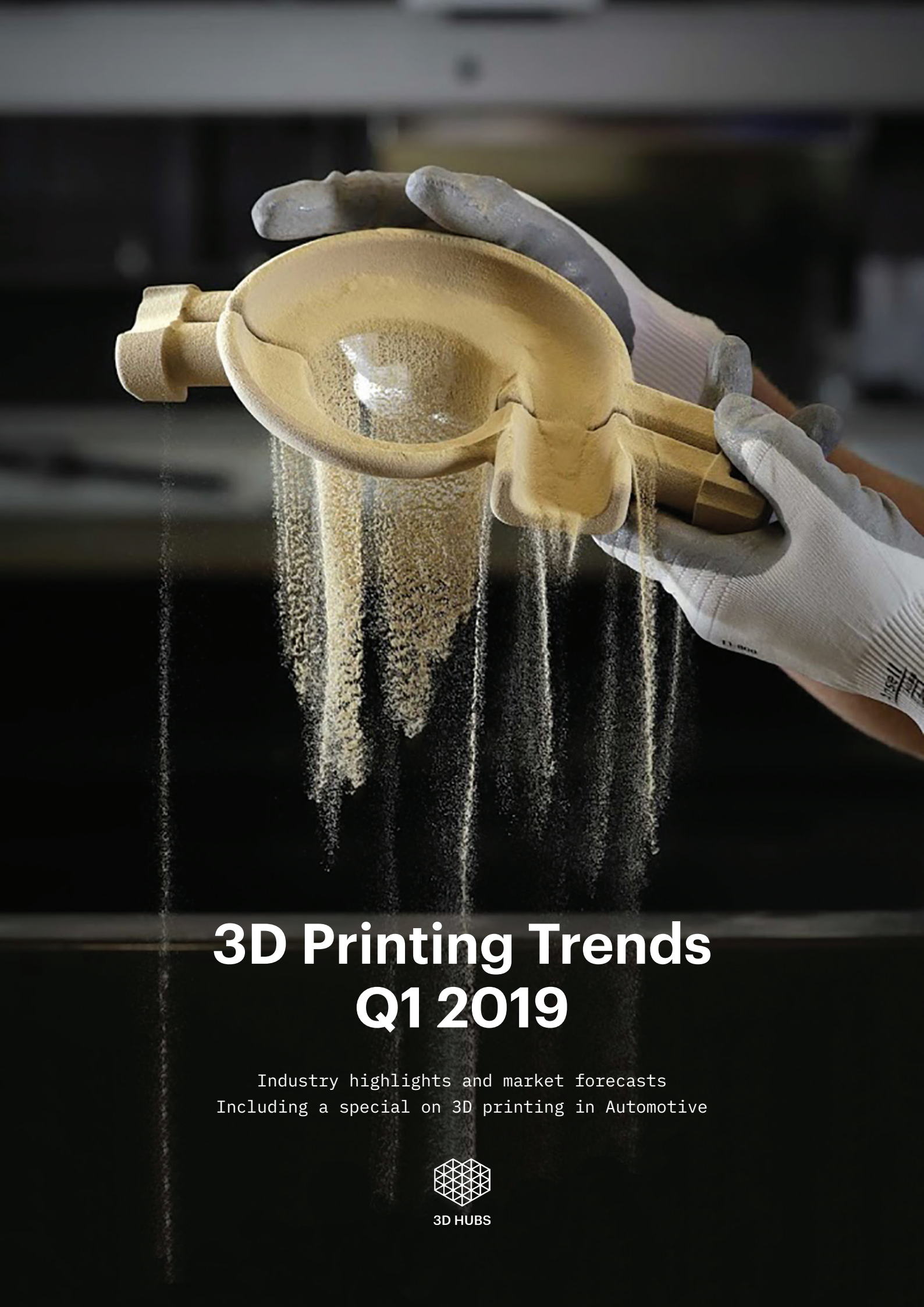


3D Printing Trends Q1 2019

Industry highlights and market forecasts
Including a special on 3D printing in Automotive

3D HUBS

Table of Contents

Executive Summary

3D printing is growing. The most significant change in 2018 was the evolution of our perception of the technology. 3D printing isn't just for prototyping anymore; Additive is now a viable method of manufacturing.

- **3D printing is making steps towards manufacturing.** Driven mainly by the automotive and aerospace industries, engineers are now examining how to integrate Additive into their manufacturing portfolio to move faster.
- **Prototyping is still the primary application.** The majority of users today still use 3D printing primarily for prototyping. This is a necessary step before the move of 3D printing into manufacturing is even possible.
- **Knowledge is currently the main barrier.** A common theme in our interviews with industry experts was that lack of knowledge is the main obstacle for broader adoption of 3D printing today.
- **Online 3D printing is driven by professional users.** The geographic breakdown of the online 3D printing demand showed great concentration around areas with a strong tech & entrepreneurial scene.
- **3D printing is only a part of the solution.** 3D printing will not replace traditional manufacturing technologies, like CNC machining or Injection Molding, but it will work alongside them to create a digital manufacturing ecosystem.

In the 3D Hubs 3D Printing Trends Q1 2019, we take a look back at 2018 to help you understand what lies ahead. In this report you will find:

- A timeline of the most influential events of 2018
- A review of the current size and growth potential of the 3D printing market
- The global distribution of the Online 3D printing demand based on transactional data
- A breakdown of the demand by industry, application, material, and process
- Interviews with 3D printing subject experts on the automotive industry
- Emerging trends & predictions for 2019

This installment of the 3D Printing Trends marks its relaunch and re-design. Upcoming editions will continue to provide periodic expert commentary on emerging trends in 3D printing and data on the growth of the broader digital manufacturing landscape.

75%

of major automotive companies in the US & Germany are using 3D printing for end-use parts

23.5%

is the forecasted average annual growth of the 3D printing market for the next five years

70%

of the global Online 3D printing demand comes from three countries: USA, UK & Germany

Method & Approach

Five different data sources were used to produce this report:

- A systematic review of the news reported by the media
- Informational interviews with leading industry experts
- Publicly available data from market analysts
- Transactional data from the 3D Hubs platform
- A survey of 400 companies using 3D printing

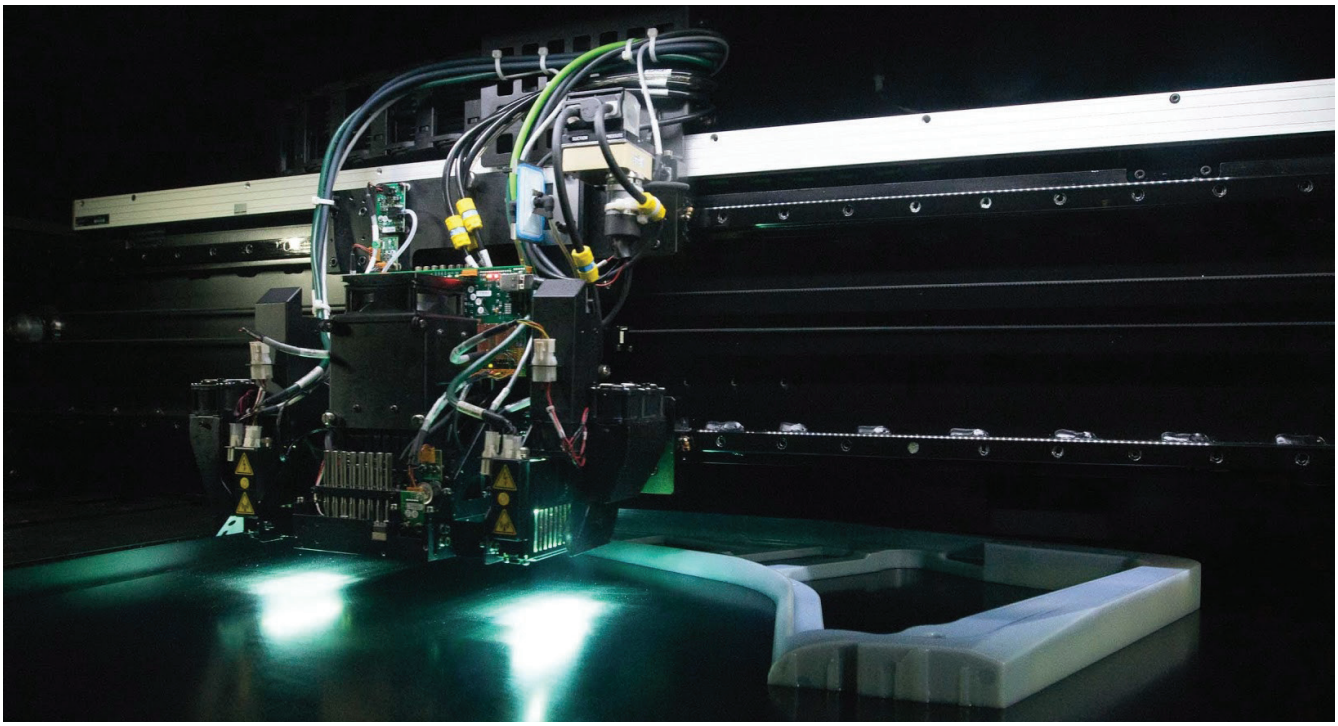
The analysis of the news articles provided an overview of the direction of the industry with an emphasis on the progress and investments of large enterprises. These early industrial adopters are at the forefront of the technology and drive cutting-edge innovation — the analysis allowed for the identification of key trends in the 3D printing industry in 2018 and beyond.

To gain more profound insights into these trends, we interviewed three industry experts. In this edition of the report, the spotlight was given to the automotive industry. Informational interviews were carried out with advanced users and 3D printing system manufacturers that lead the way with their activities in this sector: BMW, Desktop Metal and Ultimaker.

The analysis of the market provides a broad overview of the financial forces that drive the growth of the 3D printing technologies. The market size estimates and predictions of six different analysts were reviewed and compared from reports that were released in 2018. This approach gives a complete and up-to-date view of the current status and direction of the industry.

The second half of the report focuses on Online Manufacturing with an emphasis on professional 3D printing users. The analysis of the online transactions on the 3D Hubs platform, the largest global3D printing network, provides hard data about the way 3D printing is used today by the majority of design and manufacturing engineers worldwide. The user survey helped in explaining some finer points about the behavior of these 3D printing users.

This multi-pronged approach allowed us to draw a holistic picture of the current state of the 3D printing industry.

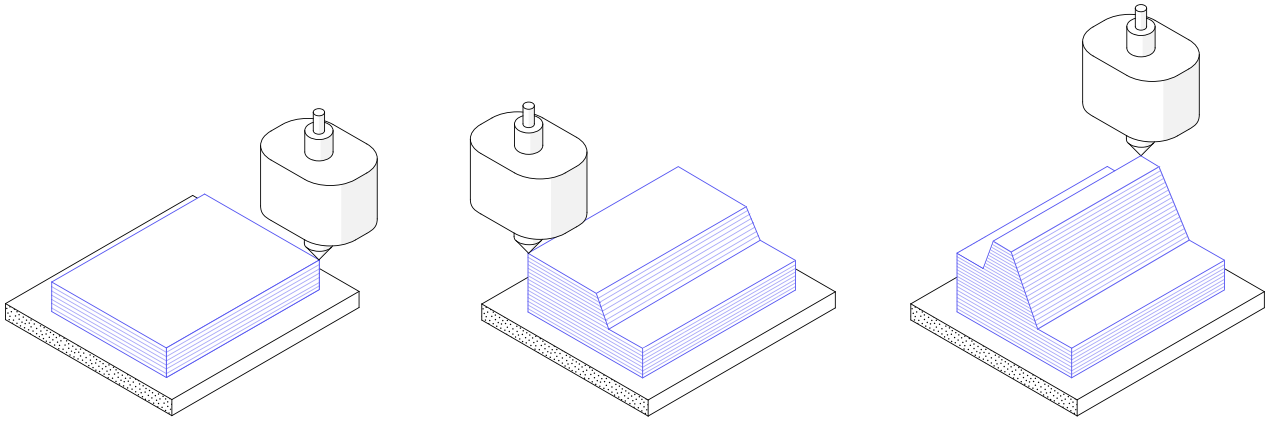


Definitions & Advantages of 3D Printing

Every 3D printer builds parts using the same basic principles: a digital CAD model is turned into a physical three-dimensional object by joining material (usually) one layer at a time.

This is a fundamentally different way of fabricating parts compared to "traditional" subtractive (CNC machining) or formative (Injection molding) manufacturing technologies. In 3D printing, no special tooling is required. Instead, the part is fabricated directly onto the build platform layer-by-layer from a digital file.

The official term used in ASTM and ISO standards to describe 3D printing is Additive Manufacturing. In practice, the two terms are interchangeable. In this report, 3D printing is used to refer to the industry as a whole while Additive Manufacturing is preferred when describing applications of the technology that aim toward industrial production.



Today, professionals use 3D printing for two purposes. As a prototyping solution to accelerate product development or as a manufacturing technology for the production of end-use parts. Here are the key benefits offered by 3D printing for each use-case:

3D printing for prototyping:

+ Rapid design iterations
+ Low-cost, functional prototypes
+ Widely accessible solution
+ Effective design communication

Additive Manufacturing:

+ Fewer design restrictions
+ On-demand production
+ Mass customization
+ Distributed manufacturing

Today, prototyping and small-scale production with 3D printing is standard practice for many engineers and designers in different disciplines. After years of experimentation, industrial users are only now making their first steps towards full-scale production with Additive Manufacturing.

To refresh and expand your knowledge on the specific benefits, mechanics, and applications of each 3D printing process, follow the links below to our comprehensive guides:

The Definitive Guide to 3D Printing →

Metal 3D Printing Technologies Compared →

The 3D Printing Handbook →

What happened to the 3D printing Industry in 2018?

Q1

Bugatti reveals 3D printed brake caliper

The topology optimized titanium caliper revealed by **Bugatti** in January set a new paradigm in 3D printing of metal components for high-performance automobiles [1]. In the same sector, **Porsche**, **Audi**, and **Mercedez-Benz** also disclosed their activities on metal 3D printing - mainly for the production of spare parts [2,3,4].

Adidas releases shoe with 3D printed insole

A limited release of the **Adidas** Futurecraft sneakers was made available in February. Their insole was 3D printed using **Carbon's** CLIP 3D printing technology. Adidas plans to push the production volume from 5,000 pairs to hundreds of thousands [5].

Key Industries

- Automotive
- Aerospace
- Consumer
- 3D printing

Key Themes

- Mass production
- Spare parts & supply
- Mass customization
- Standardization

Q2

Desktop Metal receives new investment

DM raised $65 million in March in a round led by **Ford** [6]. The company has raised to date a total of $438 million from investors including **GE**, **BMW**, and **Google**. Their first Studio System, an office-friendly metal 3D printer for prototyping, was shipped in 2018 while their Production System is scheduled for 2019.

HP integrates MJF in their Supply Chain

The company set an example in April by announcing plans to integrate their MJF technology into **HP's** internal supply chain [7]. HP also expanded its offering in 2018 by releasing the Metal Jet system and announcing their full-color 3D printer [8,9].

Ultimaker launches professional FDM 3D printer

In April, **Ultimaker** released their largest FDM 3D printer yet alongside their open material platform to better serve professional users [10]. On the factory floor, their machines are mainly used for custom tooling, jigs, and fixtures by companies, such as **Bosch**, **Volkswagen**, and **Ford** [11].

ASTM releases two new standards for metal 3D printing

Standardization is a necessity for the adoption of metal 3D printing in the aerospace and medical industries. In June, **ASTM** released a set of standards which detail best practices for metal powder bed fusion processes to ensure quality for critical applications [12].

Q3

Boeing continues investments in metal 3D printing for aviation

In August, **Boeing** made its third investment of the year in metal 3D printing [14]. This is consistent with other large aviation companies, such as **GE**, **Triumph**, and **Honda**, who also invested in metal 3D printing this year [15]. Boeing is currently using 3D printing in the development and production of their satellites, airplanes, and helicopters.

BMW 3D prints parts for commercial vehicles

BMW revealed the first metal 3D printed bracket to be used in a commercial vehicle in August [13]. The company has been active in 3D printing R&D since the '80s. They are currently collaborating with top Additive Manufacturing companies, including **EOS**, **HP**, **Carbon** and **Desktop Metal**.

BASF expands 3D printing division through acquisitions

BASF rapidly expanded its 3D printing materials offering with two new acquisitions in July [16]. This highlights the great interest of major chemical giants in the segment of 3D printing materials. Other noteworthy companies with activities in this sector are **Royal DSM** and **DuPont** [17,18].

GM kicks-off 3D printing for Electric Vehicles

General Motors revealed its plan to 3D print thousands of parts for their EVs [19]. Their goal is to increase the adoption of electric cars by improving their fuel efficiency through weight reduction. In the same space, **XEV** started in August the production of the first EV with large structural 3D printed plastic components [20].

Q4

Lufthansa opens Additive Manufacturing center for aircraft MRO

The center opened its doors in October [21]. The focus for **Lufthansa Technik** is on Maintenance, Repair, and Overhaul (MRO) of commercial aircrafts. 3D printing is in the scope of many companies that offer commercial aircraft upgrades services, such as **Airbus**, **Emirates** [22]. The main attraction is its on-demand manufacturing capabilities.

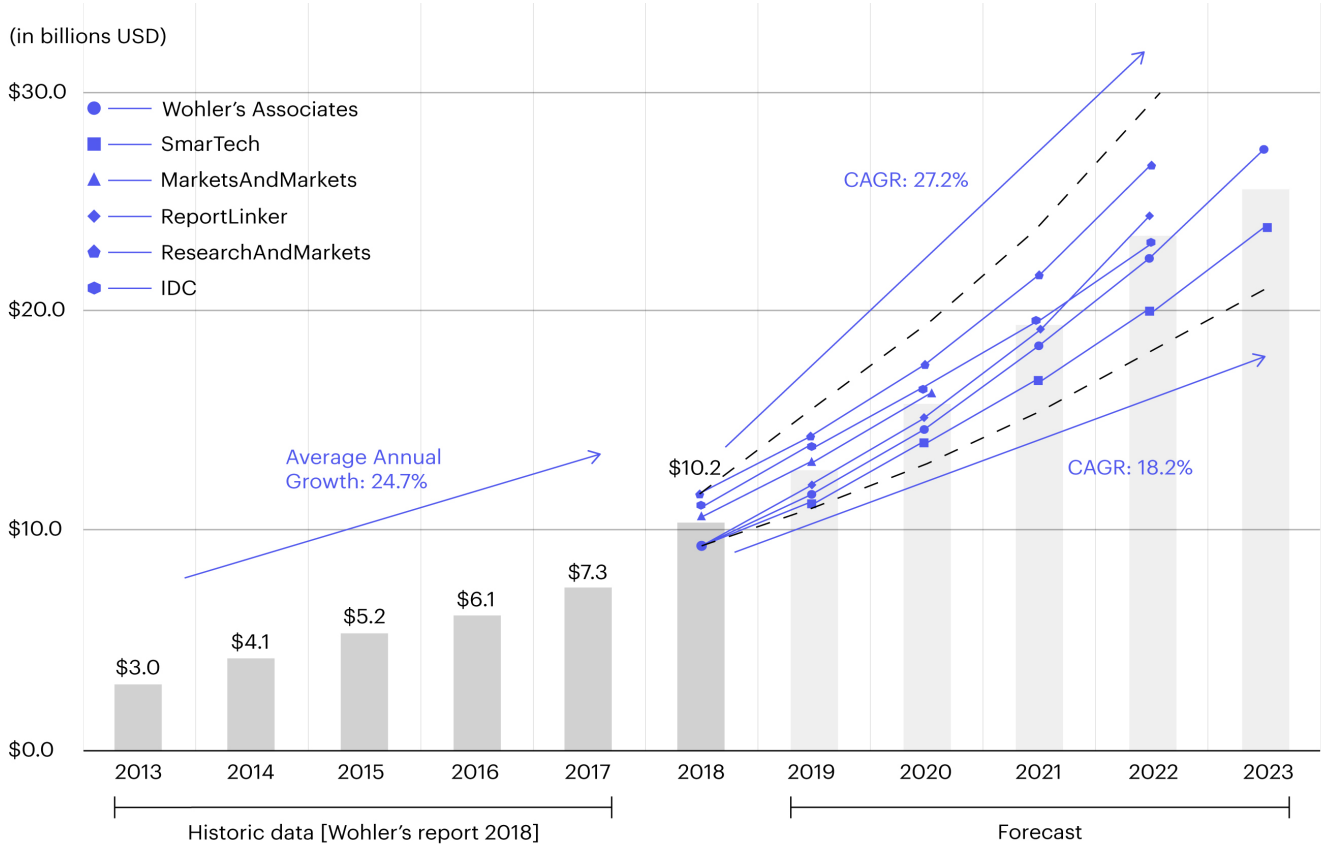
Gillette pilots razors with customizable 3D printed handles

In November, **Gillette** partnered with **Formlabs** to offer razors with customizable 3D printed handles [23]. This is one of the first commercially viable examples of mass-customization of consumer products with 3D printing to hit the market.

Ford, VW and BMW open additive manufacturing centers

Both **Ford** and **Volkswagen** opened the gates of their advanced manufacturing centers in December [24, 25], while **BMW's** campus is scheduled for early 2019 [26]. Ford also announced the use of two plastic 3D printed brackets in their upcoming commercial car.

3D Printing Market Size & Forecast



To get a sense of the bigger picture, the reports of six reputable market analysts on the current size and future growth of the global 3D printing market were reviewed. All six reports were released in 2018 and represent the most up-to-date information currently available. The graph above was constructed based on publicly available data and gives a complete overview of the key findings of these six reports.

Different analysts estimate the current annual revenue of the global 3D printing market to be between $9.3 and $11.5 billion in 2018. These figures include sales of 3D printing systems, materials, software, and services. By averaging these evaluations, a more accurate estimation of the current market size can be assessed at approximately $10.2 billion.

From 2013 to 2017, 3D printing grew at a rate of 24.7% on average every year [27]. For the next five years, the annual market growth forecasted by the analysts varies between 18.2% and 27.2% with the compound annual growth rate (CAGR) averaging at 23.5%. This means that the global 3D printing market will double in size at approximately every three years.

Investment in 3D printing is also rapidly growing. From 2016 to 2017, Venture Capital funding increased by 86% [33] and, in 2018, VC funding exceeded $300 million in startups related to 3D printing [34, 35]. The common thread of all investment: industrial solutions and applications.

VC funding though is heavily concentrated in the US. 80% of all 3D printing companies have their headquarters in the States. Moreover, three 3D printing companies alone (Carbon, Desktop Metal, and Formlabs - all US based) account for approximately 80% of the total VC funding. They are currently the only startups valued at over $1 billion, achieving unicorn status.

Looking into the future: the “slow revolution”

The global manufacturing market is currently valued at $12.7 trillion, meaning that 3D printing represents less than 0.1% of global manufacturing.

If 3D printing manages to capture just 1% of that market - a scenario that is possible according to many industry experts - then it can reach annual revenues of $125 billion. This is five times greater than even the most optimistic 5-year forecast.

Until recently, 3D printing was used almost exclusively for prototyping. The prototyping market is relatively small - estimated in the scale of $10’s of billions USD. The review of the industry and the interviews with the subject experts showed that large enterprises are making their first steps towards small-scale production and mass manufacturing with 3D printing. The size of these markets is 10 to 100 times larger than prototyping, opening up new opportunities for growth.

“Despite its rapid growth, 3D printing still represents less than 0.1% of global manufacturing”

Today, the barriers to adoption for large enterprises are mainly related to social factors; for example, an understanding of the technology and education. So it is only a matter of time until they are overcome. Early adopters see the necessary investment as an opportunity to increase their competitive offering and once they show the way, small and medium enterprises will follow.

This is the “slow revolution” everyone in 3D printing is currently describing. It is a matter of time until Additive is fully adopted and finds its place in the greater manufacturing ecosystem.

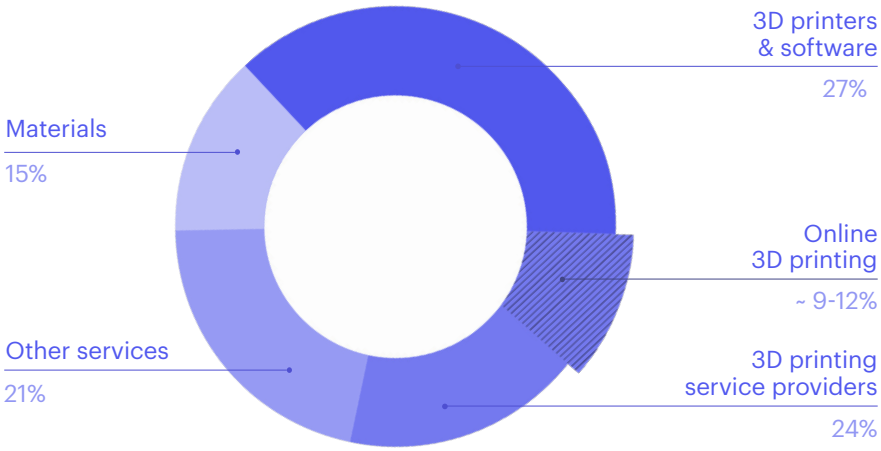
Focusing on today: the online manufacturing segment

So far we have considered the total figures of the combined annual revenue from sales of 3D printing systems, software, materials, and services.

The next few sections analyze transactional data from online 3D printing orders — “online” as opposed to 3D printing through traditional, “offline” services. The result is a snapshot of the global distribution of 3D printing demand and application by the average professional user today.

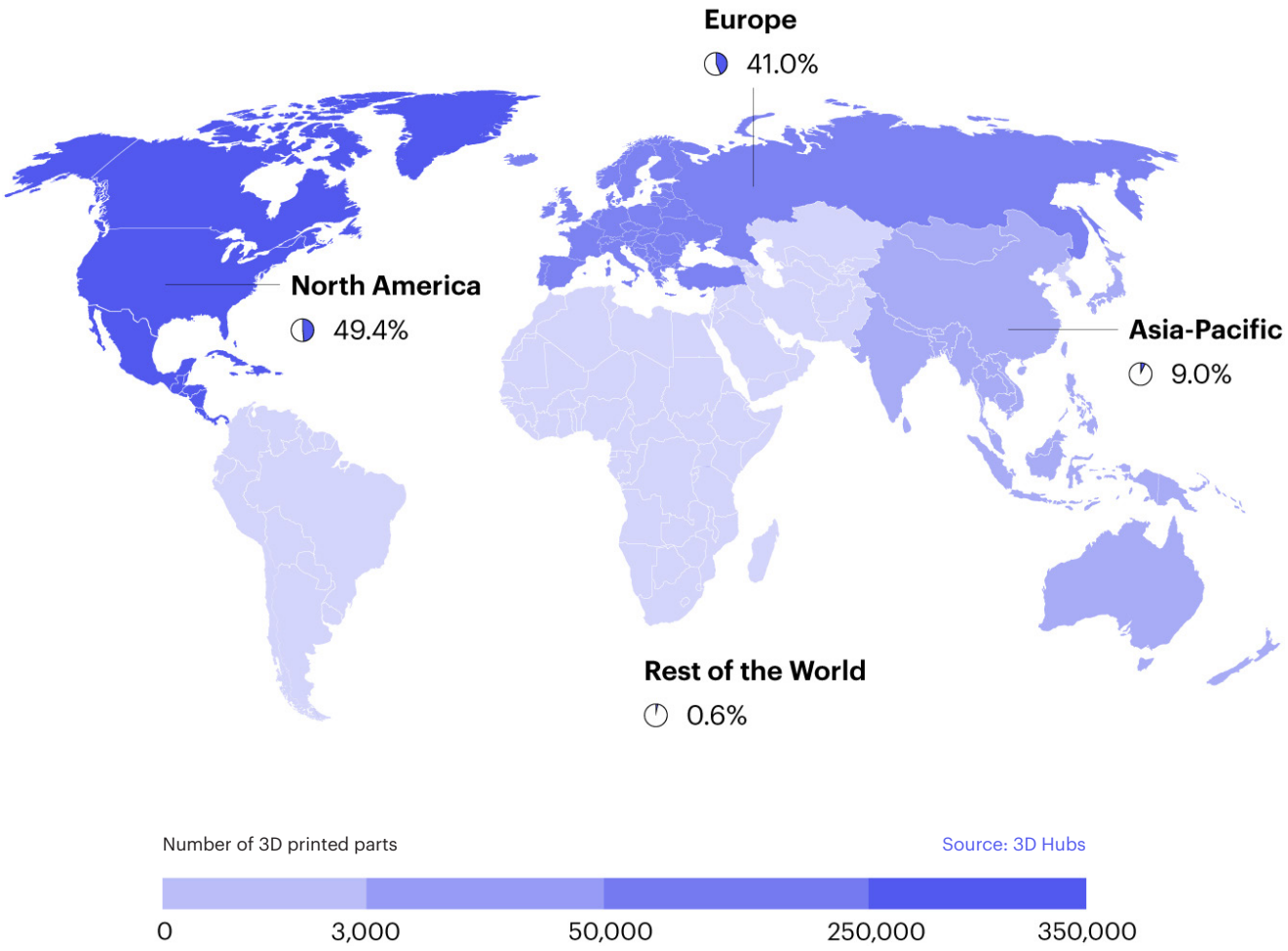
Online 3D printing falls under “3D printing service providers” which belongs in the “services” segment. The latest estimates attribute approximately 37% of the total annual 3D printing revenue to 3D printing service providers [27]. Our best estimate of the current size of online 3D printing is between 35-45% of the share of service providers or approximately $1.3 to $1.6 billion — based on our user survey.

Breakdown of the overall 3D printing market



Distribution of Online 3D Printing Demand

Global Distribution



This map gives an overview of the global distribution of online 3D printing demand based on transactional data from the 3D Hubs platform. It graphically represents the location of customers who collectively ordered more than 750,000+ 3D printed parts in 2018.

North America and Europe are clear leaders in online 3D printing, representing together almost 90% of the global demand. The US alone amounts for 45% of the demand worldwide.

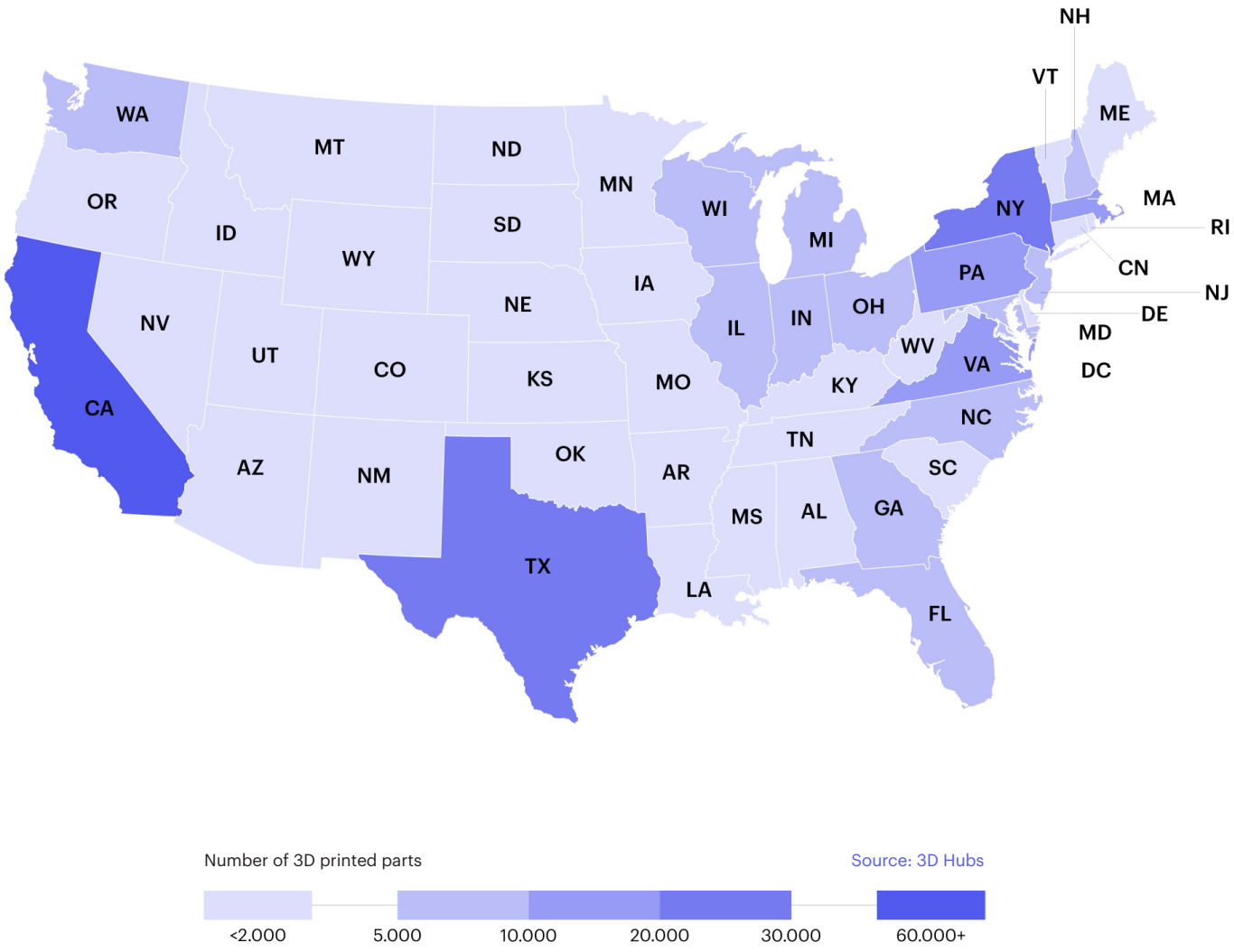
While interpreting the data here, some caution is needed. Factors such as attitude towards online manufacturing in general, market penetration or language can affect the distribution.

For example, Google Trends shows that queries related to the topic of 3D Printing in a business and industrial setting were as popular in Asia-Pacific as in Europe and the US in 2018. This fact also shows the emerging role of the Asian markets in the growth of the 3D printing industry in the near future.

"US & Europe dominate the online 3D printing demand, but Asia-Pacific is emerging."

Distribution of Online 3D Printing Demand

USA



In 2018, more than 350,000 parts were 3D printed in the USA through the 3D Hubs online manufacturing platform. This map shows the distribution of 3D printing demand by state based on the customer's location.

California was by far the state with the highest online 3D printing demand in 2018. More than 20% of the total US demand - over 70,000 parts - were shipped to customers based there. The strong tech startup scenes of San Francisco, Silicon Valley, Los Angeles, and San Diego are a substantial driver of this trend.

New York, Texas and Massachusetts follow. Hardware development and the startup scene is also active in these areas. This statistic shows how professional users are driving the demand in the US, but still mainly for prototyping purposes.

"Innovation & entrepreneurship centers drive the demand of online 3D printing in the US."

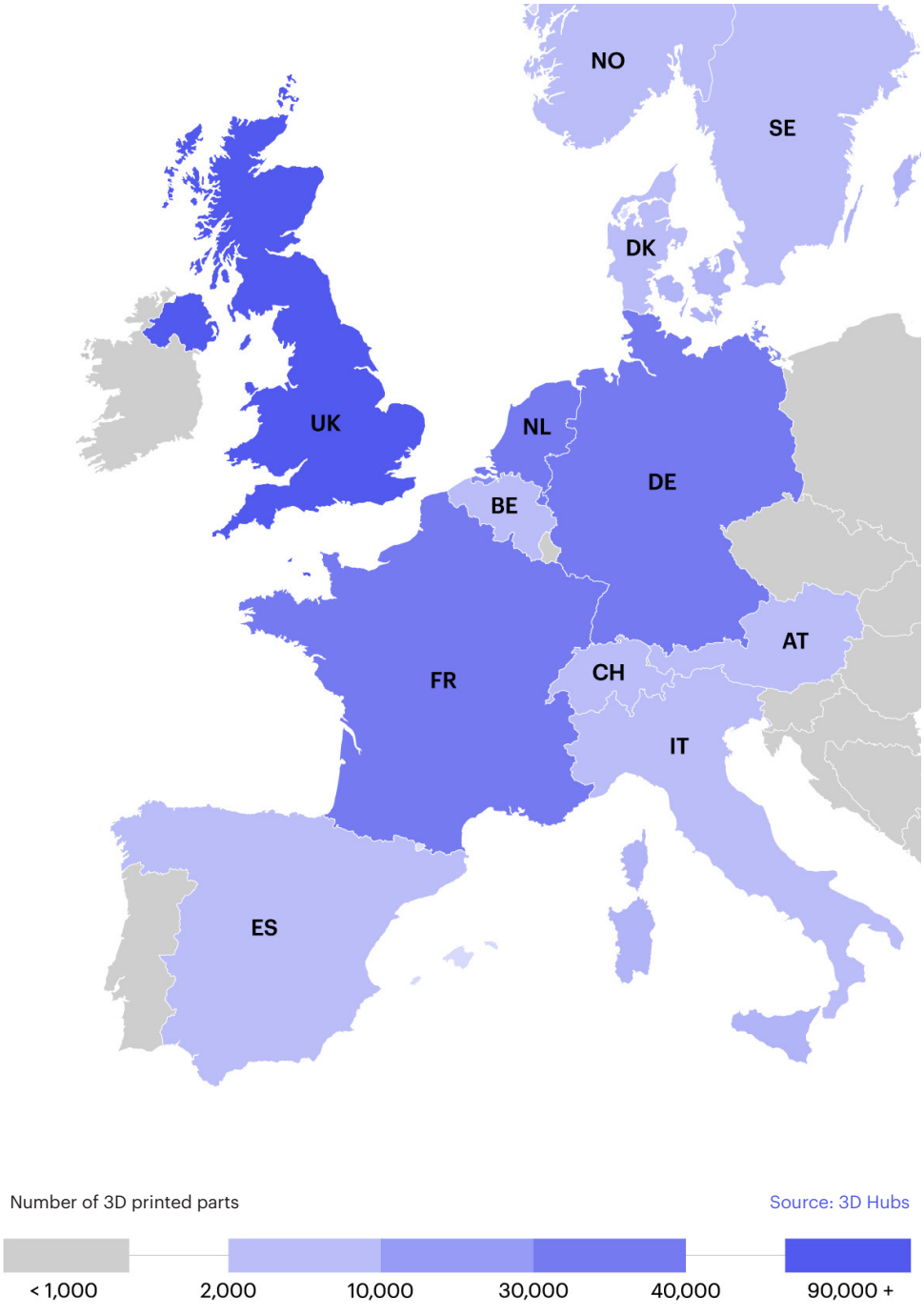
Distribution of Online 3D Printing Demand

Europe

More than 250,000 parts were 3D printed for European customers through the 3D Hubs platform in 2018. The map shows the 12 countries with the highest demand.

The UK leads the online 3D printing demand, 3D printing more than 100,000 parts, which is approximately 42% of the total share. Germany, the Netherlands and France followed.

Interestingly, the online 3D printing demand in Germany is lower than one would expect. This could be due to the proliferation of in-house manufacturing capabilities of professional users in Germany, general market penetration, or their preference towards "traditional" offline sourcing solutions.

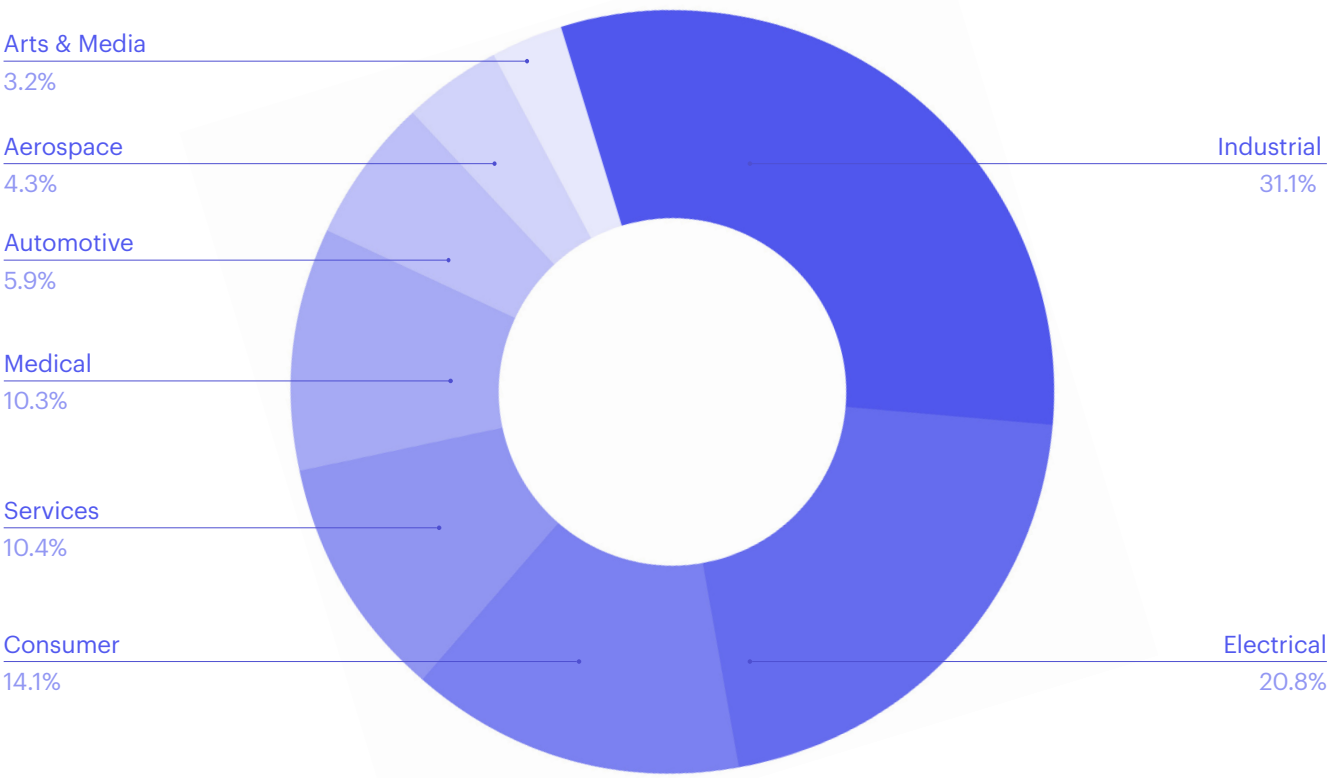


Online 3D Printing Demand

Breakdown by Industry & Application

Online 3D printing by Industry

Based on 100,000 3D printed parts



Source: 3D Hubs

This pie chart shows the distribution of online 3D printing demand by industry based on a representative sample of the total printed parts ordered by professional users in 2018. Over 65% of the demand comes from engineers working in the development of industrial, electrical or consumer goods.

On the other hand, engineers in Aerospace and Automotive, are less inclined to use online services and only capture 10% of the demand. These early adopters of Additive are more likely to have in-house 3D printing capacity for both prototyping and production or other internal sourcing systems.

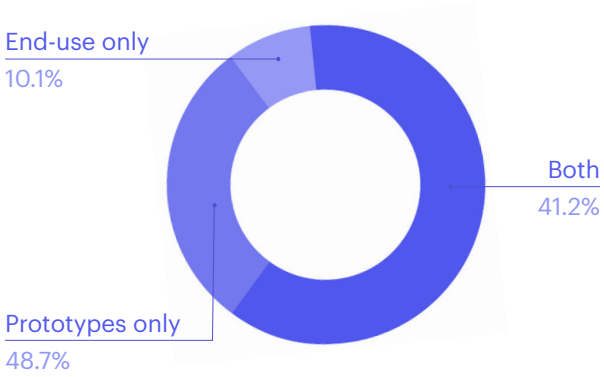
To gain a deeper understanding of how engineers are using online 3D printing today, we surveyed 3D Hubs customers. More than 400 respondents participated in this survey: all were professional users working in all the above industries and in company with size that ranges from < 5 to 10,000+.

An overwhelming majority of respondents - more than 75% - that are likely to use an online service come from companies with less than 100 employees. This data shows that the primary users of online 3D printing are indeed engineers working in Small or Medium Enterprises (SMEs).

More than 50% of the respondents use online services for the production of end-use parts, but only 38% choose 3D printing for this purpose. Conversely, 3D printing is their first choice for prototyping more than 91% of the time.

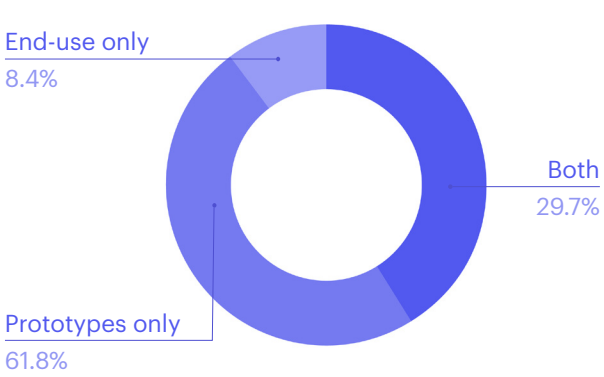
Why do you use online manufacturing services?

Based on survey of 400 professional users



Why do you use 3D printing?

Based on survey of 400 professional users



Source: 3D Hubs

Even when it comes to the production of end-use parts, engineers use 3D printing only for small volumes. Two out of three respondents mentioned that they would use 3D printing for production runs that do not exceed 20 units. 90% of engineers said they would not consider 3D printing for productions of over 100 parts.

The reason for this is simple:

- For prototyping, cost and lead time are by far the most critical factors considered by professionals before choosing a manufacturing technology; these were mentioned by 82% and 78% of the participants respectively. Current 3D printing technologies excel in these areas.

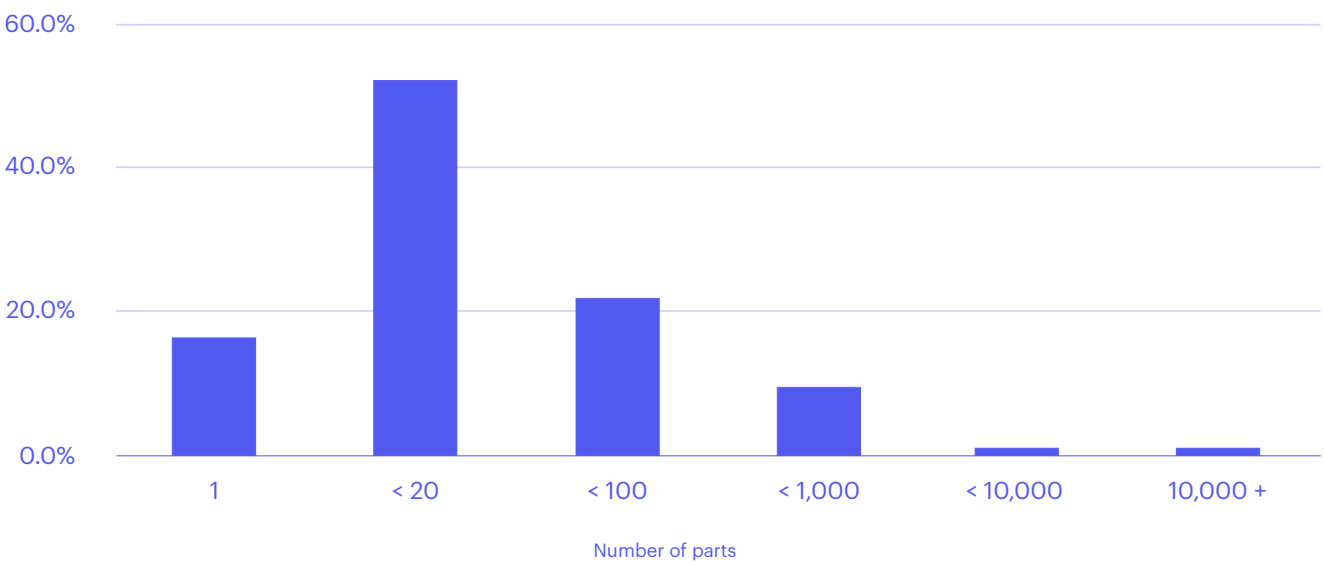
- For production, material properties and cost are the essential factors in decision making; these were mentioned by 85% and 80% of the participants respectively. Current 3D printing processes have made considerable progress in the material side, but the cost per part is still high, especially for larger production volumes or metal parts.

This is why engineers will turn to other manufacturing technologies, such as CNC machining, Sheet metal and Casting for metal production, and Injection molding and Vacuum casting for plastic parts. All these technologies are available on the 3D Hubs online manufacturing platform.

For what production volumes would you consider using 3D printing?

Source: 3D Hubs

Based on survey of 400 professional users



Online 3D Printing Demand

Breakdown by Material & Process

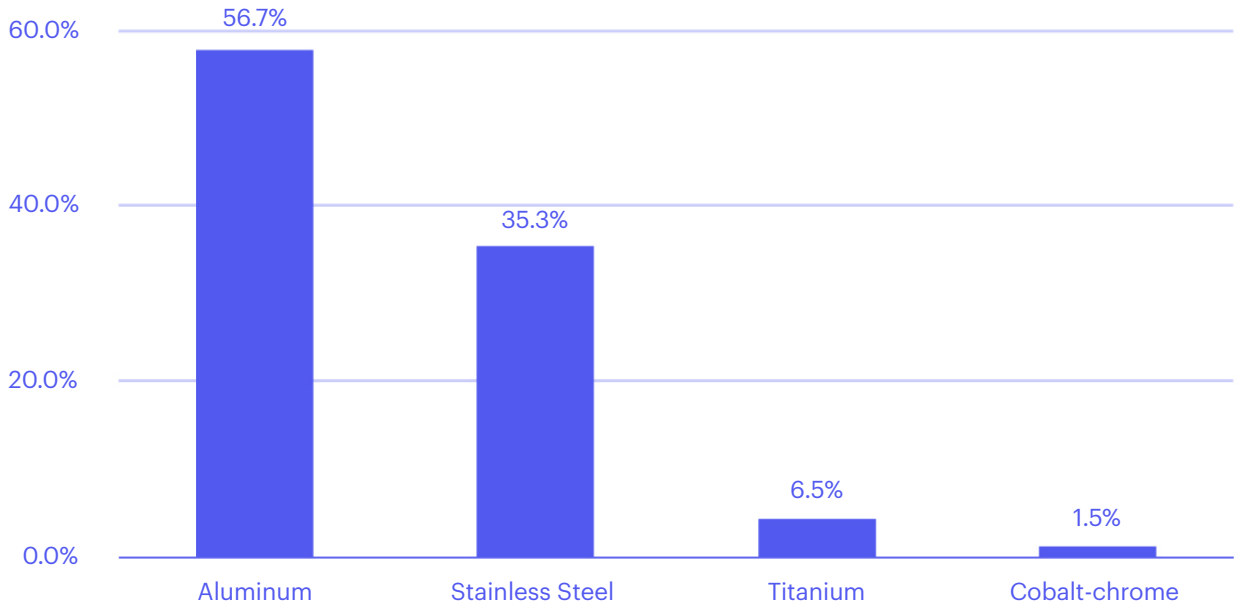
The graphs below show a breakdown of the global online 3D printing demand by material in 2018. In terms of parts printed, the online demand for plastics was 100 times higher than that for metals, but the value per part of the later was on average 35 to 50 times higher.

For plastics, FDM/FFF captured the majority of the online 3D printing demand - almost 80%. SLA/DLP and Material Jetting resins captured combined 12% of the demand, while SLS and MJF the remaining 8%.

For metals, the DMLS/SLM processes with aluminum or stainless steel as the material capture more than 90% of the demand.

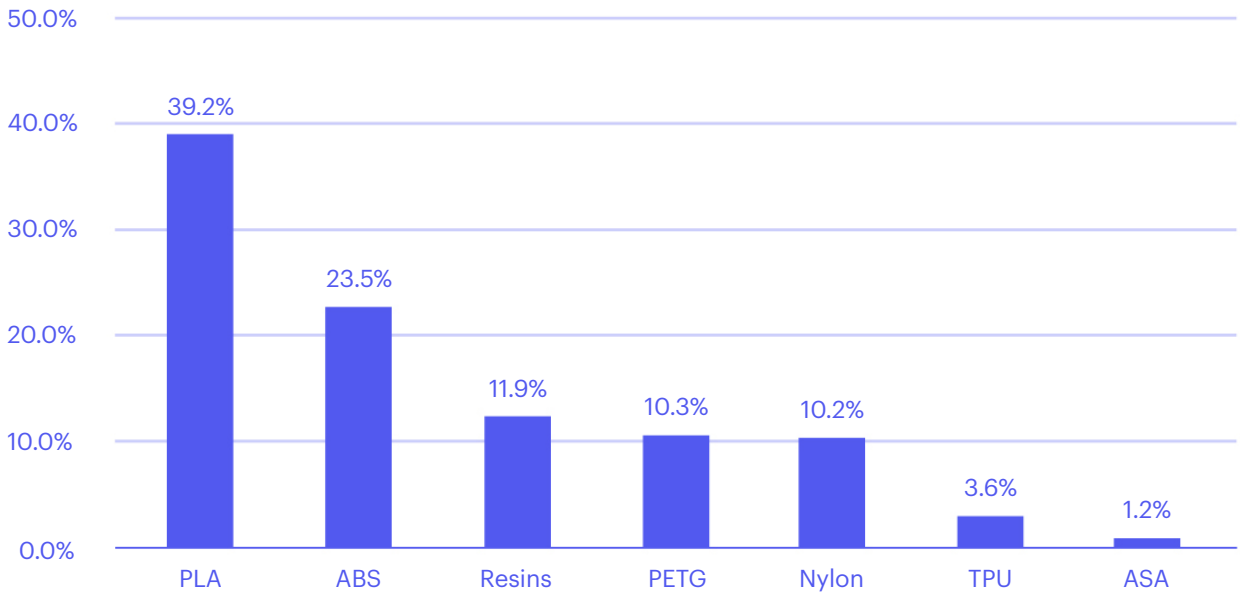
Online 3D printing of Metals

Source: 3D Hubs



Online 3D printing of Plastics

Source: 3D Hubs



“10% of all online 3D printed parts were produced by an HP MJF printer”

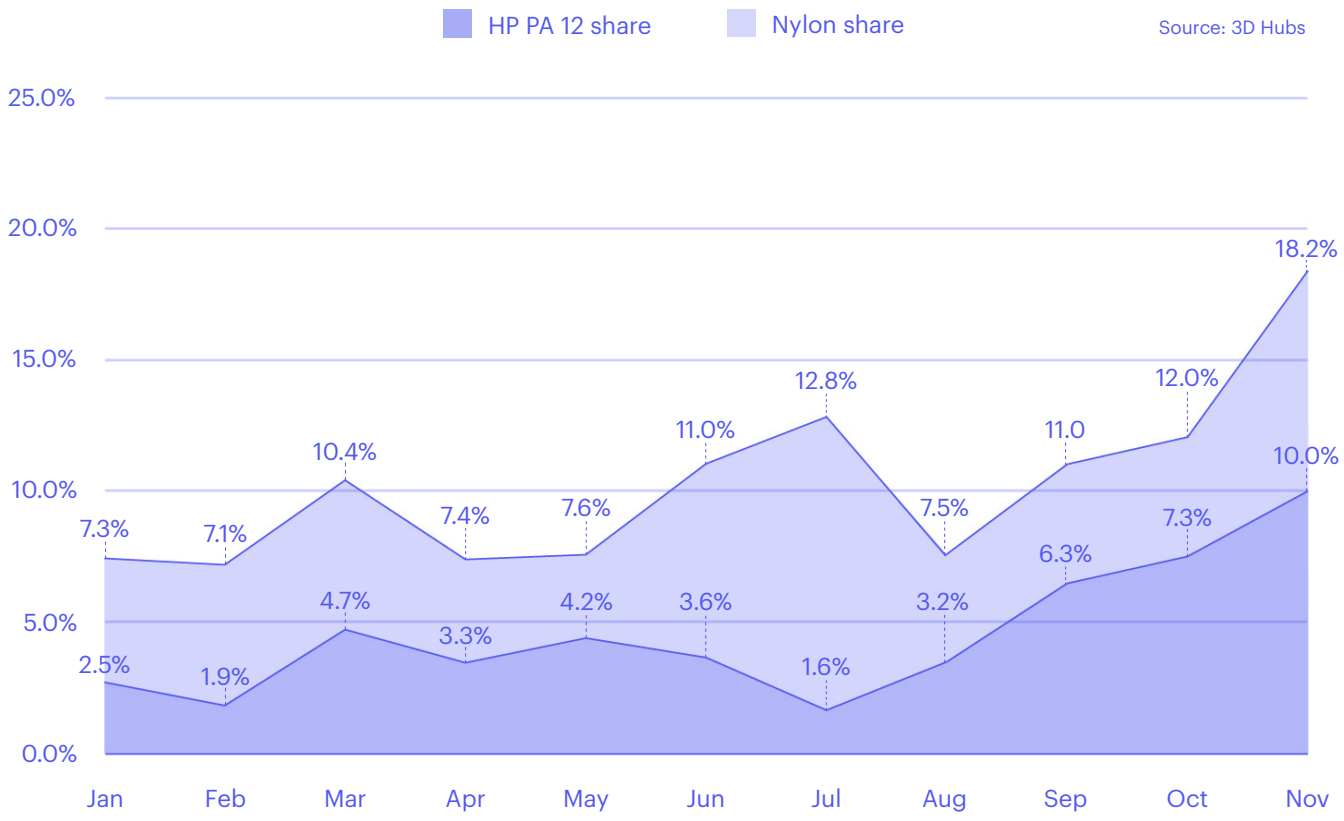
When we take a closer look at the data on a month-by-month basis though, an interesting trend emerges. The demand for 3D printing in nylon, an engineering material mainly used in SLS and MJF technologies, increased drastically from September onwards.

This uptick was driven primarily by HP’s MJF technology. Of all the parts ordered on the 3D Hubs platform in November, an impressive 10% were printed by an HP MJF 3D printer.

This statistic shows both the commercial appeal of the technology with 3D printing service providers and the need from professional users for high-performance functional 3D printed parts.

HP MJF’s share of the Online 3D printing Demand

Based on 700,000+ printed parts



Industry Highlight: Automotive

Desktop Metal

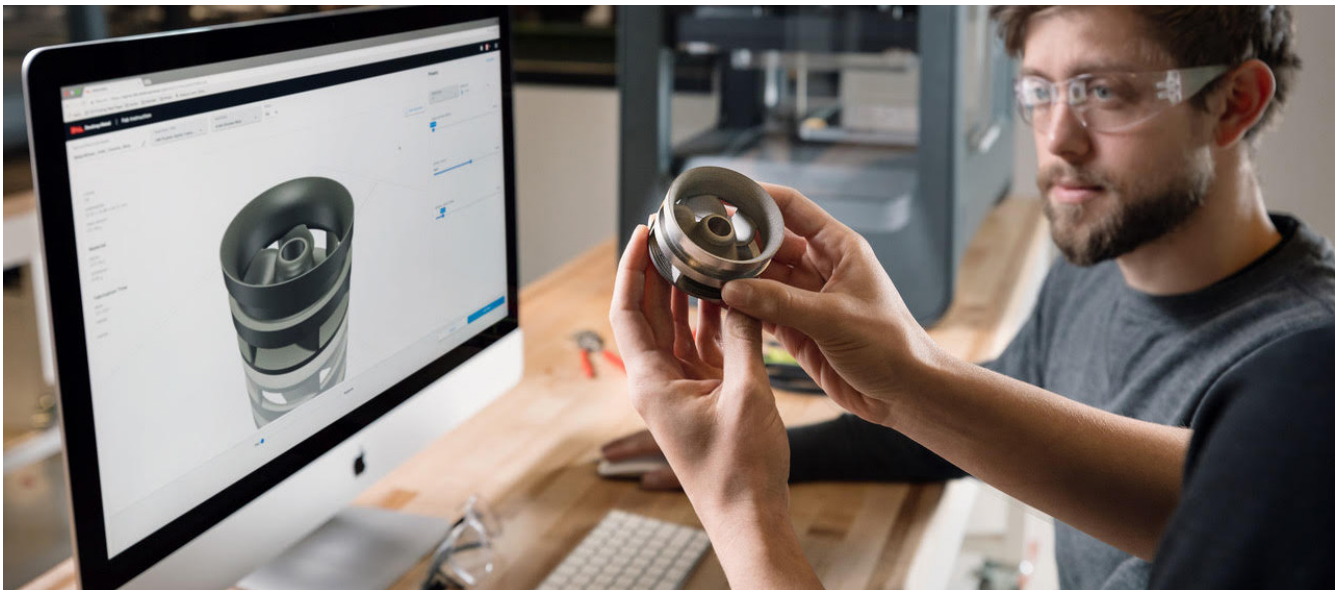


Image courtesy: Desktop Metal

Desktop Metal is one of the fastest growing companies in the field of metal 3D printing, producing systems both for prototyping and production. They also have an active collaboration with large automotive companies such as BMW, Ford, and Audi. To learn more, we talked with Jonah Myerberg, Co-Founder & CTO, about the past, present and future of metal 3D printing in automotive.

"The automotive industry has been watching and evaluating Additive Manufacturing for at least 10 years, but the investment didn't make economic sense until now" Jonah explains when asked for the main reason why there were so many announcements in 2018 from car manufacturers.

"The aerospace and medical industries could afford a significantly higher price for both the machines and the finished parts. For example, GE has fully embraced metal 3D printing for producing components for their jet engines. The only way they could get the throughput they needed was to create assembly lines with hundreds of metal 3D printers working in parallel. In contrast, the automotive industry operates in two orders of magnitude higher volumes, so their factories would have to be 100 times bigger."

The turning point for automotive was the release of new metal 3D printers that can significantly reduce the cost per part and give a clear path towards mass production. According to Jonah, materials are secondary. In fact, they must remain unchanged for broader adoption. "Automotive engineers and engineers from any industry look at additive and say: I don't fully understand the process, but I do understand the materials. I use these materials all the time. 3D printing is now just a new way to manufacture them."

For Jonah, "the most exciting strength of additive manufacturing, especially metal additive, is that it touches so many different types of engineers" For the manufacturing engineer, the main benefit is the lack of tooling. Parts can be manufactured based on software, directly connecting the digital design environment to the physical world. Mechanical engineers can work with fewer manufacturing constraints and design parts that are optimized for their function. Logistics and supply chain teams are also very excited about 3D printing and its ability to massively distribute manufacturing around the globe.

Currently, the main barrier to entry to metal 3D printing for production is "an understanding of the technology and how to design for it." We are currently going through "a gestation period in which engineers begin to learn how to design for additive and companies start running rough cost calculations." The next step for large car manufacturers, like Ford and BMW, is to buy the machines and start running tests internally. Once these are complete, they will push the technology into their supply chain and their tier one suppliers.

Jonah is very positive about the growth of 3D printing in the next few years. "It's beginning to form a hockey stick," he notes. Until now, the main market for 3D printing was prototyping, which is relatively small. As 3D printing starts to penetrate low-volume manufacturing and mass production, new opportunities in much larger markets open. He sees a future where 3D printing will be complementary to all other manufacturing technologies out there, especially metal Injection molding and CNC machining. "As people discover this, the industry as a whole is going to explode."

Ultimaker

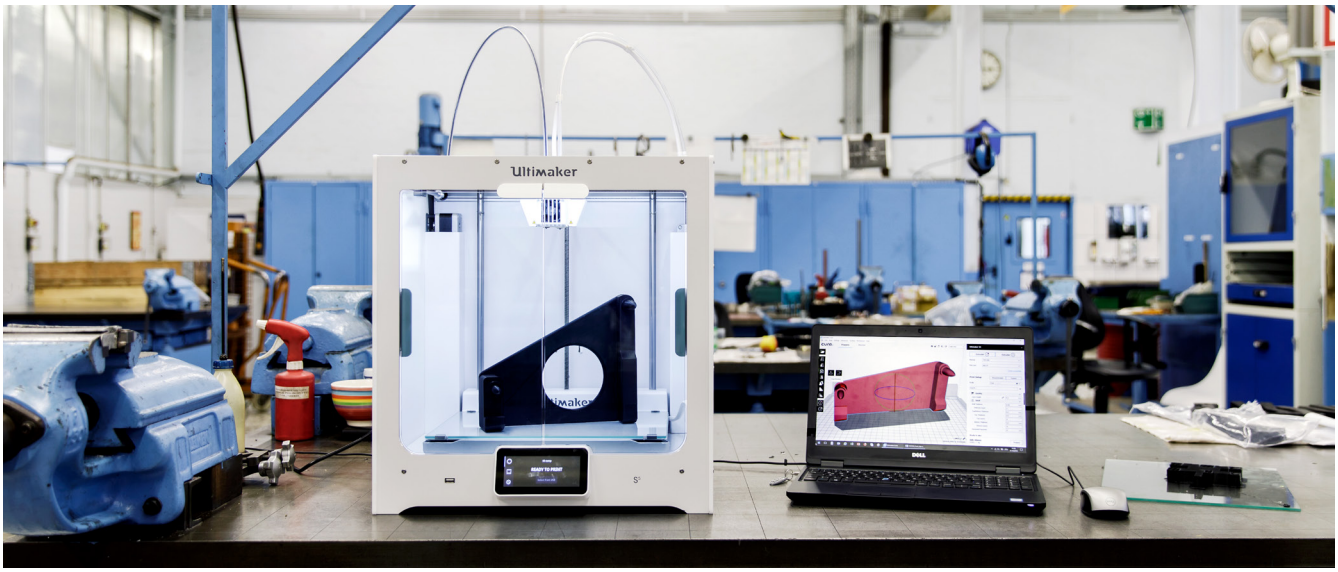


Image courtesy: Ultimaker

Founded in 2011, Ultimaker produces some of the most used professional-grade desktop FDM/FFF 3D printers and software globally. Their products serve thousands of users across the globe, empowering professional in a broad range of industries. To learn more about their activities in automotive, we talked with Paul Heiden, senior VP of Product Management at Ultimaker. He was happy to share some of his insights from his most recent qualitative market research.

Paul thinks that the main reason we saw so many examples of 3D printing applications from the automotive industry in 2018 was simple: they were one of the first to integrate it into their part development. He mentions: "We are just now starting to move from a market of technology enthusiast towards early adoption. These efforts are still very much driven by a few internal ambassadors in each company."

Paul sees three main current and future industrial applications of 3D printing: prototyping, manufacturing of custom tooling and spare part production. The level of adoption of each of these use-cases varies greatly. Prototyping with 3D printing is currently universally adopted. R&D engineers from automotive companies like BMW, Volkswagen or Ford, use 3D printing daily to communicate their requirements to their suppliers. Paul notes: "If we look at prototyping, people use it above all because there is an enormous increase in efficiency by being able to talk over objects instead of drawings."

However, prototyping is only the first step. "We now also see an overflow towards 3D printing for tooling", he states. "In tooling, the real improvement, the real value for everybody, is in the closer interaction with the operator." He continues with an example: a large project between BMW and Ultimaker. The goal of the project was to empower the operators by creating more opportunities for informal interactions between them and the maintenance engineer. Using 3D printing custom tools were ready to test the next morning - instead of 60 days later. "We're past the point where people discuss whether it's useful. The savings are incredibly obvious."

There is a new field language growing around 3D printing. One of the most surprising findings of Ultimaker's research was that it is not only the form of the tool that's important; the color matters too. Operators use color coding - green for left, red for right - to improve their efficiency. 3D printing allows making such changes on the fly. Of course, there is room for improvement. Understanding CAD and materials are sparse skills on the factory floor. "We need to simplify the workflow. An open materials platform and a deep software integration are key for making 3D printing fit in existing workflows."

Spare part production is one of the most important emerging use-cases for 3D printing. "If you look at the widest possible application of 3D printing, that's in spare parts", he explains. "The ability to create parts where you need them when you need them. That's what 3D printing is all about: distributed on-demand manufacturing." For this to become a reality, we need to go through many other stages. "If we want to produce spare parts, then we need to go through 3D printing of functional prototypes first. But we also need to ensure that we develop parts in such a way today that they can be 3D printed tomorrow." Paul is optimistic that this will happen; it's just a matter of time.

When comparing different 3D printing processes for plastics, Paul places his bet on FFF - as expected - for two reasons. Firstly, the cost of acquisition and ownership of FFF 3D printers is much lower than that of SLA or SLS. This makes it is easy for large enterprises to envision an enormous global network of standardized machines that can manufacture-on-demand at the press of a button. Secondly, FFF seems to be by far the most flexible technology for adopting specialty materials that the automotive companies already use. Paul believes that this is crucial for broader adoption.

Predictions for 2019

More applications and exciting case studies

"2019 is going to be an even more exciting year than 2018 and 2017. As more and more customers engage in design optimization projects, they'll say: "What can we do better? Can we do something like General Motors is doing? Can we do something like BMW is doing? Can we do something like Bugatti has done?"

Jonah Myerberg, co-founder & CTO of Desktop Metal

3D printing will become easier and more distributed

"We will see an increasing pressure on R&D to make 3D printing easier to use and adopt. To do that we need to examine the entire workflow. So we will see deep integration with CAD and scenarios where engineers start distributing to their branches, to the manufacturing floors and the partners in their supply chain."

Paul Heiden, VP of Product Management of Ultimaker

Standardization will lead to greater industrial adoption

"Engineers want to receive the same result every time they press print. Ensuring repeatable results has been the holy grail of industrial 3D printing for many years now. However, it takes time for international organizations like ASTM and ISO to publish their technical standards. So many early innovators, like BMW and 3D Hubs, are coming up with their in-house processes to ensure quality. This will expedite the wider industrial adoption of 3D printing."

Brian Garret, co-founder & CPO of 3D Hubs

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About 3D Hubs

3D Hubs is a global network of manufacturing facilities specialised in 3D printing, CNC machining and injection molding. Through our online platform we're giving companies access to directly available production capacity for the fastest lead times and at the lowest price. Founded in 2013, the 3D Hubs network has produced more than 2 Million parts.

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