EXECUTIVE SUMMARY

Will 3D Printing Replace Conventional Manufacturing?

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Image: Siemens

3D printing can bring several advantages to manufacturing

3D printing (3DP), or additive manufacturing, is increasingly being used for production parts, not just prototypes, molds, tools, or other one-off parts. It aims for something bigger: no less than becoming the default manufacturing technology of the future.

That's unlikely to happen. However, 3DP will be a key part of the future manufacturing landscape, thanks to benefits that it can bring over injection molding, machining, casting, or other conventional methods:

- Customization and personalization
- Ability to create complex geometries
- Part consolidation
- Lower cost in some cases

The following slides show case studies on how 3DP can deliver these impacts, and the next section looks at how they will play out to drive the growth of the 3DP market.

Our forecast approach and methodology takes a cost-based look at the 3D printing market

Our approach to sizing and forecasting the 3D printing market differs from other approaches. We estimate and project the total value of 3D printed parts on a cost basis, broken down by:

- **Material costs.** Estimate of the cost of materials used for 3D printing each year, based on market prices for 3D printing materials. We capture not just materials *sales* but also the value of materials used internally by the companies that formulated them – hence, our estimates can be higher than others.
- **Printer costs.** Estimate of the depreciated capital costs for the printers used to produce the parts made each year – *not* the value of all the printers sold in a given year (though we do forecast printer sales separately). Rather than simply adding printer sales (the increase in the 3D printing capital stock) to materials and services (the variable operating costs of producing parts), this allocation provides a more comparable figure to those other inputs to arrive at a total 3D printing market. Given how fast the 3D printer installed base is growing, this figure is typically somewhat lower than annual printer sales.
- **Service cost.** Estimate of all the other service costs – from design to labor, software to post-processing – that go into producing a 3D-printed part.

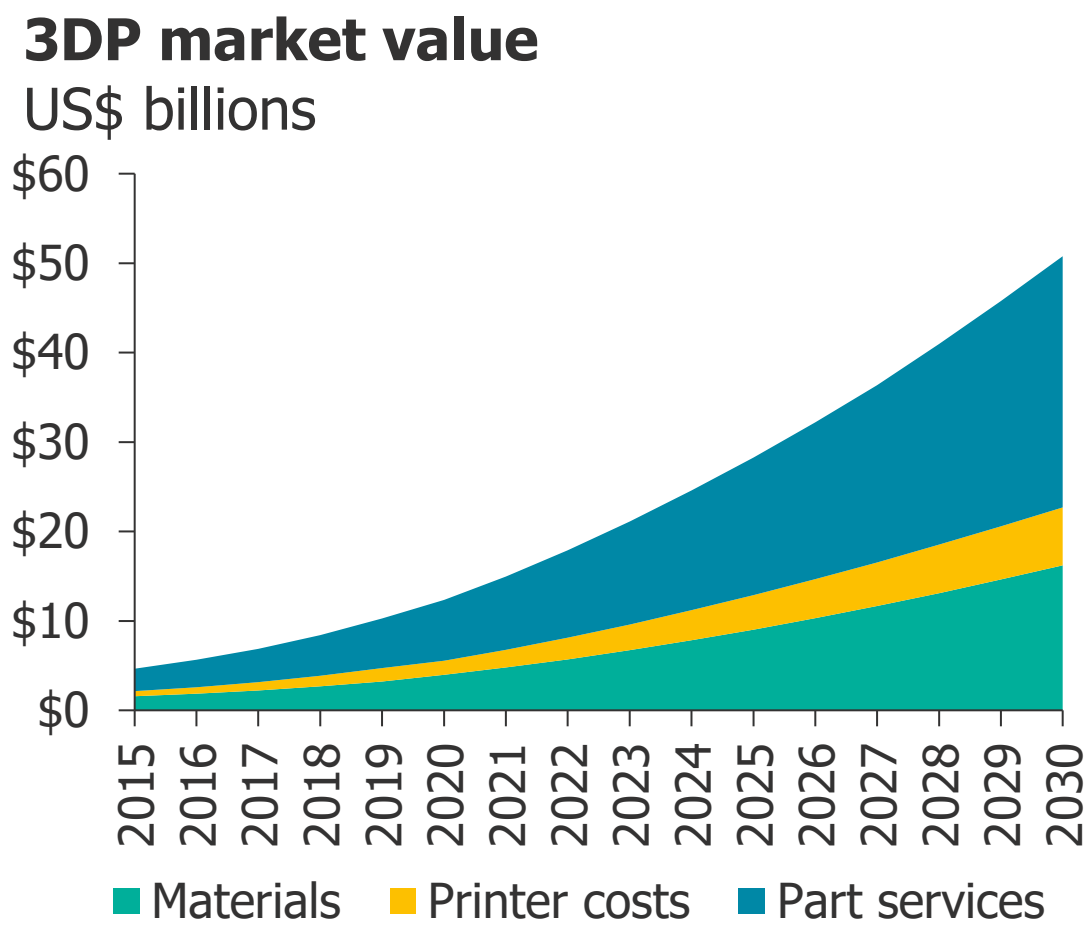
We arrive at our figures by collecting data from various sources – including industry reports, company publications and filings, and our own extensive primary research interviews with industry participants. We calibrate our models against historical data and project forward using logistic growth curves and growth rate models depending on the market segment.

3D printing is set to grow to $51 billion by 2030, rising at a 15% compound annual growth rate (CAGR)

Overall, we estimate the value of 3D-printed parts to rise from about $12 billion in 2020 to $51 billion in 2030, averaging 15% annual growth.

Of that, total materials will account for about a third of the costs, maintaining their share. More expensive materials like metals, higher-cost polymers, and composites become more common even as prices for basic materials fall. Materials grow from $4.0 billion today to $16 billion in 2030.

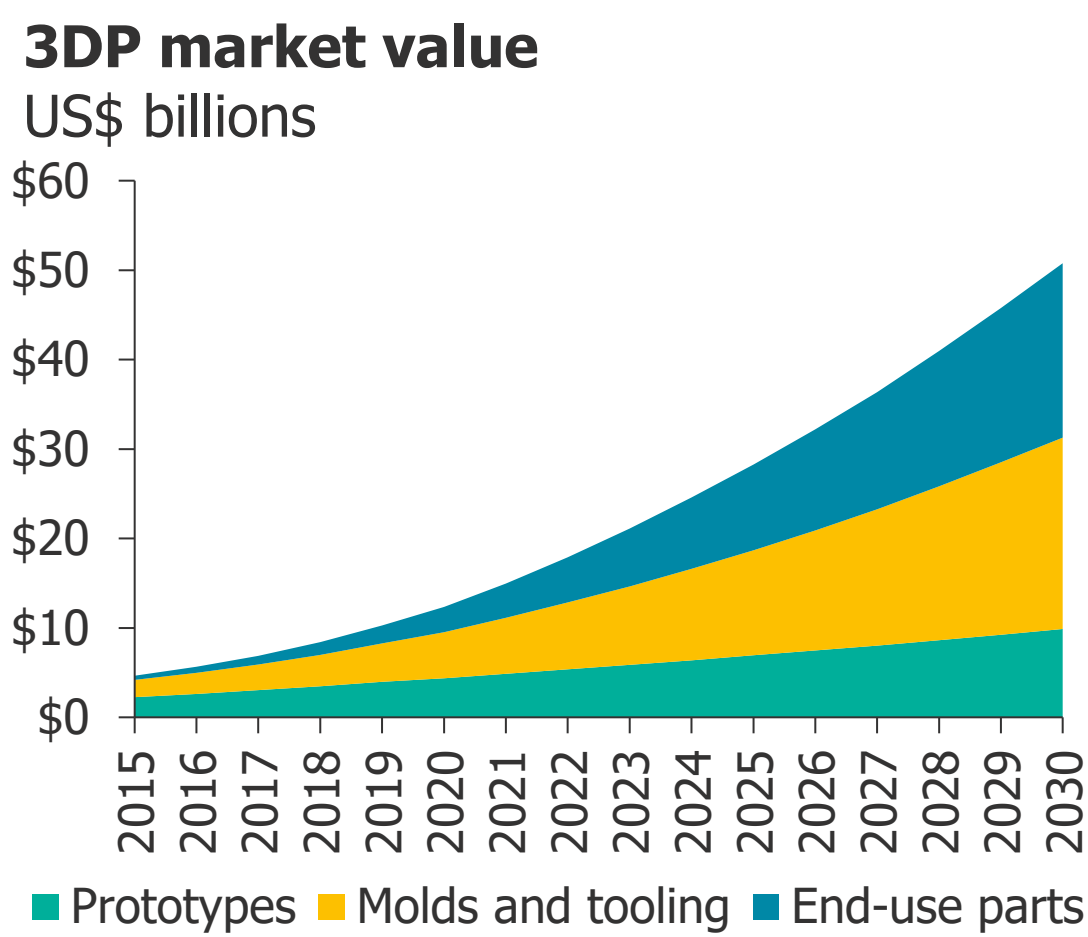
Printer costs in our accounting rise at a similar rate to the market overall, from $1.6 billion in 2020 to $6.5 billion in 2030, as the overall installed base of printers increases. Note again that annual printer sales are higher – though they do not grow at quite as rapid a pace (see slide 20 for more details).



Use of 3D printing for production parts drives growth, expanding at a rapid 21% CAGR

The biggest driver of the overall 3D printing market is indeed greater use of 3D printing in manufacturing, making production parts across a variety of industries. End-use parts explode from around $2.8 billion in value today to $19 billion in 2030, a nearly sevenfold increase – and account for 38% of the 3D printing market in that year.

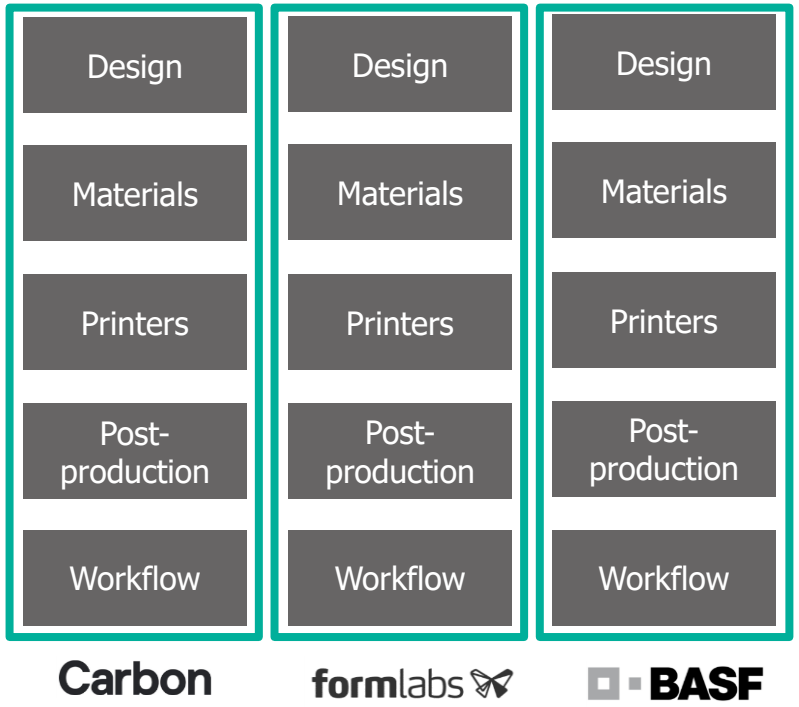
Prototyping as well as molds and tooling have been the main uses of 3D printing so far, and they continue to grow as well, albeit at a less superheated 9% and 15% CAGR, respectively. Prototyping accounts for $4.4 billion today, rising to $9.9 billion in 2030, while molds and tooling remain just ahead of production parts, reaching $21 billion in 2030, up from $5.2 billion in 2020.



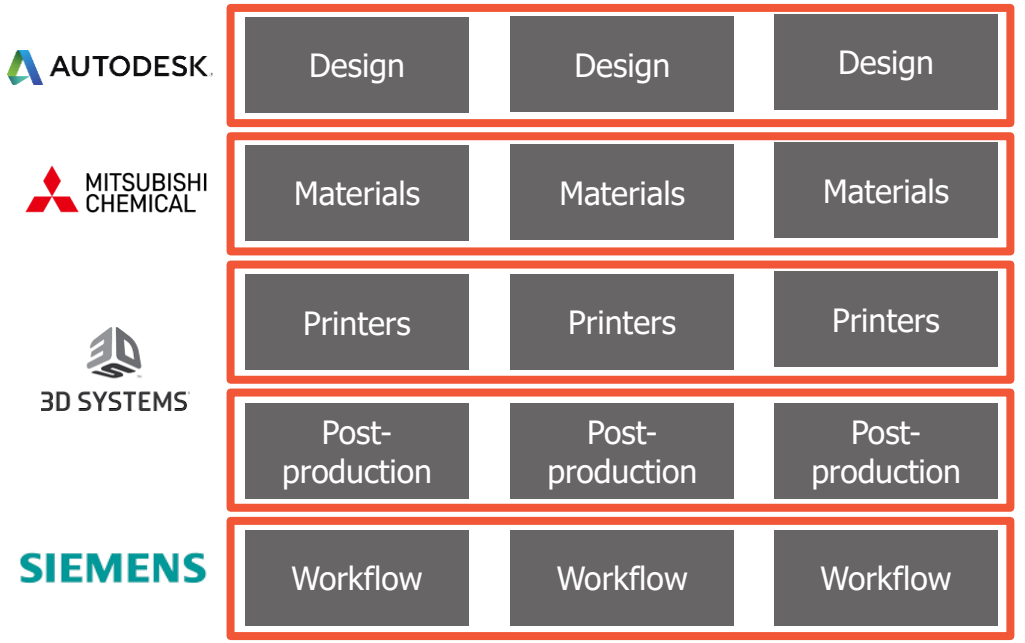
While vertical integration is needed today, horizontal integration may be more successful in the future

Due to the relative immaturity of 3D printing as a manufacturing technology, complete well-integrated ecosystems are needed to help make it competitive. However, as capabilities become more standardized, more modular approaches will become possible, and horizontally focused specialists may build commanding positions in their layer of the 3D printing stack – much like in the evolution of the computer industry in its earlier days.

Current strategy: vertical integration



Future strategy: horizontal focus



Note: Companies are chosen just as representative examples, not necessarily implying that any of them are pursuing or will pursue these strategies as shown

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