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Science, scientists and the public good

Editor's note – the author of these comments asked for anonymity—an indictment upon the environment in which we are working.

INTRODUCTION

How do we build confidence in science and technology?

How can we make the system run better?

The following is a commentary on these and endeavours to suggest some solutions.

THE STATE OF PLAY

In New Zealand many scientists in the Crown Research Institutes (CRIs) and full time scientists in the Universities face uncertain futures, have little or no bargaining power, little social status and find themselves in positions where they have no real career prospects. The Foundation for Research Science and Technology's (FRST) recent withdrawal of several million dollars of Public Good Science Funding from Hort Research at very short notice and its effect on the careers of dozens of staff testifies to this. New Zealand scientists can be viewed as pieces on a science chessboard to be sacrificed when their current role does not quite fit this year's trendy science philosophy.

It has been argued at length that competition is good for our country because through competition the best is brought out in people. It is hardly surprising that in a country where sports are so important that such a "sports model" be applied to other areas of society. In New Zealand this competitive, presumably Treasury driven, model for science has been taken to the nth degree. No other public servants are treated so shamelessly so it is hardly surprising that: there is bitterness, a loss of morale, and discontent amongst scientists; in New Zealand's youth an understanding that our science industry is less attractive to aspire to than a career in law, commerce, health, etc.; for the *crème de la crème* of New Zealand scientists a career off-shore is preferable to staying at home, and for overseas scientists New Zealand is a less than desirable destination.

In the late 1980s / early 1990s a Labour/National alliance wrought the present system and have permitted it to continue unabated for more than a decade leaving, in its wake, wasted scientific lives and an appalling waste of a very expensive resource. The Minister has asked for suggestions of non-revolutionary changes that might be made to improve the conduct and implementation of science in New Zealand but in the circumstances I doubt if this is enough.

Below are some thoughts on how New Zealand science might be rationalised, made more efficient, and be made a safer environment for scientists where they can get on with the jobs they have been employed to do and in the process receive fair and equitable compensation.

Installation of a standard 5 year contract

At the moment when staff in the CRIs bid for research funding they are not just attempting to access funds for operating costs but are bidding for their salaries too and their very survival. In contrast, many in the Universities can bid for the same research funds from behind the protection of vote education. This is hardly a level playing field.

Some semblance of security for full time scientists in the CRIs and Universities could be returned by introducing a standard 5 year contract for them. In my vision the contract

would cover salaries and bare essentials but scientists would be expected to find their operating costs from the public purse, industry or commercial activities. The contract would be reviewed annually. Those scientists who achieve what is expected of them would have their contract renewed for 5 years and hence would have a clear career path in front of them. In contrast, those who fell short of expectations would have 4 years to change their research path or find alternative employment. I have changed my area of research several times and know that 4 years is sufficient time to do this. Even so a 5 year contract would still not give fulltime scientists in the CRIs and Universities the security enjoyed by their counterparts in the tertiary education sector, other public servants, or even the support staff in their own departments. Are these really the employment conditions that should be provided to those entrusted with generating the valuable information that will be required to create the Knowledge based Economy?

While a 5 year contract would slow down the rate with which the direction of science could be changed, the benefits to science would be considerable by making science a more respected profession and a worthy career in the eyes of our young. It might also persuade a few of our overseas resident scientists to return as well as helping retain a few more of our best graduates. However, perhaps the greatest benefit would be that those who determine research priorities would be required to make long term judgements of what is best for New Zealand as opposed to the incessant, destructive, tinkering that currently occurs.

Innovation

The process of innovation begins with the germ of an idea or a serendipitous finding – why does this fungus suppress the growth of a bacteria on this agar plate, and the like. Nobody can order these ideas up but it is possible to generate a climate in which the ideas have the best chance of surviving. Some ways this can be achieved are by ensuring there is time for reflective thought, a minimum of stress in the workplace and a contented staff. These same factors are also likely to ensure that the ideas stay at home rather than drifting off-shore to the highest bidder. I am sure that the current science environment does not fit these ideals.

Measurement of science output

In the Universities the number of scientific publications is the current measure of scientific output. A scientist's salary and status is closely tied to this. Over the past 10 years the amount of research funding the Universities have received has increased markedly as they have gained greater access to research funding. It is, therefore, hardly surprising that the number of publications produced by the Universities has increased in line with the additional funding. Currently there is a call, particularly from the Universities, for "more funds for basic science". This may well be an admirable aim but because of the way staff are measured the chief effect would be a further increase in publications rather than a dramatic increase in the exploitation of science. It is much better for science ideas to be turned into cash in New Zealand rather than leaving this to the multinationals who actively sift through scientific papers to sort out potentially lucrative prospects. What is obviously needed in the Universities and the CRIs are better ways of recognising those staff who exploit scientific information rather than just publishing it.

Rewards and salaries

The current move by the University of Otago to split the rewards from exploiting intellectual property between the "inventor(s)", the department they are in and the University is an admirable step to rewarding staff not just for numbers of published papers but for the implementation of ideas that will be of benefit to the country

(<http://policy01.otago.ac.nz/policies/index.html> - Policy For Intellectual Property Rights). In the CRIs there is no policy of this sort and instead there is an insistence that all intellectual property belongs to the CRI. Is this a hazardous policy in view of the lack of tenure in the CRIs, relatively low salaries compared to New Zealand Universities and science managers, and opportunities that might present themselves off shore?

Managers of the CRIs and Universities can easily compare themselves with salaries paid to administrators in the private sector and as such command salaries well beyond the scientific members of staff who actually generate the intellectual property. In the CRIs there is no pay parity with the Universities (this was discontinued 20 years ago) and the relatively few scientists in the private sector are simply paid what is current in the public sector. Surely quality scientists in the CRIs deserve at least what is paid to competent lecturers / scientists in the Universities.

Simplification of the current system of distributing research funds

It is time to inspect the science administration industry which has grown up in New Zealand. FRST (including Technology New Zealand), the Ministry of Research Science and Technology, the Royal Society of New Zealand, Industry New Zealand, the administrators of the CRIs and Universities, and numerous other public and private bodies, are all involved in the allocation of funding and assessment of results. This industry purports to improve the quality of New Zealand science but in effect is a very expensive, self perpetuating, inefficient, bureaucratic system that takes up an obscene amount of scientist's time (and funding) that could be better spent in doing the jobs they are employed to do. It may well be the Rolls Royce of science management systems but in a small, relatively poor country such as ours we simply cannot afford the petrol, the maintenance costs and the damage the inevitable "accidents" cause.

The intense and protracted negotiation process between FRST and contractors wishing to access public funds has led the CRIs and Universities to employ go-betweens whose job is to determine just what FRST wants and facilitate the negotiation process. This is not helped by FRST's strange use of the English language and incessant coinage of vague terms instead of using perfectly adequate plain English. Clearly changes are needed here too.

All that is really required is for well informed Government to decide just what it wants to spend on each of the broad areas of science with the aid of the Royal Society of New Zealand and then let the Universities and CRIs to decide how the funds will be apportioned to career scientists. The Ministry of Research, Science and Technology could act as auditor. The advantages of such a system would be to:

- Negate the need for FRST so releasing several million dollars to research that is currently devoted to administration.
- Release very experienced senior research staff in the CRIs and Universities to do the jobs they were trained to do instead of having them spend a very large portion of their time writing funding applications and writing reports that simply have an audit function rather than a role in science.
- Return a degree of corporate memory to the management of science which has all but disappeared.

Rationalisation of courses taught in the Universities

There is considerable duplication of courses taught in the Universities. Rationalisation of courses with a well balanced approach to the humanities as well as science, and informed targeting of what is taught, would provide significant benefits. However, it is essential that

these changes are made in a responsible manner—some of the changes that were installed when the CRIs were established would be unacceptable.

Amalgamations within the tertiary sector and the Crown Research Institutes

There is no place in a country of only 4 million like ours for the wide array of organisations that ‘do science’ and administer it. As a University student in the 1970s I would have benefited considerably from being able to take some of the practical courses on offer at the local Polytechnic. Some 30 years on we are still waiting for the integration of the courses they teach.

The amalgamation of the nine CRIs into two (biological and physical) or amalgamation with the Universities is well worth considering. Amalgamation of the CRIs and Universities could be achieved with little more than the stroke of a government pen with the shift of the research and key support staff to the University payroll achievable within a few months. In less than a year of such a change there should be some significant benefits:

- Savings of 10% to 20% by removing the need for some of the CRIs’ infrastructures—savings which could be ploughed back into science so increasing the effective pool of funds available,
- Some of the staff transferred to the Universities would be available for teaching and would thus help reduce the Universities’ student / staff ratio,
- Collaborative research would be fostered between scientists from the old CRIs and the staff of the Universities,
- The incorporation of a large group of people working on applied science into some University departments would be of significant long term benefit,
- There would be a much more robust feedback loop between the generators of scientific ideas, the implementers and exploiters of these, and the teachers of these ideas to the scientists of the future.

CONCLUSIONS

Change needs to occur and I believe that the current enlightened government should make it happen now before any more harm is done to the science that should underpin New Zealand’s future.