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Science friction: Larry Marshall, CSIRO 2.0 and the politics of innovation

One year into CSIRO's top job, Dr Larry Marshall is learning that the language of start-ups doesn't always translate, writes Jessica Gardner.

Jessica Gardner *News director*



Updated Feb 12, 2016 – 3.08pm,
first published at 1.00pm

One year after taking the top job at the country's top science and research body, Dr Larry Marshall makes a frank admission about his experience so far. And it might strike some as naive. "I hadn't anticipated how much politics this job would entail."

The physics graduate, serial entrepreneur and venture capitalist spent 25 years in Silicon Valley where he got used to leading enthusiastic teams who lap up a bold vision and the ruthless pursuit of that vision.

After announcing [a sweeping restructure of CSIRO just over a week ago](#), however, he got a stiff reminder that he was not running a start-up any more.

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CSIRO boss Larry Marshall: "I hadn't anticipated how much politics this job would entail." **Daniel Munoz**

Marshall's staff "renewal", which [will force 350 scientists to move into priority research areas or move on](#), and his sometimes clumsy explanation of it, earned him the ire of climate scientists because about 100 of those jobs will come from researchers who have for decades monitored carbon dioxide levels and modelled the harmful impact of global warming.

For Marshall, the logic is clear. The science of climate change is settled, he says, so CSIRO should move on to mitigation.

But putting aside the climate science storm for a moment, what Marshall is really facing is something many leaders of top Australian businesses would be familiar with: just how hard it is to go from laying out a vision to actually implementing it.

Bridge to business

The added degree of difficulty comes because Marshall is forcing his Silicon Valley ways – moving fast, ruthlessly diverting resources – on to a 90-year-old government-based organisation.

But the 53-year-old is steaming forward with his disruption of CSIRO regardless. He's more than aware that while he's been overseas creating laser technology start-ups and investing in digital pioneers, his home country has lagged behind on innovation.

In a 2014 study, Australia rated 10th on investment in innovation, but 81st on a measure of input versus output. That is, we are investing in research and

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Marshall notes the statistics with great exasperation, but [he has a plan for how to improve them](#). And a key element of the plan will be building a bridge to the very business leaders who sympathise with his cultural-change conundrum.

First, he wants his scientists to think more like entrepreneurs. CSIRO created the country's first [science venture accelerator](#), called ON, last year. As distinct from digital accelerators like Startmate, which foster ventures like apps and online shopping start-ups, [ON](#) works with scientists to use their deep knowledge in areas like artificial intelligence, health and agriculture to come up with commercial ideas. One of the ideas incubated in the first round of ON has already been picked up by a large Australian health company, which will develop it further.

Second, a new \$200 million fund will be spent on progressing great basic science, from CSIRO and other research organisations, over the so-called "Valley of Death". This is where a research organisation does not have the business smarts to see an idea through, and it may be too risky for a private business to pursue. "It is intended to be half the bridge that joins science with industry," Marshall says.

Zebedee, a handheld 3D laser mapping product, illustrates this conundrum. CSIRO scientists created the sophisticated software, which is now being commercialised in a joint venture with a British firm after it was targeted for use in a range of applications, from mine sites to crime scenes.

Initially, the mining community showed little interest in the technology. It was "on a lab bench" and they just shrugged their shoulders. "We put it on a trolley and wheeled it through a mine and showed them that it worked," Marshall says. "It wasn't until we put it into a handheld device and gave it to a miner ... and suddenly they got it. Then they started coming to us with applications."

Confidential projects

Marshall is also playing a more direct approach in getting business on board with his new strategy. He's reluctant to name the listed companies, but he sat through separate workshops with executives from "a large resources company, a large mining services company ... [and] "one of the big four banks" last year. "What came out of that were three really profound insights into their business where we saw a

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CSIRO scientists are now working on three confidential projects in collaboration with the companies, and Marshall plans to run more workshops to strengthen the bond with big business. "That's a whole new engagement model for CSIRO," he says. "It is still fundamentally about science and technology, but rather than [CSIRO] leading with the science, we're getting [industry] to lead with the vision.

"CSIRO is too often 'science push' than 'market pull'."

Much of the collaboration helping companies to deal with digital disruption [will come out of Data61](#), the entity created when CSIRO merged its digital productivity division with the government- and university-backed technology research body NICTA (National ICT Australia), which was at risk of closing.

Global soft drink maker Coca-Cola has already been a beneficiary of a collaboration with Data61 and entrepreneur Jason Hosking, who founded big data start-up Hivery. Hosking and his business partner Franki Chamaki were helping Coke work its vending machines more efficiently. "They have the basic problem of limited shelf space and they've got literally hundreds of products to choose from," Hosking says.

The pair used prescriptive analytics, which combines machine learning and artificial intelligence with historical data, to help the soft drink giant stock its machines more efficiently. Before, Coke used "a lot of gut feel, manual intervention, many hours of experimentation. We do it at a single press of a button."

After a Data61 pilot study for Coke turned out to be a success, it sparked a pre-agreed commercial deal. Hivery was spun out of Data61. The co-founders and their three science collaborators now own the majority of Hivery, with Coke and Data61 both holding minority stakes.

"It wasn't pure research," Hosking says. "It was a great example of industry collaboration with deep technical and research capability, with an eye to commercialisation in the future.

"It's fantastic that the CSIRO is going through this kind of revitalisation phase. We see in other parts of the world a much better connection between deep research and technical capability and industry and commercialisation.

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building capability beyond the resources boom."

'Fine balance'

But Hosking is quick to warn that CSIRO should still do ambitious basic science that doesn't satisfy immediate commercial objectives. "It's a fine balance."

Marshall wants everyone to know he is not a denier of climate change. But this has done nothing to persuade sceptics of another kind inside CSIRO, who see Marshall as a puppet working for a government they believe is not serious about the issue. Marshall's lack of nuance in [describing the fervour of the environmental lobby as sounding "more like religion than science"](#) – which he subsequently apologised for – only fuelled the conspiracy.

One of the CSIRO divisions hardest hit by the restructure will be Oceans & Atmosphere (O&A). The kinds of things its scientists do include monitoring carbon dioxide in the air from Cape Grim, a rocky outpost on the north-western tip of Tasmania.

The station is a joint venture with the Bureau of Meteorology. Following on from the job cut announcement, CSIRO is working with partners like the BoM to see what work can be passed on. Marshall is adamant that measuring and monitoring can continue with fewer people, but modelling will be reduced.

Dr Michael Borgas, who leads O&A and is also head of the CSIRO Staff Association, says what will walk out the door is people making "scientific inference" from such data.

He agrees scientists at the BoM could probably do this, if funded, although he argues that the lack of an overarching national policy for science thwarts such ideas.

What Borgas is worried about is Marshall pushing ahead with his strategy before the country can have a conversation about the opportunity cost. CSIRO can use its government funding to pursue commercialisation activities that risk-averse companies refuse to fund, but that will be at the cost of basic research, which has traditionally only been the domain of government, he argues. "We need a broad

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Marshall is on record saying that he does not want CSIRO to abandon basic research, and also talks about pursuing "moonshots", which may take decades to reach an outcome.

But he remains defiant about the latest changes and his vision for CSIRO.

"I think people confuse public good with pure science," he says. "There's definitely an overlap, but at its heart, public good is what's good for Australia."

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Jessica Gardner is the Financial Review's News Director. She has previously edited the Companies and Markets section. *Connect with Jessica on [Twitter](#). Email Jessica at jgardner@afr.com*

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