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Innovating for startups: Is deep tech a bane or a boon?

In the eighth part of a special series looking at Singapore's burgeoning startup scene, Pete Kellock, founder of muvee Technologies, says that startups based on deep technology have a competitive edge, but they need to find the right customer-product fit.

By Pete

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SINGAPORE: About 30 years ago I started a company in London called Zyklus. It failed.

Zyklus made some revolutionary gear for professional musicians. I had recently completed a PhD in electronic music, I was deeply immersed in the field, and I was passionate about it. I got together with a couple of friends and after two years of 100-hour weeks, we brought to market a highly interactive music sequencer unlike anything that had come before.

It was used by some famous musicians. One - producer John Walters - even formed the "Zyklus Band" using three of them. But we didn't sell nearly enough to make a profit.



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It failed because we weren't focused enough on users. At the time I knew very well that you had to be user-driven and I thought I was. But looking back I can see now that I was only 10 per cent of the way there. Part of the problem was that our machine had a steep learning curve: It was a conceptual leap from what people knew. But more fundamentally it wasn't something most people wanted, at least not at that time. A few people thought it was brilliant, but the majority didn't "get it".

And that was our fault. We designed and built whatever we thought was cool, fun, creative, ground-breaking. But we didn't do nearly enough to understand how potential users actually worked, thought and felt. My mindset was that of a PhD student, not an entrepreneur.

Startups founded on deep innovation have some advantages. If you have truly innovated, then by definition you're unique, you have something no competitor has. And if your technology is deep, it will probably take competitors a while to catch up. Better still, if you can keep innovating fast they may never catch up.

[Local startup Voice2Choice](#) is a great example. At its core is signal processing technology pioneered by founder Adrian von dem Knesebeck while doing his PhD at Helmut Schmidt University in Hamburg – technology which turns one voice into another. You can, for example, record yourself saying something and turn into any number of dramatically-different voices: A high-pitched girl, a husky elderly woman, a deeply resonant Morgan Freeman – more or less any kind of voice timbre.

FINDING THE RIGHT CUSTOMER-PRODUCT FIT

But deep technology also creates deep challenges.

Above all is customer-product fit. Products (or services) have to do one of two things to attract customers: They have to solve a problem or they have to be fun. If they are also innovative, they have to do these things dramatically. It's often said that a tech startup has to solve a problem 10 times better than existing solutions (10 times faster, 10 times easier, 10 times cheaper, etc) to get noticed. Or, if the selling point is fun, it has to be great fun, compelling and addictive enough to keep bringing you back. And most times there is a very long journey from having a cool prototype demo – even one that wows audiences – and a product with that kind of impact.

It's a journey of discovery in which, to succeed, you have get to know your users exceptionally well. It typically involves meeting with dozens (if not hundreds) of users, building minimalist variants of your product with different feature sets (known in the startup world as Minimum Viable Products or MVPs), letting users loose on them and measuring the response. It's iterative: Constant tweaking, lots of minor rethinks and usually a few "pivots" – the term used by entrepreneurs for the moments when you realise you're up the proverbial creek without a paddle and need make a radical change – in product, customer segment, business model or some other fundamental aspect of your strategy.



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In this journey, deep technology can sometimes be an impediment. Instead of asking: “What do customers really want?” You find yourself asking: “What else could we do with our technology?” Of course that’s not always bad – if deep technology is your competitive edge you don’t want to abandon it readily, and the latter question does sometimes lead to a viable product. But that’s the heart of the matter: One way or another you must arrive at a viable product or line of products, one that will lead to a profitable revenue stream. Without that, deep technology is of no commercial value.

And customers are hard to please. If your offering doesn’t exactly match their desires, if it misses the mark in just one or two ways (often ways that a technologist would consider trivial), it will likely fail. So this process of viable product discovery is much harder and more protracted than most researchers expect. For me, as for many technology-oriented entrepreneurs, it took a failed startup to learn that lesson (and sometimes I still wonder if I’ve learnt it well enough!).

DEEP TECHNOLOGY, DEEP CHALLENGES

A related issue is the effectiveness of a new technology in real-world cases. The typical high tech demo is a highly constrained idealised example: Researchers cherry-pick the case(s) used in their demos and ignore integration into a broader workflow or “user journey”, sometimes knowingly, sometimes unaware, often a bit of both. It’s a bit like comparing a school lesson on Newton’s laws of motion using air pucks with a car crash: The real world has myriad “extraneous factors” (friction, crumpling and rollover, not to mention nearby pedestrians) which complicate idealised cases, often beyond recognition.

When evaluating deep-tech startups, one of my first questions is: “When doesn’t it work?”, and if possible, I try to get my hands on it to carry out my own tests. The goal is to establish whether the technology works well enough in enough real-world cases to delight a substantial number of users.

A great many promising technologies fail in this regard: Even the most stunning demo is but one small part of the jigsaw of a profitable product, let alone a successful company.

And this leads to the final challenge facing the deep-tech startup: Raising enough money. In the best-case scenario, a deep-tech startup will successfully identify a killer product with their technology at the core. But “completing the jigsaw” nearly always involves a lot of hard work: Tweaking the technology to optimise it for the specific use-cases of target customers, making it easy or appealing to use, bridging or pasting over gaps, such as format incompatibilities for digital media, which are liable to trip up users, and a host of other such factors.

The deeper the technology, the more work it usually takes to achieve all this, and that requires serious investment. A new e-shopping venture built around a straightforward website may be able to validate its business model or even get to profitability on an investment of S\$20,000 or less. A startup based on artificial intelligence or other deep tech may well need millions. And



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often the bulk of the money is spent not – as most people assume – on creating the first prototype, but on turning that prototype into a viable product.

So, is deep tech a boon or a curse? In the long term a boon, but only if you find a killer app for it.

Pete Kellock is an entrepreneur with a background in digital media. He was a founder of muvee Technologies and its first CEO. He is also a mentor with the Mediapreneur, Mediacorp's incubator programme (<http://www16.mediacorp.sg/themediapreneur/>) which provides start-ups with seed funding, a working space, mentoring, networking opportunities and attractive media packages to speed up their growth and development.

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