OFFICE OF THE PRIME MINISTER'S SCIENCE ADVISORY COMMITTEE

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Chief Science Advisor

Speech: Australia New Zealand Leadership Forum, Sydney, Australia
Saturday 22 August 2009
Sir Peter Gluckman, Chief Science Advisor

The role of Chief Science Advisor to the New Zealand Prime Minister is new — I am the first appointee and have only been in the post for a couple of months. The appointment reflects the self evident fact that science is critical to many of the challenges we all face, from increasing business productivity to dealing with climate change. A scientifically literate and engaged society at all levels is more likely to be ambitious, innovative and productive.

My role differs somewhat from that of the Australian Chief Scientist and is one of providing independent advice to the Prime Minister on matters of science, on matters of science policy, promoting the public engagement in science and assisting the Prime Minister with respect to projects by which science can advance our place in the world and its economy, protect our environment and improve our society.

One of my early tasks has been to encourage a dialogue on three critical questions: first, why must a country like New Zealand invest in science; second, how should a country of only four million people and with a complex internal parochial geography undertake science — in particular, what is the role of purely competitive public funding versus strategic and performance based funding; and thirdly, how do we exploit that science to maximum value?

The New Zealand science system needs to become more efficient and outcome-focused in all parts of the science to innovation chain. A country of only four million cannot do everything in science and we are working through the bases on which choices are made. It is important to realise that basic research and new disciplines are as essential to later exploitation as water is to a hydroelectric scheme. A balance across the chain must be maintained and reinforced. Basic research must not be compromised for short term gains and long-term cost. The basic science of today is your opportunity and technology in the next decade.

Many of you may think of R&D in the traditional sense as largely being exploited within the manufacturing sector, but basic advances in science, engineering and mathematics have had

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as great an impact on the service sector. The Royal Society of London has just released a report entitled “Hidden Wealth” that points out how much productivity in the service sector is dependent on true R&D, through the application of both open and closed innovation processes. For many of you, the report would make interesting reading on its discussion of the role of naïve and not adequately science-based approaches to modelling in the fiscal meltdown of late last year.

A challenge for a country such as New Zealand, and I suspect Australia, is how to take science to scale — be it in ensuring that government policy is evidence-based (a matter that has been a sharp focus of my UK equivalent and part of my work program); be it in promoting transfer of common good knowledge to sectors such as farming or the service sector; or be it in promoting the transfer of new knowledge from the public to the manufacturing, service and agricultural sectors. This private sector transfer is of particular concern for New Zealand, which has one of the lowest proportionate expenditures on private sector funded research of any OECD nation, and has a strong statistical relationship to productivity rankings.

Because New Zealand cannot and should not do everything in science as in defence, partnerships particularly with Australia are critical. Already we have one major joint science infrastructure project in the synchrotron, and the commitment to work together on the SK array has been made. If that contract is won then the impact, both direct and indirect, on our weightless economy will be enormous. The skill base in ICT will have to rise exponentially and this, alongside the current increases in broadband services, if properly exploited, will be associated with enormous skill gaps in mathematics, science and engineering. This needs addressing. But do not underestimate the problems of capturing such a major project — science has its own diplomatic culture and the science leadership, diplomatic processes and business will need to work together across both countries to capture it. It is no different to what was needed by Australia to get the Olympic games. Parenthetically, biology is now entering a digital era and the importance of advanced ICT should not be lost to biological science in our two countries.

But such trans-Tasman exchanges must not be limited to infrastructure or be unidirectional, and indeed they are not but we could do better. New Zealand has outstanding science in many areas — obviously in pastoral science but also in geological sciences, marine sciences, nanotechnology, electrical induction technology, industrial mathematics, computer imaging and modelling, some niches of biotechnology, land use, and biosecurity to name but a few. Already some exploitation of that expertise has occurred through joint seed funds, but the level of investment is not making the most of the opportunities. We saw yesterday a good example of what might be possible in the climate change session.

Climate change is the obvious area of mutual scientific and economic interest — the more we take a joint strategic approach, the more likely that we will both benefit. The science is

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emerging. We heard yesterday of how science can be exploited. Science, business and diplomacy all converge here and leadership across these three sectors needs to work closely here to ensure progress.

Both countries have become much more strategic in their public research investment — you, through devices such as the CRCs, and we, through somewhat similar centres of research excellence (CoREs). Should we be looking for formal interactions across the Tasman; why should not a CRC or a CoRE span the Tasman; should we be seeking to rotate staff?

A major reason governments invest in science is for its effects on economic growth. But neither country has optimised its relationships between the two sectors. This has been a major focus of my first two months in office. What are some of the issues? The cultures and incentives of business and public good science are of necessity different, and this needs mutual recognition. There are institutional issues of peer recognition, peer pressure and reward that are often raised but my impression is that is often an excuse. In my experience the most intellectually entrepreneurial are also the most business entrepreneurial, and we need systems that identify and then nurture such individuals early. Neither country has enough and we need to see more rotation of individuals between the two sectors. This itself can be a challenge.

Many companies come too late to researchers and when they do they often do not ask the right question. They come and ask for help on an already evolved problem, rather than coming early and finding out what science might exist that might create new opportunities. Their time horizons can be different. Indeed the big pharma model, with which I am somewhat familiar, ensures that dialogue between the boffin and the marketeer happens at every stage from the most basic onwards, but direct market pull too early will not succeed. Basic and even applied science often has outcomes and potentials the market cannot foresee — Viagra and Post-its are obvious examples.

The quality of commercial access to universities and institutes is patchy: companies may not know how to access; scientists may be slow to see the potential of what they have or do not know where to go; academics can be jealous of what they know (will they see any upside, will their time be diverted into something for which they get no peer recognition); are the public and private institutes in collaboration, reciprocal but unequal exploitation, or competition. Perceptions of value can be wildly different. The quality of technology transfer between university, institute and business is highly variable — there are few true specialists in this step and many companies only engage sporadically in it so the professional in these companies may not understand the issues of the other side. Science both helps existing business and makes new ones. The latter can be a real challenge. Then there is the valley of death — the issues of capital, startup, spinouts, venture capital and so on.

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Some countries, notably Denmark, have taken a refreshing look at these related issues of tech transfer, industry access, IP management and seed capital. They have clustered these activities and seen enormous benefit.

Finally there is the issue of to what extent business R&D should be supported, or not, by government. There are many ways by which this can be done — tax breaks, support of indirect costs, shared infrastructure and facilities, discretionary grants. Each has different outcomes and objectives. Without fully understanding the state of the science system, where the government puts its dollar may not lead to the desirable outcome.

Last night John Key ended his speech with an exhortation to the future of both our countries. Science will be a central component of changing national attitude, approach, ambition and achievement.

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