Article

Creating engines of growth

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Changes in the New Zealand science system have been approved by the Minister of Research, Science and Technology. This paper discusses the main recommendations, including how implementation focused on excellence and leadership can allow the CRIs to become the desired engines of growth for the economy.

Introduction

Concerns about the New Zealand science system, and the consequent direction of the Crown research institutes (CRIs) functioning within it, have been apparent for over a decade (e.g. Sommer & Sommer 1997; Edmeades 2004). Momentum for change has, however, taken time to build (Rowarth 2009). The National Science Panel, constituted in 2006 by the Royal Society of New Zealand, released 'A Science Manifesto' in 2008 containing 'a plan for recovery of New Zealand science' (National Science Panel 2008; Tallon 2008). The ten recommendations included the establishment of an office of the Chief Scientist. Professor Sir Peter Gluckman was appointed Chief Scientific Advisor to the Prime Minister in 2009. Under the new Minister of Research, Science and Technology (RS&T), Dr Wayne Mapp, a CRI review was begun, also in 2009. The Taskforce, chaired by Neville Jordan (Immediate Past President of the Royal Society of New Zealand) produced a set of recommendations which echoed many of those made in the Manifesto by the National Science Panel. These recommendations have been supported by the Minister (Mapp 2010). A platform has now been created upon which the engines of growth can start up – but questions remain at many levels on how the recommended changes will be brought into action. The Minister himself (Mapp 2010) has said that implementing the recommendations will require a significant behavioural shift in the CRIs, in particular a reduction in the use of competition to drive performance, and a shift of responsibility to the CRIs' boards to lead and be held accountable for their results.

This paper considers the factors in governance and leadership which will be critical in creating the appropriate management for the engines to function and create the desired growth in the New Zealand economy.

Changes

Changes, described as being the most significant in the sector for 20 years, and requiring 'real and significant cultural change by the owner, and the CRIs themselves' (Gluckman 2010) are being implemented ensuring that 'New Zealand gets the best from its CRIs' (Mapp 2010).

The changes include:

1. greater clarity on the role and purpose of each CRI
2. strategic and longer-term funding for CRIs
3. strengthened CRI board accountability and
4. a set of balanced performance indicators that will enable CRIs to improve accounting to the sectors they serve and the government.

Points one and two – clarity of role and secure funding

The first point on role and purpose aligns with statements that CRIs will be working for the benefit of New Zealand as a whole, not just for the benefit of the individual CRI in terms of profit. The Ministry of Research, Science and Technology (MoRST) will engage with CRI stakeholders to produce an initial set of Statements of Core Purpose for CRIs and Statements of Corporate Intent. Although these have been produced in the past, difficulties were experienced with achieving what had been signed off by the shareholding ministers because of funding decisions by a different agency, the Foundation for Research, Science and Technology (FRST). Having strategic and longer-term funding for CRIs (point two) will allow greater certainty in achieving the agreed Purpose and Intent.

Of perhaps even greater importance associated with more stable funding is that job satisfaction will be enhanced for those within the science system. The single most important factor in job satisfaction is 'making progress'. The Harvard Business Review Breakthrough Ideas for 2010 included work by Professor Theresa Amabile, Edsel Bryant Ford Professor of Business Administration and head of the Entrepreneurial Management Unit at Harvard Business School (Amabile & Kramer 2010). Based on her research into motivation, she concluded that the

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top motivator of performance is being able to make progress. In analysis of 12,000 diary entries, 76% of people's best days were associated simply with this factor, and, as Professor Amabile points out, enabling progress is within the control of leaders and managers. It is wheel spinning and roadblocks, frequently associated with what are termed bureaucratic management systems, that lead to low motivation and morale.

Recently-published research on New Zealand scientists and technologists (Sommer 2010) reported that 40% of scientists spend more than 30% of their time on paperwork – bidding, justifying and accounting. If the review recommendations are adopted, scientists will be able to spend more of their FRST-funded time on research (current estimates are the approximately 50% of CRI income comes from FRST), and using the knowledge and skills they have spent considerable years (at least seven at university) gaining and developing – to make progress for New Zealand Good.

Of further note is that they will be able to do this research collaborating with other scientists, not only because they are being encouraged to do so by the establishment of a fund for major national collaborative challenges, but also because the individuals involved will no longer be under pressure to 'make money', or divert a greater proportion of limited funds, for their own CRI. Sharing information for the benefit of the country will become the imperative. Sharing (rather than competition) has been shown to increase creativity. So does security. In fact, in her groundbreaking research involving 12,000 diary entries by 238 people in seven different industries, Professor Amabile was able to show that people are most creative the day after they feel that they had a productive day (discussed in Rowarth & Goldson 2009).

Point three - accountability

The third point, greater accountability within CRI boards, is a recommendation fraught with possibilities for unintended consequences. Public annual general meetings and annually monitoring and evaluating performance against the core purpose and Statement of Corporate Intent has been suggested. This will benefit New Zealand as long as the board members do understand the core purpose – now recommended to be excellent science for New Zealand Good. The implication is that the boards will have some members who understand science at least as well as they understand balance sheets. The CRI Taskforce recommended a review of board composition to ensure an appropriate balance of expertise between science, technology transfer, finance, management and governance. It also recommended that each board should include at least one eminent scientist to provide research leadership and science expertise.

A second area of potential concern is that board accountability could lead to a proliferation of management within the CRIs. The counter to this is the recommendation that talented people are placed in positions of top leadership and management positions, and given the authority and autonomy they need to take strategic decisions. Governance and leadership is expanded under a separate discussion below.

Point four – performance indicators

The fourth point is a change in performance indicators. It is this change that could be of most benefit: scientific excellence assessed by independent expert panels and technology transfer as a core and measurable responsibility. It aligns with similar emphasis being made across the Tasman by the Australian Government (2010): new targets have been set for increasing research groups performing at world class levels (indicated by increased citation rates), completion of higher degrees, business investment in research, and level of inter-institutional and inter-country collaboration.

The review's recommendation 'that CRIs have an independent expert science panel to assess excellence of science' is part of the monitoring system. The other element in this consists of the scientists themselves. Scientists are intrinsically motivated by performance hence their fascination with rankings and the citation index. They want to be regarded highly and be seen to be making a difference for New Zealand. The current system encourages neither, with consequences for morale. The Sommer report (2010) indicates that less than a quarter of the CRI scientists in New Zealand would recommend science as a career in New Zealand under the current system.

Technology transfer, a new performance indicator, has the potential not only to improve adoption, but also to reassure the industry in apparent concerns about research direction. Although long-term funding does mean that overt industry consultation is being reduced, the offset is in the technology transfer indicator: information passes both ways. With direct exchange between user, extension and research, problems and solutions can be identified, tested and implemented with relative speed. This means that progress will be made, and progress, as already discussed, brings motivation. With New Zealand Good as the aim, there need be no arguments about sharing information or about 'who owns the Intellectual Property'. The answer will be New Zealand.

Governance, leadership and management

In the general good feeling about the changes, concerns do exist: the manifestation of the current science system was not what the then Minister of RS&T, Hon Simon Upton, intended (Upton 2010).

Greater accountability within CRIs' boards means that the boards must understand the core purpose of their CRI: excellent science for the benefit of New Zealand. At present scientists are in the minority on CRI boards. As it is the boards, in their governance role, that appoint the CEOs, there is potential for some confusion about purpose and type of leadership required.

Research from the London School of Economics (Goodall 2006) reported a positive correlation between the lifetime citations (adjusted for discipline) of a university's vice-chancellor and the university's ranking in the Shanghai Jiao Tong Academic Ranking of World Universities. The suggestion was that better researchers tend to have greater prestige within the hierarchy of the academy, and so enjoy credibility and negotiating strength that extends beyond their own discipline. Further, being a successful research academic might also help in attracting faculty, particularly 'stars' to a university: having a distinguished researcher as leader is thought to enhance the appeal of an institution. Two further components involved in leading research universities were identified as managerial expertise and inherent knowledge of the academic system.

This would seem so obvious that it is surprising research was needed to confirm it – yet in making the appointment of a vice-chancellor, appointment committees continue to debate

what the 'business' of a university really is – human resources staff advise appointment committees that what they need is a manager who understands people and budgets.

For a 'normal' business they are probably right. What Goodall's research supports is that the business of a university is not normal. It is not about 'making money' *per se*, and the people it employs tend not to be 'normal', either. They have, for instance, spent a minimum of seven years at university becoming sufficiently well-qualified to be employed as a researcher – in return for a salary somewhat below that which they might have been awarded in the private sector. People interested in research are not motivated by money (if they were, they would have chosen a different career), but by discovery and rigour, plus educating for the future. These are difficult to place on a balance sheet.

What is true for university research is also true for CRIs

Leadership is more than being appointed as the leader. Leadership inspires people to follow a vision, and the credible vision will be created only if the leader knows the industry.

Jack Welch (2005), ex-leader of General Electric and author of many books on leadership, summarises attributes for leadership as Edge, Execution, Energy and Energise. He puts these on top of the basic requirements of integrity and intelligence (and these days the latter is acknowledged as both mental and emotional, that is IQ and EQ).

Edge (being ahead of competitors) requires knowledge of the sector, in terms not only of its foundation, roots, development and potential, but also in what competitors are doing. It requires having contacts and networks. With knowledge comes the ability to be innovative and creative, to see potential before competitors. The leader then has the energy to execute the plan to make the potential a reality before anybody else does, and energises the followers so that they, too, are committed. The leader has the experience to be able to 'walk the talk'. Trust is inspired in the followers, and they have confidence in the vision. Good leaders are passionate about the industry in which they are participating, and almost certainly this means that they will have become involved in that industry early in life.

Andrew Oswald, Professor of Economics at the University of Warwick, puts the case for leadership simply. Leaders need instinct. Oswald (2003) suggests that 'When you are sailing into the Bermuda Triangle, it is better to have a cussing tattooed skipper with a lifetime of salt water in her rum-soaked veins than a reliable and charismatic captain who is a brilliant organiser, gorgeous figurehead and savvy harbour-party public speaker'.

The critical factor in an unexpected situation, or troubled times, is instinct, and instinct is, again in the words of Professor Oswald, 'cut into you by years of listening and seeing and making mistakes and biting your lip through triumphs and foolishness and black times and white times'.

Instinct reflects knowledge, and knowledge is a prerequisite for creativity. The person who is knowledgeable about the sector has the ability to make changes – to react instinctively and appropriately, creating a plan to solve the predicament. The business person in charge of a struggling institution is likely to cut conference travel, make bold advertising statements to increase revenue, increase accountability, and put administrative staff in charge of budgets. The researcher will invest in research, appoint top scientists to lead research areas, and reward publication in high quality journals. The budgetary reviews may well occur as well – but research encouragement will be high on the agenda.

In the university system, high quality and increased quantity of research outputs results in a high ranking, which attracts more students and research contracts – and the dollars follow. The basis of success is great research. Putting excellence back as a CRI goal is heartening for many reasons.

Managing accountability is still important, but can be achieved by combining as much autonomy as possible with a system of monitoring research performance.

Autonomy, the ability to take responsibility and to be treated as if those responsibilities will be exercised, costs nothing (noting that no mention of a funding increase was made in the review), but is important in science – professionals rate autonomy more highly than salary (as long as that salary is above a comfortable threshold) and hours. The US Gallup-Healthways Well-Being Index data published last year and involving over 100,800 people in 11 job categories shows that autonomy is associated with engagement and satisfaction. Furthermore, research from the University of Ulster (Borooah 2009) reports that the greater the weight that an employee places on the internal aspects of a job (that is, responsibility, usefulness, social interaction) the more likely the person is to be satisfied. Scientists weight internal drivers highly.

Funding systems based on excellence of past achievement, rather than promise of deliverable results, entail the development of agreed measures of performance, with reduced bureaucracy and improved efficiencies (Thornley & Doyle 1984). In an attempt to improve efficiency, New Zealand science has become increasingly management-driven during the past decade (discussed in Rowarth & Goldson 2009). Cook & Hughes (2009) have suggested that management tools and approaches of twenty years ago won't achieve improved public sector performance. Although they were commenting on the health system the same is true for science. The merger of MoRST and FRST is one step towards simplifying the science management system and moving towards the model recommended by DEMOS recently for a creative organisation in the UK: 'conceptual simplicity is the best response to organisational and contextual complexity' (Hewison *et al.* 2010).

Conclusions

The creation of the CRIs 18 years ago was a brave move. The reorganisation now being proposed is equally brave – but vital if New Zealand science is to fulfil the desired role in driving economic growth. The changes proposed for funding, accountability and performance indicators have the potential to liberate the creativity in New Zealand scientists and allow them to test innovative ideas rigorously for the benefit of New Zealand. If the implementation occurs as conceived, the CRIs will be enabled as engines of growth. The onus is on the scientific community to assist in the transformation, helping MoRST, as well as the CRI boards, to make the right decisions about their future.

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