Additive manufacturing, commonly known as “3-D printing,” is gaining rapid adoption across many industries, from aerospace and defense to Swiss watchmaking and gourmet chocolate confectionery.¹ Analysts estimate the 3-D printing market will reach $30.19 billion by 2022.²

With 3-D printing, manufacturers design three-dimensional objects on a computer and send the design file to a connected 3-D printer. The printer heats a material (such as resin, powders, plastic, metal or even chocolate) to a consistency of hot wax. It then sprays this gooey material in fine layers, one on top of another, to form the object.³

Some economists view the rise of 3-D printing as a new industrial revolution. It can significantly cut the time to test and develop new products, speed delivery of custom parts and components, allow a higher degree of customization, and aid in refining prototypes for new, more complex products and designs.⁴

For many supply chain specialists, the big question is whether 3-D printing represents a disruptive technology or one step in the transformation of the supply chain. The process has the potential to disrupt the global supply chain by reducing inventory holdings, cutting shipping time and transportation costs, improving responsiveness and turnaround time, and establishing local production capabilities. It also enables on-demand manufacturing so a company can offer a broader "virtual” inventory and custom products, both faster and at a competitive price.⁵

3-D printing is expected to significantly affect the global supply chain in several ways:⁶

- Inventory levels will decrease as more items can be printed locally and on demand.
- Virtual inventories will replace real inventories: Product design files can be uploaded and stored on the cloud and then accessed when needed to print the product for the designer or customer.⁷
- Global deliveries will decline as products are printed closer to customer delivery points. This will reduce overseas manufacturing as well as air and ocean freight delivery and insurance costs. These factors could reduce product prices and increase profits.
- Customer responsiveness will improve as manufacturing lead times decline with more orders being filled locally.
- Manufacturers will have greater ability to customize production as products can be specifically designed to the unique needs of each customer.

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3-D printing supports lean manufacturing by changing production techniques as well. Instead of simply testing a product design with 3-D printing and then shifting production to a process such as injection molding, manufacturers often can produce the new product simply with 3-D printing. This approach is more economical, especially for the production of low or medium volume complex products.8

The on-demand capability and shorter delivery time of 3-D printing also will impact the role of retailers and disrupt the manufacturer-wholesaler-retailer chain. Because 3-D printing enables customers to order specifically what they want directly from a manufacturer, order fulfillment will begin to bypass both wholesalers and retailers.9

3-D printing may not be the solution to all supply chain issues, but it will go far to reframe the concept. Companies considering how to introduce 3-D printing into their global supply chain should consider factors such as their operating environment, manufacturing capabilities, product portfolio and customer base.

To discuss these topics in more detail, please contact your PNC Relationship Manager.