Manufacturing revolution with 3D printers

GENEVA, SWITZERLAND: Three-dimensional printing could herald a new industrial revolution as potentially important as the invention of the steam engine or telegraph experts claim.

For the uninitiated, the prospect of printers turning out any object you want at the click of a button may seem like the stuff of science fiction. But 3D printing is already here, is developing fast, and looks set to leap from the labs and niche industries into the wider market.

"There are still limits imposed by the technology available today," said Olivier Olmo, operational director of Switzerland's EPFL research institution. "But I'm certain that within 10 or 20 years, we'll have a kind of revolution in terms of the technology being available to everyone," he said.

The concept's roots lie in fields ranging from standard two-dimensional printing to machine-tooling.

First, a 3D digital design is created either from scratch on a computer or by scanning a real object, before being cut into two-dimensional "slices" which are computer-fed into a printer. The printer then gradually deposits fine layers of material - such as plastic, carbon or metal onto the printing material - and builds a physical object.

The product can be as hard or as flexible as you program the printer to make it and can even include moving parts rather than being just a solid block.

"In theory, anything that we have today can be produced through 3D printing. It may alter manufacturing processes as we know them," said Simon Jones, a technology expert at global law firm DLA Piper.

Jones said that in addition to the potential ecological impact of producing products right where they are needed, 3D printers could make small-scale production of objects cheaper, rather than turning out huge numbers of one item, which may go to waste.

Customised products

"The technology offers possibilities that available manufacturing does not," said Carla van Steenbergen of i.materialise, a

Belgium-based service that prints designs for users.

Van Steenbergen pointed to objects such as customised screws for broken bones, which match a patient's specific anatomical characteristics and thereby cause less deterioration than the traditional variety.

"It's the kind of thing that traditional technology won't allow. It's the kind of area where the big added-value lies, making the impossible become possible," she claims.

The technology has been around for longer than many would think: the first commercial 3D print technology, known as stereo-lithography, was invented in 1994.

It has taken time to gradually inch its way into the limelight.

"3D printing is far from the mainstream, but it's a sign that something is happening," said Tristan Renaud of Prevue-Medical, a company that turns out models from 3D medical imaging data.

Prevue-Medical's technology chief Erik Ziegler said using online 3D printing services was likely to remain the norm for a while, given the high costs of the printers.

An alternative service is provided by "Fablabs" - short for "fabrication laboratories" - a concept created by the Massachusetts Institute of Technology that offers grassroots access to small-scale manufacturing facilities.

3D printers for home use

But for those tempted by home-output, a handful of 3D printers have hit the consumer market, retailing for around US$2,000.

As with computers, the price is expected to fall over time as demand rises and technology advances.

Van Steenbergen said that at the industrial level, 3D printing is not set to take over from classical manufacturing methods, but rather go hand-in-hand with them.

"I think it will affect the manufacturing of some products, but it's never going to replace the conventional processes," she said.

It also raises a raft of questions.

For example, would a car manufacturer be ready to let a neighbourhood mechanic print spare parts? And if such goods were produced under licence, what quality guarantees would be offered to consumers?

On the intellectual property front, what constitutes fair production of a replacement part for something you already own? And would designers of 3D objects be protected from an equivalent of file-sharing, so widely bemoaned by the music industry?

"We'd tend to see an increase in commercial impact," said Jones. "It would be very difficult to prevent that once 3D technology got to a cost that's sensible."

Francis Gurry, head of the UN's World Intellectual Property Organisation, underlined that the global 3D printing business is forecast to be worth US$3.7bn by 2015.

In contrast, world merchandise exports were worth US$18.3trn last year, and commercial services, US$4.3trn.

Despite remaining small in global terms, Gurry said, the value of 3D printing is expected to expand relatively fast, to US$6.5bn by 2019.

Source: AFP via I-Net Bridge