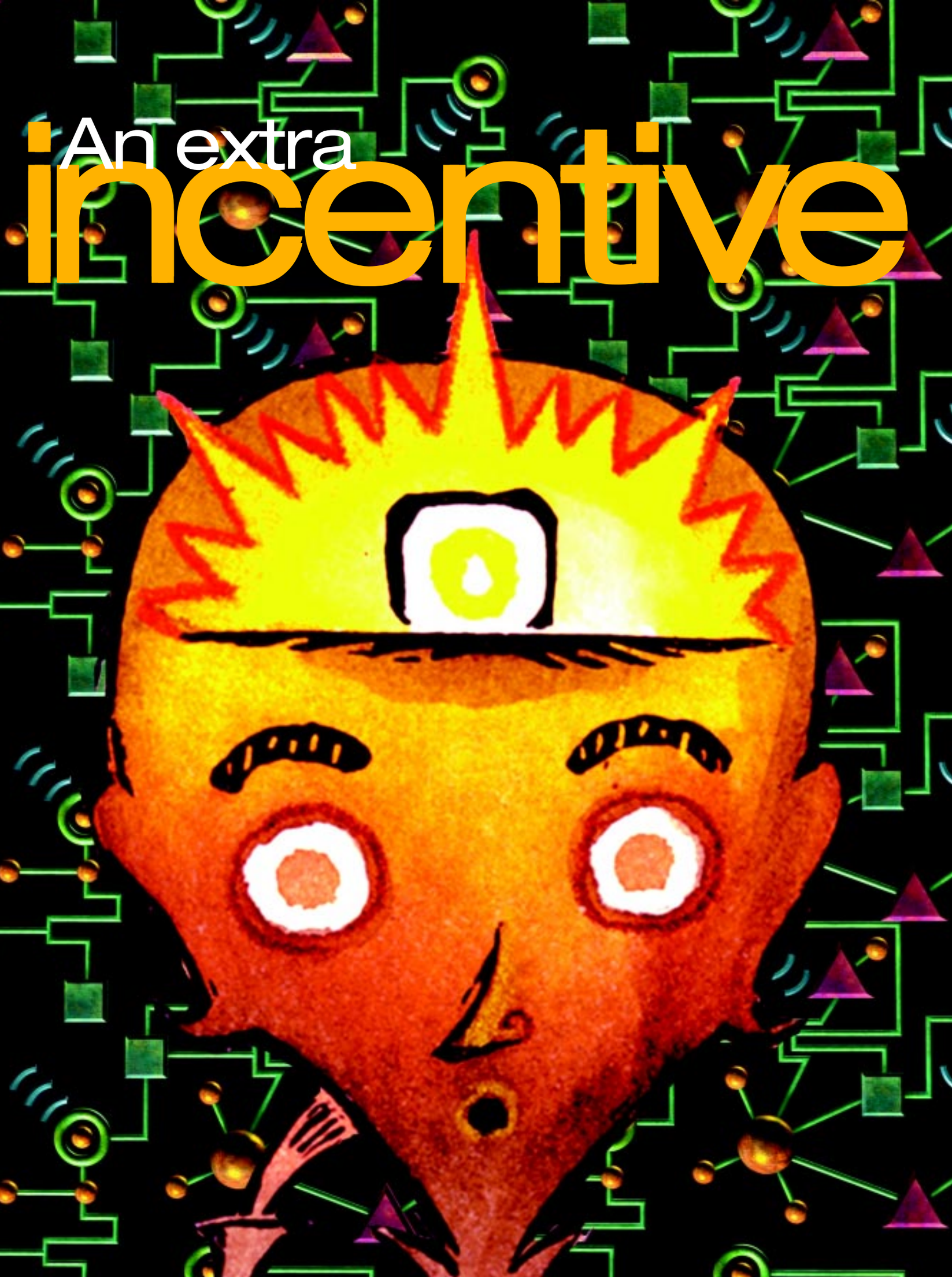
An extra incentive



The government is pushing for incentive-based pay to boost productivity at Crown Research Institutes. But will it work? In the second of a series about bringing an invention to market, **Fiona Rotherham** reports on what makes inventors tick in the corporate world

HOW DO YOU make the New Zealand Symphony Orchestra and Fur Patrol sound good in the same venue? Simple: a variable room acoustics system. Mark Poletti has spent over 10 years working on the "simple" task of producing optimal sound quality in concert halls for different musical genres. His invention — produced as part of his job with the government's Department of Scientific and Industrial Research (later to become Industrial Research, or IRL) — is basically a network of microphones feeding into a multichannel digital reverberator and out again to loudspeakers. The hard part was controlling varying reverberations without getting that loud ringing tone in your ears.

First patented in 1993, the system was later exclusively licensed by IRL to a US company to develop and market worldwide. Last year the system began being sold in earnest and Poletti still plays an important role in the technology transfer.

Commercial success? Well, you'll find his invention in the Prague Concert Hall and New York's Museum of Natural History, to name but a few. Under the fixed-term licensing deal, IRL gets a royalty on every sale. And Poletti? He has the kudos of an award-winning invention and the luxury of being paid while he's working on his idea, something backyard inventors don't have. But any financial reward above his basic salary is based on team performance. Though Poletti mainly worked on this invention himself, he shares a cash bonus — based on how well it sells — with the communication team with whom he works.

His case is typical. Inventors within companies, universities and Crown Research Institutes (CRI) usually don't own their intellectual property. Companies argue, perhaps logically, that doing successful research is what their employees are paid for. A performance bonus once your great idea starts earning revenue and a chance to purchase company shares are the most you are likely to get from most corporates. At the other end of the generosity scale, universities often offer the inventor around one-third of net proceeds from any royalty income stream or shares in a spin-off company.

In the middle are the CRIs. They've tended towards the corporate model but, urged by the government to review their intellectual property sharing policies, most CRIs are in the process of introducing reward structures giving extra incentives to entrepreneurial staff.

Which system is the best? Will incentives such as profit share or equity stakes motivate the performance of knowledge workers? And are they cost effective?

The answer depends on who you talk to. Research shows financial incentives do make a measurable difference, says Stewart Forsyth, a specialist in improving individual and organisational performance. For example, in 1997 US researcher Jim Guthrie looked at the relationship between 11 "high-involvement work practisces" (HIWP; things like employee shareholding and profit sharing) and the performance of 164 of New Zealand's larger businesses. His findings: organisations that used more HIWP had higher productivity. And the difference was significant. The average difference between companies that were one standard deviation above the HIWP mean, and those one standard deviation below, was $167,600 in sales per employee, Guthrie found. These results are in line with international research, Forsyth says.

Financial incentives are the only way to free intellectual property (IP) trapped within research institutions, says Stewart Washer, chief executive of CRI AgResearch's commercial arm, Celentis. "If we win, they should win. It is a retention issue and one way of attracting new staff to CRIs. There is a worldwide talent war going on."

Mike White, executive director of technology at Christchurch-based software developer Jade, does not necessarily agree. The most his inventors can expect is a healthy pay rise and a one-off bonus when income from a successful product starts rolling in. The maximum bonus paid so far has been $15,000, he says. Even so, the company has low staff turnover. "We pay them well, and a happy working environment is incentive enough."

Anyway, who do you reward? Take a small R&D company like Pulse Data, whose BrailleNote product for blind people is proving a big hit offshore. Pulse Data argues it's too difficult to work out who to reward when your product development is incremental. "This is not a Hamilton jet scenario," says business development manager Greg Thompson, referring to the revolutionary development of a jet boat engine in 1953 by inventor Sir William Hamilton. "It is more evolutionary."

HortResearch chief executive Dr Ian Warrington reckons his organisation has a possible solution. HortResearch's new IP sharing policy will cover everyone in the value chain. "A business manager may not make as big a contribution as the person who made the original discovery, but still plays a critical role in finding commercial partners and bringing that discovery to the point where it can be licensed."

Still, there are incentive sceptics in the CRI camp too. NIWA, one of the less commercially oriented CRIs, says its role is about knowledge transfer, whether public-good science or commercial research is involved. "If someone makes a new discovery about climate change that saves thousands of coastal properties, just because that is public-good science should it be valued less?" says business development manager Dr Bryce Cooper.

There can be legal problems, too. Crop and Food Research

What the employees love …

American consulting firm Watson Wyatt found incentive practices that added most value to US corporates were:

- shareholding
- top performers being paid significantly more than average performers
- salaries above the market rate
- pay linked to the company's business strategy
- employee performance appraisals used to set pay
- participating in a profit-sharing plan based on the firm's overall success

… and what they hate

Watson Wyatt found one of the most value-destroying HR practices was profit sharing based on a business unit's success. People's "unfairness detectors" quickly show up any mismatch between individual contributions and rewards within a team.

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chief executive Paul Tocker says the CRIs are prevented by law from offering shares in themselves as an incentive, and could run foul of securities law if they offered a large number of staff shares in a start-up company commercialising a particular invention.

The Securities Commission rules say a prospectus — the cost of which could prove prohibitive in these cases — is needed when shares are being offered to a lot of people, as this could be interpreted as a public offering. "Our philosophy is we want our staff to have access to the future growth opportunity in IP — everyone from the chief executive to the lowest paid person in the organisation," Tocker says. Crop and Food Research can reward staff by sharing royalty income, but the shareholder value stream is where most future value lies.

None of this stopped AgResearch's Celentis moving to a reward system similar to the university model. "We're looking at something under 30% [for the inventor]," Washer says. "We're taking raw technology and developing it further, adding value that costs a lot of money, and we need to take in other partners and shareholders along the way."

No win

Will it work? The University of Auckland's commercial arm, UniServices, was set up 13 years ago to handle knowledge transfer. It tends to follow the one-third model for giving its inventors incentives. UniServices' success is undeniable — it has grown its earnings 20-fold, from $2.1 million in its first year to $44 million today. But how much of a contributing factor has the entrepreneurial payment system been? Chief executive John Kernohan says that despite many years of experience, it is difficult to know. Some researchers are unhappy with a one-third share of a spin-off company and think they should get 100%, Kernohan says, and they get more upset when their shareholding gets diluted as commercial partners put in capital to take the invention to market. "Ten per cent of a company worth $1 million is better than 30% of one worth $100,000, but New Zealanders don't tend to see that — they always think about control."

The arrangements are further complicated because they are always entered into before the value of the invention is clear, says Mike Doig of Victoria University's commercial arm, Victoria Link. Most inventions and patents turn out to have no value, "but if the incentives are not attractive enough, these academics just wouldn't do it," he says. What Doig means is that academics earn promotion — and kudos among their peers — through publishing their research. It takes a fairly big incentive to get them thinking about patent protection instead of publication. You can't patent an idea after it has been published.

Under common law, employers own IP created by staff. The situation is less clear-cut when it comes to research students. The University of Otago is currently negotiating an IP sharing scheme with students that is "a bit more generous" than the one with staff because of the ownership issue, says deputy vice-chancellor Ian Smith. "Some universities put a disclaimer on the enrolment form so when students sign up they alienate their IP rights. I don't know if they read that when they sign it."

Professor John Raine, international vice-chancellor at Canterbury University, has been on both sides of the fence when it comes to IP sharing. He's been involved in both a business spun off from the university and in writing the university's policy in this area. He and a student, Don Clucas, invented a co-generation engine system that produces heat and power from any conventional fuel. The spin-off company, Whisper Tech, exported $1.5 million of the co-generation engine system to Europe and Japan in the last financial year but forecasts that figure will be $15 million by March 2003. While the student and the university still hold stakes in the company, Raine has sold half his share.

At overseas universities such as Stanford and Harvard, the royalty flow from commercialised ideas over a number of years has created a virtuous cycle, where it funds new research and flows back to the university coffers. Even in New Zealand, incentives are starting to make a difference to university funding, Raine says.

"People hear of colleagues that have ended up with a few thousand dollars in their pocket and they think 'Heck, I could have done that', and decide to join the party." 5

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How the CRIs do it

The government is pushing Crown Research Institutes to introduce extra incentives for entrepreneurial staff. Here's what they are doing:

AgResearch: Performance and bonus remuneration scheme, moving to a reward system where inventors share royalty income and somewhere under 30% of shares in start-up companies.

Crop and Food: Salary and bonuses based on the collective performance of the individual and the institution. Wants all staff to share IP growth opportunities by allowing them to purchase shares in spin-off companies, but has struck legal problems.

Environmental Science and Research: Performance-based remuneration. Supports giving staff further incentives but is still assessing its options. Has concerns that R&D is only one part of the value chain for commercialisation.

Geological and Nuclear Sciences: Has a limited incentive programme. Looking at customised packages that include sharing financial benefits from IP and non-monetary benefits such as "free" research time, travel and study assistance.

HortResearch: Already shares IP income with staff at an individual's request as part of their overall remuneration, negotiated on a case-by-case basis. On July 1 it is shifting to a more formula-based policy for all staff. Incentives will be linked to the person or teams responsible for a particular income-generating invention. Looking to second staff into spin-off companies.

Industrial Research: Salary and team performance bonus. Has considered alternatives, but no changes are planned at this stage.

Landcare Research: Salary plus equity bonus, based on company and individual performance. This policy is under review.

NZ Forest Research: Performance-based remuneration. Drafting a new policy that shares IP income with individual inventors and research teams, though there is some divergence of opinion among staff on what should be done.

National Institute of Water and Atmospheric Research (NIWA): Performance-based remuneration, with staff bonuses linked to the institute's profit above budget. Reviewing overall IP management, but change is unlikely this year.