

## 3D printing goes flat out

July 18 2013, by Lesley Parker

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The ability to "print" objects ranging from plastic toys to bionic ears and even 3D artworks, has been described as possibly heralding a new industrial revolution, by freeing up – and speeding up – product design, prototyping and manufacture.

Antoine Hermens, Head of the Management Discipline Group at the University of Technology, Sydney (UTS) Business School, certainly believes 3D printing will have the sort of impact the iPhone and the App Store have had on our lives.

"In itself, 3D printing isn't going to be a source of competitive advantage but it will become an industry standard," says Dr Hermens. This means businesses that don't keep up with the technology and the design possibilities it offers, won't survive.

"Will it bring manufacturing back onshore? No, because the technology is available globally," Dr Hermens says. "But it will change the way we compete, and the competitive advantage will be in the design of the [product] models themselves."

Box-shaped 3D printers follow a computer-based 3D model or pattern to lay down successive layers of material – anything from plastics to powdered titanium – to build up a physical object.

So far, the technology has been mostly used to rapidly produce scaled-down [prototypes](#) for demonstration or testing, although some industries have started using 3D printing for main-line product manufacture.

UTS owns several industrial 3D printers. These cost tens of thousands of dollars when UTS bought its first two machines in 2003, says Adam Goodrum, Workshop Manager at the Faculty of Design, Architecture and Building. But since then, prices have fallen by a half to two-thirds. Consumer models are now selling for as little as \$1000.

Goodrum, who also teaches furniture design at UTS, says 3D printing "massively, unbelievably" cuts the time it takes to produce a prototype or product.

"Things that are otherwise so hard to achieve, they can happen rapidly and so accurately. You can design something on the computer in the morning and, after maybe three hours' printing, in the afternoon you could be trying it out to see whether it works or not."

Just as the usefulness of the iPhone and other smartphones expanded as developers produced apps to do everything from control your TV to check your heart rate, the capabilities of 3D printing too are growing exponentially, says Dr Hermens.

In the defence, aerospace and medical sectors, 3D printers are being used to produce components that are far more intricate than you can manufacture using existing methods, or even make by hand, he says.

Locally, a Victorian foundry has the real prospect of winning a major overseas contract by employing 3D printing to substantiate its claims for the redesign of a component used in earthmoving equipment, he says.

This component has to be hard enough to do its job but soft enough to eventually break in a certain place, allowing it to be removed and replaced easily.

"With 3D printing you can design it to break where you want it to break

and you can prove the product [with a prototype]," Dr Hermens says. "When they prove it to this big Japanese company this small foundry more than likely will get the order, which is for tens of millions of dollars."

Before long, businesses will be selling patterns direct to the end user. Take surgical scalpels, for instance. "Ultimately, there'll be a printer in your local hospital that will print those scalpels, because it's more hygienic, it's faster, it's cheaper."

Dr Hermens says the Australian government, like the US government, must help industry adopt this technology and help universities turn out a new type of engineer.

"Manufacturing in Australia is struggling to survive, but it can survive. We haven't got scale, so it has to be intellectually driven, it has to be design driven, it has to be driven on the basis that ... we know how to exploit the capability of the technology we're engaged with."

Provided by University of Technology, Sydney

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