

One giant leap

New Zealand needs to make a quantum leap in its business research expenditure. Just how far do we have to jump? By **Bob Gauldie** and **William Giesbers**

NEW ZEALAND SEES ITSELF as quite successful in competing on the world stage, whether in sport or the export of products and expertise. Undoubtedly, New Zealand has achieved some noteworthy successes internationally. But if we analyse how well we are doing in creating our national wealth by deriving profit from innovation, the situation is worse than we may think. If we compare how much expenditure is committed to research and development, New Zealand is well down the OECD ladder and falling behind the standards of countries we would like to catch up with economically and socially — the countries whose wealth and lifestyle we admire.

Patent applications are directly related to business R&D expenditure (see graph). Patents are applied to the protection of profits from innovative, moneymaking

commercial products. The graph confirms that the number of patent applications is a measure of economic success. Large numbers of patent applications funded by large amounts of business expenditure on R&D (BERD) clearly place countries in the upper socioeconomic sector. New Zealand clearly sits in the lower socioeconomic sector.

We're not quite a banana republic yet but our social systems are all in defensive mode, and so, too, is most of our economy. Most of our exports are based on cost containment and minimal profits hoping to be rescued by a low-valued dollar, or represent an out-of-season marketing advantage. New Zealand produces too little in the way of high-technology content, high-profit margin products. So where should New Zealand aim to be?

Ireland is often cited in the popular press as an economic model that New Zealand should emulate. We disagree. Ireland operates a shell economy in which more than 80% of exports have significant imported content. A better economic target is Finland. Comparison of the Finland and New Zealand economies (have a look at www.cia.gov/cia/publications/factbook/) shows how similar we are: Finland has 126.5% of the New Zealand per capita GDP. For New Zealand, an increase in per capita GDP from US\$24,200 to US\$30,600 is a feasible target.

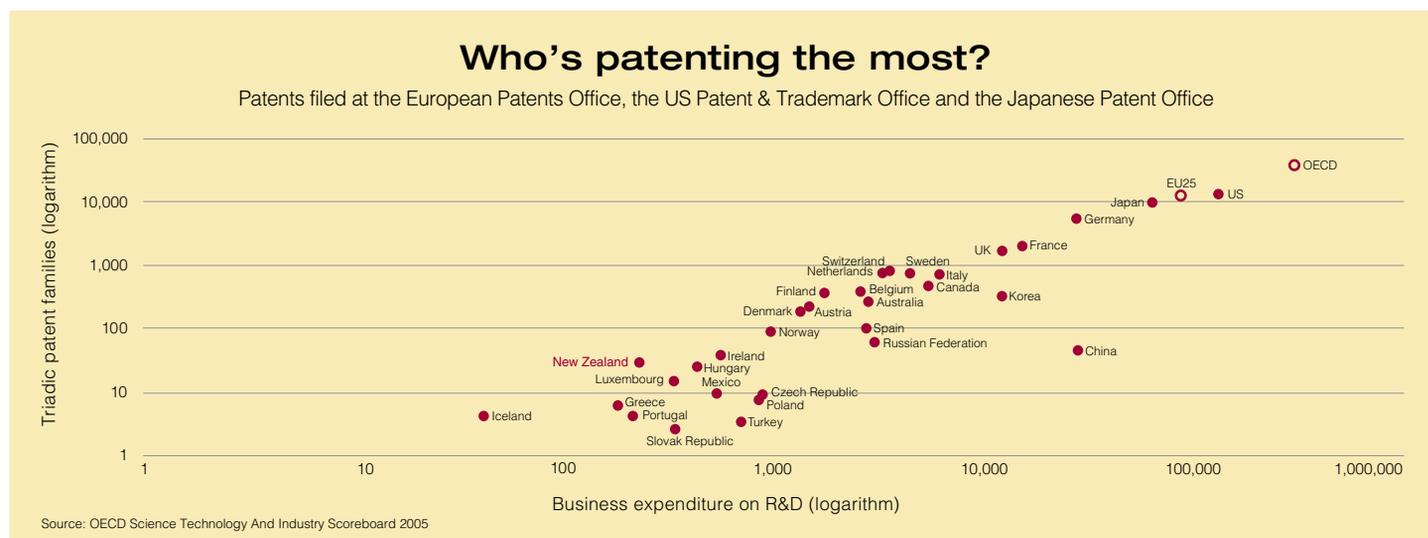
To increase patent applications to the Finland level, New Zealand would have to increase its business expenditure on research and development from NZ\$369.35 million to NZ\$2,802.9 million, a 7.59-fold

increase. Spending this amount will not draw us up to Finland's level of patents. It will only send us forward into the future at the same rate as Finland. We would have to spend significantly more each year to draw abreast of Finland and then spend the \$2,802.9 million each year, or whatever Finland's level had increased to over the time we took to catch up. We think New Zealand needs to increase its BERD to the Finnish level, but we question if this is currently possible.

Let us explain. As discussed in our previous opinion articles, there are three problems in New Zealand's way: the development cost of creating innovative products, the roll-out costs of manufacturing and marketing these, and the manpower needed to create and implement them.

How will we deal with these problems? If we assume the average roll-out cost of bringing an innovative product (that is, a patentable product) to market is at least five times the development cost to the patent stage, then our go-forward New Zealand enterprise would require another \$14 billion input to go commercial, in addition to the \$2.8 billion BERD. That makes a grand total of \$16.8 billion for go-forward investment per year that would enable us to keep pace with Finland. In 2004 the total expenditure on R&D in New Zealand only amounted to \$1.6 billion. Obviously, it is a huge gap to leap over.

The second problem is where the manpower comes from to implement such investment in business R&D. New Zealand does not have enough technically competent people to provide the manpower for a \$16.8 billion-a-year commercial,



Both at the social and economic levels, New Zealand has to move off the back foot and into the aggressive mode of the export economies that feature in the upper socioeconomic sector

aggressive go-forward enterprise that would push us only as far up the socioeconomic ladder as to keep pace with Finland. The *Dominion Post* recently reported the Labour Department estimated "up to 530,000 New Zealand adults have inadequate literacy and numeracy skills ... a serious impediment to economic growth in the next decade". And at the recent ASEAN conference, secretary-general Ong Keng Yong delivered a blunt warning on New Zealand's dependence on low technology output and our failure to provide competitive manufactured products in the Asian economy.

How long will it take and how much money is needed to develop New Zealand's human resources to the point where we could indeed go forward by making high-profit margin saleable products? There is no easy answer but one thing is certain: money needs to be invested in social infrastructure to provide the human resources to make a go-forward economy possible and we think we need to be well on the way to closing the gap in competent manpower in the next two years.

It is in the longer term of five years-plus that success in commercialising innovation will depend on the amount of money invested. It is evident we have severe investment problems in lifting New Zealand even to keep pace with Finland's standard so we need to start addressing this now — and let us not overlook that these are annual sums we are talking about.

We need to bear in mind New Zealand has under invested in R&D for a long time. It has taken years to slide down the OECD to where we are now, and it will no doubt take time to change the focus, create a determination to succeed and build momentum. Our only way out is to drastically increase our investment in technically competent manpower and business expenditure on R&D. The idea that we can

operate a so-called 'knowledge economy', in which clever academics and government scientists can convert small investments into large profits, is itself an academic illusion. The value of academics, who are critical to New Zealand's future, is their role to produce the high-quality graduates needed to drive the creation and implementation of commercially viable and profitable innovation-driven products.

New Zealand's great leap forward is a very long jump indeed. New Zealand business has to prepare itself to go forward by establishing leadership both by developing commercially sensible funding instruments to support commercial development and implementation of innovative commercial products, and by taking the reins in raising education standards to the level that can sustain a go-forward economy.

*And don't forget: The innovation survey we set in motion in our last article (May 2006) is producing a steady stream of replies. If you have not yet filled out the innovation survey questionnaire please check out the form at www.unlimited.co.nz/innovationsurvey

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Letter

Climate call

Congratulations on your timely editorial 'Carbon chaos' (April 2006). It is pleasing to read a measured assessment of the poor state of New Zealand's climate change policy. This failure will come back and bite us all, including those in the business sector who have argued so strongly against the government's policy package.

The science overwhelmingly supports the fact that human activities are changing the global climate. There are still uncertainties, but all the rapidly accumulating evidence and modelling indicates that climate may be changing even faster than expected. The time we have to cut our greenhouse gas emissions and to adapt our society and economy is fast reducing.

But mitigate and adapt we must. Yes, there will be costs and many of those costs will fall on business. Our economy is still based on a stable and benign climate.

Agriculture, horticulture and forestry are all fairly sensitive to it. There may be some winners in the climate change future but they are unlikely to be homo sapiens. Palaeontology, archaeology and history tell us there are more often losers.

Like the Kyoto Protocol itself, the government's policy package was imperfect and incomplete. But also like the Kyoto Protocol, it was intended simply as a first step to something more meaningful. New Zealand has wasted an opportunity to lead the next step. We have been too focused on past ways of thinking about complex issues and too little focused on the enormity of the challenges ahead. In numerous recent forums I have said we need to 'discount the past and weigh the future' when responding to such issues as climate change.

You are correct in saying the carbon charge was set at a level that would have no impact on transport behaviour. Demand is too inelastic. But the charge would have sent a signal to investors in electricity generation. Relative to fossil fuel projects, renewable generation projects would have become more economically favourable.

In 2004, in anticipation of the carbon charge, the Resource Management Act was amended to remove any consideration of the effects of carbon dioxide. With the carbon charge gone there is now a huge gap. It would be disastrous if, in the interim, fossil fuel-generated electricity jumped in and squeezed out renewable energy and demand-side option. These are far less harmful to the environment and will help future proof our quality of life against rapidly rising fossil fuel costs.

Regardless of whether carbon charges would change transport behaviours, the revenue could have been used for other purposes, for example programmes to reduce travel demand. New Zealand could do with a First World public transport system.

If the package was flawed as claimed, one alternative might have been for government to commit to it while engaging the community to design a more effective version in the meantime. Then, in 2008, something would have been in place and business would have had some certainty in what will become an increasingly uncertain world.

Dr J Morgan Williams, Parliamentary Commissioner for the Environment