# Market Guide to 3D Printer Manufacturers

Pete Basiliere

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## Supply Chain Value Hidden in Plain Sight

<table>
<thead>
<tr>
<th>Wheel Protection Jig</th>
<th>External Suppliers</th>
<th>Ultimaker 3D Printers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td>$835/part</td>
<td>$22/part</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>56 days</td>
<td>10 days</td>
</tr>
</tbody>
</table>

Photo source: Ultimaker
Supply Chain Value Hidden in Plain Sight

Volkswagen Autoeuropa:

- 100,000 vehicles produced annually
- 1,000 3D printed jigs and tools
- Seven Ultimaker desktop 3D printers
- $310,000 annual savings
- Two month ROI

3D Printing Defined

An additive technique that uses a device to create physical objects from digital models
# 3D Printing Defined
An Additive Technique That Uses a Device to Create Physical Objects From Digital Models

<table>
<thead>
<tr>
<th>Technology</th>
<th>Definition</th>
<th>3D Printer Price Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Extrusion</td>
<td>Material is selectively dispensed through a nozzle or orifice</td>
<td>$0.5k to $400k</td>
</tr>
<tr>
<td>Stereolithography</td>
<td>Liquid photopolymer is selectively cured by light-activated polymerization</td>
<td>$3.2k to $800k</td>
</tr>
<tr>
<td>Sheet Lamination</td>
<td>Sheets of material are bonded to form an object</td>
<td>$9.0k to 37.0k</td>
</tr>
<tr>
<td>Binder Jetting</td>
<td>A liquid bonding agent is selectively deposited to join powdered materials</td>
<td>$5.0k to $1.8m</td>
</tr>
<tr>
<td>Material Jetting</td>
<td>Droplets of build materials are selectively deposited</td>
<td>$20k to $600k</td>
</tr>
<tr>
<td>Directed Energy Deposition</td>
<td>Focused thermal energy fuses materials by melting them as they are being deposited</td>
<td>$200k to $5.0m</td>
</tr>
<tr>
<td>Powder Bed Fusion</td>
<td>Thermal energy selectively fuses regions of a powder bed</td>
<td>$20k to $2.0m</td>
</tr>
</tbody>
</table>

US dollars; k = Thousand; m = Million

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# Another 2D Technology Goes 3D

Selective Thermoplastic Electrophotographic Process (STEP)
From Evolve Additive
The 3D Printer Technology Landscape, Worldwide

Number of 3DP Manufacturers by Technology

- Sheet lamination: 3
- Material jetting: 5
- Binder jetting: 9
- Directed energy deposition: 10
- Stereolithography: 30
- Powder bed fusion: 36
- Material extrusion: 32

Number of Manufacturers With Multiple Technologies

- One Tech: 89
- Two Techs: 14
- Three Techs: 1
- Four Techs: 2

Note: 3DP = 3D printer; Graphs include only companies with 3D printers costing more than $2,500
See Gartner's "Market Guide for 3D Printer Manufacturers," (G00319094) for more details and a list of providers

3D Printing at the Beginning, Middle and End

**Rapid, Iterative Prototyping**
- Prototype in plastic, produced in either plastic or metal
- Produce copies at multiple locations simultaneously

**Tools, Jigs, Fixtures**
- Increased productivity
- Greater flexibility
- Improved quality
- Fewer injuries

**Finished Goods**
- Low-volume end-use parts and spares
- Bridge manufacturing, startup, end-of-life
- Customized designs

Photo sources: Stratasys (Volvo engine pump), Markforged (grippers); Frustum (engine pistons)
Balance the Supply Chain Opportunities and Risks

**Opportunities**
- Unique Product Performance
- On-Demand Product and Tools
- Reduced Product Complexity
- Response to Design Changes

**Risks**
- Limited Supply Sources
- Lack of Certified Processes
- Specialized Skills Required
- Producing Product at Scale

85% of supply chain practitioners are using or will use 3D printing within two years.

45% of supply chain practitioners say 3D printing presents a significant supply chain challenge.

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**Volume Determines Whether to Use 3D Printing**

[Diagram showing cost per unit versus units manufactured for conventional and additive manufacturing, with a break-even point for future AM cost curve.]
Complex Designs Favor Additive Manufacturing

How Do You Pick the Right 3D Printer Manufacturer When There Are More Than 100 Enterprise-Class Suppliers?
Begin With the End in Mind

1. What do you want to build?
2. What technology or technologies can produce the part?
3. Who manufactures the 3D printers that can build the part?
4. Which model 3D printer meets your requirements?
5. Which 3D print service bureau meets your needs?

From Design for Ideal Manufacturing to Manufacturing the Ideal Design
Recommended Gartner Research

- **Market Guide for 3D Printer Manufacturers**
  Pete Basiliere (G00319094)

- **Market Guide for 3D Print Service Bureaus**
  Pete Basiliere (G00326947)

- **Take a Strategic View of 3D Printing to Maximize Its Value Within Your Supply Chain**
  Michael Burkett and Pete Basiliere (G00332549)

- **Adopting 3D Printing for Industrial Parts Has Key Impacts on CAD and PLM Priorities**
  Marc Halpern (G00312880)

- **Predicts 2018: 3D Printing and Additive Manufacturing**
  Pete Basiliere, Michael Shanler, Stephen E. Smith and Others (G00342398)