Chapter 7
What Is Next?

ABSTRACT

Fourth Industrial Revolution gave birth to few different technologies, not known until now. One of them is 3D printing. If subtracting manufacturing is part of Industrial Revolution 3, Additive manufacturing is for sure part of Industrial Revolution 4.0. 3D printing has the potential to transform science and technology by creating bespoke, low-cost appliances that previously required dedicated facilities to make. 3D printers are used to initiate chemical reactions by printing the reagents directly into a 3D reactionware matrix, and so put reactionware design, construction and operation under digital control. Some models of 3D Printers can print uniquely shaped sugar confections in flavors such as chocolate, vanilla, mint, cherry, sour apple and watermelon. They can also print custom cake toppers–presumably in the likeness of the guest of honor.

INTRODUCTION

Today, 100+ years after Henry Ford invented mass production at 1909, we have question: mass production vs. 3D printing? 3D printing — or additive manufacturing — is fundamentally different from the bottom up. Without intending to solve this dilemma, here are concluding remarks of the author.

From a cost perspective, it does not really matter whether each 3D printed product is the same or different; additive manufacturing has no need for standardized molds. This allows fully customized or even personalized products to be produced at the same cost.

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Of course, the flip side of this is that 3D printing doesn't have as steep of a price drop when bringing up economies of scale — at least when compared to mass production as it exists today. Therefore, a 3D printed product may bring more value to an individual user, but is generally more expensive than a mass-produced product.

When products are produced through 3D printing they are modeled or purchased digitally before any manufacturing has taken place; production is on demand. Once purchased, the production of these products can happen locally — as local as one's own living room, even — as 3D printers are compact and automated. Because of its locality, there is no need for stock, no need for shipping and, perhaps most importantly, no waste.

With this in mind, it is no wonder that the question has been raised repeatedly about whether the 3D Industrial Revolution can replace mass manufacturing; creating personalized objects on demand sounds almost too good to be true. Well, in part, it is. It turns out that mass production is a remarkably efficient system that is notoriously hard to beat on standardization and price.

Without question, mass manufacturing is ideal for creating large quantities of products where standardization is beneficial. While current 3D printing technologies cannot compete with existing prices (or even quality), the core benefits of 3D printing — on demand, personalization and design complexity — add little or no value to many product categories that exist in the mass manufacturing space. Hence, mass manufacturing systems can be expected to remain the dominant form of production in many industries.

There are plenty of product categories where the benefits of 3D printing are already beginning to make a significant difference. Specifically, these include products that are made in relatively low quantities (limited scale), have a need for personalization or are simply impossible to make with conventional manufacturing technologies.

Industries such as fashion, aerospace, medicine and food have already been showing signs of disruption with the introduction of additive manufacturing technologies. The most significant benefit of 3D printing is not that it could replace mass manufacturing in its current form, but, rather, it will introduce an entirely new category of products.

For example, take an everyday thing like Nike running shoes. All models are mass manufactured as the same product — standardized size differences notwithstanding. However, with the introduction of NikeiD, the Portland,