in the public sector, providing effective incentives for the transfer of people between the public and private sectors is particularly important in enhancing the global competitiveness of New Zealand enterprise.

How can we improve?

At present the main government RS&T funds for investing in the development of people are the *Supporting Promising Individuals* programmes funded through Vote Research, Science and Technology and administered by the Foundation for Research, Science and Technology (FRST), the Health Research Council (HRC) and the Royal Society of New Zealand (RSNZ).

As shown in the diagram below, *Supporting Promising Individuals* consists of a large number of schemes, providers and application processes for a relatively small amount of funding (\$18m). An evaluation carried out in 2002 by the Ministry of Research, Science and Technology noted that *Supporting Promising Individuals* had been created by amalgamating a variety of disparate schemes that focused on individuals, rather than any strategic analysis of what types of support for people and skill development the New Zealand RS&T system should have. While some of the schemes are focused on fostering the development of top talent and future science leaders, others are focused on increasing workforce capacity in particular areas, or amongst under-represented ethnic groups.

GOVERNMENT INVESTMENT IN RS&T SKILL AND CAREER DEVELOPMENT – MAJOR SCHEMES



As can be seen from the diagram above, a significant proportion of the current investment in *Supporting Promising Individuals* is focused at graduate level (Masters and PhD⁶), where a lot of other sources of funding exist (eg from the Tertiary Education Commission, universities’ own scholarships and research contracts). As the tertiary education reforms are embedded, tertiary education institutions are expected to become more responsive to the needs of government and stakeholders. Over time, this should reduce the need for RS&T investment to ‘plug gaps’ in graduate training, enabling greater focus on career development at the postdoctoral level and beyond. The recently launched Rutherford Foundation, an initiative of the Royal Society of New Zealand that the government will contribute \$1 million annually to, has the potential to play a significant role in this area in future, alongside the existing investments of the HRC and FRST.

Feedback from the RS&T sector suggests that, while many people are positive about the current fellowship schemes that are available, there is a gap in support for early career researchers immediately after undertaking post-doctoral training. It has become increasingly difficult to get to the stage of establishing an independent research career, as a large proportion of funds are allocated to researchers with a proven track record. This is particularly the case in areas where there is significant ‘overbidding’ for the total funds available. From the consultation process, the option to ‘refocus and expand investment in RS&T scholarships and fellowships’ was the most consistently supported option among the submissions received, particularly among university respondents.

The majority of submissions on the Advanced Skills Action Plan discussion document agreed that the level of complexity of the current schemes should be reduced. However, there was a lack of consensus about how to achieve this. Some submissions favoured setting up a single access point for all fellowship applications, while others felt the disparate schemes could be amalgamated and administered by a single funding agency. A number of risks were identified, such as a loss of flexibility and options for applicants, and a potential reduction in the ability to identify and target funding to particular sector priorities. This suggests that there is a need to strike a balance between reducing complexity and maintaining schemes that are fit-for-purpose. Irrespective of any changes to the number of schemes, feedback from the sector suggests that we should also look for opportunities to reduce the complexity of application processes, to promote greater accessibility and uptake of funds.

⁶ While the diagram shows the dollar value of investment, this trend is more apparent when the number of people supported at each career stage is considered. This is because the size of a Masters or PhD grant is smaller than a postdoctoral or early career grant.

Actions

The following set of actions will reposition the investment in RS&T scholarships and fellowships to enable New Zealand to obtain better value from this investment.

ACTION 1.1:

Evolve the current mix of fellowship programmes to improve support for top talent across the RS&T system

Current support for top talent is fragmented. We will strengthen and align existing funding to develop a set of high profile fellowships, which will encompass postdoctoral, early career and mid career stages. The early career stage will be our initial focus as work to date suggests that this is where the main gap exists. Over time, the new fellowships will build off the success of the Top Achiever Doctoral Fellowships to create a coherent and strategic package of support across career stages.

MEASURES:

- Number of postdoctoral and early career researchers (<8 years post-PhD) supported through Vote RS&T fellowship schemes
- Number and proportion of fellowship recipients successful in obtaining permanent employment after fellowship completion
- Number and proportion of fellowship recipients successful in competing for external research funds after fellowship completion.

ACTION 1.2:

Clarify criteria for Vote RS&T support for training scholarships

Lead responsibility for undergraduate, Master and PhD training sits within tertiary education funding streams. Vote RS&T support should only be directed to these career stages in limited circumstances. For example, evidence suggests that, while NZ does not have overall shortages of RS&T workers, we do have shortages in some areas. Providing targeted training grants may be an efficient way to attract people into these areas, particularly if potential employers are involved as partners. It also enables us to increase diversity in the RS&T workforce, through targeting under-represented groups. We will work with funding and investment agencies to develop a more coherent approach to RS&T investment in graduate training.

MEASURES:

- Number and proportion of training scholarship recipients successful in obtaining permanent employment after fellowship completion
- Number and proportion of fellowship recipients obtaining employment in area of study
- Number and proportion of individuals successful in obtaining further training or research funding

ACTION 1.3:

Reduce the administrative complexity of RS&T scholarships and fellowships

The distribution of RS&T fellowship funding across three funding agencies has the potential to create unnecessary complexity. We will seek to make the schemes more accessible and user-friendly through simplifying current administrative processes currently used by funding agencies. For example, this may include changes to application forms, review processes and timelines, and seeking consistency across funding agencies in terms of eligibility, rules, and entitlements.

MEASURES:

- Number and proportion of fellowship applications received that are deemed ineligible
- Length of time taken to process fellowship applications.

Maintaining the RS&T Workforce

CHALLENGE: TO ENSURE AN ADEQUATE QUANTITY, QUALITY AND DIVERSITY OF PEOPLE CONTINUE TO BE ATTRACTED INTO NEW ZEALAND RS&T, TO SAFEGUARD OUR FUTURE WORKFORCE.

CAREER OPTIONS ARE VARIED, FLEXIBLE AND UNDERSTOOD

 THE SUPPLY OF PEOPLE WITH ADVANCED SKILLS MATCHES EMPLOYER DEMAND FOR THOSE SKILLS

 RS&T CAREERS ARE ATTRACTIVE TO A BROAD RANGE OF PEOPLE

Why this matters

Labour issues in the RS&T sector are part of the current tight labour market.

There appears to be no evidence of overall shortages of researchers in New Zealand at present, although there may be shortages in some specific disciplines or areas.⁷ New Zealand does have an ageing workforce, with the baby-boom generation approaching retirement, and the current favourable inflow of RS&T-skilled immigrants is not guaranteed to continue. While it is difficult to identify what is the ‘right’ balance for New Zealand between attracting RS&T talent from overseas, and developing our domestic RS&T talent, in both cases the quantity and range of people we can attract to the sector is heavily dependent upon the attractiveness of RS&T careers in New Zealand.⁸ Increasing the size of the pool of people would increase the range of skills available to choose from and lead to an increase in quality and productivity.

The drivers affecting attractiveness change through life. These drivers are related to: age, satisfaction, salaries, opportunities on offer, degree of challenge available and sought, the extent to which people feel valued, family arrangements, lifestyle and security.

The necessary degree of specialisation in RS&T fields makes it a different labour market to most. The need to undertake advanced training means that entry costs are higher than most careers, and there may be limited employment options within a particular area of specialisation.

If careers are unattractive and elements of the RS&T workforce feel dissatisfied, we may face issues related to productivity (the extent to which they are de-motivated by their dissatisfaction) and to quality (the need to be attractive to top quality researchers if we are indeed to remain world leaders).

To ensure an adequate supply of skilled people with the experience and ability to address the distinctive needs and opportunities facing New Zealand, RS&T careers also need to be attractive to a broad range of people. Such diversity is characterised by differences in ethnicity, culture, gender, age, family status, disability and professional training and experience.

Initiatives addressing diversity will tend to focus on ensuring that there are no unreasonable barriers which prevent particular groups of people from entering or remaining in a workforce or workplace. The majority of diversity issues are ones that are generic to any employer of a highly skilled workforce, although it is important to note that research organisations need to be able to focus on the distinctive needs of New Zealanders. Our RS&T, and hence our RS&T workforce, needs to be able to connect to our communities both now and into the future.

⁷ For example, discussions with the sector have suggested that there may be shortages of geophysicists and process engineers.

⁸ When we discuss the ‘quantity of researchers’ we are referring to the number of people qualified, experienced and able to fulfil New Zealand’s RS&T requirements.

How can we improve?

While there is a widely-held perception that science careers in New Zealand are unattractive, this perception of attractiveness is not supported by workforce shortages, high staff turnover or inability to fill vacant positions within research organisations. This implies that the general “unattractiveness” is offset by other factors. Feedback from the sector suggests that there is no ‘silver bullet’ when it comes to improving the attractiveness of New Zealand RS&T careers, and a range of responses from both RS&T employers and government are needed.

For employers, this may include:

- clearer communication with RS&T staff about the organisation’s vision, and their role in delivering this vision
- greater involvement of RS&T staff in decisions that affect them
- providing more opportunities for creative exploration
- providing more ‘stretch’ opportunities outside the organisation, such as industry secondments or international exchanges.

For government, it may include:

- identifying and responding to cost pressures
- streamlining and improving funding processes
- clearer communication of science priorities over time.

Some of these issues relate more to New Zealand’s overall RS&T environment, discussed under Theme Four: *Providing an Enabling Culture*, rather than any specific workforce challenge.

One important element of attracting and retaining top performing people into RS&T is raising awareness of the different career opportunities that exist, and the skills and knowledge employers are seeking. People entering or considering an RS&T career may have limited awareness of RS&T career opportunities beyond the traditional path of employment by a university or a CRI. A number of existing programmes focus on promoting RS&T career opportunities to secondary school students. However, there is limited support targeted at people at later career stages, such as those moving from undergraduate to graduate study, PhD students and post-doctoral fellows. The number of Māori and Pacific people entering into an RS&T career also remains low, despite the fact that these groups are a growing proportion of our population. This suggests that initiatives to specifically target these groups are needed.

Actions

ACTION 2.1:

Improve access to RS&T careers advice

The government’s draft Skills Strategy for New Zealand recognises the need to enhance the relationship between supply and demand for skills. This is particularly important for the RS&T workforce, given the amount of investment required to obtain an advanced qualification, and the necessary degree of specialisation. We will improve access to information and career advice to enable individuals to make informed decisions about advanced training.

MEASURES:

- Number of institutions and RS&T organisations participating in the initiative
- Number of people accessing the career information and resources provided
- Proportion of target audience reporting that the resources and advice provided were useful in aiding career decision-making.

ACTION 2.2:

Strengthen engagement between RS&T employers and young people

Many RS&T employers have recognised the need to attract and engage with their future workforce, and have developed initiatives such as summer internships, scholarships and education support initiatives. We will investigate ways to provide incentives for the development and expansion of such activities within the sector. Initiatives that engage with Māori and/or Pacific youth will be particularly encouraged. There may also be an opportunity to link this action to initiatives developed by individual tertiary education institutions, which aim to attract students into areas of RS&T that are consistent with their organisational plan.

MEASURES:

- Number of RS&T employers participating in relevant initiatives
- Number of young people, and proportion of targeted audience participating in relevant initiatives
- Number of participating young people that subsequently enrol in an RS&T qualification (if at secondary school level at the time of contact), or obtaining employment in the RS&T organisation (if at tertiary education level at the time of contact).

ACTION 2.3:

Assess ways to improve the attractiveness of RS&T careers to Māori and Pacific peoples

Submissions on the ASAP discussion document identified a range of potential reasons for the low participation of Māori and Pacific peoples in RS&T. Some pointed to the wider economic and social disadvantages facing these groups, others suggested that RS&T work environments can be incompatible with Māori/Pacific cultural values, or felt the problem was due to a lack of role models and mentors. As Pacific peoples are generally under-represented at postgraduate level, it is likely that many of these issues are not unique to RS&T.

Many submissions suggested that the undergraduate or secondary school levels would be a more appropriate place to focus initiatives designed to encourage Māori and Pacific peoples into RS&T careers, rather than the existing focus on providing scholarships for postgraduate training. However, as a number of tertiary education institutions and Crown Research Institutes have already introduced initiatives in this area, we need to ascertain how government can best add value.

We will conduct further work to gather evidence about the factors that would encourage Māori and Pacific people to pursue an RS&T career, the effectiveness of current schemes, and the identification of potential new opportunities. Such opportunities will be pursued with advice and support from other relevant agencies, including Te Puni Kōkiri and the Ministry of Pacific Island Affairs.

MEASURES:

- Number of Māori and Pacific researchers supported through RS&T funding contracts, scholarships, and fellowships
- Career stage of Māori and Pacific researchers supported
- Proportion of Māori and Pacific people in the core RS&T workforce compared to the New Zealand population.

THEME 03

Developing Skills

CHALLENGE: TO EQUIP NEW ZEALAND'S RS&T WORKFORCE TO MEET THE CHALLENGES OF THE FUTURE

RS&T WORKERS HAVE WORLD-CLASS TECHNICAL SKILLS
LEADERS AND ROLE MODELS ARE NURTURED AT ALL LEVELS OF THE RS&T SYSTEM
RS&T WORKERS ARE BUSINESS-SAVVY

Why this matters

The people within the RS&T workforce need the skills to deliver high quality research outputs to the users of RS&T in New Zealand, and keep pace with world-wide RS&T developments.

Developing the advanced technical skills needed to conduct world-class RS&T requires continuous development and lifelong learning. Access to quality research infrastructure, and training from experienced researchers at the top of their fields is essential in enabling New Zealand's RS&T workforce to develop these skills. It is important that we provide opportunities for top emerging researchers to undertake this training, both in New Zealand and overseas. Support for the development of international networks and collaborations throughout researchers' careers is important in enabling ongoing learning and the diffusion of cutting-edge knowledge and technology back into New Zealand.

Recent projects carried out by the OECD have highlighted the need for scientists and researchers to have additional, non-technical skills – including leadership, communication, networking and entrepreneurial skills, and to demonstrate 'business savvy.' This is placing increasing demand on the RS&T workforce, who now require a broader range of these 'soft' skills, as well as the technical skills traditionally supported by government RS&T funds.

The activities of respected role models and leaders in RS&T guide and shape scientific and technological enquiry. There is no one agreed definition of leadership or any one set of personal qualities or competencies that characterise leaders. There is a perception that 'leadership' cannot be separated from 'management' activities in RS&T careers, which deters many potential leaders from showing leadership within their organisation, discipline or sector. Leaders exist at different levels and include leaders of people, leaders in business, operations and strategy, and leaders at the communications level, all with differing roles and with associated differing imperatives/competencies.⁹

In the broad RS&T environment in New Zealand this is reflected in a number of leadership paradigms, notably:

- science business leaders (strategic and business-focused)
- science team leaders (people-focused)
- science area gurus (strategically and operationally-focused)
- science communicators/educators (who form the bridge between science and society).

The skills present in the RS&T workforce can be applied more broadly to share knowledge and increase the impact of RS&T. Such activities are crucial to commercialise the outputs of RS&T, and convert these outputs into tangible economic returns and growth. This requires 'business savvy' and entrepreneurship.

Entrepreneurship comprises a spectrum of skills including the ability to take risks, to raise capital and the capacity to commercialise a product or service. This is seen as the role of a specialised few who inherently thrive on risk and uncertainty, and not a role that can be easily learnt - or expected of people in RS&T careers. Rather, the RS&T system needs a culture that enables entrepreneurs to engage, function effectively and access the knowledge and ideas they need.

⁹ According to DDI (A blueprint for Leadership Success, 2003)



Business savvy incorporates business awareness, building market intelligence, building networks, recognising commercial opportunities and understanding issues related to protection of intellectual property. It is essential that these activities take place within the RS&T community if it is to relate effectively with entrepreneurs and generate the commercialisation activity required of it.

RS&T-based business savvy is most commonly developed through involvement in commercial activity - this can be as a result of a secondment in industry, involvement in commercialising a product, or simply in running a commercial RS&T contract. Clearly, those working in the private sector get much greater exposure to business savvy and apply their skills more frequently.

How can we improve?

Many research organisations already run programmes designed to enable their staff to develop the range of ‘soft’ skills needed in today’s RS&T workforce. Submissions on the ASAP discussion document indicate that some of those programmes are held in high regard, and many feel that support for the development of these kinds of skills is best left to the employer. This suggests that any government intervention in this area should focus on opportunities to add scale and coordination, and to facilitate exposure to new experiences outside the individual’s organisation setting, rather than seeking to duplicate or replace the valuable programmes that already exist within organisations.

In recent years, two government schemes have contributed to the development of business savvy within the research community through the transfer of people between public research organisations and firms. These are the Technology for Industry Fellowships (TIF), administered by the Foundation for Research, Science and Technology, and the Enterprise scholarships, administered by the Tertiary Education Commission. Changes to TIF are being implemented as a result of the recent introduction of an R&D tax credit, and the subsequent need to redesign grant schemes that support R&D within firms. A review of the Enterprise scholarships is also underway to investigate ways to improve the design and uptake of this scheme. As changes to TIF and Enterprise are already underway, no specific new actions to support business and entrepreneurial skill development have been identified for implementation through the ASAP. However, we intend to monitor the impact of the changes to TIF and Enterprise on researchers’ access to opportunities to develop commercial skills and experience, with a view to identifying any additional opportunities that may exist.

Action

ACTION 3.1:

Develop a new experiential leadership programme

We will create a new leadership development programme to provide experience-based, RS&T specific leadership coaching to emerging leaders. This will include opportunities to receive mentoring from existing leaders, and the development of cross-disciplinary cohorts that allow emerging leaders to exchange ideas and learn from each other. Such an approach builds on the success of the Oxygen Group, a group of future RS&T leaders convened by MoRST, and complements existing leadership development programmes operated by some RS&T organisations, which mostly focus on the development of management skills.

MEASURES:

- Number of programme participants obtaining formal leadership opportunities eg appointment to management positions, governance Boards, participation in international delegations etc
- Number of participants reporting new skills and networks acquired as a result of participation in the programme.

THEME

04

Providing an Enabling Culture

CHALLENGE: TO DEVELOP AN RS&T SYSTEM THAT IS FLEXIBLE, CONNECTED, AND ENABLES TALENT TO FLOURISH

RS&T WORKERS FEEL VALUED
BY EMPLOYERS AND SOCIETY
CREATIVITY IS VALUED AND
THERE IS SPACE FOR IT
RS&T WORKERS ARE
NATIONALLY MOBILE AND
KNOWLEDGE IS SHARED
ACROSS NZ
RS&T WORKERS ARE
INTERNATIONALLY MOBILE
AND COMPETITIVE IN OUR
CORE AREAS

Why this matters

Feedback from consultation with the RS&T sector has identified the provision of an environment which suits researchers, allows researchers to think creatively, and pursue their research interests, as one of the most important elements of attracting and retaining top RS&T talent.

A key component of RS&T endeavour is creativity - the ability to be imaginative and come up with new ideas or practices. Creativity occurs throughout the practice of scientific and technological enquiry and can change what RS&T is done and how. While creativity exists within individuals, some organisational settings have the ability to promote or constrain creativity. It is not possible to force creative events to occur, but we need to ensure our systems and organisations provide space and opportunities for them.

Many RS&T skills and activities can be enhanced by the sharing of knowledge that occurs when a workforce is mobile. Mobility can be organisationally or individually based, temporary or permanent. It includes both international mobility and national mobility – between organisations, organisation types and disciplines. Decisions to move are often dependent on personal circumstances. Mobility cannot be forced, but barriers which hinder people from pursuing such activities can be minimised.

National mobility is important in increasing informal knowledge flow, but there is a perception of limited scope for this because traditional career development routes and boundaries leave few opportunities in a small RS&T system. The challenge is to inject increased flexibility in career options and overcome traditional boundaries.

International mobility is already a very significant feature of our RS&T system. We need top researchers to continue to flow in and out of the country, so that:

- we have continued access to world-class knowledge and networks
- we continue to have sufficient RS&T personnel working in New Zealand
- we keep in touch with international developments, technology, thinking etc
- we continue to build the reputation of RS&T in New Zealand
- the diaspora can offer valuable opportunities to other New Zealanders through research collaborations or study opportunities.

Public debate in this area often centres on the “brain drain”, which is just one aspect of the overall flow of skilled people to and from New Zealand – that of talented young New Zealanders leaving the country. Closer inspection of the available information shows that these young New Zealanders are currently being replaced by skilled people of other nationalities, so that, rather than a drain of talent, we are experiencing a “brain exchange”.¹⁰ In fact, the proportion of people with university-level occupations is higher for those arriving than those departing, raising the possibility that we may be gaining skilled people through migration, not losing them. This is good news for the supply of skilled people in New Zealand, provided migrants are able to make use of their skills in appropriate areas within the RS&T field.

¹⁰ Glass and Choy, 2001

How can we improve?

Feedback from the sector indicates that we are doing well in some areas. For example, while opportunities for international exchanges are seen as one of the most important factors in developing advanced RS&T skills, the feedback also suggests that the sector views this area as relatively well supported (through such schemes as Vote RS&T's International Science and Technology Linkages fund). Such activities should continue to be supported, and expanded over time.

Consultation with the RS&T sector has revealed a strong view that broader system settings and organisational settings are creating barriers to career attractiveness. These include:

- salary levels for scientists, which are seen as not competitive with other professions and overseas careers
- availability of funding for creative or investigator-initiated research
- funding uncertainty, with application processes seen as overly complex, compliance costs too high, and too many small pots of funding
- the number of career researchers who hold a research grant but no ongoing employment commitment ('tenure')
- the commercial, profit-driven focus of research organisations.

Many of these areas require longer-term solutions that fall outside the scope of an Advanced Skills Action Plan. Some relevant changes are already in train. For example, the introduction of negotiated (non-contestable) research, science and technology funding are expected to improve career security and stability through enabling longer-term planning by research organisations.

Security of employment appears to be a major concern for the RS&T sector, which is understandable given the high degree of specialisation, and the individual investment in training. Feedback from the sector suggests that this issue is particularly important for non-teaching staff within the university sector, where short-term contract employment appears to be more prevalent. Amongst this group, it appears to be a particular concern for health researchers. Preliminary discussions suggest that some employers are already conscious of these issues, and are considering options for addressing them.

New Zealand's main contestable fund to support investigator-initiated research is the Marsden Fund, administered by the Royal Society of New Zealand. This fund is currently significantly oversubscribed, with approximately 8-10% of applications successful in obtaining funding. Many submissions on the discussion document argued that increasing the size of the Marsden Fund would be the best way to increase creative opportunities for researchers, particularly early career researchers, who in a constrained funding environment may not have the track record to compete with more established researchers. However, the RS&T funding landscape has changed significantly since the Marsden Fund was established, with the creation of new mechanisms to support research excellence within the tertiary education sector (such as the Performance Based Research Fund (PBRF) and the Centres of Research Excellence). This creates an opportunity to reconsider and reaffirm the role of the Marsden Fund in today's innovation system. While radical changes in the nature of the fund are unlikely, there may be an opportunity to improve its operation. For example, we could consider whether the current disciplinary focus of the Fund is effective in terms of supporting inter-disciplinary research, and options to improve the distribution of funding across career stages.

The other area where there may be a need to improve system settings that influence career development is the mechanisms that support early career researchers (particularly at the postdoctoral level) across the RS&T system. The post-doctoral career stage represents the transition between training and an independent research career. This is traditionally a highly mobile career stage as researchers seek to broaden their skills, knowledge and experience of different working environments. We need to ensure that adequate incentives are in place to ensure this next generation of researchers is fostered, and opportunities to establish permanent careers are enhanced.

While some researchers at the post-doctoral level are supported through individual fellowships, the majority are supported through research contracts, typically under the supervision of a more experienced principal investigator.

HOW CAN WE IMPROVE? CONTINUED

There is some concern within the sector that current system settings may be creating the wrong set of incentives for the participation and development of researchers at postdoctoral career stages. Relevant issues identified by the sector include the incentives created by the PBRF, approaches to overhead cost recovery for post-doctoral researchers, and levels of overbidding for RS&T funding.

Actions

ACTION 4.1:

Review the Terms of Reference for the Marsden Fund

The Marsden Fund has a major role in supporting top talent and providing space for creativity within the RS&T system. The current Terms of Reference for the Fund includes an objective to 'broaden and deepen the research skill-base in New Zealand.' We will review the Marsden Terms of Reference to clarify the role of Marsden in supporting people, skill development, and creative investigation.

MEASURES:

- Age and career stage distribution of successful Marsden recipients.

ACTION 4.2:

Review incentives for the participation of post-doctoral researchers in Vote RS&T projects

We will investigate the current incentives for post-doctoral researchers to participate in and lead Vote RS&T projects. This will consider to what extent the rules of funding and investment agents are creating negative incentives for the participation of post-doctoral researchers in Vote RS&T funded projects. It will also feed into broader discussions between the Ministry of Research, Science and Technology and the Tertiary Education Commission, in the context of the current review of the PBRF.

MEASURES:

- Number of post-doctoral researchers supported through Vote RS&T funding, by funding agency.

TO ATTRACT, RETAIN AND DEVELOP TOP-PERFORMING PEOPLE TO WORK IN RESEARCH, SCIENCE AND TECHNOLOGY IN NEW ZEALAND



NEW ZEALAND RESEARCH, SCIENCE AND TECHNOLOGY HAS THE PEOPLE AND SKILLS IT NEEDS TO:

- DRAW SUSTAINABLE VALUE FROM OUR BIOLOGICAL BASE
- RECOGNISE AND MANAGE OUR ENVIRONMENT AS AN ASSET
- SEED AND SUPPORT HIGH-TECH INDUSTRIES
- STRENGTHEN SERVICES FOR HEALTH AND SOCIAL WELLBEING

▣ Next Steps

Page 30 provides an overview of the actions identified in this plan, and explains how these link to the critical components identified for the RS&T workforce. Implementation of the Advanced Skills Action Plan will be led by the Ministry of Research, Science and Technology, in partnership with other government agencies with an interest in the development of advanced skills.

How will the Plan be resourced?

The Advanced Skills Action Plan will be implemented in line with the investment strategy identified in *From Strength to Strength: Government’s Agenda for Research, Science and Technology*. Increasing support for career development is identified as a second order priority in the Agenda. This means that we will seek to implement the actions within existing resources where possible. However, some of the actions may require additional investment over time. These include:

- Action 1.1: Development of a new fellowship programme to support top talent across the RS&T sector
- Action 2.1: Improve access to RS&T careers advice
- Action 2.2: Strengthen engagement between RS&T employers and young people
- Action 2.3: Assess ways to improve the attractiveness of RS&T careers to Māori and Pacific peoples

The availability of new investment will determine how quickly these actions can be implemented. For some actions, implementation will also depend on available departmental resources. While it is not possible to specify absolute timeframes, the table below classifies the actions into two groups depending on whether we expect to make immediate or longer-term progress.

GROUP ONE: IMMEDIATE PROGRESS

GROUP TWO: LONGER-TERM PROGRESS

1.1 Evolve current mix of fellowship programmes to improve support for top talent across the RS&T system	2.1 Improve access to RS&T careers advice
1.2 Clarify criteria for Vote RS&T support for training scholarships	2.2 Strengthen engagement between RS&T employers and young people
1.3 Reduce the administrative complexity of RS&T scholarships and fellowships	2.3 Assess ways to improve the attractiveness of RS&T careers to Māori and Pacific peoples
3.1 Develop a new experiential leadership programme	4.2 Review incentives for the participation of post-doctoral researchers in Vote RS&T projects.
4.1 Review the Terms of Reference for the Marsden Fund	



THIS DOCUMENT HAS BEEN PRINTED ON ROYAL OFFSET HIBRITE. IT IS MANUFACTURED USING ECF PULP SOURCED FROM SUSTAINABLE, WELL-MANAGED FORESTS BY AN FSC, EMAS AND ISO 14001 CERTIFIED MILL.

MINISTRY OF
RESEARCH
SCIENCE +
TECHNOLOGY

MRST
TE MANATŪ PŪTAIAO

newzealand.govt.nz

MINISTRY OF RESEARCH, SCIENCE + TECHNOLOGY

Level 10, 2 The Terrace, PO Box 5336, Wellington 6145, New Zealand

www.morst.govt.nz

HG-MRST06081