“Nothing but blue sky… and it pays off”

by Peter Griffin
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Around the world there’s growing pressure on blue skies research as cash-strapped governments look for quick answers to complex questions.

In Israel, I spoke to numerous Nobel Laureates who bemoaned this state of affairs. They told me that they would not have made their discoveries if they hadn’t been given the remit to follow their curiosity. Some of them made discoveries that were harnessed by others to revolutionise whole industries. They fear that short term thinking by politician desperate for results that will please the electorate will kill the golden goose – the creativity and curiosity that leads to true game-changing discoveries.

But in Israel I also met a man who sees it

as his life's mission to to fight this trend, to support and conduct fundamental research and to resist the pressure to shift focus to applied science that can be harnessed by industry. Professor Daniel Zajfman is an atomic physicist and for the last nine years, president of the acclaimed Weizmann Institute in Rehovot, about 20 kilometres south of Tel Aviv.

Named after Chaim Weizmann, the biochemist and statesman who served as the state of Israel's first president, the Weizmann Institute has that Ivy League feel to the place. The lecture theatre Professor Zajfman greeted us in is one of the most impressive I've ever been in. The grounds of the campus are well-manicured, the buildings modern and stylishly designed. In the reception of the physics building I was in, there's a sculpture by Salvador Dali. There's clearly serious money behind the place, something I presumed was down to the institute's close ties to industry.

How wrong I was.

“It’s a mistake to have industry and science working together,” Professor Zajfman told the journalists assembled in his lecture theatre.

“The goal of the academic institution becomes the goal of industry.”

At Weizmann, no researcher is allowed to work for companies, in contrast to the various university professors from Hebrew University and Ben-Gurion University I found dotted throughout the various science and tech startups I visited in Israel.

“They don’t start their own company. We don’t believe you can do both. Most of them would fail. They’d be bad managers of companies,” Professor Zajfman told us with the characteristic bluntness Israelis are known for (Zajfman is Belgian by birth but has obviously picked up the trait).

Zero strategic plan

The whole premise of Weizmann is that the institute recruits the best scientists from Israel and around the world and lets them follow their curiosity. There are around 250 research groups in the institute, around 3,000 students, researchers and other staff in total across five faculties, 17 departments and one graduate school. Students pay no fees and postdoctoral researchers are paid a salary.

Professor Zajfman said it isn't unusual for the institute to spend up to US$5 million setting up a research group.

"We've zero strategic plan," he says.

"The important thing is not what we are doing, but the people who are doing it. We are not thinking about investing in cancer or energy research. We feel that science moves because of the people, not the field of science. We are doing things here that are of no interest to anyone."

To unravel the institute's successful formula, says Professor Zajfman, you need to look to the history of science. X-rays or the internet, transistors or fibre optics – the discoveries underpinning them were made by serendipity or chance.

"Discoveries typically aren't made by people trying to solve a problem, or invent something. Major discoveries are not made in the lab. They are made in the minds of scientists. Scientific research is what you do when you don't know what you are doing."

Recruiting the best scientists isn't necessarily about picking the most experienced ones. Professor Zajfman says experts are "dangerous" because they think they know everything. Like the Israeli startup community, the Weizmann Institute has learned to embrace failure.

"Most of what we do is failure. We are leaning on the one per cent that is successful. What's the timeline? If it is three years, you are in the wrong

institution. Our horizon is not three years, but 30 years," says Professor Zajfman.

It sounds like a researcher's dream institution. But how does it work financially?

The institution has an annual budget of around US$350 million. Its last published annual report for 2012 shows the funding came from the Government of Israel, grants from Israeli and overseas funding bodies, revenue from commercialisation activity and donations.

The royalties roll in

Commercialisation? But didn't Professor Zajfman say industry and science don't mix?

Actually, Weizmann is heavily involved in the commercialisation of science, via its technology transfer company Yeda.

Professor Zajfman's point is that the needs

of industry have nothing to do with Weizmann's research agenda. As he outlined above, occasionally knowledge will be created that can be commercialised, in which case Yeda will do so. A good example is the multiple sclerosis drug Copaxone, which was developed at Weizmann and licensed to Teva Pharmaceuticals. In 2013 it generated revenue for Teva of US$4.3 billion, 40 per cent of the company's revenue.

Weizmann gets a royalty on every sale of the drug. In 2012 the institute claims that "total sales of products and technologies based on Institute research was over $21 billion this past year".

"The institution has no financial problem," says Professor Zajfman. "What we do with this income is put it in an endowment and it funds non-applied research."

Over the decades – the first patent for Copaxane was filed by Teva as far back as 1971, Weizmann has produced enough

fundamental knowledge that could be translated into drugs, technologies and products to keep this blue skies research model working.

“If everyone worked like this it would be chaos. The less structure, the less guidelines, the more ideas come out. A lot of my job is to protect this freedom of thinking,” Professor Zajfman admits.

And he has no intention of changing the way Weizmann works.

“I know the world has changed, everyone is focussed on metrics and parameters. Not here. This is fundamental research.”

Part of Weizmann’s success – and the reason for its strong government support, is that it has trained some of the country’s best scientists – some 30 per cent of all PhDs in Israel were educated at the Weizmann Institute.

Some of them occupy top positions in

universities around the world. But Professor Zajfman breaks from convention in determining what excellence is in science.

“There’s no measure to tell you whether science is top quality, not the h-index or citations. Science is not excellent, people are excellent,” he says.

The challenge for Weizmann and for Israel, he adds is securing top talent in a competitive market. People from 120 different countries study or work at the institute, something Professor Zajfman believes is crucial to fostering the creativity the institute is known for.

“We are educating too many PhDs, its a nice export product. I’m not really worried about the brain drain, but the outstanding individuals who are not here.”

Recruiting the best from overseas is tricky for any institution, but Israel’s geopolitical situation doesn’t help.

“Living in Israel is a profession itself,” says Professor Zajfman. “Not everyone wants to live here.”

Nobel Laureate – we are losing the balance

The whole premise of Weizmann is endorsed by Israeli biologist and the 2004 Nobel Laureate for Chemistry, Professor Aaron Ciechanover.

“What I see when we recruit young people, mostly, in the life sciences, is the first thing they want to do is to establish a company,” says Professor Ciechanover, who has spent much of his career at the Technion, Israel’s Institute of Technology, in Haifa, where he was born.

“Rather than just concentrating on a problem. What we see gradually is a destruction from basic science into more applied science. We are very much concerned that in academia we are gradually forgetting the basics and we are going just

to the applied with the concern that we are going to dry this spring of knowledge that fed us in the beginning," he says.

Professor Ciechanover echoes other Nobel laureates in pointing out that a relatively obscure area of research he was involved in led to his Nobel winning breakthrough – characterizing the method that cells use to degrade and recycle proteins using ubiquitin.

"We discovered a system that was very esoteric, we were not interested in diseases. Other companies took it and developed drugs. The new generation of young scientists in the life scientists will never discover these things because they go directly to the upper echelon."

His advice then?

"We should think both in academia and in industry of rebalancing the system between the basic and translational. I'm concerned that the financial pressure on universities

worldwide is a driving force in this spirit that shifts the balance from basic to translational and in the end we are going to lose the source of knowledge."

Something Weizmann's president would no doubt agree with.

Peter Griffin visited Israel as a guest of the Government of Israel.

Responses to "Nothing but blue sky… and it pays off"

Grant Jacobs says:
01/09/2015 at 11:21 pm
A few other research institutions have a generally similar approach. Janiela Farm was set up with this line of thinking in mind. One early success they had was Betzig's Nobel last year. (His microscopy work is stunning and the story of how it came to it is worth reading if you haven't already.) Another is England's MRC LMB, who have garnered about a dozen Nobel prizes over the years (their wikipedia entry makes

for impressive reading!).

Sydney Brenner is an advocate for this general approach, which he touches on in this interview.

As you might expect, many would like to know the reason behind the success of these laboratories. In the case of the MRC LMB, some put (part of) it down to Max Perutz's leadership and the standards he set. Stephen Curry has a post, The Perutz Effect, that touches on some of that.

I think there is something to this, but I suspect it depends on selecting people with the right frame of mind, appropriate leadership and appropriate management.