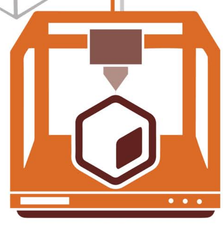
Why 3-D printing is poised to transform manufacturing

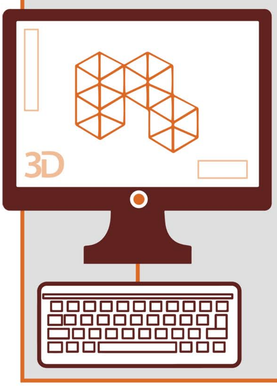
At a glance

Three-dimensional (3-D) printing (also called additive manufacturing) technologies allow people to produce physical objects based on digital models by adding or "printing" successive layers of materials. This technology has the potential to turn any business—or even your living room—into a prototype workshop or factory. And as the quality of 3-D printing rises and the price of the technology falls, additive manufacturing is moving to the manufacturing floor, benefitting an increasing number of industries.



Beyond prototyping

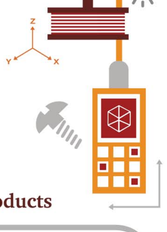
The growing role of 3-D printing in manufacturing is making an impact on the full value chain from design to production. Besides offering the ability to create prototypes more quickly and affordably, 3-D printing may achieve widespread adoption by giving companies the capability to better serve customers through:



- Low-volume, on-demand manufacturing
- Individually customized products
- Restructured supply chains that dramatically reduce maintenance, repair, and operations costs
- A single digital design thread that drives all processes from design to production, incorporating analysis, feedback, and testing
- The ability to create complex designs at the same cost as simple ones

Benefits

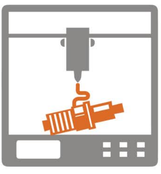
- Fast, inexpensive prototyping
- Enhanced product design and manipulation
- Streamlined machining, tooling, and fabrication
- Simplified assembly of multiple parts
- Ability to offer inexpensive, custom-made, one-off products



Potential challenges

Skills gap in rapidly evolving 3-D printing technologies	Lack of industry standards to enable simpler, more logical 3-D printing processes	Difficulty printing with multiple materials
Lack of consistency among the same printed products	Lengthy, costly changeovers and setups between productions	Limited and expensive raw materials

Potential applications



Manufacturing
From consumer goods to heavy equipment, 3-D printing will be used in design, prototyping, and full-scale manufacturing of parts and finished products.

Personalized medicine
3-D printed medical devices, such as hearing aids, will give patients access to custom medical devices and implants.

Design marketplaces
More affordable 3-D printers and services enable businesses and consumers to create, customize, buy, and sell individualized designs.

Manufacturing as a service
3-D printing companies rent or lease fleets of printers to businesses that prefer not to make up-front investments in technology that is rapidly changing.

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