



Could 3D Printing Solve your Supply Chain Problems?

Mohan Sodhi, Professor of Operations and Supply Chain Management at CASS Business School examines the business case for bringing 3D Printing to your business and customers

There is a great deal of excitement about 3D printing and the possibility of it signalling manufacturing's return to the West.

Additive manufacturing – as 3D printing is more formally called – is now being used to make a vast range of things, from airplane engine components to prosthetics, plus clothes to chocolate cake.

But would it work in your environment – for products, components or spare parts – and if so, how?

Here are some business questions for discussion within your organisation; these should help you decide whether 3D printing could benefit you economically, or if it should be kept to the confines of the laboratory.

Low Volume and High Variety

Additive manufacturing works best in the creation of parts or products that are needed in low volumes but a large variety, such as spare parts.

Take Adidas, which will start 3D printing at its 'SpeedFactory' plant in Germany this year. There, it will use >



robots to make parts for customised athletic shoes, the bespoke nature of which demands low volume and high variety components.

The bulk of Adidas' manufacturing will remain with contractors in the Far East, which will supply around 300 million pairs of standard trainers versus 100,000 pairs of custom trainers created at the SpeedFactory.

Made to Order, Not Made to Stock

Although manufacturing in high volume could be much cheaper than 3D printing, the cost of delivery and inventory-keeping can change the economics.

Mattel Inc. is offering on-demand manufacturing direct to the customer. Their microwave-sized 3D printer and computer app for children, called ThingMaker, essentially gives people their own high-speed and bespoke supply chain at home.

An app will let a child print customised toys such as dinosaurs, robots, and dolls. It may mark the end of parents desperately queuing for the latest on-trend toy at Christmas, when they can print it themselves.

Mattel has gone further in pushing production to the customers by allowing children to design their own toys.

Similarly, there are opportunities for businesses to let their customers print their own products, the IP of which remains with the company while the customer has an opportunity to customise the item.

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The Rise of Plastics

While some businesses are experimenting with other materials such as metal, for the most part, 3D printing uses plastics.

This means a move towards plastics being used more commonly to make parts and products. Take Mercedes Benz Trucks, which has opened its catalogue of spare parts to truck owners; it's going to 3D print spare parts in plastic only.

Mercedes Benz benefits by not having to keep huge numbers of moulds in different locations around the world and in not taking weeks to fulfil a customer's order for a single part.

Manufacturing Complexity

The more complex a part or product, the more 3D printing will be useful. This means the economics – not only for the supply chain, but for manufacturing – are changing.

One reason that GE and Rolls Royce are using 3D printing to manufacture parts for aircraft engines is because those components are otherwise difficult to create and assemble. They – and you – can save a great deal of material and time by using 3D printing, and often make a part that is more reliable.

The Value of Time

One more often ignored calculation is the cost of waiting. GE and Rolls Royce understand that waiting a day for an airplane part to be shipped means a day of lost flight revenues for the airline. Being able to 3D print the part rather than waiting can have huge benefits; likewise you should consider which products or parts you or your customers' would benefit from having almost instantly. ■



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Mohan received his Ph.D. in Management Science from the Anderson Graduate School of Management at UCLA. Subsequently, he taught operations management at the University of Michigan Business School

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