Additive Manufacturing - A Promising New Technology for Healthcare Manufacturing and its Impact on the Supply Chain

Additive manufacturing, also known as 3D printing or rapid prototyping, is in the news with greater frequency these days. Research and development is underway around the world, with scientists trying to determine how best to take advantage of this remarkable process. With big implications for both prototyping and distributed manufacturing in the biotechnology, medical, dental and pharmaceutical industries, we think additive manufacturing holds a great deal of promise for healthcare manufacturers but will require shifts in how the industry operates its supply chains.
Here's our point of view—

What is additive manufacturing?

Additive manufacturing is a process that takes computer-aided design or other digital data file formats of a 3D image and converts them into a solid item. This form of "printing" or direct digital manufacturing uses an additive process, where successive layers of material are laid down in different shapes. It's distinctly different from traditional machine manufacturing techniques which rely on the removal or subtraction of material by cutting or drilling.

How does it work?

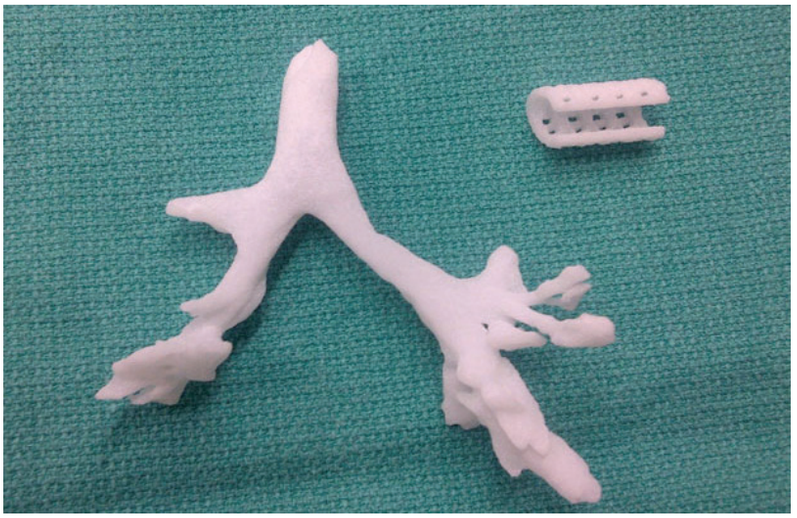
A wide range of materials such as metals, plastics, paper, powders, even human cells serve as the "ink" that is layered and bonded or fused to create a 3D object.

The technology is revolutionary; the power of additive manufacturing is in its flexibility. This type of manufacturing allows for building objects of a greater degree of complexity than is possible with traditional manufacturing and by design, reduces or completely eliminates waste.

What are some of the applications for healthcare manufacturing?

Current applications for additive manufacturing include dental and bone structures, prototypes for medical devices and tools with which students can practice surgery. There are already examples of organ regeneration and replacement, including a successful gall bladder implant.

Biotech companies believe additive manufacturing holds promise for clinical trials and instances where human testing isn't safe or legal. One company developed a bioprinting method to create strips of liver tissue to use for experimental drug tests. The implications for tissue replacement and testing are enormous, as are those for the manufacture and delivery of drugs.



3D printed trachea splint. Courtesy of USNews.com

How soon will additive manufacturing be commercially practical for the healthcare industry?

Requiring big R&D investments, additive manufacturing is predicted to be commercially viable in five to ten years. Predictions for consumer applications in additive manufacturing are much the same, although some forecast even faster adoption than that. 3D printing, as it's likely to be called by the consumer market, could grow quickly because open source 3D printers could offset their cost by enabling consumers to make their own common household items.

With the potential for sweeping change in the method and pace at which healthcare products and pharmaceuticals are manufactured, possibly as soon as in five years, Scott Sheldon engineers are working with companies now to ensure their supply chains operations are equipped to take advantage of the opportunities this new manufacturing technology is going to create.

Implications for the Healthcare Supply Chain

Sourcing and Manufacturing

-Management of raw materials: Raw materials will need to be managed in smaller quantities through a greater number of "localized" shipping points.

-Material manufacturing: Expect to see an increase in demand for raw material over finished product as customization shifts to the end user who can create products or medicine for a specific purpose or person.

Distribution

-Modal shifts: Weight-to-value shipping ratios will be crucial in designing efficient distribution networks.

-Technology: Additive manufacturing itself is creating a technological revolution, but consider the impact on production location. In the future, a hospital may be able to extract healthy cells from a patient in need of an organ transplant and create a new one on-site, or create personalize medicine at the point of need.

Costs

-Imports: Cost of imports and type of materials will change. Additive manufacturing will shift supply demands, and possibly create new source country suppliers, including on-shoring in the U.S.

-Potential cost savings are very good, even though the raw material costs can be higher. Because those materials are lightweight and distributed in small quantities, additive manufacturing will drive supply chain cost efficiencies.

The Takeaway

Traditional manufacturing isn't going away; it's still the best method for mass production. And while additive manufacturing will remain out of most end users' reach for several years, this revolutionary technology has great potential for the healthcare market in the near future. It's going to move from niche adoption to broader acceptance, driven by the enormous potential for cost and time savings, faster time-to-market capabilities and unique benefits for the manufacturing of medical devices, surgical tools and medicine.

At Scott Sheldon, we're working with healthcare companies like yours that are considering the implications that additive manufacturing will have on their business models; companies that want to get out in front of the sweeping change this technology is going to have on their business. This is the best time to assess the ways in which your business may need to retool supply chain operations to drive the most benefit from this revolution in manufacturing.

The ultimate benefit for the healthcare industry?

Broader availability of life-saving medicines, devices and tools that deliver better patient outcomes and save lives.

Plastic prototypes printed at Scott Sheldon on our 3D printer.