

Abstract

Design of a decision-aiding model between subtractive manufacturing and 3D-printing

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3D-printing is becoming more and more widely used in industry. As this happens, manufacturers are becoming unsure of when to use this new technology and when to trudge on with subtractive (conventional) manufacturing processes. Subtractive manufacturing processes are well-established within many manufacturing companies due to its high efficiencies and low costs. However, 3D-printing offers a greater level of customization, can be automated, and can easily have designs transferred via computer files. Each method has its respective advantages, however, each one also has its downfalls. Subtractive manufacturing produces unnecessary waste, is limited from creating certain geometries, and requires a skilled laborer to run the machines. 3D-printing can present a safety hazard due to its introduction of particles into the air, being slower at producing parts, and the design of a part being easily contained and compromised within a computer file.

Since there are so many different advantages and disadvantages to each method, it is very difficult for a business to decide which form of manufacturing to use for any part. To solve this problem, we developed a decision-aiding model that will ask key questions that will determine whether form of manufacturing to use, and to do an economic analysis comparing the two forms of manufacturing and the time to manufacture each.