

## Restoring the balance

There needs to be a better balance between competing research and development needs in New Zealand.  
By Bob Gauldie and William Giesbers

IN THE FIRST OF our articles on innovation (March) we looked at the way US and EU companies acquire, then implement, profit-making innovations into their product lines. They are, after all, our competitors as well as our colonisers — both past and present. In our second article (April) we investigated how New Zealand R&D funding agencies respond to the needs of our manufacturers in terms of how we match and, therefore, compete with the US and EU models. We found New Zealand manufacturers are not making effective use of the innovative products of R&D funding in New Zealand, either because they do not know they exist, or that such products are not relevant to their needs. A few favoured companies and industry sectors do receive a great deal of attention in government R&D funding, but this appears to be largely an inheritance from the long-gone days of import controls and subsidies.

In New Zealand, we believe the balance is out of kilter between the long-term fundamental R&D, the startups based on new discoveries, and the short-term business R&D aimed at upgrading existing product lines.

Currently, the balance of R&D-based innovation production is summarised by the two adjacent diagrams ('R&D funding by area').

The R&D funding scenario starts on the far left with the Marsden Fund providing for basic research, followed by the MoRST/FRST and university funding that has pressured the CRIs, universities, State Owned Enterprises and government departments to move towards the centre (the company startup region, where the

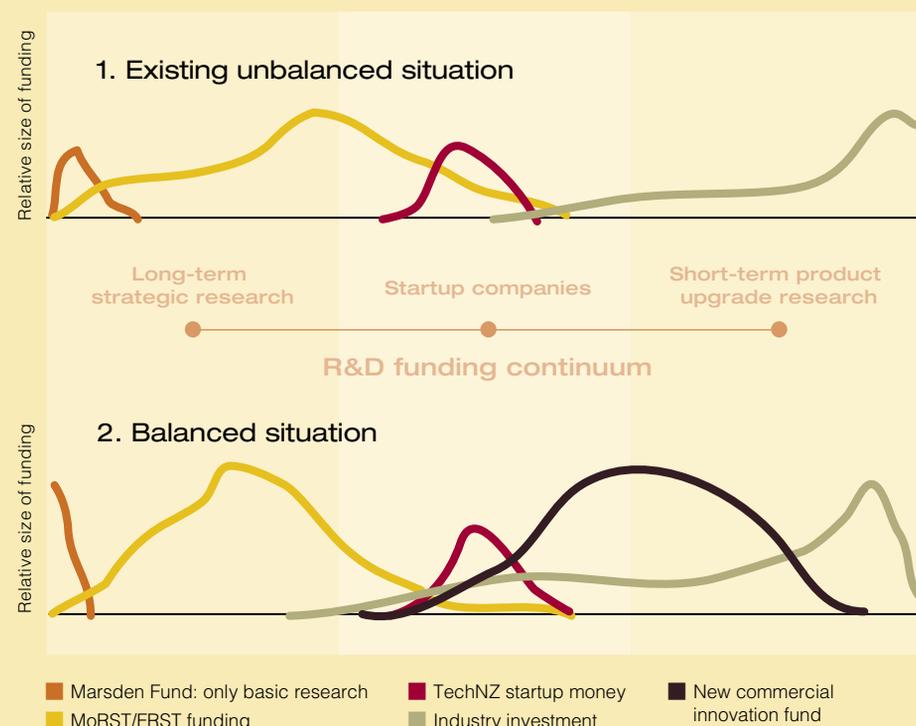
small TechNZ fund also sits). Then, on the far right the commercial sector is focused on short-term, product-line development R&D. This situation leads to an imbalance, with too much emphasis on the left, non-commercial sector and no clear funding path for innovative R&D products from the left side to move through the central startup region, to the right-side, commercial development that extracts profits from the implementation of R&D products.

Part of the reason for the imbalance, we think, is that government has been more successful at backing its own team — the CRIs, universities, SOEs and government departments — than backing New Zealand manufacturers. Given our long history of past-government import controls, subsidies, exchange-rate controls and often arbitrary behaviour by ministers, it is no surprise that government should see itself as the chairman of the board of New Zealand business. This observation is still relevant today even though government has undergone substantial transformation in the last 20 years.

Industry must also shoulder part of the blame. There is no evidence that industry in New Zealand initiates enough of the

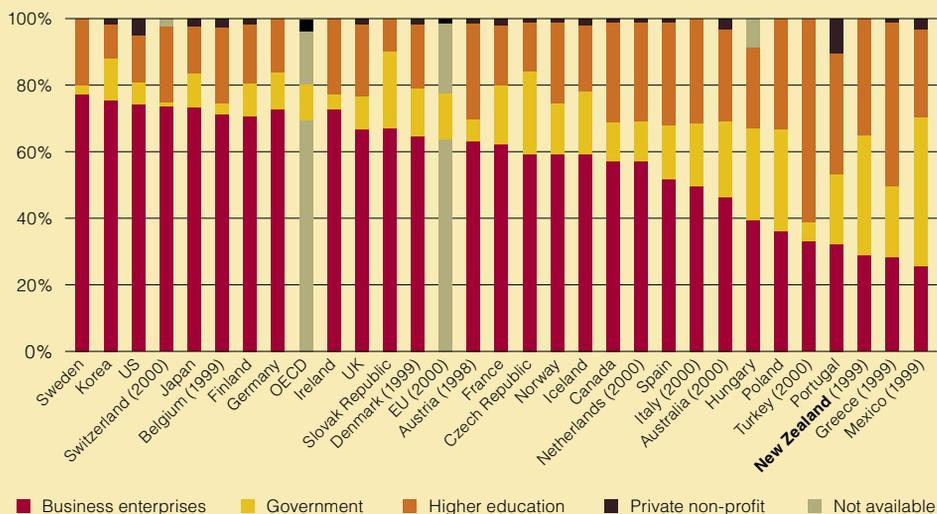
big-picture research that leads to collective control or influence of an international manufacturing sector by a New Zealand national industry group. New Zealand industry tends to be like the rugby team that focuses on perfectly executing the lineouts and scrums only to lose the match because it does not have adequate strategies to mount either secure defence or penetrating attack. The net effect for New Zealand is the development of big-picture strategies for defence and attack have been left to the government; or government has simply abrogated any potential industry initiatives, such as the global warming carbon credits issue. To be an effective competitor with overseas companies and, therefore, increase our profit margins at our competitors' expense, New Zealand needs to establish a better balance between the key elements of effective profit making along the R&D funding continuum from long-term strategic research, through company startup, to short-term profit-directed product-cycle research. The implications of the imbalance on our international competitiveness are evident (see graph 'R&D expenditures by performing sector'). New Zealand is among the countries with

### R&D funding by area



## R&D expenditures by performing sector

Percentage share in national total, 2001



SOURCE: OECD SCIENCE TECHNOLOGY AND INDUSTRY SCOREBOARD 2003

the lowest levels of business expenditure on R&D, which also happen to be in the lowest socio-economic bracket of the OECD.

Now, coming back to the funding diagrams, the gap is clear to see in the R&D funding continuum between the funds for company startup, and the funds for R&D in short-term product-cycle research. A better arrangement would be as shown in the second diagram. In this scenario, the Marsden Fund is pushed further left into the fundamental theoretical research area, the MoRST/FRST funding is also pushed to the left to be more involved in strategic and long-term research, rather than in startup-oriented research. The TechNZ fund remains in place, but commercial research is pushed much further across towards the centre from short-term research so that commercial R&D goals can influence both strategic research, and have more influence in the startup area. All of this movement towards the left of the R&D funding continuum is caused by pressure exerted by a new source of funding — we've dubbed it the Commercial Innovation Fund.

The new funding arrangement as we've outlined in the second diagram is certainly balanced in the sense of our March *Unlimited* discussion of how US and EU businesses source and implement profit-making innovations. In the US and EU, strategic R&D funding supports long-term research that is closely integrated with quality graduate production. Other funds

and tax incentives are used to support inhouse commercial short-term research aimed at product-line development. There are hidden sources of imbalance in New Zealand business expenditure on R&D preventing us from following the overseas two-pronged approach to funding the sourcing and implementation of commercial innovation R&D products. The main reason is the small size of New Zealand companies, and the effect of this on R&D investment. New Zealand has, in comparison with the OECD, a low proportion of business expenditure on R&D. One reason for this is that New Zealand has the largest proportion of firms with less than 50 employees in the OECD. The cost of risking \$100,000 on a research project to a company with more than 250 employees is vastly different to a company with fewer than 50 employees.

We reported in our April article the OECD observation that the number of patentable products from R&D is a function of the amount of business expenditure on R&D. New Zealand is trapped in a vicious circle. Small companies cannot afford business expenditure in R&D and, therefore, remain small technology adopters and adapters. Government is large enough to afford R&D expenditure on its own CRIs, SOEs and universities, but has neither the skills, nor the mandate to turn its science innovations into profitable exports and, therefore, largely remain as providers of R&D products that New Zealand manufacturers cannot

use. This is part of the reason why New Zealand is trapped among the low-tech countries. Any strategy to increase business expenditure in New Zealand on R&D to produce and/or implement profit-making innovations must take the sting out of the risk of investment in R&D by small companies.

So what's the answer? Our proposed Commercial Innovation Fund is aimed at constraining the risk of R&D investment for small New Zealand companies. A tax-based, risk-relief option does not seem likely in the present (or future) fiscal environment. All other options for risk-relief, apart from the conventional 'friends, fools and family', involve government, simply because so few New Zealand companies are big enough to shoulder the R&D risk. Inviting the government to constrain risk in business expenditure on R&D also invites government to assume the role of chairman of the board of New Zealand business. To return to our rugby analogy, how do we stop the government forwards from keeping the ball away from the business backs for so long after they have won possession that we inevitably turn the ball over to our competitors?

We're asking for your input before we go further with the scope and size of any proposed Commercial Innovation Fund. We want to assess the degree to which government funding is acceptable to New Zealand business as a key resource to reduce R&D investment risk.

We have a short questionnaire you can find online at [www.unlimited.co.nz/innovationsurvey](http://www.unlimited.co.nz/innovationsurvey).

The questions are fairly general to avoid people having to mine their company records for answers. If you want to be more specific, then please do so. You can send other material to R&D Survey, *Unlimited*, PO Box 6813, Wellesley St, Auckland.

The survey results will be reported in the July issue. Unless of course, we are so overwhelmed with responses that we need more time! Thank you for taking time to fill out the survey.

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