BRIGHT SPARKS, DIM FUTURE?
What's happened to our No 8 wire culture?

Drinking challenge
Goodbye hangovers, hello Sunday mornings

Plus
A Kiwi country boy's long, secret and winding road to debut-novel success

THE DOMINION POST
Nikki Macdonald meets some clever Kiwis and asks whether we’re really the No 8 wire culture we think we are.

Kevin Maskell reckons he looks like an axe murderer. So, sitting in cold council corridors trying to convince engineers to even eyeball his invention has been no small challenge.

The Auckland builder and father of two was so troubled by the drowning of Auckland toddler Aisling Symes in a drain in 2009 that he felt compelled to design a manhole safety grill. “The thought of losing your child, I just could not get my head around that.”

Maskell, 58, is the original No 8 wire guy: see a problem, find a practical solution, look through your old tools’ cabinet list to find the player with “patent attorney” beside his name. But conceiving a workable design was far from an instant ticket to success.

They say necessity is the mother of invention. So it’s no surprise that a nation born of tough nut pioneers who had to fashion everything out of nothing should consider itself a culture of innovators. Innovators maybe, but does this translate into marketable products?

In Maskell’s case, his patent attorney applauded his idea, but reckoned there’d be hundreds of similar designs around. He was wrong. About $10,000 later, Maskell had patent pending protection. There were other grills available, but his points of difference were a cheaper price and the easy three-point fixture, which is super-quick to install.

Teaming up with an engineer mate, he made a prototype and spent the next nine months flogging the idea to council engineers. “They’ve now set up a small manufacturing plant, done successful field testing and signed a distribution deal with manhole manufacturer Hynds, which will include the three-point fixture on new manhole frames, slashing installation costs.”

When Your Weekend asked Maskell, he’d just sold 130 in one day. But it’s been tough. “There have been some bad days, I tell you. I was lucky I had a wife who worked – she’s a school teacher. “I’m a rough old bugger. No wonder they sat me in these council rooms and didn’t talk to me. I couldn’t afford a salesman, so I had to do it myself. I’m not very articulate and I mix up my words, but when they talked to me they knew I knew my product.”

The main reason Maskell stuck it out was the memory of his fibreglass pioneer father’s disillusionment at the sad end to his numerous promising concepts. “I saw how he would come up with an idea. He always thought he would get the support, but he never did. The ideas just died. I saw his disappointment that nothing ever came to fruition and decided I was going to give it a shot. I didn’t care how much it cost me.”

There are some spectacular success stories – Wellington speed-enhancing software company Aptimize was this month snapped up by United States technology giant Riverbed Technology, reaping investors multimillion-dollar returns.

But the bigger picture is rather more bleak. The World Economic Forum’s innovation index ranks New Zealand 25th, behind Qatar and Malaysia and just ahead of the Czech Republic. Finland, with a comparable population, ranks third. So where do we go wrong?

Award-winning superconductor scientist Bob Buckley, from Wellington crown research institute Industrial Research Limited (IRL), believes there are still plenty of clever Kiwis – the blokes in sheds, such as Maskell, coming up with smart, if low-tech, saleable solutions. Where we falter is with the kind of complex inventions needed to really pull New Zealand out of the innovation doldrums.

Buckley’s science skills were distilled from childhood curiosity – as a kid in Napier he’d wait for the fertiliser truck to drive by, trailing toxic chemicals. “I remember running out and grabbing all the sulphur and doing all sorts of experiments. That’s where you learn so much stuff. It’s about inquisitiveness.”

But transforming inquisitiveness into marketable inventions takes institutional support. “At that individual level, we do really well. At an organisational level, we start to fall down, and when you’re looking at multiple organisations we really fall apart. Individuals can’t do it on their own. They need infrastructure behind them. If you want to take a product to market, you’ll need multiple technologies, multiple disciplines.”

False IRL’s collaboration with former employee Stuart Vather, to commercialise a stroke rehabilitation gaming system. What looks like a straightforward invention involves 10 entities: IRL did the engineering; Christchurch’s Burwood Spinal Unit, Otago School of Medicine and Princess Margaret Hospital contributed medical know-how; Stickmen Studios designed the computer games; Uniplast injection-moulded the bar. And so on.

Vather – a chemistry PhD – left IRL to chase his dream of taking life-altering technology to market. As with most mindless repetitions, stroke exercises soon become tedious and 80 per cent of patients abandon them in frustration. Vather’s products aim to make rehabilitation fun. His company, Im-Able, has so far commercialised one product and is developing three others, catering for different degrees of disability.

The Able-X resembles plastic bike handlebars incorporating an air mouse. Players move the whole bar to hit targets on screen. Stroke patients with limited movement in one arm use their strong arm to support the weak one. This reactivates the damaged neurological pathways controlling the weak arm, and the limb slowly regains strength.

It looks simple, but there are smart features – the targets grow the longer the patient takes to hit them, so it’s easier to succeed; and the game can be personalised to concentrate on a patient’s weakest area. As their strength improves, they go on to swatting moving mosquitoes and netting butterflies.
PhD student Craig Anslow developed a “multi-touch table” for his PhD, but software that can identify potential bugs is his real focus.

Vather says the results have been immensely satisfying – one trial patient can now use a knife and fork and another said the device had restored his dignity in front of his grandchildren.

Still in the production pipeline are a strength-measurement tool and a giant mouse for patients who can’t lift their bad arm at all. But there’s not enough cash to commercialise them all.

Even after the technology is devised, making a workable prototype costs $150,000 to $200,000.

Finding investment capital is a fundamental problem for Kiwi inventors, Vather says. He has nine investors, including himself. They’ve secured approval to sell in Europe and have sold the Able-X in South Africa, Australia, the US, Britain, Malta and Taiwan, but he expects to take three years to break even.

Vather has discovered other relevant technologies sitting, untapped, in crown research institutes (CRIs) and universities. If he doesn’t commercialise them, there’s a good chance no-one will.

And that, says Medecine Mondiale founder and inventor extraordinaire Sir Ray Avery, is a key reason New Zealand lags in the innovation stakes. "If you came to New Zealand with $100 million and said ‘show me a portfolio of your CRI research’ ... the Government can’t do it. Nobody knows.” He speaks from personal experience. Medecine Mondiale is making hi-tech nutritional products for developing countries, in conjunction with Massey University professor Paul Moughan.

As in so many cases, the collaboration stemmed from a chance meeting, at which Sir Ray discovered the product he’d been researching for three years was virtually identical to one Moughan’s team had been studying for more than 15 years. Sir Ray could then match their clinical trial results with his own lab research to accelerate the project.

But without that chance meeting the link would never have been made.

It’s that haphazard networking that has spurred Sir Ray to conceive the New Zealand knowledge bank – a kind of innovation wikipedia that will allow companies and innovators to explain what they know and what they do. An online trade show in 100 languages.

“We don’t communicate with each other. I’m trying to get everything in New Zealand in one place, on one website, and get a kind of online community.”

A new Kiwi Innovation Network was also launched this month, with the aim of helping universities and CRIs work together to commercialise their research.
While there’s plenty of smart thinking in New Zealand, it’s often in the wrong areas, Sir Ray says. Bright minds are inventing radical concepts, then trying to sell them, rather than finding a product that’s actually needed. For example, wool with antibacterial silver nanoparticles, touted as being wearable for a month. “The point is, who wants to wear it for a month, for a lot more money? That’s not a product.

“Often, what kills projects is their lack of viability from day one. The product doesn’t have a customer.”

Or lack of market research. When Sir Ray worked for Douglas Pharmaceuticals it invested millions in a gel wound dressing proven to reduce scarring by 50 per cent. It looked like a winner, except that nurses wouldn’t use it, because it had to be changed three times a day instead of once every few days.

Craig Anslow’s Victoria University hoodie reads “Engineering geeks”. The 32-year-old explains the whizzy 48-inch touch table he’s spent two years building and refining for his PhD.

“It’s like an over-priced iPad, but can sense up to 250 individual touch points. Which means you can make multiple fingers across the screen to create neon swirls, have a family jigsaw session or play air hockey against a mate. Constructing the DIY table – built for $5000 by piecing together snippets of advice from global tech forums – was a non-trivial exercise,” Anslow says. But it’s only a means to an end.

Knowing he could never compete with global technology giants to design and produce the tables themselves, software is his real focus. He’s designing applications to assist software development teams to visually map their software, to work out potential bugs.

“Eighty per cent of software is maintenance. You want to know, ‘where are the problems?’ If you’ve got a building that’s got a leak, there’s the problem. That happens in software, too – memory leaks. You can draw a visualization to show where those memory leaks are.”

He brings up a word map on the touch table. When you touch two or more terms, the programme highlights the relationships between them. The ideal is an animated diagram acting like a car dashboard, showing current activity and mapping changes as they happen.

Anslow will test his invention with software developers over the coming year, and then release it for free use. He’s using all open-source programmes so wants to keep it freely accessible. And the Science and Innovation Ministry is funding his research, so he doesn’t need to make it pay.

“It’s this kind of hi-tech, relatively quick-turnaround invention that physicist Sir Paul Callaghan wants to see more of in New Zealand. “Instead of us being seen by the world as a place that has sheep and The Lord of the Rings, people might see us as smart and innovative.”

Although agriculture has historically been a bount of Kiwi innovation, we’ve now hit resource limitation and it’s time to look to other sectors to commercialise smart ideas. To nurture innovation, New Zealand needs to spend more on basic science and on research and development, Sir Paul says.

New Zealand’s research and development spending is well short of the OECD average in both the government and private sector. “We’re way behind. One of the reasons government doesn’t spend any more is it says our private sector is doing so badly. To me that’s a silly argument.”

New Zealand is also prone to investing in foolish fails, such as biotechnology, which means large investments, long lead times and major regulatory hurdles. Where Kiwi inventors succeed is in niche markets – such as Fisher & Paykel’s domination in sleep apnoea devices.

“If a hi-tech company in New Zealand is doing something that sounds sensible, it probably won’t succeed. It’s doing something where you’re inclined to say, ‘what the hell is that?, they might well be on to something.”

Smart hi-tech start-ups often don’t need millions to get to the ground. His own magnetic resonance company, Magnitek, started with $300,000 and now exports $3 million a year and is growing annually by 50 per cent.

“We’ve proven we can grow $500m-a-year export companies. We’ve got about 10 of them, we need 100. We don’t have a vision for a longer-term strategy for New Zealand. We’re sunk. We have to do this.”

Canadian and would-be entrepreneur Karen Bender, 35, liked Kiwi nanotech researcher Simon McMaster’s invention. But she hated the idea of running a sophisticated nanotech company out of New Zealand. “A company of four million, so far away from everything else. There’s no way you can produce a global company from here.”

But McMaster would not be swayed. The pair’s company, Footfalls and Heartbeats, won TechNZ funding through last year’s Bright Ideas challenge and McMaster now works out of Wellington business incubator Creative HQ.

Their concept is clothing incorporating nanoparticles that measure heart and respiration rates and transmit the information without wires. As a former massage therapist to elite sportsmen and now runner weary of irritating monitor straps, Bender was sold on the idea of device-free measurement.

“When I run I want to run, I don’t want to be fixing the strap.”

McMaster is completing his nanotechnology PhD at Leeds University and has already devised a textile with connectivity that halves power supply needs. His research uses the knitted fabric itself as a strain sensor: knits deform and return under strain, for example when the chest expands and contracts in breathing. So, the fabric’s deformation can be used to register respiration rate. They have yet to work out the nanotech electronics, but other scientists have developed nanoparticles that do what they need, so they could licence the technology or join forces.

They’re self-funding the project, which Bender estimates has already cost about $350,000, including their time.

While it’s a risk, Bender was prepared to sink money into a master of business degree – this teaches the same skills in the real world. “The measure of success is getting the contract, not getting an A grade.”

Though it seemed an unlikely base for a global innovation, she’s discovered Wellington has advantages for a hi-tech start-up: world leading nanotech experts at the MacDiarmid Institute, well-trodden export pathways and a natural playground close enough for brief escapes from the all-consuming project.

Footfalls and Heartbeats aims to license its technology and Bender hopes to get paid next year. The best-case scenario is that Nike picks up the concept in a few years for $70m to $100m. Or a healthcare provider uses it for patient monitoring (a potentially bigger and more lucrative market). Worst case, the project fails but at least they gave it a go.

The same goes for Kevin Maskell: “You won’t believe this, but this is not really about the money. I’ve got a house and a boat and a renter and kids and a lovely wife. I don’t need to drive a BMW. You’ve got no idea how much of a buzz I get out of the fact I’ve made something that no-one else on the planet has ever thought of.”
PATENTLY OBVIOUS

It hardly screams innovation central. Tom Haskell’s workplace is a cold Paraparaumu unit, with sheepskin slippers under the desk and charts rolled into every crevice. The 72-year-old petroleum geologist has no history of invention, but he’s just been granted his first United States patent to go with the New Zealand, Australian, Canadian, South African and various European versions.

It started 12 years ago, when son Bruce, an England-based professional event rider, complained about his horribly restrictive protective jacket. A lifelong yachtie, Haskell helped refine and produce inflatable life jackets in the late 90s, so Bruce figured he should be able to fashion something more practical. Though not much of a backyard inventor, Haskell is used to problem-solving at work. He mulled for months. Then he had an idea. He pulls out two curved tiles – fibreglass over a sheet of yellowed newspaper. It was the beginnings of his armadillo-like, energy-absorbing jacket. The overlapping plates diffuse the impact of a fall or kick. Preliminary testing, using drainpipe slices as tiles, found the concept met two out of three European standard levels.

So he set about protecting his design. More than a decade on, he’s at an impasse, with a fistful of patents, but still no jacket. “It now comes down to money. If we can get money we can go, if not we can’t. That’s something I don’t know how to go about.”

He won’t put a price on his efforts so far, but it’s safe to assume it’s in the tens of thousands. It’s a familiar story – investment capital is notoriously difficult to come by in New Zealand. And there is plenty of competition: in 2009, 770 patents were granted to Kiwis.

While some are awarded to individuals, like Haskell, beavering in back yards, most go to universities, crown research institutes and leading innovators, such as Fisher & Paykel Healthcare and Wellington’s Formway furniture design company, says A J Park patent lawyer Michael Brown. It’s a complex and costly process. Even a fully developed, simple invention costs at least $6000 to protect, not including a search to see if an idea is patentable. Design patents, which protect a product’s look rather than the way it works, are cheaper. And that’s just for a New Zealand patent. If you want to sell your invention in the US, you need a US patent to prevent another company copying your technology there. And if you want to sell to Asia, or Europe, you’ll need to translate your application.

For products that can’t easily be broken down to see how they work (eg KFC’s secret spices), guarding a trade secret can provide better protection than publishing your design, Brown says. While there’s still plenty of good old Kiwi ingenuity out there, New Zealand’s small size and venture capital shortage are definite barriers to greater innovation.

Tom Haskell has patented an energy-absorbing safety jacket for equestrian riders. ‘It now comes down to money. If we can get money we can go, if not we can’t.’

Photo: CRAIG SIMCOX

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