



# Annual Additive Post-Printing Survey: Trends Report 2020

Recording trends in the 3D Post-Printing Industry since 2019.

**ANNUAL EDITION 2020**

**POSTPROCESS**  
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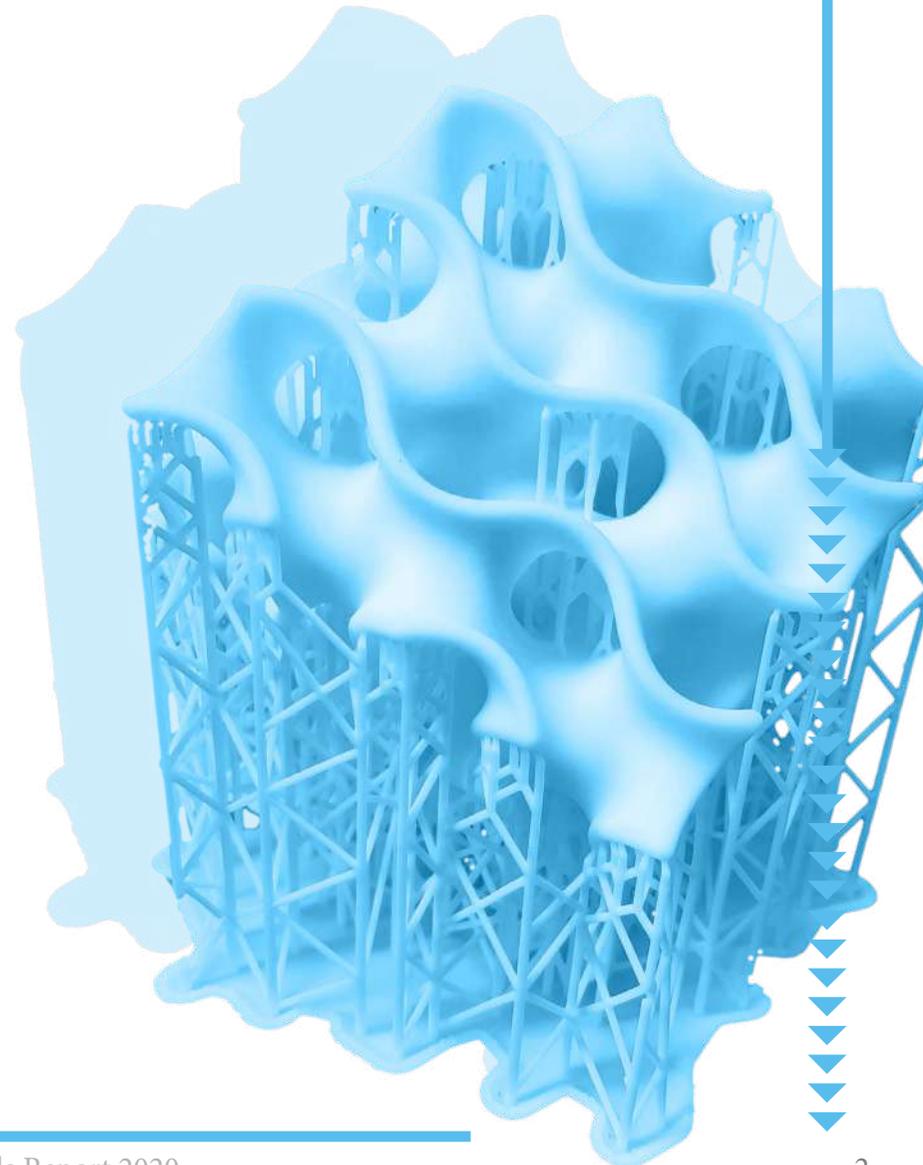
# INTRODUCTION

Welcome to the *2nd Annual Additive Post-Printing Trends Report*. PostProcess is excited to share the results of this year's one-of-a-kind industry survey.

The additive manufacturing industry is reaching an inflection point where the post-print step, also known as post-processing, is becoming more widely recognized as a critical part of the overall workflow and path to production scale adoption. Our offering of post-printing solutions that work with all print technologies allows us to be uniquely positioned to bring a comprehensive perspective of the additive post-printing market to this report.

Expanded questions in this year's survey reveal many interesting angles to the analysis, especially when looking comparatively across 3D print technologies, markets, and post-print processes. New topics around investment decision-making and growth plans add to the dataset even further.

We're proud to put forward this year's report in the hopes that it will help the industry and end-users on their additive journey. We thank all who participated for their time and insights.



# KEY TAKEAWAYS: OVERALL TRENDS

Respondents using print technologies targeted for **PRODUCTION SCALE** reported the highest post-printing expenditures and the most labor challenges.

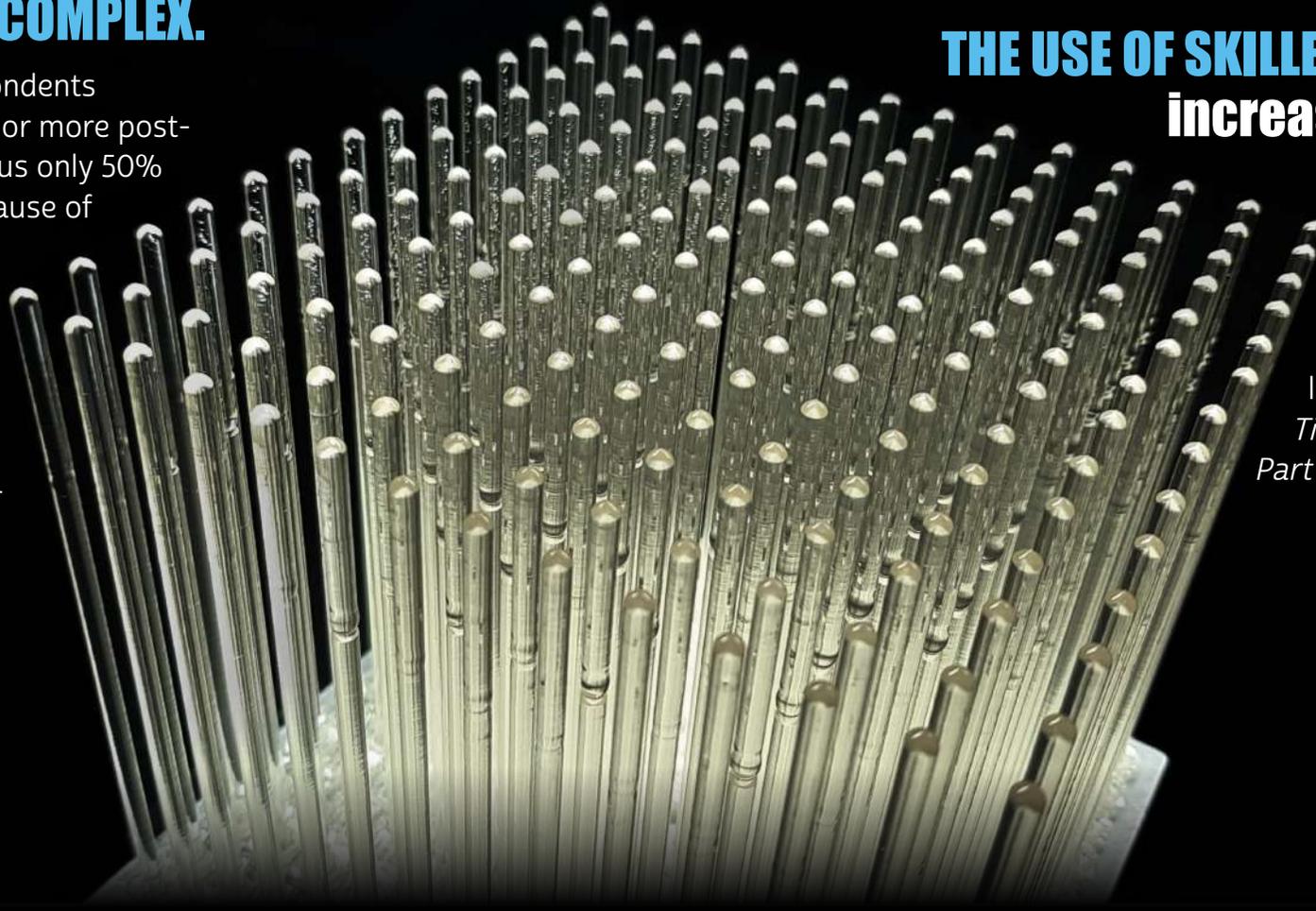
Powder Bed Fusion and Vat Photopolymerization lead the pack in scaling up to short-run production, but the post-print workflow could hamper this progress. This is where automated solutions shine.

## Post-Printing operations are getting **MORE COMPLEX**.

This year, 75% of respondents reported performing 3 or more post-printing methods, versus only 50% last year. Whether because of adding new print technologies or requiring more steps to get the desired final part, users should seek solutions that enable scalability while simplifying the process.

## THE USE OF SKILLED LABOR is an increasing concern.

This category jumped up two spots over last year in the ranking of Top Post-Printing Challenges, while *Length of Time to Finish Parts* and *Part Consistency* held their spots as the #1 and #2 selections.

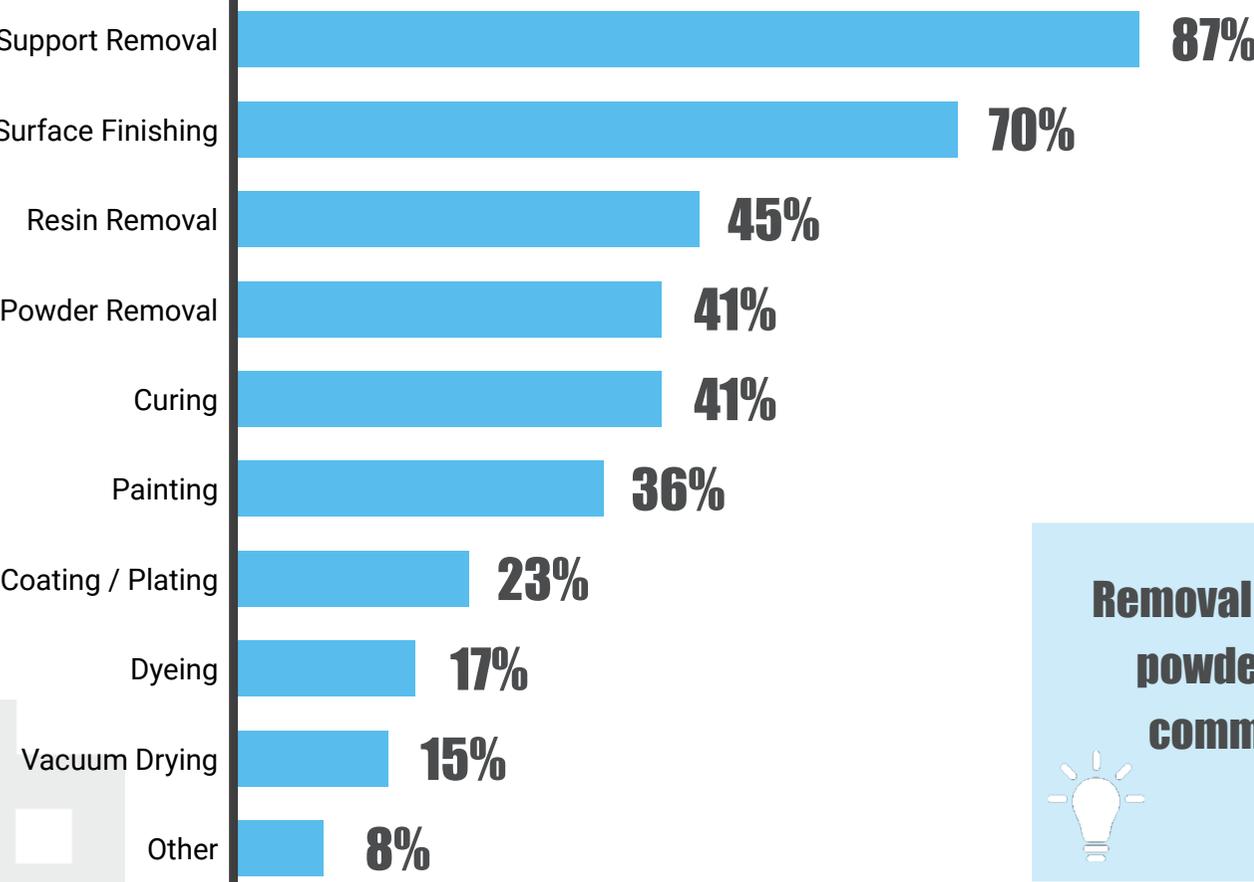


# POST-PRINT METHODS & CHALLENGES

There are a number of different post-print methods that can be utilized to achieve the desired final 3D printed part. 85% of respondents are performing 2 or more different processes in their workflow. Three-quarters of respondents are performing 3 or more processes. Support Removal and Surface Finishing combined account for near 50% of responses.

## Which of the following post-process methods does your company utilize in your operations?

Participants were able to pick multiple choices.



Overall, our respondents are tackling more post-printing methods. An increased number of processes adds complexity to manage operator skill sets with different equipment and software while still maintaining delivery of consistently high-quality parts on time and within budget.

**Removal processes - support, resin, and powder together - are still the most common post-printing operations as observed in 2019.**



# PRINT TECHNOLOGIES & MATERIALS

The health, safety, and environmental impact of additive manufacturing is usually focused on the “print” step - but what about post-printing?

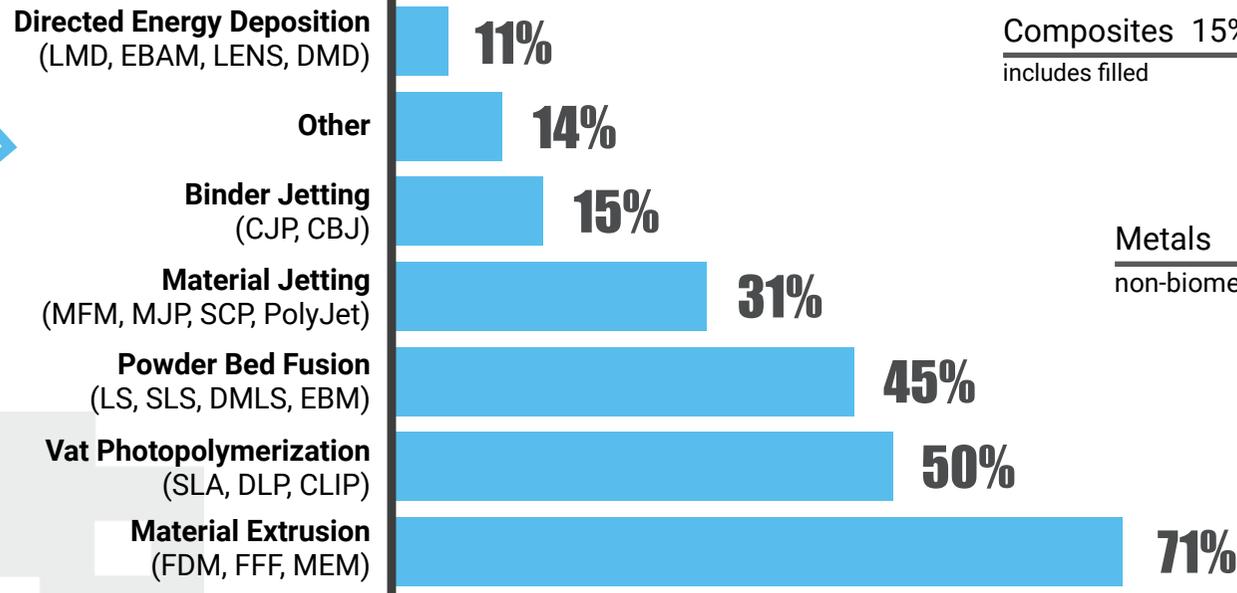
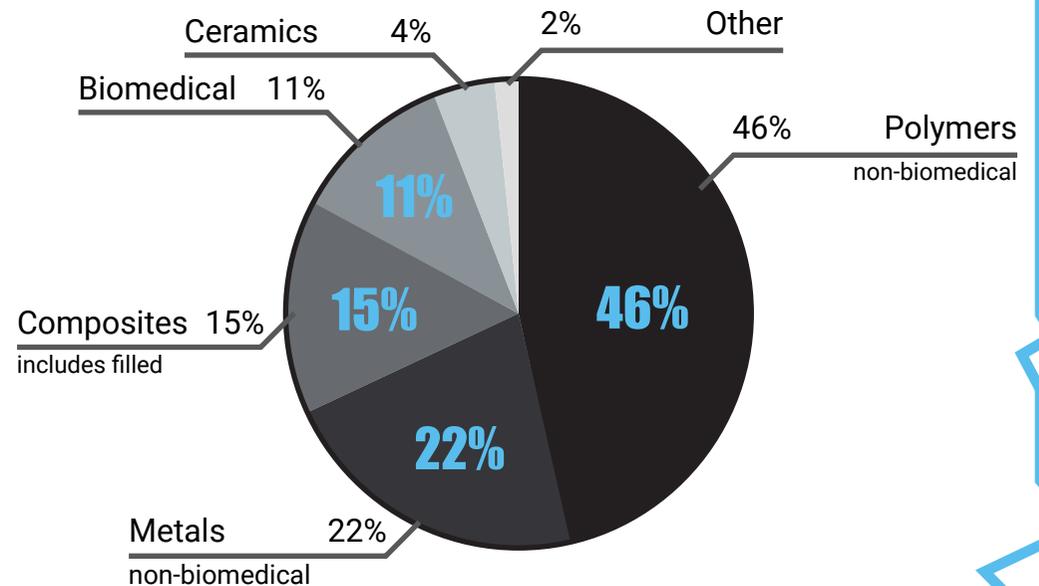
Vat Photopolymerization respondents have the highest concern for improving the health / safety / environment impact aspects of their post-printing operation, followed closely by Powder Bed Fusion respondents.

Respondents using Metals were the most likely to say their current post-print methods are a challenge to reaching their additive manufacturing goals.

**Approximately 70% of the respondents are printing two or more technologies.**



## Which materials does your company use?



Respondents are using a variety of 3D print technologies, however the top 4 technologies account for 84% of all responses. For Powder Bed Fusion, there were an equal number of respondents printing metal vs. polymers.



Respondents using **MATERIAL EXTRUSION**, such as FDM, have the most difficulty with **DAMAGED PARTS**.

Traditional methods of manually removing supports and sanding, as well as dunk tanks that can warp parts, are a possible culprit.

While **LENGTH OF TIME** is the biggest post-print pain point across all technologies, it is reported most often by **MATERIAL JETTING** respondents.

Approximately 3 out of 4 using Material Jetting said the length of time to finish parts is a problem. This is most likely attributed to the fact that traditional methods to complete required support removal have been a one-at-a-time manual process.

**POWDER BED FUSION** and **VAT PHOTOPOLYMERIZATION** report the most issues with using **SKILLED LABOR** for post-printing.

With these print technologies nearest to production scale adoption, this would be an obvious concern as labor-intensive post-printing operations are not sustainable for higher volumes.

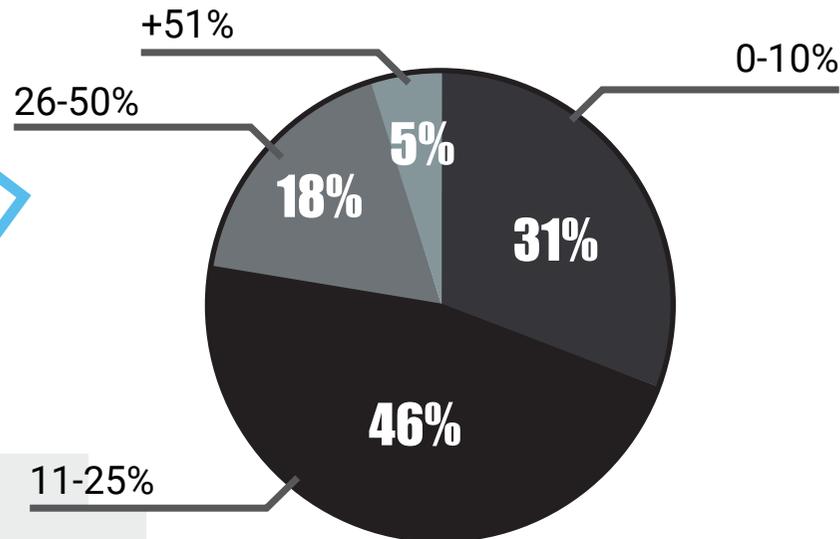
**KEY  
TAKEAWAYS**



While the number one reported post-print pain point is Length of Time to Finish Parts, the analysis for each of the top 4 print technologies individually reveals unique opportunities to help relieve the post-print bottleneck.

Material Extrusion	Material Jetting	Powder Bed Fusion	Vat Photopolymerization
<b>#1 Challenge</b> Length of Time to Finish Parts	<b>#1 Challenge</b> Length of Time to Finish Parts	<b>#1 Challenge</b> Throughput Limitations	<b>#1 Challenge</b> Skilled Labor Being Used
<b>#2 Challenge</b> Damaged Parts	<b>#2 Challenge</b> Consistency	<b>#2 Challenge</b> Skilled Labor Being Used	<b>#2 Challenge</b> Damaged Parts
<b>#3 Challenge</b> Consistency	<b>#3 Challenge</b> Damaged Parts	<b>#3 Challenge</b> Damaged Parts	<b>#3 Challenge</b> Throughput Limitations

### What percentage of your additive operation expenditure is allocated to post-printing?

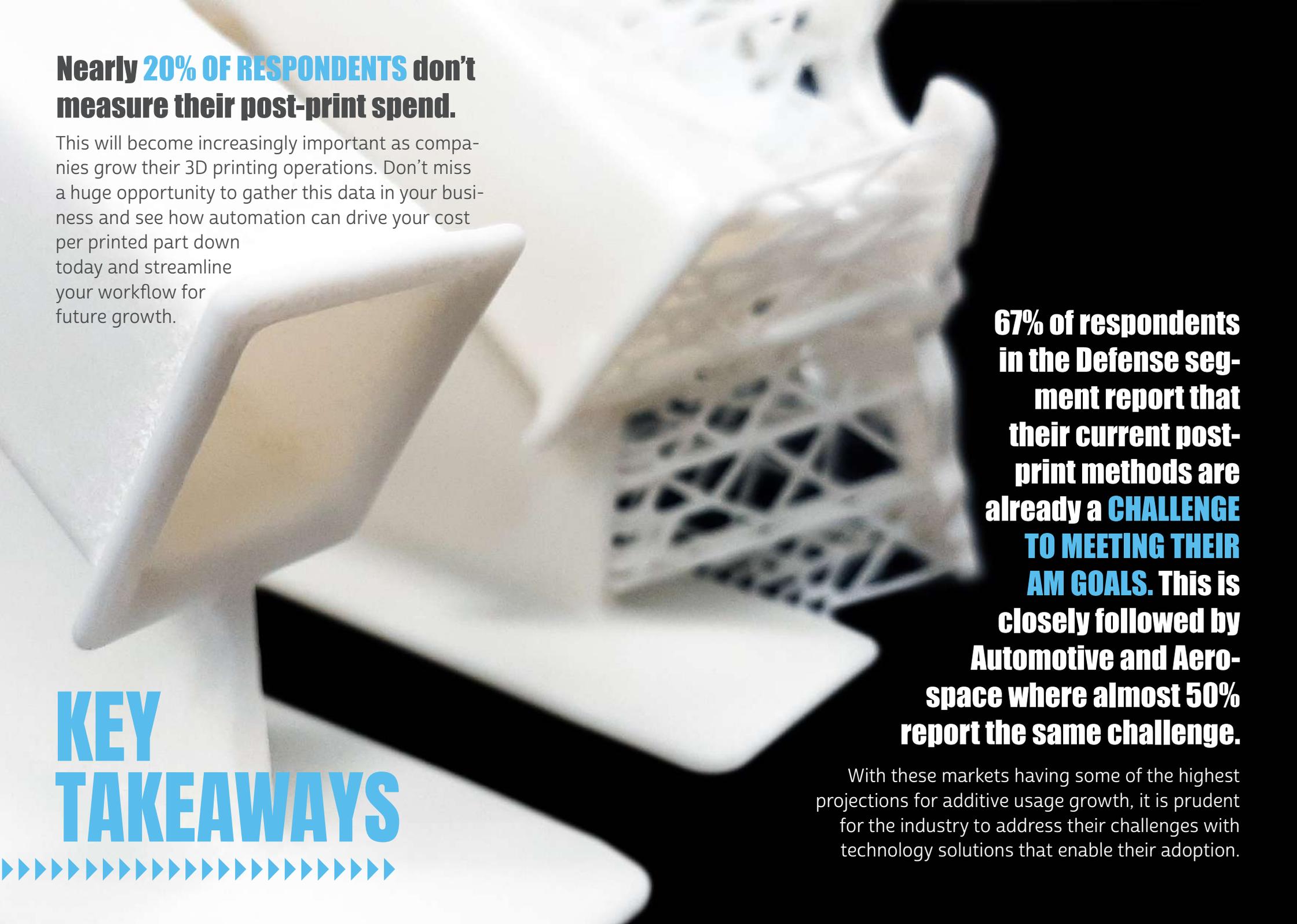


When asked to define their post-print expenditure as a part of their total additive operation, the majority who responded chose the 11-25% range. However, when this same data is broken down by print technology:

- Vat Photopolymerization has the highest contribution to the 51%+ expenditure category
- Powder Bed Fusion has the highest contribution to the 26-50% expenditure category

When looking at post-print expenditure by the end market, Automotive reported the highest percentage of respondents selecting the +51% category, at about two times that of any other market.

# TOP POST-PRINTING CHALLENGES & EXPENDITURES



**Nearly 20% OF RESPONDENTS don't measure their post-print spend.**

This will become increasingly important as companies grow their 3D printing operations. Don't miss a huge opportunity to gather this data in your business and see how automation can drive your cost per printed part down today and streamline your workflow for future growth.

**KEY  
TAKEAWAYS**



**67% of respondents in the Defense segment report that their current post-print methods are already a CHALLENGE TO MEETING THEIR AM GOALS. This is closely followed by Automotive and Aerospace where almost 50% report the same challenge.**

With these markets having some of the highest projections for additive usage growth, it is prudent for the industry to address their challenges with technology solutions that enable their adoption.

# LOOKING AHEAD: SCALABILITY

The ratio of respondents who expect to shift their mix of Prototyping to Production in the next 3-5 years was consistent over last year's survey.

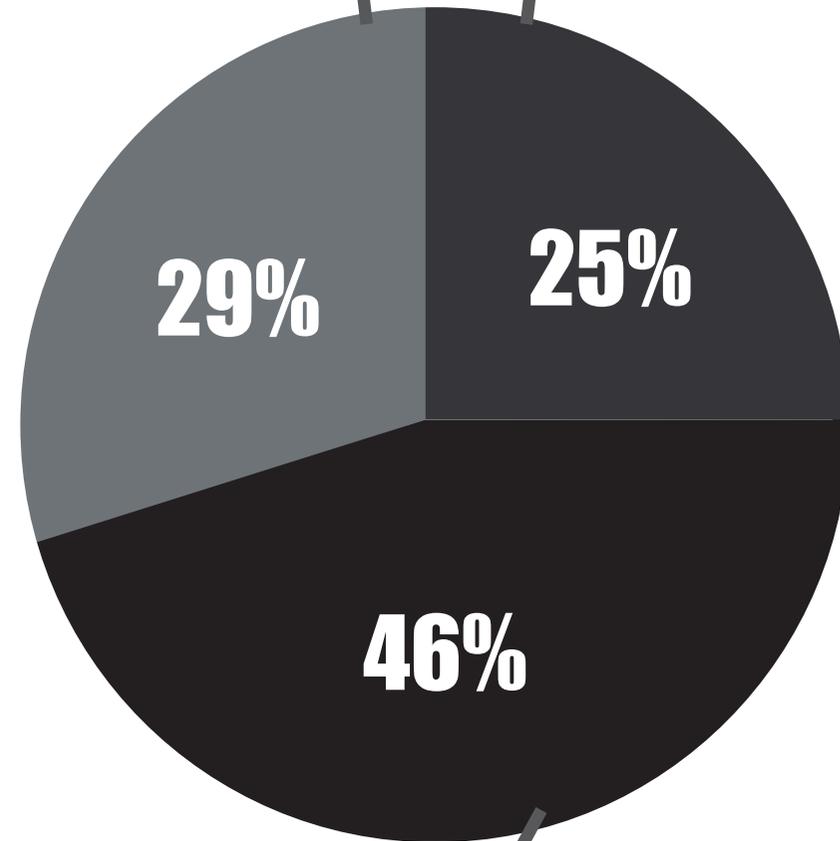
However, we added a new element to the report this year for respondents to reflect on their future plans. We asked how their post-printing operations are supporting or inhibiting their goals. Only 25% say today's methods are acceptable for what they have planned.

When analyzed by specific print technology:

- Powder Bed Fusion users have the highest prevalence of saying their post-print methods are already a challenge today, independent of using Metal or Polymer materials.
- For the remaining top 3 print technologies (Vat Photopolymerization, Material Jetting, and Material Extrusion) most users say post-print methods may be acceptable today but will be a challenge in the future.

Current methods are a challenge today

Current methods are acceptable for today and foreseeable future



Current methods are acceptable for today but will become a challenge in the future

**Improving end part quality is the #1 priority for most markets, but none as dramatically as for Medical users, with 93% of Medical respondents indicating it is a primary consideration.**

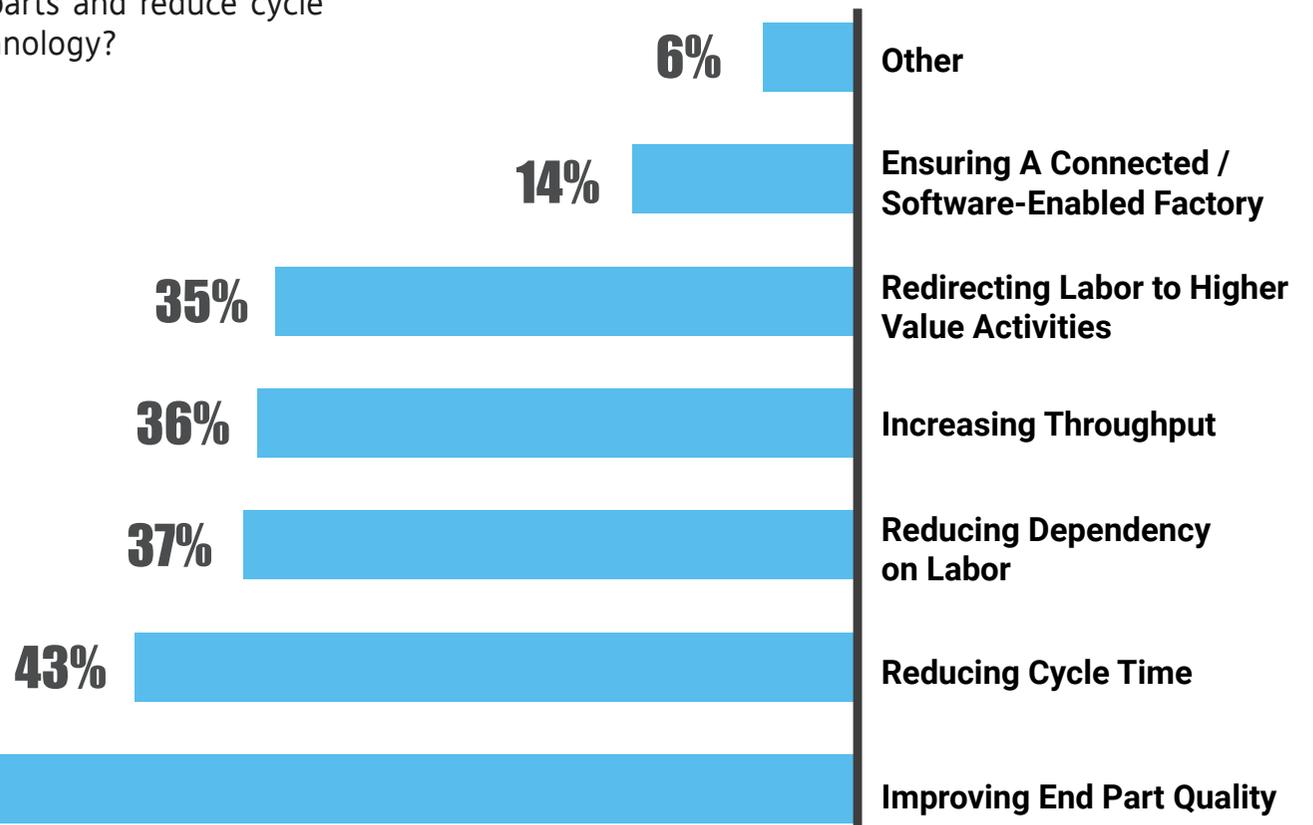


# LOOKING AHEAD: Investment

**What are the primary considerations that shape the decision to invest in post-printing technology at your organization?**

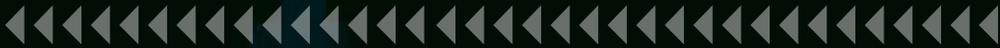
Respondents across the board are looking for their 3D post-printing investments to deliver high-quality parts and reduce cycle times. But what about each unique print technology?

- Powder Bed Fusion - this group has the most interest in a connected / software-enabled factory
- Material Extrusion - 75% of respondents are looking for improved end part quality, with the other options to a much lesser degree
- Material Jetting - Quality, time, and throughput all are near equal top choices for more than 50% of users
- Vat Photopolymerization - after part quality, these respondents are most interested in solutions that will decrease their dependence on labor

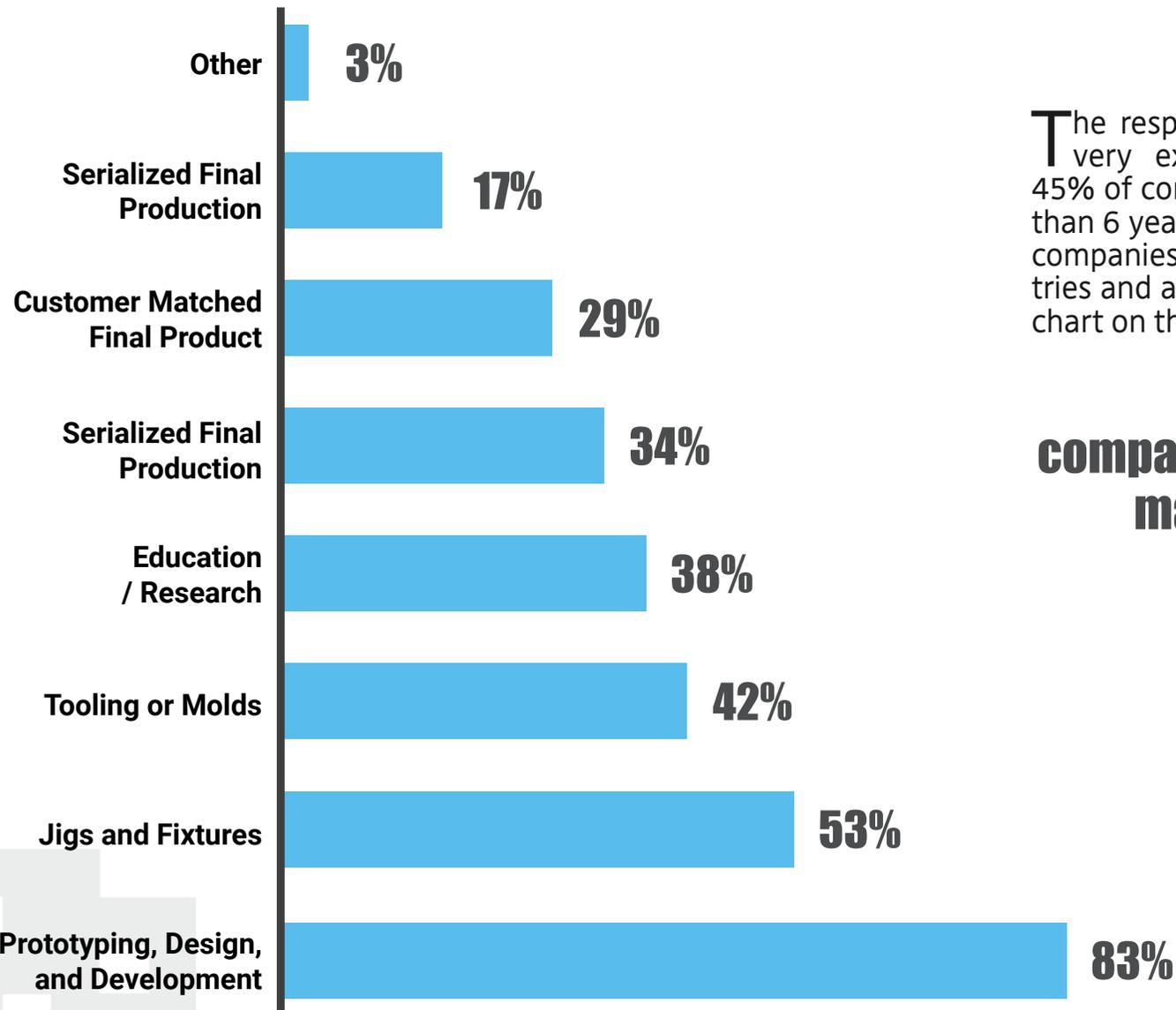


**79%**

# APPENDIX: MEET OUR RESPONDENTS



## How does your company currently utilize additive manufacturing/3D printing?



# DEMOGRAPHICS: COMPANIES

The respondents' companies are largely already very experienced in additive manufacturing. 45% of companies have been utilizing AM for more than 6 years, and 73% for more than 3 years. These companies represent more than 10 different industries and a variety of applications as outlined in the chart on the left.

## Which best describes your company's current use of additive manufacturing / 3D Printing?



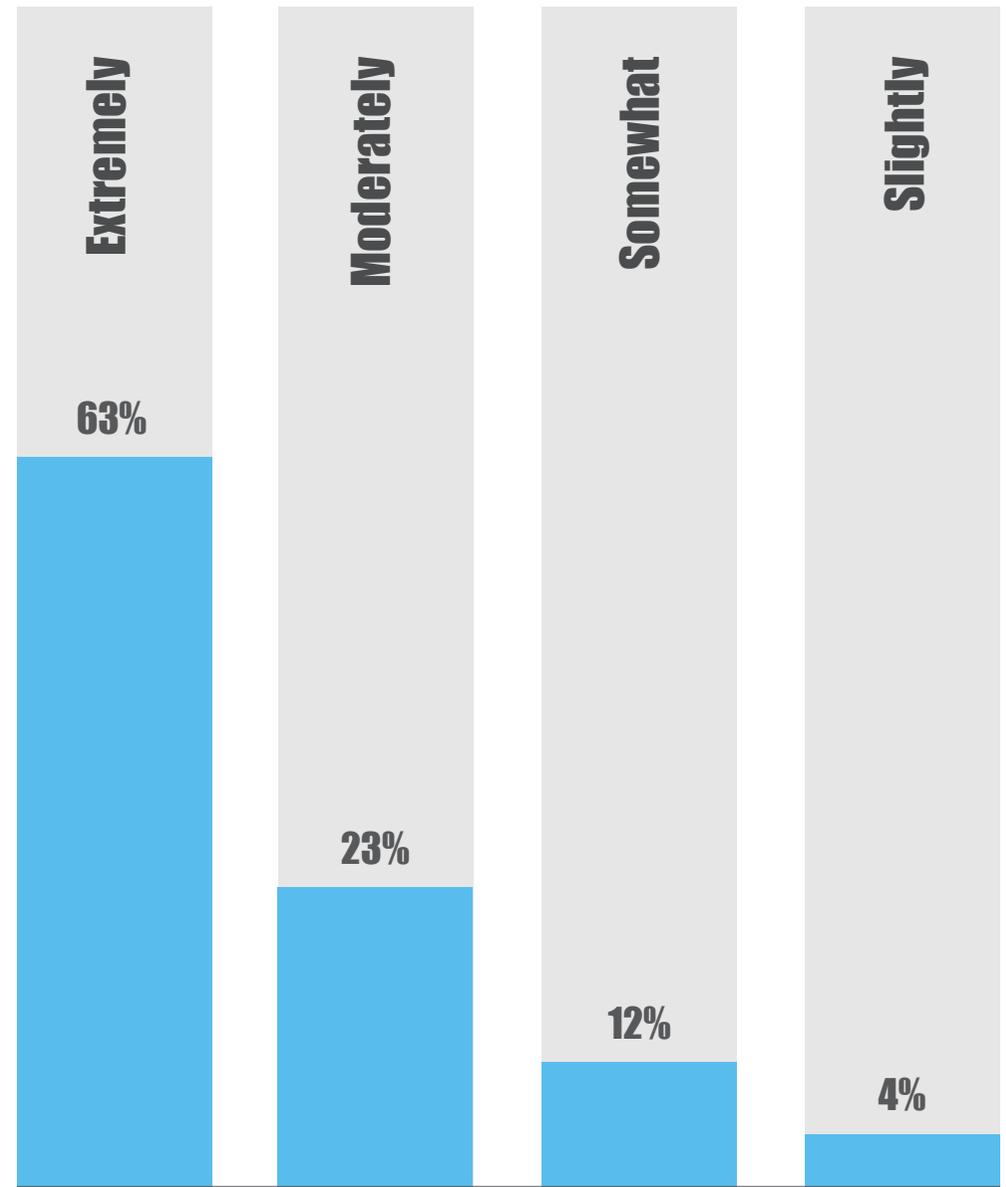
# DEMOGRAPHICS: Respondents

The vast majority of respondents are highly qualified to be assessing their company's post-printing, with almost 85% extremely or moderately familiar with their methods.

In terms of personal experience in additive manufacturing, the group was split approximately 50% more than 5 years and 50% less than 5 years. 80% of the respondents are in Manufacturing, Engineering, R&D, or Owner / Management / Executive positions. The Engineering category had the largest response at 36% of the total.

Respondents' geographic location was recorded as 53% in North America, 30% in EU and Russia, and Asia and India accounting for the bulk of the remainder.

## How familiar are you with your company's additive manufacturing post-printing methods?





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