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JABIL

3D PRINTING TECHNOLOGY TRENDS

JULY 2023

A Survey of Additive
Manufacturing
Decision-Makers



In the ever-evolving landscape of modern technology, breakthroughs such as artificial intelligence and cloud computing have revolutionized the way businesses function, paving the way for unprecedented levels of efficiency and productivity. Standing tall among these groundbreaking innovations is additive manufacturing – a game-changing technique that has firmly established itself as an indispensable asset within the manufacturing arena. As 3D printing technology advances at a rapid pace, it persistently redefines the boundaries of production capabilities, delivering increasingly remarkable results with each passing day.

Since 2017, our biennial survey of additive manufacturing decision-makers has assessed the industry's pulse and its far-reaching implications on the manufacturing sector. The findings consistently indicate that additive manufacturing continues to flourish, playing a pivotal role in designing and producing goods. Confidence in 3D-printed products has surged among manufacturers, underscoring the myriad advantages offered by this cutting-edge technology.

Predominantly employed in prototyping and design, 3D printing is expected by decision-makers across various job levels to expedite product delivery. Furthermore, custom-engineered materials are gaining traction, with two thirds of respondents integrating them into their production processes. These specially designed materials cater to unique customer requirements, product specifications, and sustainability initiatives. Additive

manufacturing's inherent versatility continues to lay the foundation for these ongoing and future developments.

Sponsored by Jabil, this report presents the findings from a survey of 200 mid-to-senior level decision-makers who oversee additive manufacturing within their organizations. In partnership with SIS International Research, we have gleaned valuable insights on additive manufacturing from leading companies, covering aspects such as the current state of 3D printing, challenges, preferred materials, future plans, and expectations surrounding the technology. Notably, 65% of participants make critical decisions for companies boasting over \$5 billion in annual revenue, which skews the average demographic of survey respondents compared to earlier studies sponsored by Jabil. This discrepancy may have impacted the year-over-year results of certain questions.





Key Findings

Current Direction and Expectations of 3D Printing

- Prototyping remains the predominant use of additive manufacturing for the majority of those surveyed, but since 2017, there has been continued growth in the use of 3D printing for production parts (**67% of 2023 respondents**), bridge production (**59%**), and jigs, fixtures, and tooling (**58%**).
- Companies with **more than 100 3D printers** are more likely to use the technology to repair products.
- **96%** of participants use in-house 3D printing, but outsourcing is still typical, especially with additive networks and contract manufacturers.
- Prototyping is also widely recognized as the area most significantly benefited by additive manufacturing (**selected by 96% of respondents**), followed by design (**52%**) and small-scale production (**27%**).
- **Seven in 10 decision-makers** expect moderate growth of 3D printing for their company in the next two to five years, in contrast to significant growth reported in previous surveys.
- **97%** of participants say that their organization uses 3D printing to produce functional or end-use parts.
- **74%** of the survey participants printed at least 10,000 parts last year, while **36%** polled printed up to 100,000 parts in that same timeframe.
- While participants aren't as bullish on overall 3D printing industry growth, **they are expecting larger growth** in the use of 3D printing for production parts or goods in the next three to five years.





Key Findings
Current Direction
and Expectations
of 3D Printing
Continued

- Issues with the cost and availability of materials are extremely prevalent, noted by **85%** of decision-makers, increasing **31%** from 2021.
- Material costs mentioned as a financial barrier to additive manufacturing rose from **18%** to **79%** since the 2021 survey.
- In addition to material costs, processing and system equipment costs are all **significant challenges organizations face**.
- While almost all respondents described the expected benefits of 3D printing, the most frequent benefit discussed was **faster part delivery timelines**.
- More than half of those surveyed (**55%**) say that their company's top leadership recognizes additive manufacturing as a strategic capability.





Key Findings

Additive Manufacturing Material Preferences and Outlook

- Plastics/polymers remain the leading materials used in additive manufacturing among **97%** of those polled.
- Between plastics and metals, **two thirds of participants** indicate their company uses plastics most often.
- Almost all (**96%**) respondents said their organization would want to use metal additive materials if certified versions were available at a reasonable cost, followed closely by plastics/polymers (**88%**).
- Two thirds of participants say that their organizations utilize **custom-engineered materials**.
- **Nine in 10 participants** say the biggest additive manufacturing materials challenge they face is that the materials they need are not available.
- Only **27%** of the participants say it takes too long to develop the materials they need, representing a sharp decrease from the 2021 survey.



*As you review the results, please keep in mind that not all percentages may add up to 100 due to rounding.



Current Direction and Expectations of 3D Printing

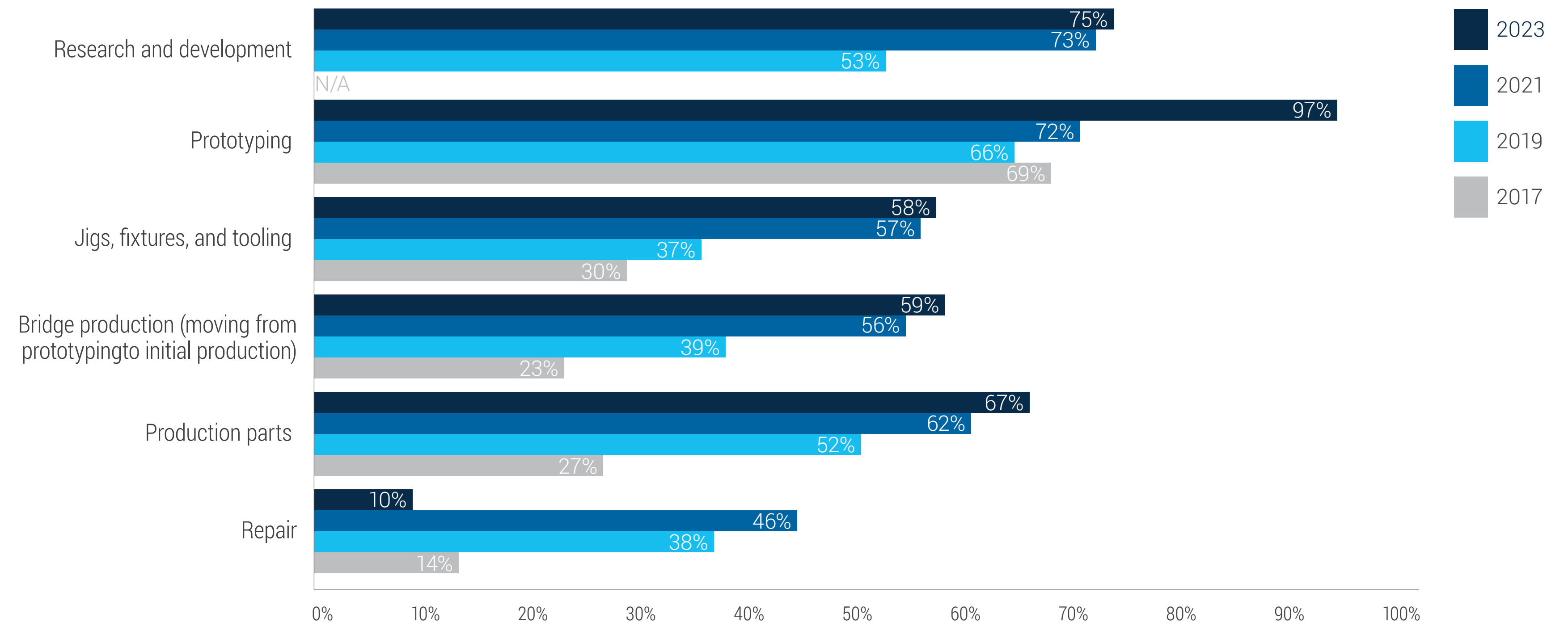


Prototyping Remains Primary Use Case, Other Functions Considerably Increase

Prototyping continues to be a central application of 3D printing in organizations, with its usage growing rapidly since the previous survey. Additionally, there has been a significant increase in the number of companies employing additive manufacturing for production parts since 2017. Concurrently, the use of jigs, fixtures, and tooling has nearly doubled. However, there has been a considerable decline in using additive manufacturing for product repairs, which could potentially be due to changes in the demographics of survey participants.

In what ways is your company **currently using** 3D printing?

Choose all that apply.

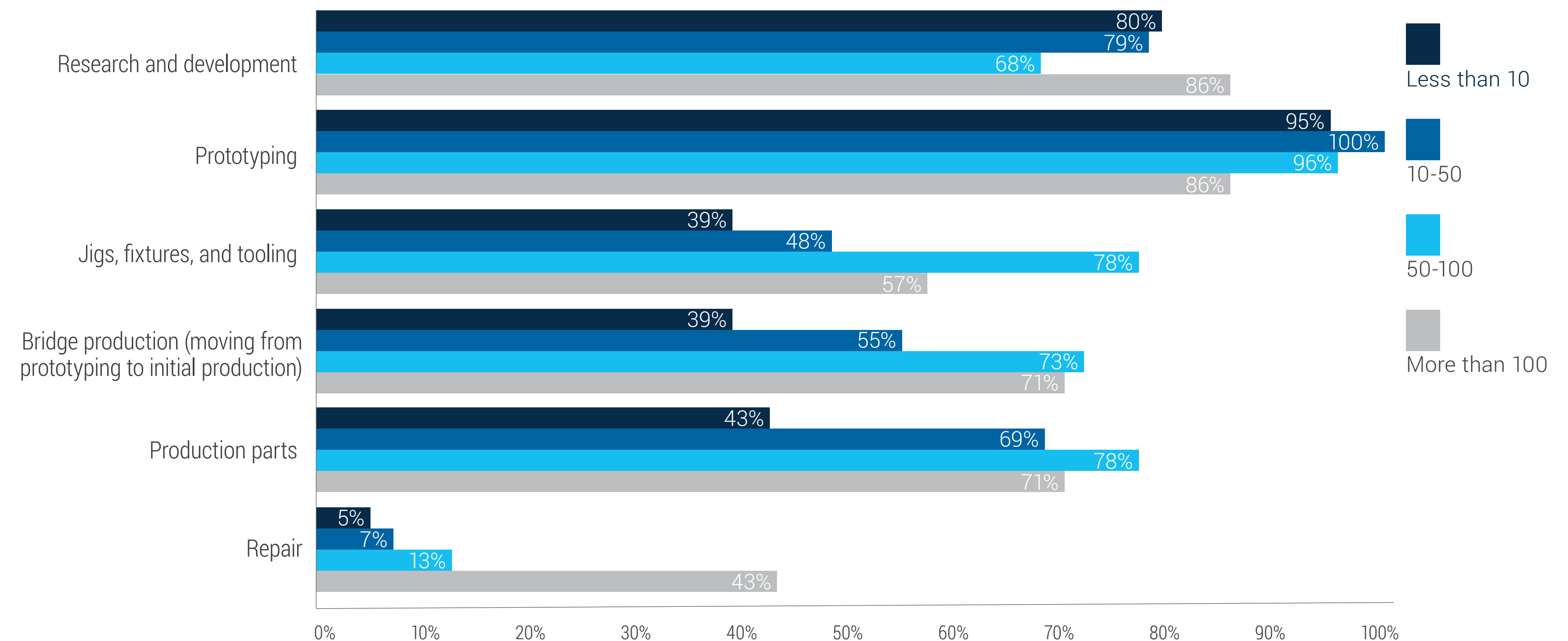


Companies with 100+ 3D Printers are More Likely to Repair Products with Additive Manufacturing

No direct relationship exists between the quantity of 3D printers a company possesses and its application of additive manufacturing. It is natural for organizations with fewer than 10 printers to mainly focus on R&D and prototyping. The most significant variation is observed in product repairs using additive manufacturing. For this purpose, 43% of companies with over 100 printers employ them, which is considerably higher than the 13% of companies with 50 to 100 printers — the next highest group.

In what ways is your company **currently using** 3D printing?

Choose all that apply. (By number of 3D printers)

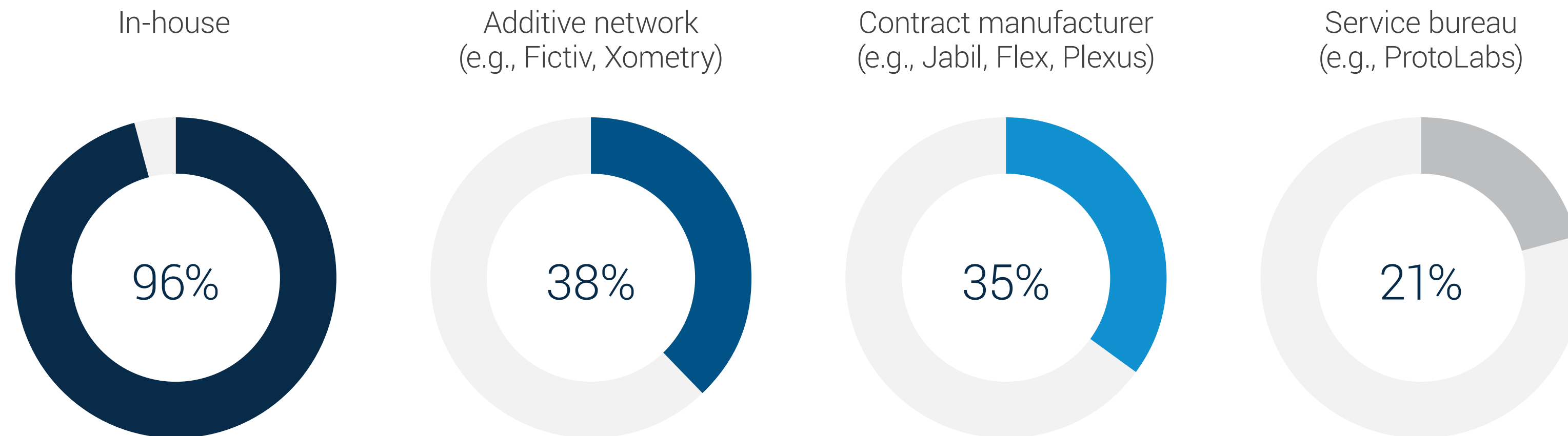


Almost All Have In-House Printers

Almost all respondents (96%) reported that their companies utilize in-house 3D printers. The most popular outsourcing option was to depend on an additive network, which over one third of survey-takers communicated was an alternative their organizations use. However, participants also reported comparable use of contract manufacturers, while 21% of those polled use service bureaus.

Where does your company conduct 3D printing today?

Choose all that apply.

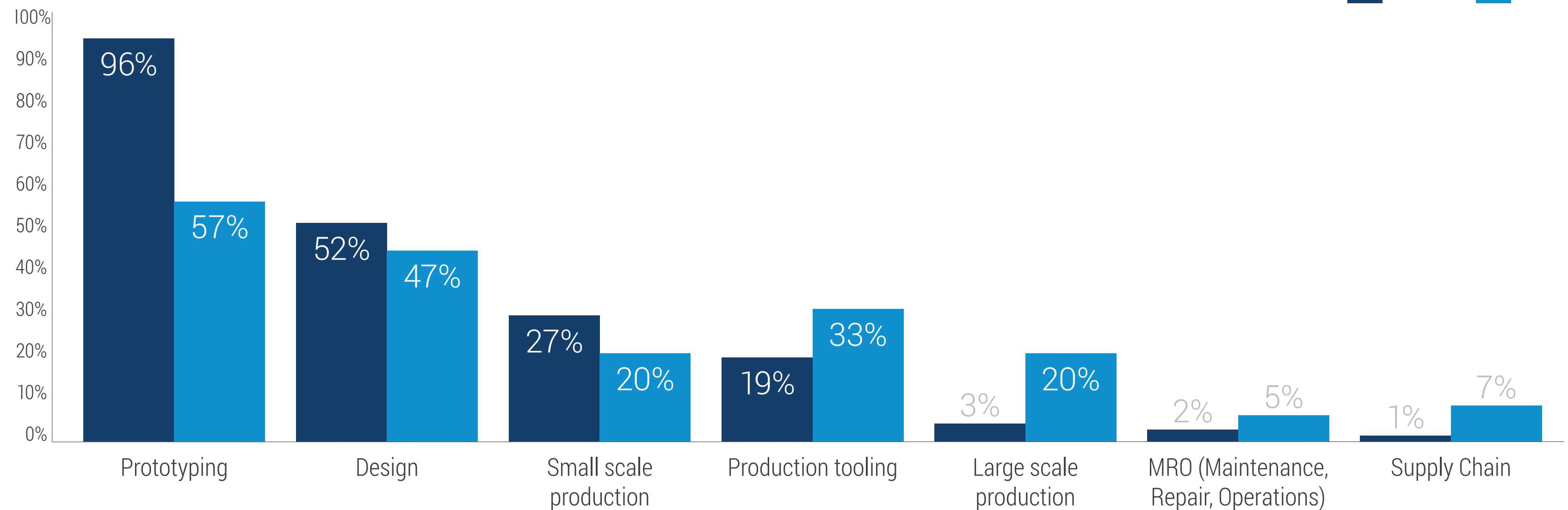


Additive Manufacturing Has the Greatest Positive Impact on Prototyping

As anticipated and in line with general research, prototyping is the product lifecycle stage that has experienced the most significant positive impact from additive manufacturing, with over half of the respondents (52%) also mentioning its influence on design. The design process has undergone a revolution due to the adoption of additive manufacturing, which offers increased flexibility and enables designers to explore possibilities beyond digital models. 3D printing allows for the creation of custom parts that combine multiple traditional components, thereby reducing the number of parts needed. Furthermore, additive manufacturing streamlines and accelerates many of the early stages in the product lifecycle, helping companies move to large-scale manufacturing and commercialization faster.

What part of the **product lifecycle** is the most positively impacted by 3D printing?

Choose up to two of the following.

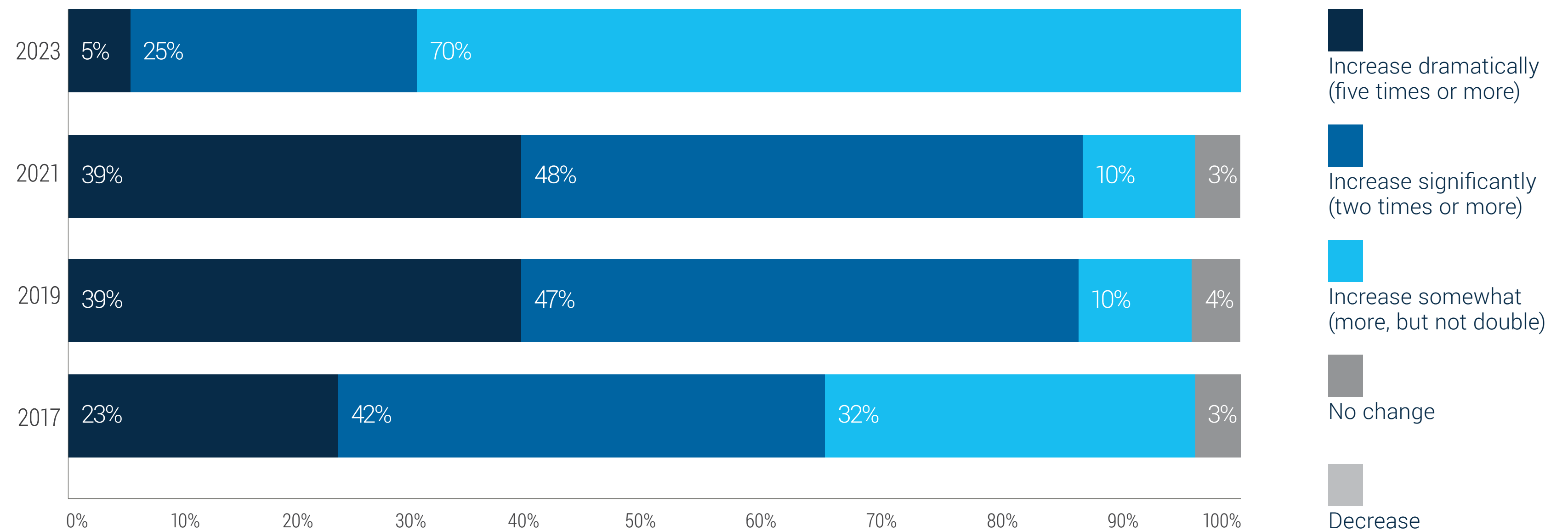


Majority of Decision-Makers Expect Moderate Growth

In 2023, there has been a noticeable change in expectations, as the majority of respondents foresee a moderate increase in the utilization of additive manufacturing within their organizations. This outcome contrasts with previous results, which typically predicted substantial and rapid growth. The shift in expectations could be attributed to the widespread adoption and proficiency in 3D printing, leading decision-makers to become more aware of the technology's potential. As organizations become familiar with 3D printing, the once dramatic expectations have transformed into actual achievements, resulting in more tempered projections. However, it is worth noting that no decision-maker expects a decline or stagnation in the growth of additive manufacturing.

How do you expect your company's use of 3D printing to change in the coming **two to five years**?

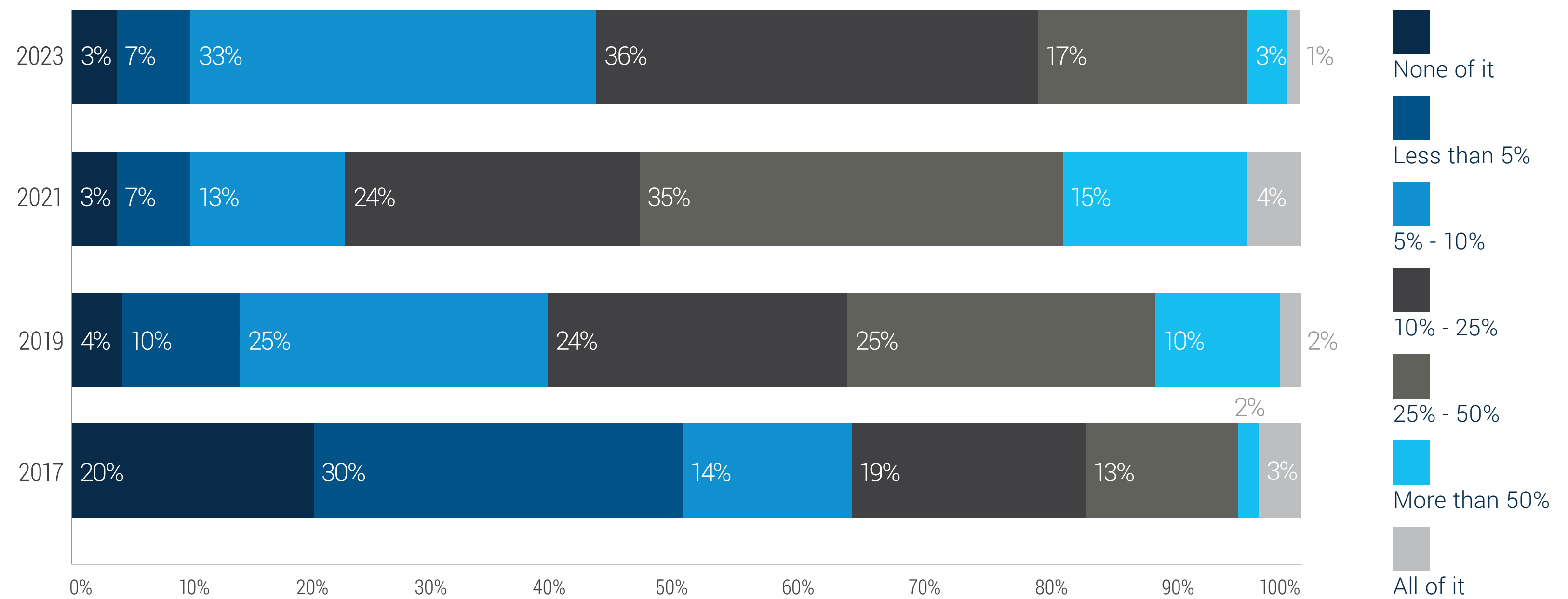
Choose the answer that most closely applies.



Almost All Companies Use 3D Printing for End-Use Parts

An impressive 97% of survey participants said their companies employ additive manufacturing to create functional or end-use parts. Most use 10% to 25% of their 3D printing capacity for producing these end-use components. This demonstrates the critical role 3D printing plays in the product lifecycle, as it is now widely used to create final products or end-use parts.

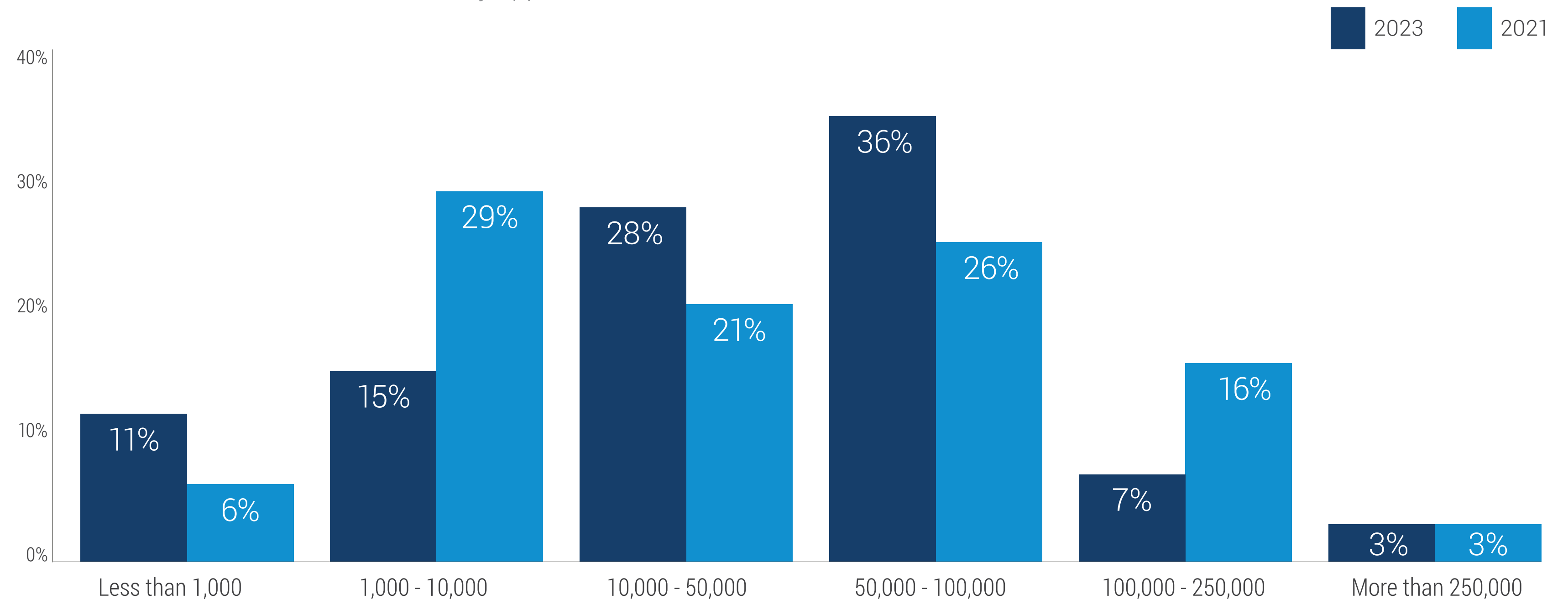
Approximately what percentage of your 3D printing is currently producing **functional** or **end-use parts**?



A Majority of Companies Produce More Than 10,000 Parts

Almost three quarters of participants' companies generated over 10,000 parts last year. Most commonly, respondents reported that their organization produced 50,000 to 100,000 parts (36% of participants). Only 11% of participants said they produced fewer than 1,000 parts last year.

In the last year, approximately **how many parts** has your company produced using 3D printing?
Choose the one answer that most closely applies.



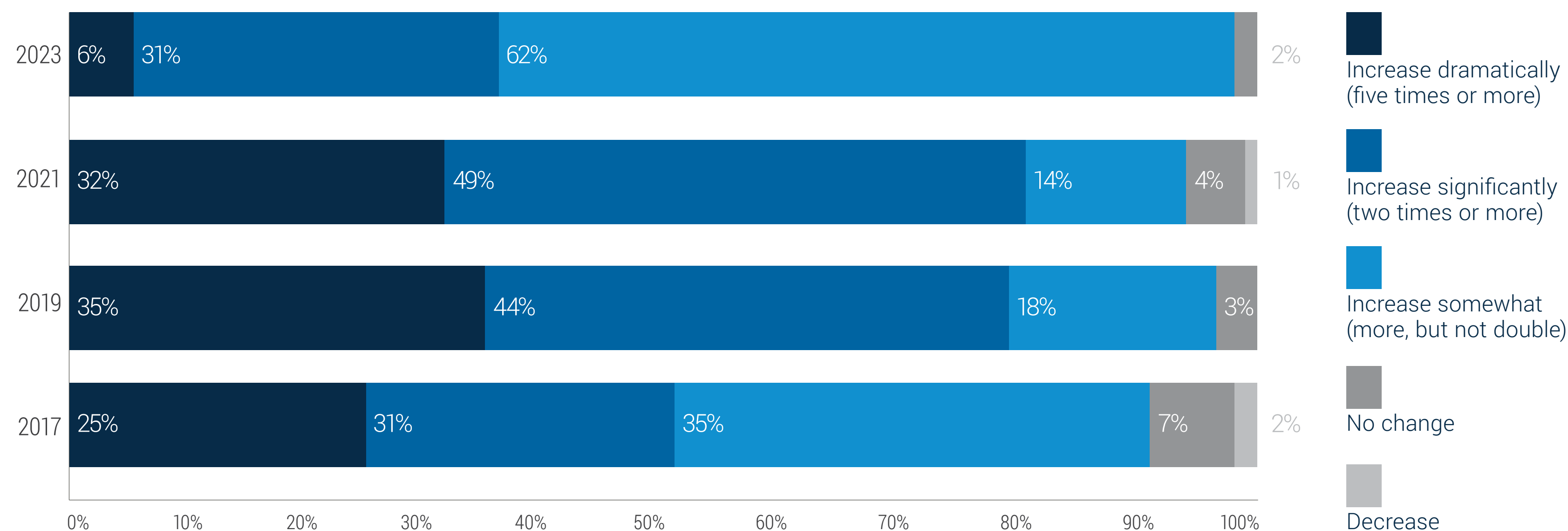


Respondents Have Modest Expectations for the Production of Parts and Goods With 3D Printing

Approximately 62% of survey participants anticipate a moderate increase in their organizations' application of additive manufacturing for part or product production in the coming years. This expectation aligns with the respondents' expectation of modest growth in additive manufacturing use overall within their companies. The reason behind this might be the current stable adoption of 3D printing, which could diminish the likelihood of rapid expansion. Still, nearly all respondents expect their companies will increase the use of 3D printing for part and good production, with 37% anticipating significant or dramatic growth.

How do you expect your use of 3D printing for production of parts or goods to change in the coming **three to five years**?

Choose the answer that most closely applies.



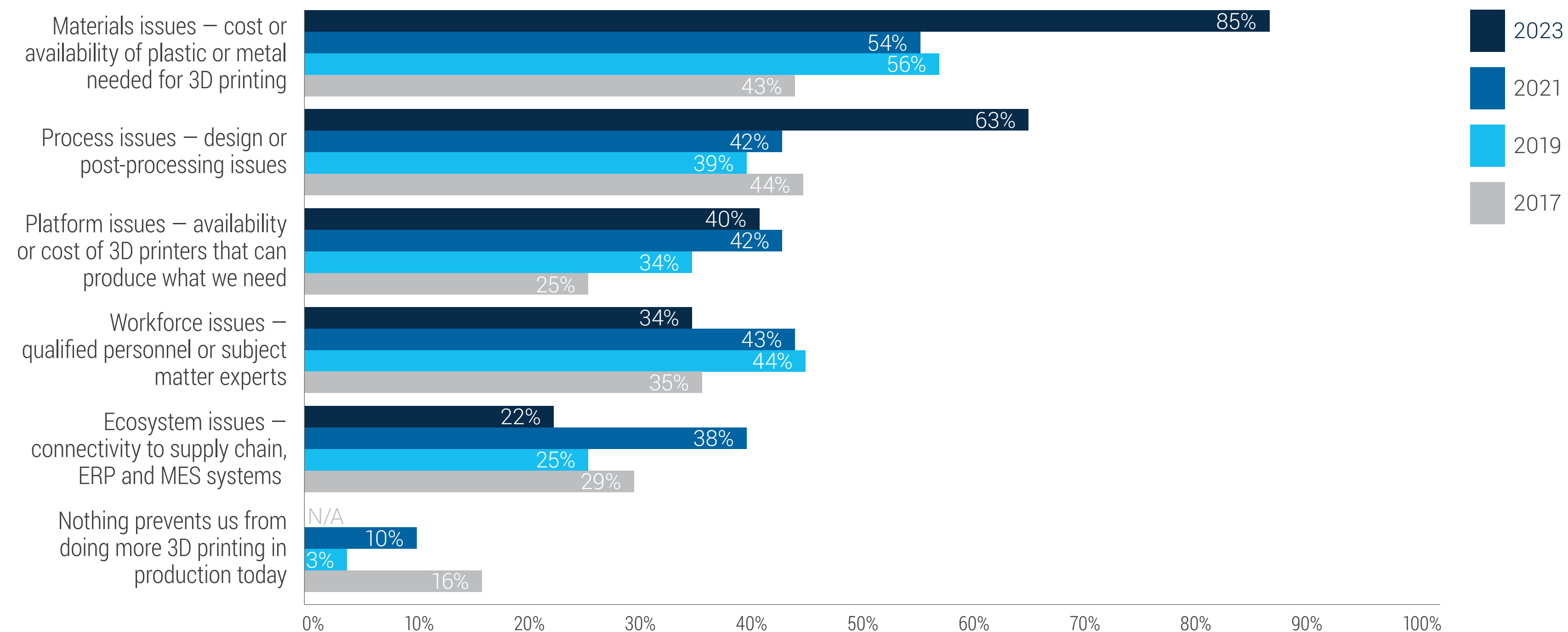


Material Cost, Availability Cause Significant Issues in the 3D Printing Process

A substantial rise in material-related issues has been observed in the additive manufacturing process, with 85% of decision-makers stating that such problems hinder their companies from increasing 3D printing production. This can be ascribed to the growing demand for 3D printing materials, which is not being met by a corresponding increase in supply. Consequently, this imbalance has led to a sharp spike in concerns about escalating costs and unavailability of materials. Furthermore, there has been a marked increase in process-related issues, which have risen by 21% since 2021.

What prevents your company from doing more 3D printing in production today?

Choose all that apply.

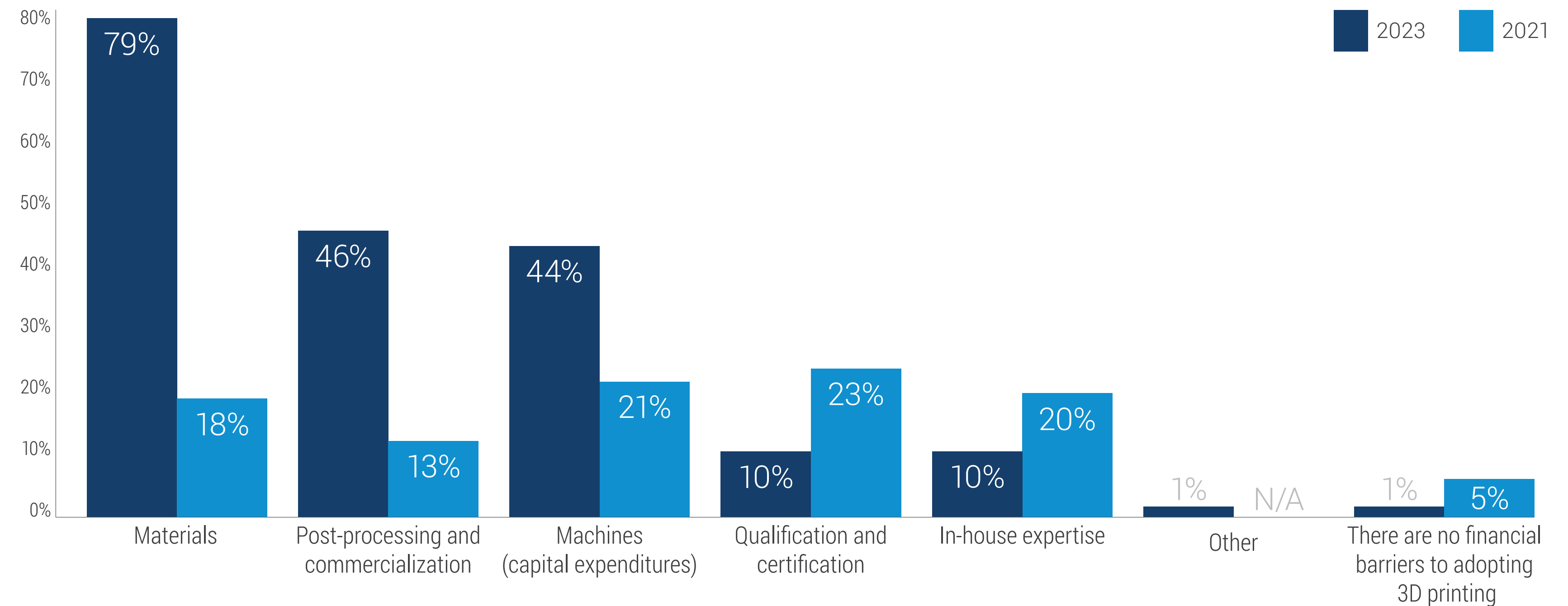


Issues with Materials Deter Decision-Makers

Material costs present a significant financial obstacle for companies aiming to expand their 3D printing capabilities. This issue is the foremost concern, identified by 79% of survey participants. In fact, this challenge has grown substantially between 2021 and 2023. Additionally, concerns related to machinery or capital expenditures have doubled.

Which of the following causes the **primary financial or cost barrier** to adopting 3D printing at your company?

Choose up to two of the following.



Costs Pose Greatest Challenges for Companies

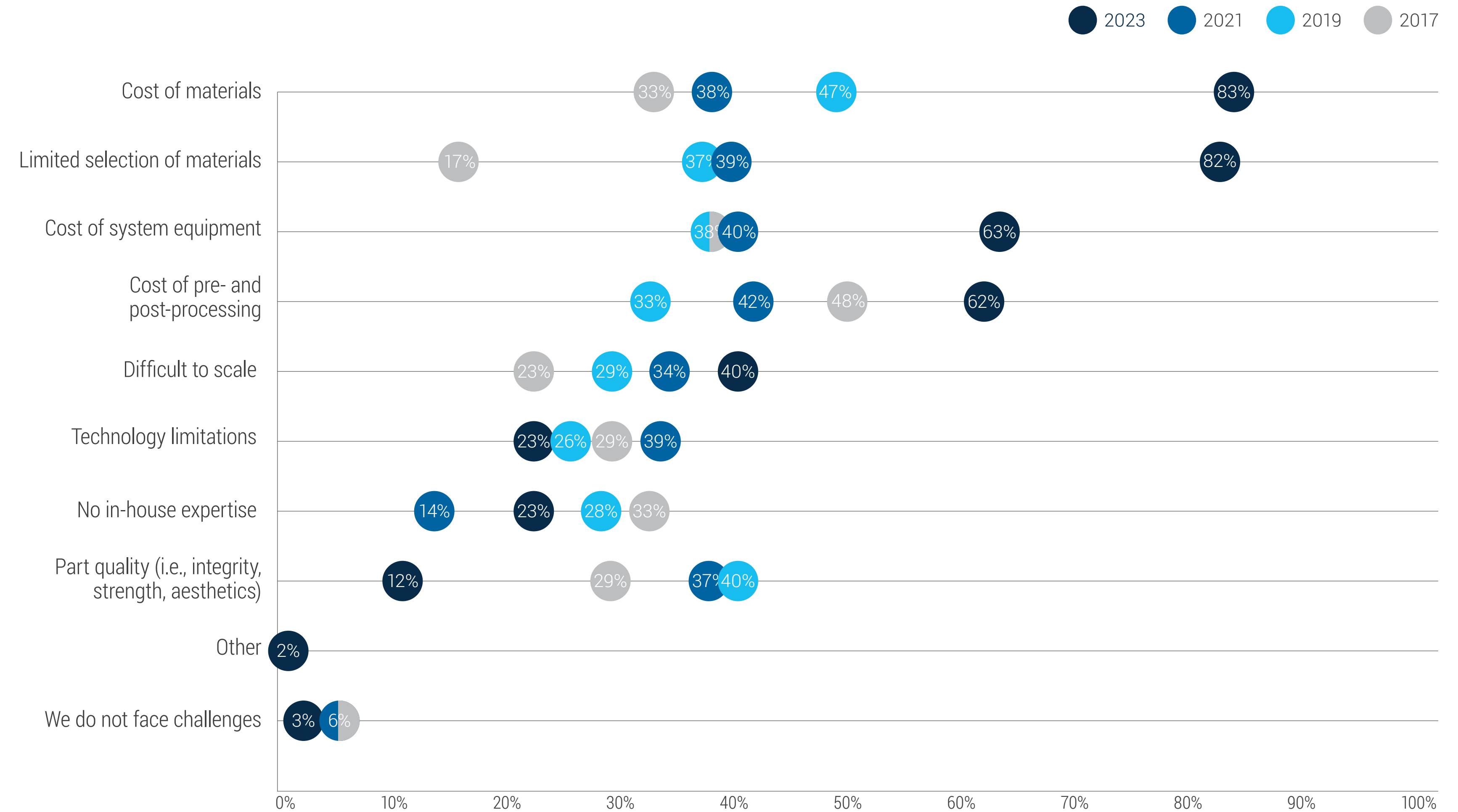
Financial barriers, such as material expenses, processing charges, and system equipment costs, have been identified as significant 3D printing challenges for businesses. The issue of rising costs and a restricted range of materials is consistently highlighted as a critical concern for decision-makers throughout the report. There was a considerable 43% increase in the number of respondents facing a limited selection of materials since 2021, a potential consequence of material shortages.

On a brighter note, companies have experienced notable advancements in innovation. For example, technology limitation challenges have decreased by 16% since 2021, and part quality issues were reported by only 12% of respondents, compared to 37% in 2021. These developments suggest enhancements in technology and the dependability of 3D printed components.

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Costs Pose Greatest Challenges for Companies

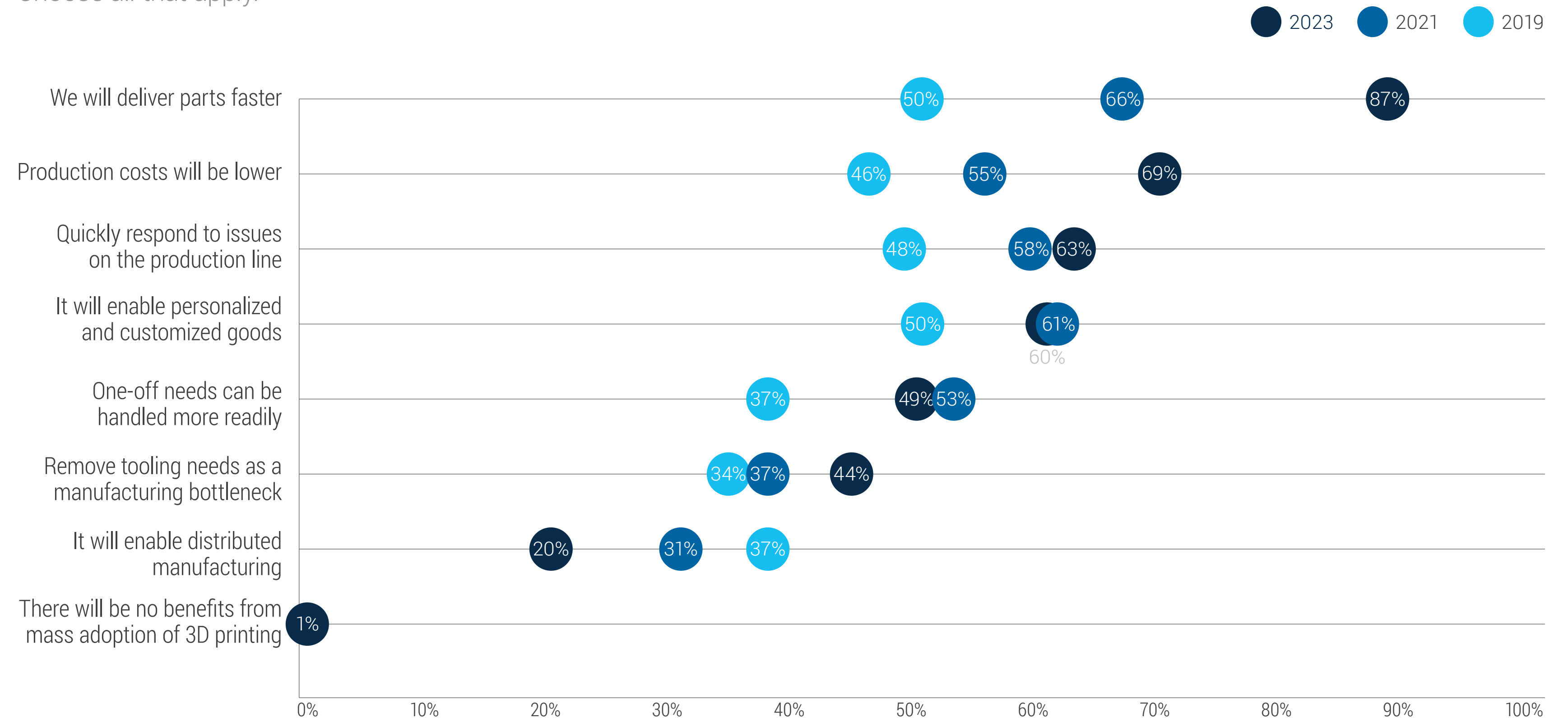
What **challenges** does your organization face with 3D printing? Choose all that apply.



Respondents Expect a Variety of 3D Printing Benefits

Consistent with Jabil's earlier surveys, respondents consider the most significant advantages of additive manufacturing to be quicker delivery times and reduced production costs, with nearly all participants identifying various benefits. The most frequently cited advantage of additive manufacturing was faster delivery times. Interestingly, this figure has increased by 21% since 2021, emphasizing that decision-makers anticipate 3D printing will continue to shorten delivery times.

What **benefits** do you expect to gain from mass adoption of 3D printing for manufacturing?
Choose all that apply.





Regardless of Number of Printers, Overall Expectations Remain

There is not a definitive correlation between a company's number of 3D printers and their anticipated benefits, with expectations of additive manufacturing fairly consistent across respondents. This is presumably due to the almost unanimous expectations seen in the last question, regardless of the number of 3D printers an organization has. However, companies that have more than 100 3D printers are more likely to expect issues on the production line to be addressed quickly than companies with fewer printers. Nearly nine in 10 (86%) respondents in this category held this expectation compared to just over six in 10 (62%) respondents with 10 to 50 or 50 to 100 printers. Additionally, those with more than 100 3D printers are more likely to expect 3D printing to remove tooling needs as a manufacturing bottleneck.

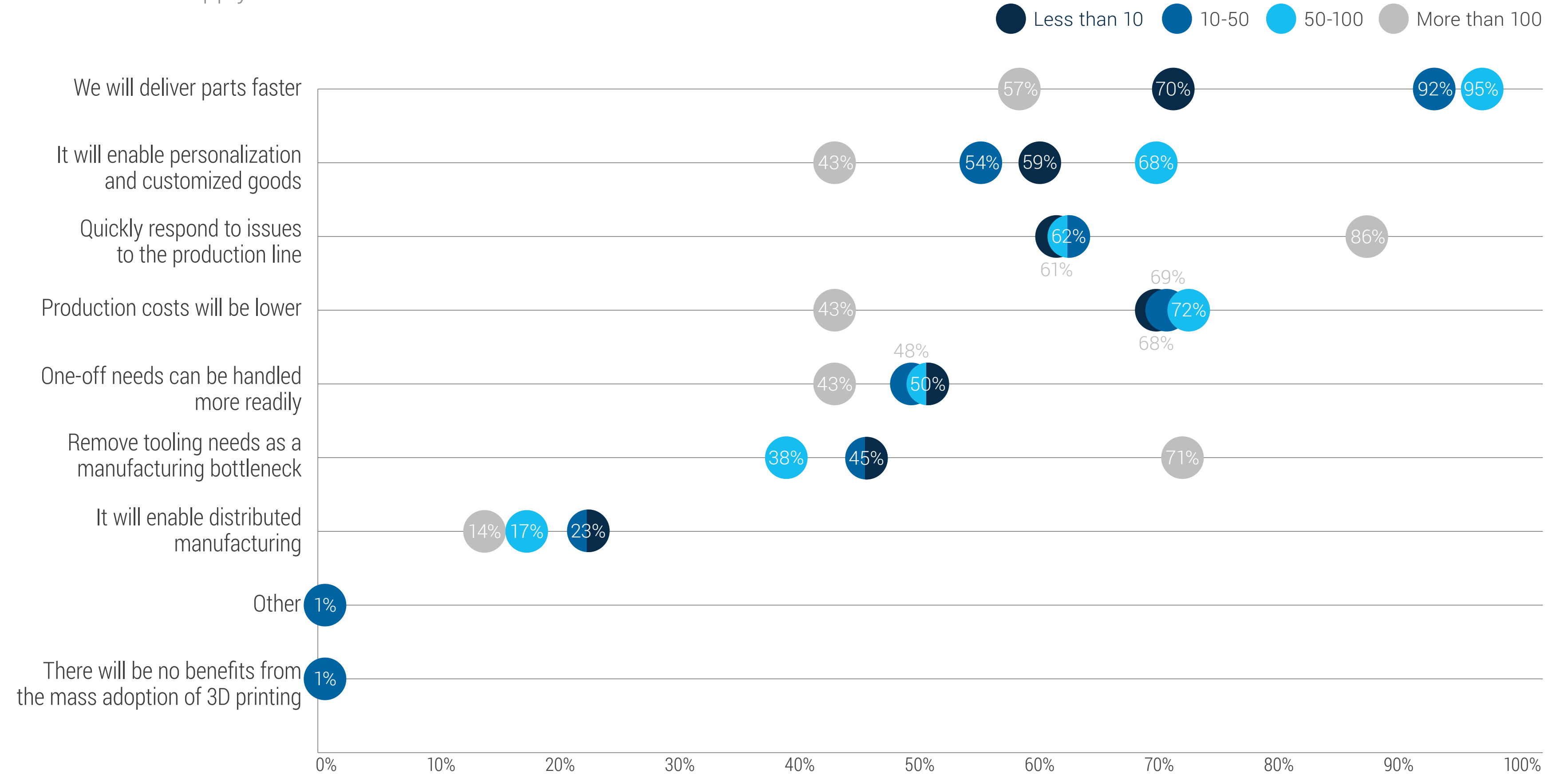
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What **benefits** do you expect to gain from mass adoption of 3D printing for manufacturing?
Choose all that apply.

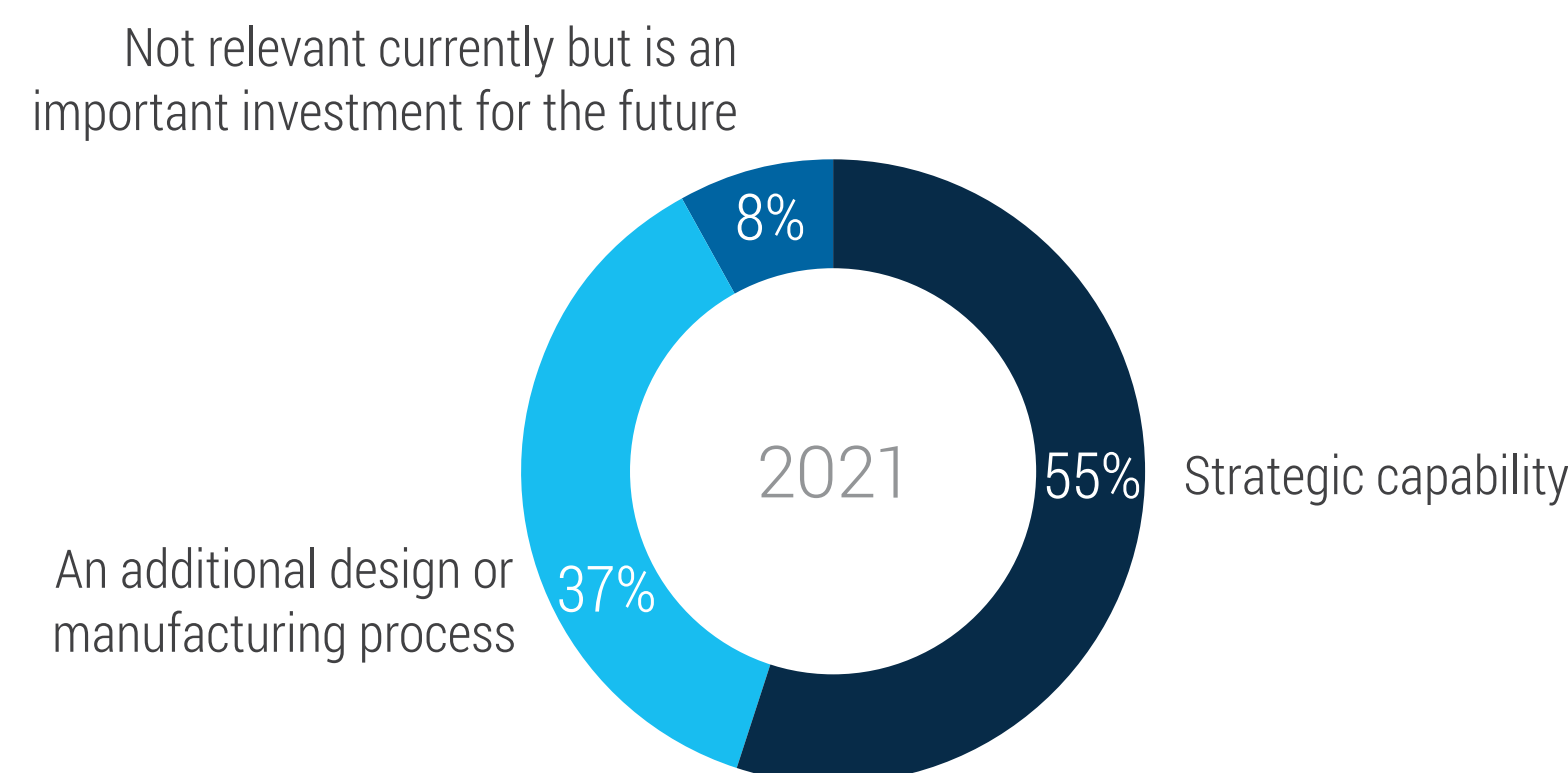
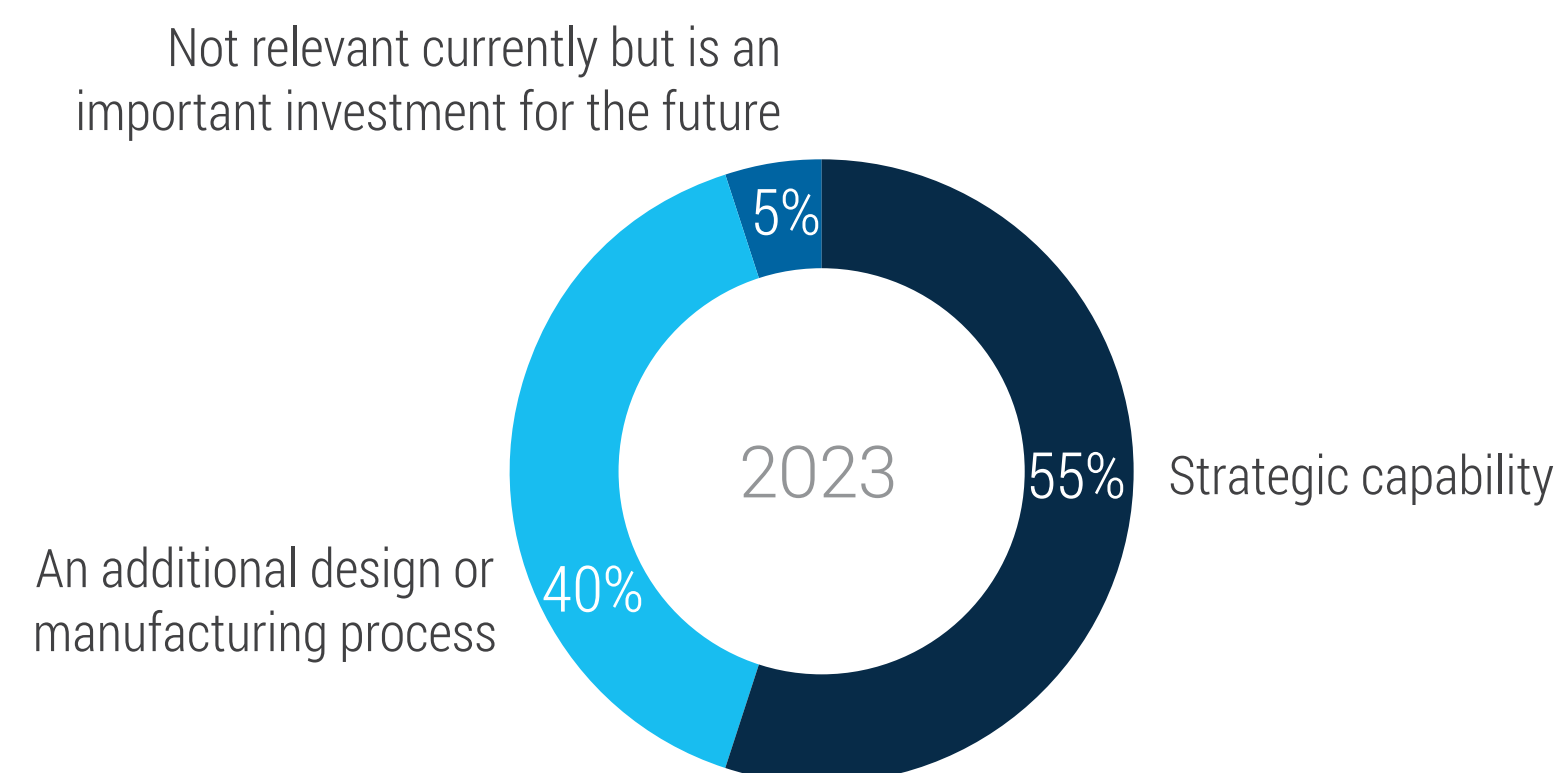


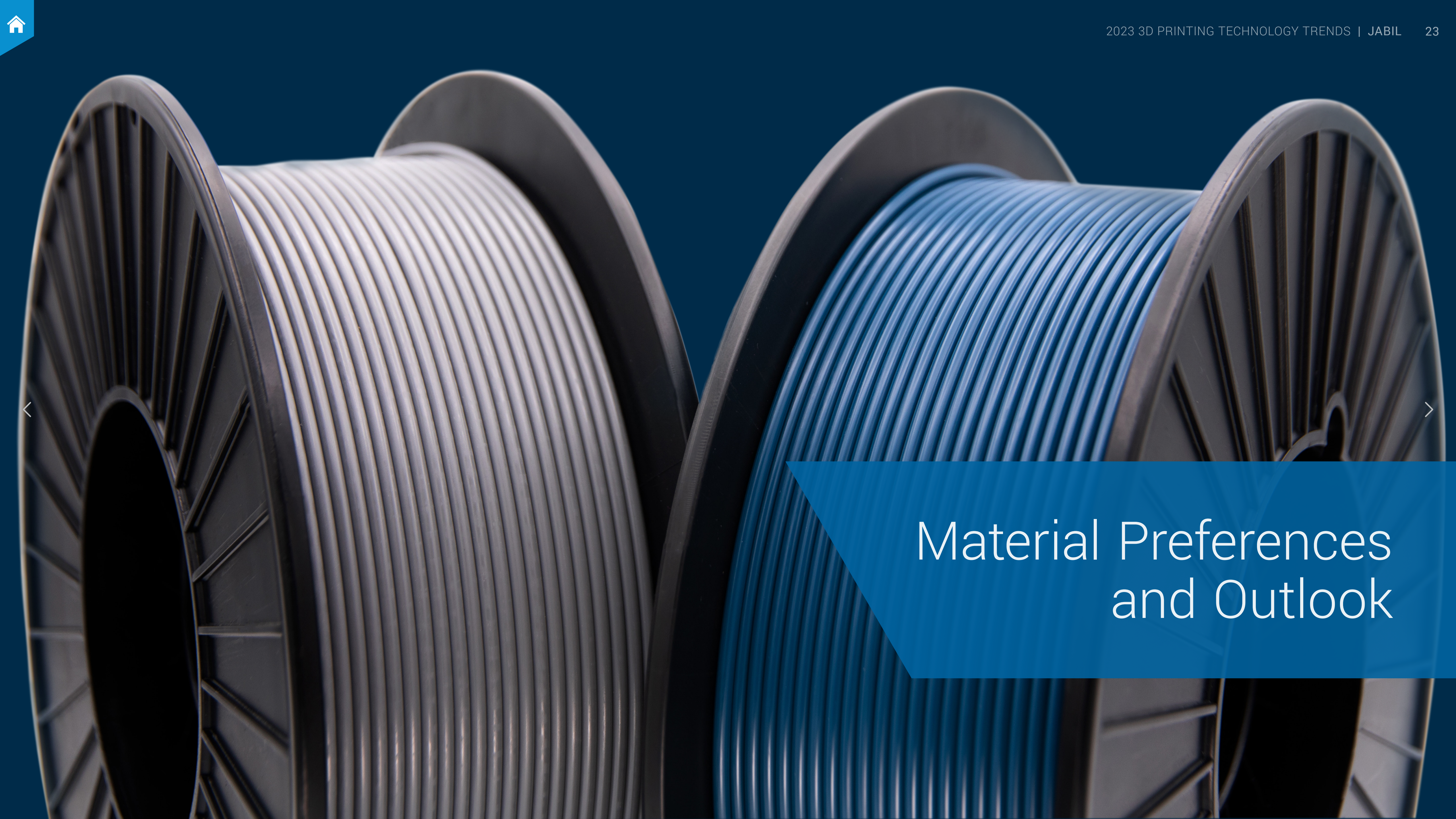


Majority of Top Leadership Recognizes Additive Manufacturing as Strategic

More than 50% of top executives regard additive manufacturing as a strategic opportunity to enhance their organizations. Additionally, 40% of senior leaders consider 3D printing as an alternative method for designing or producing products. These perspectives align with the overall positive outlook that decision-makers hold on the advantages of additive manufacturing, recognizing the potential benefits 3D printing can bring to an organization.

Which of the following best represents the **opinion of your company's top leadership** towards 3D printing?





Material Preferences and Outlook

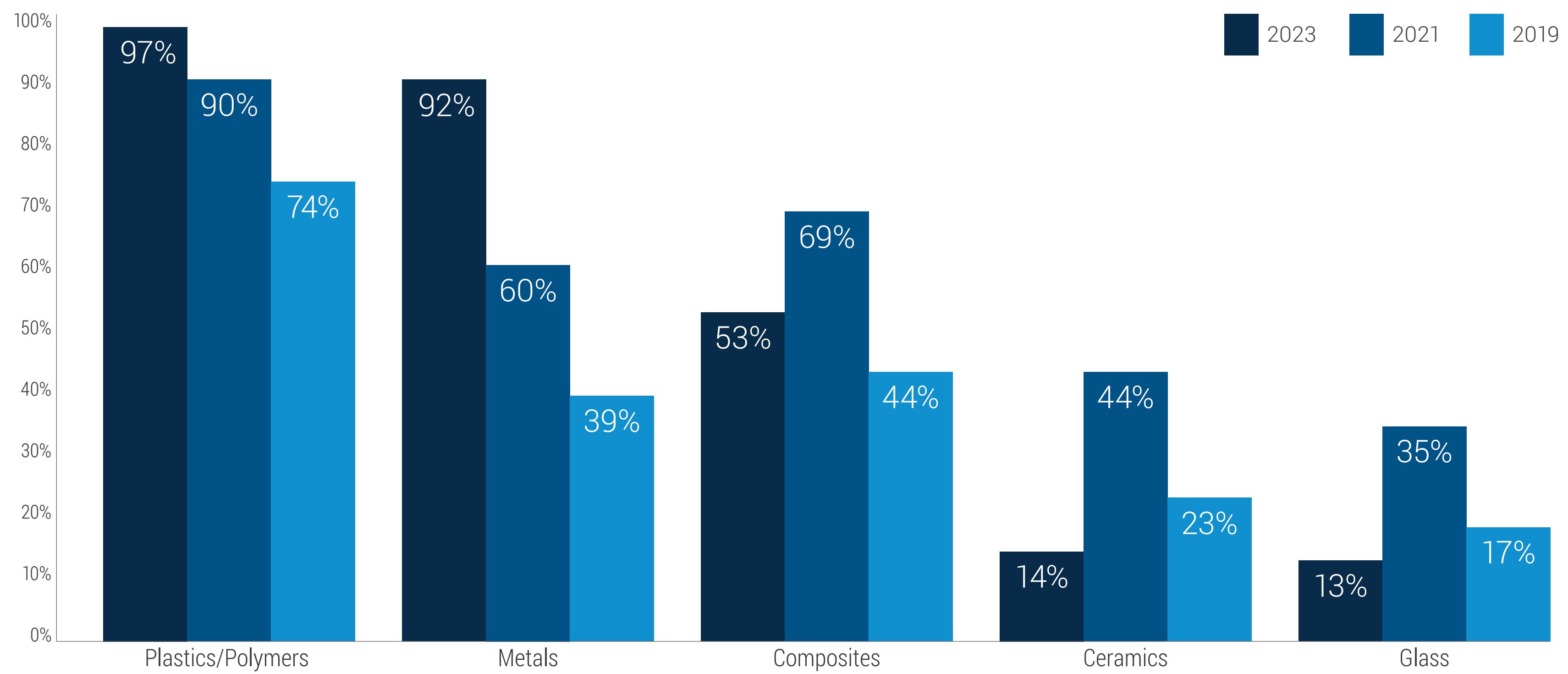


Plastics/Polymers Remain Leading Material Used

Almost all respondents (97%) said their organization uses plastics/polymers in their 3D printing processes. While plastics/polymers are the leading materials, the use of metals has greatly increased. This growing interest can be attributed to customers' needs for durable materials. Furthermore, metals are a popular material for customers who need dependable and sturdy goods, like aerospace manufacturers.

What **types of additive materials** is your organization currently using for 3D printing?

Choose all that apply.

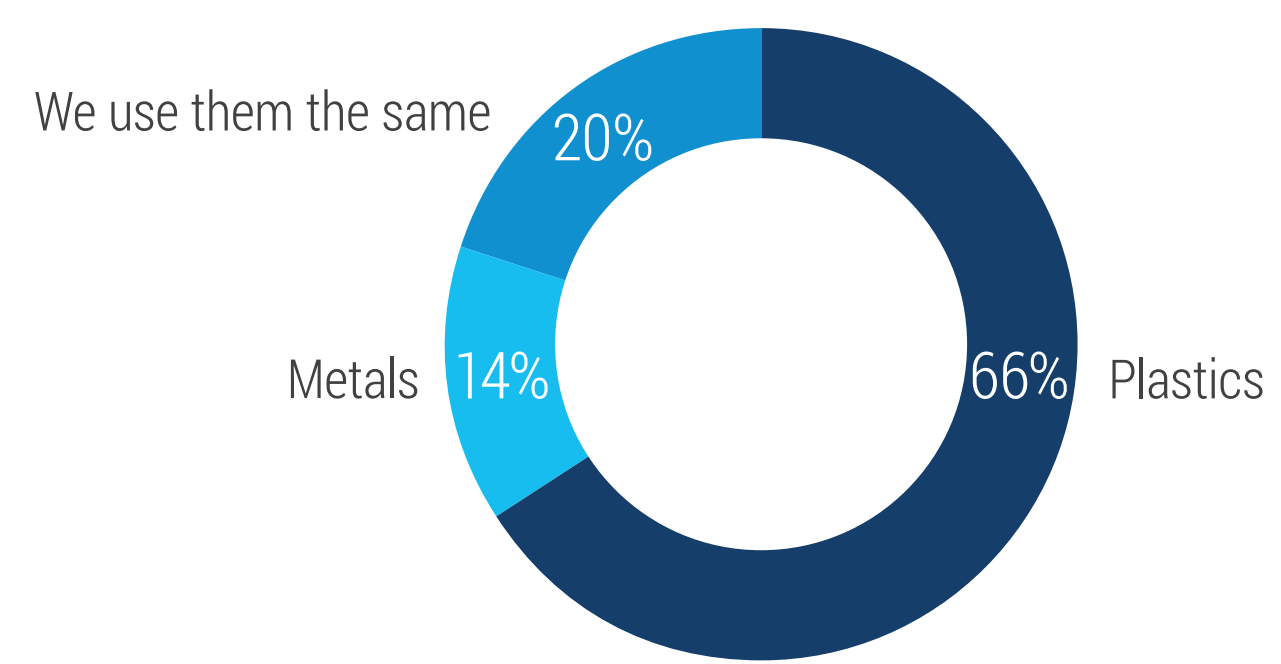




Plastics are Used Significantly More Than Metals, but Some Use Both

Plastics are undoubtedly the most common additive materials, with 66% of decision-makers reporting that plastics are their most-used material for additive manufacturing. This vast utilization of plastics corresponds with how prevalent the material is for 3D printing. Nonetheless, 20% of decision-makers responded that they use plastics and metals the same amount in their processes.

Which of these types of additive materials does your company use the **most**?



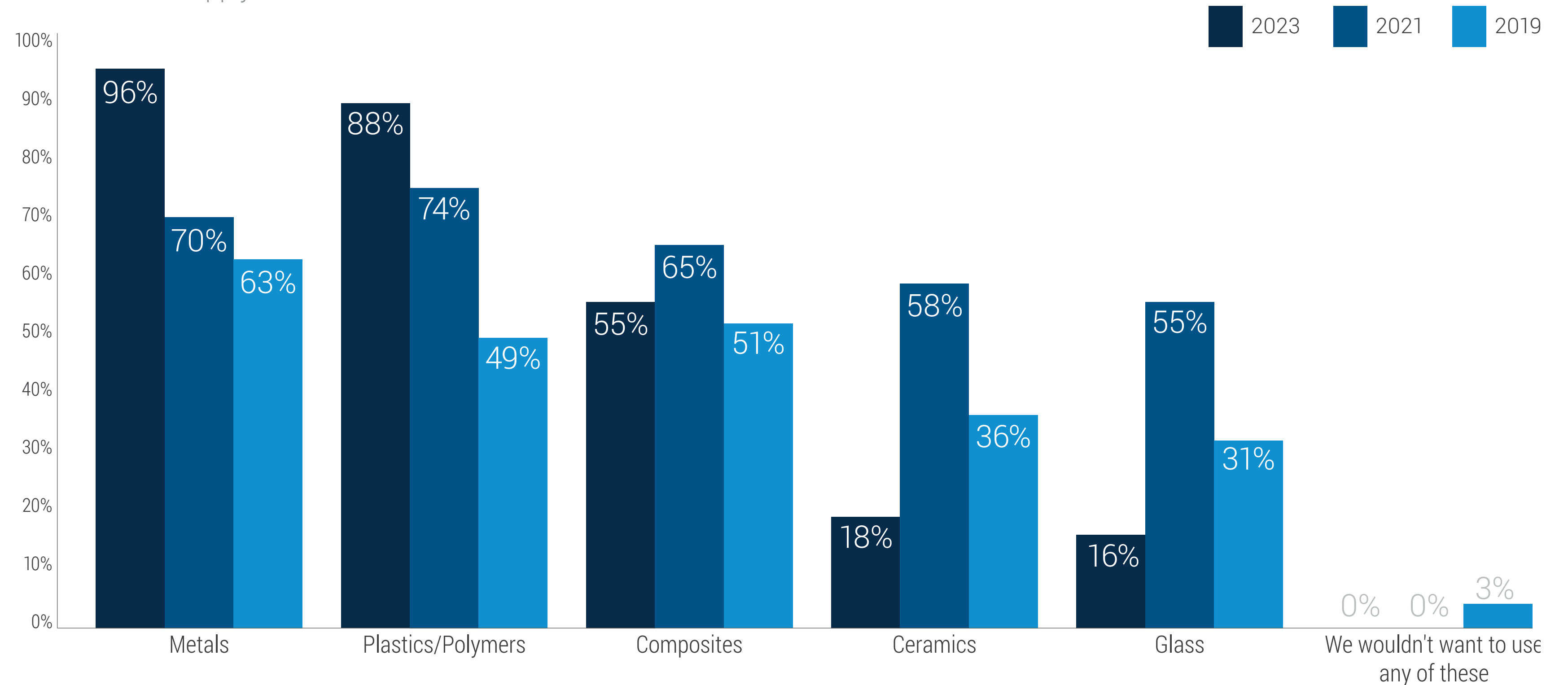


The Desire to Use Metals Surpasses that of Plastics/Polymers

A shift in decision-makers' preferences is evident, as 96% of respondents express a preference for using metal additive materials under the right conditions. Although plastics/polymers would still be favored by 88%, this percentage is lower than the 97% who currently utilize plastics/polymers. This inclination is likely attributed to the lower costs and greater availability of plastics/polymers compared to metals.

What types of additive materials would your organization **want to** use if there were certified versions available at a reasonable cost?

Choose all that apply.

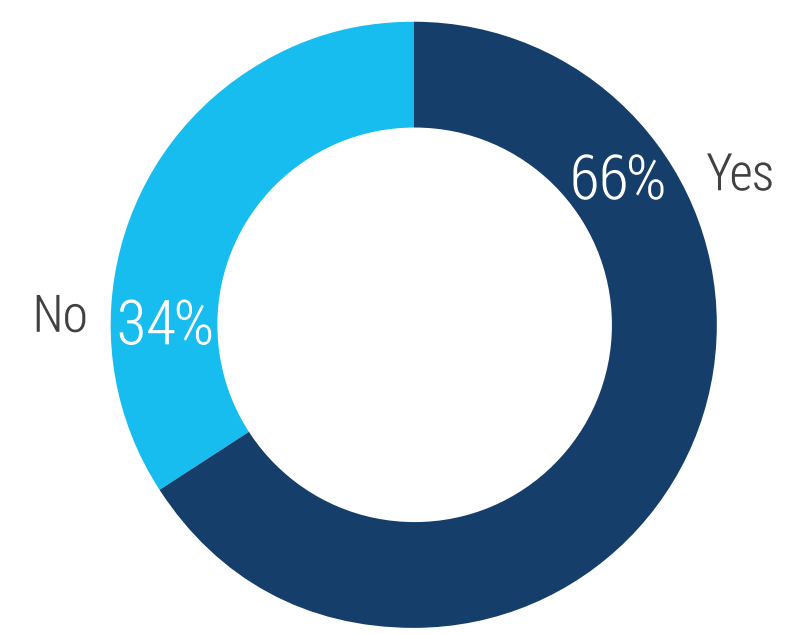




A Majority of Organizations Leverage Custom-Engineered Materials

Two thirds of respondents' companies use custom-engineered materials in their additive manufacturing processes. By tailoring the material composition and structure to the exact specifications required by an application, manufacturers can produce parts with superior performance characteristics such as strength, durability, heat resistance, and electrical conductivity. Additionally, custom-engineered materials can be used to reduce weight or improve aesthetics in applications where these factors are critical.

Do you currently leverage custom-engineered materials?



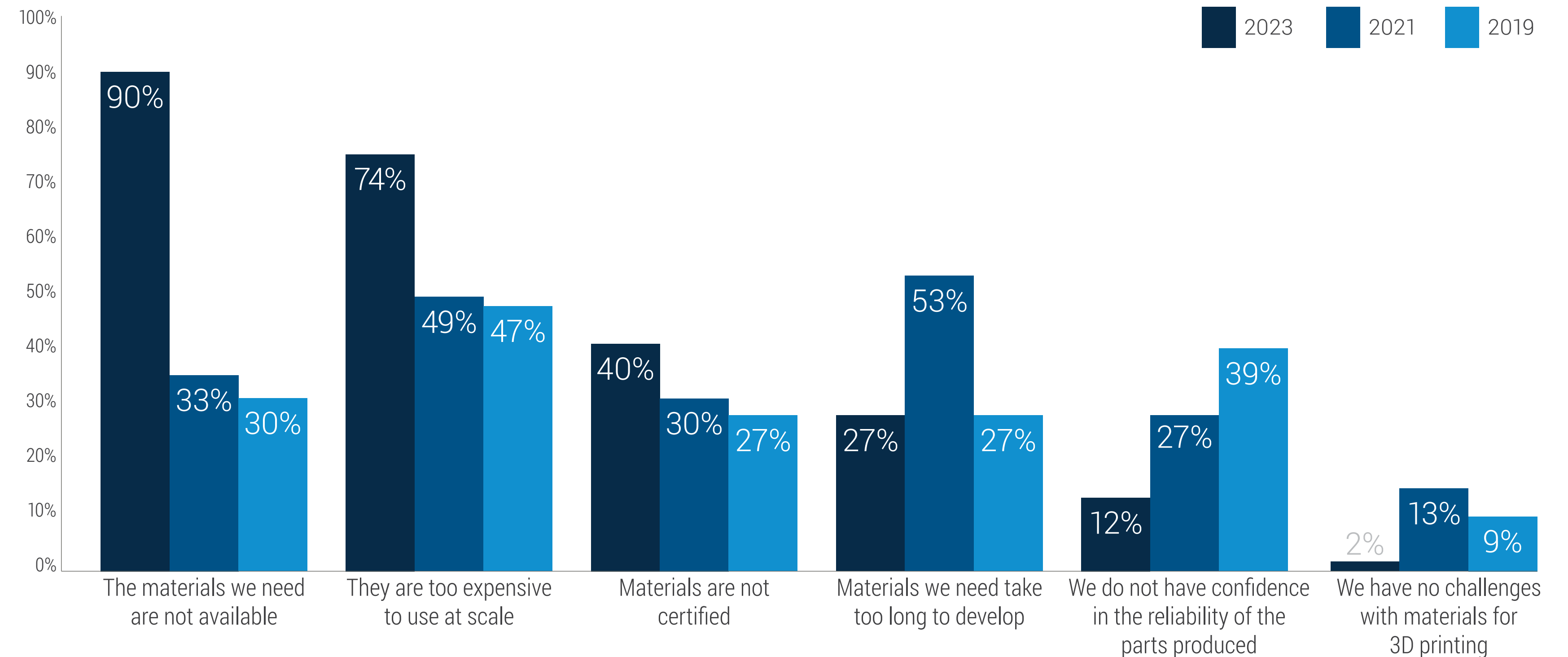


Material Availability is Indisputably the Biggest Challenge Faced

As observed in other findings, material accessibility poses the greatest challenge for organizations when it comes to the additive manufacturing process. In fact, 90% of respondents indicated problems with material availability. This represents a 57% increase since 2021, demonstrating the extent to which shortages are affecting the 3D printing process. On a more positive note, there has been a significant improvement in product reliability and trust in additive manufactured products. Currently, only 12% of respondents express concerns about the parts produced, marking a 15% decrease from 2021.

What challenges does your organization face with 3D printing materials?

Choose all that apply.





Survey Participants and Methodology





Goals and Methodology

RESEARCH GOAL

The primary objective of the research was to acquire data regarding the latest developments in 3D printing and additive manufacturing materials to assist in presenting new opportunities.

METHODOLOGY

Independent sources of manufacturing decision-makers were invited to participate in an online survey. The decision-makers were asked 33 questions, including demographics, focused on additive manufacturing, including materials used, challenges faced, and the future of 3D printing for respective organizations. Some questions have been repeated from the 2017, 2019, and 2021 studies to allow for trend analysis.

PARTICIPANTS

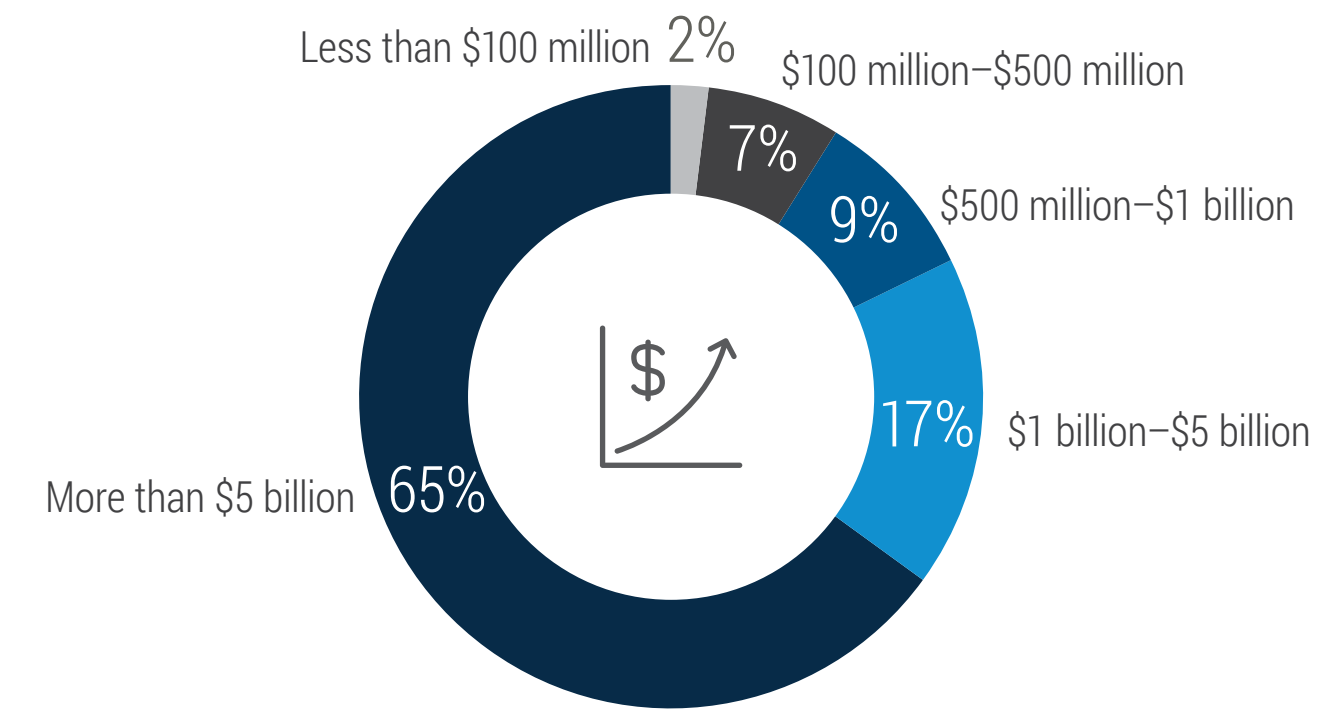
A total of 200 decision-makers knowledgeable about additive printing completed the survey. These participants were executives, team managers, and senior individual contributors, with 65% being decision-makers for organizations with annual revenues of more than \$5 billion dollars.



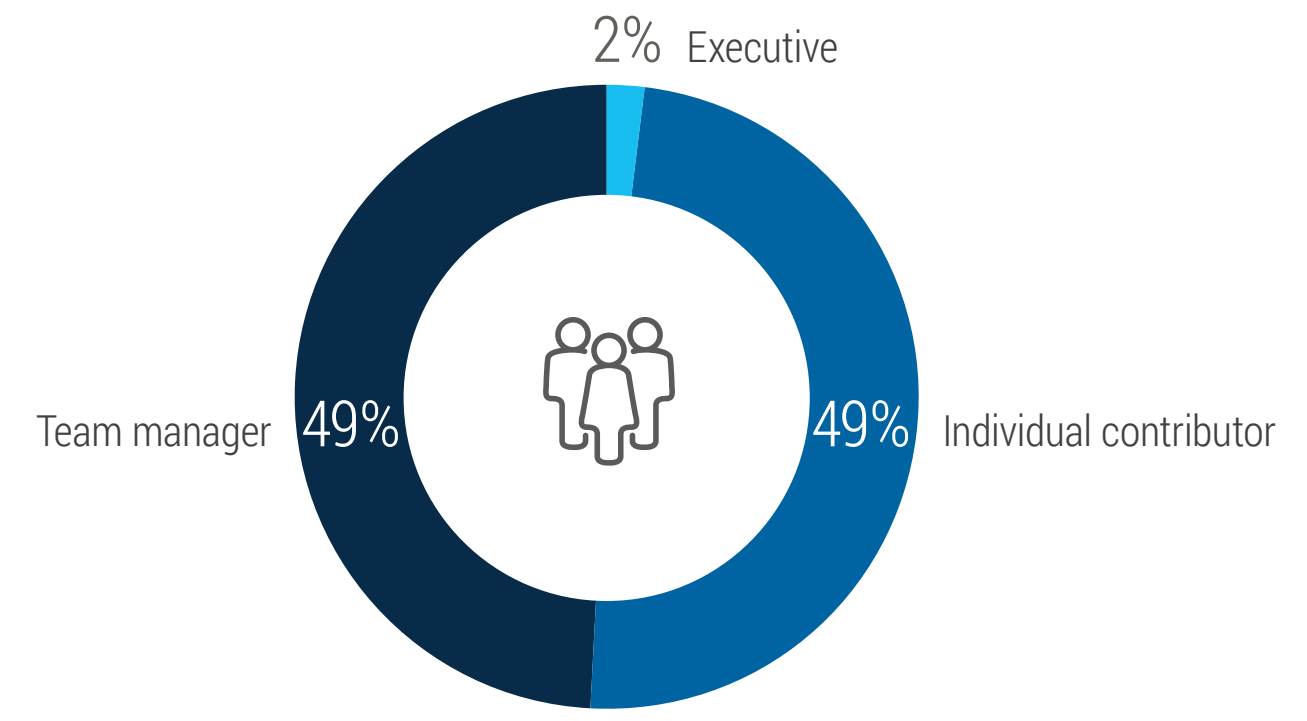


Survey Participants

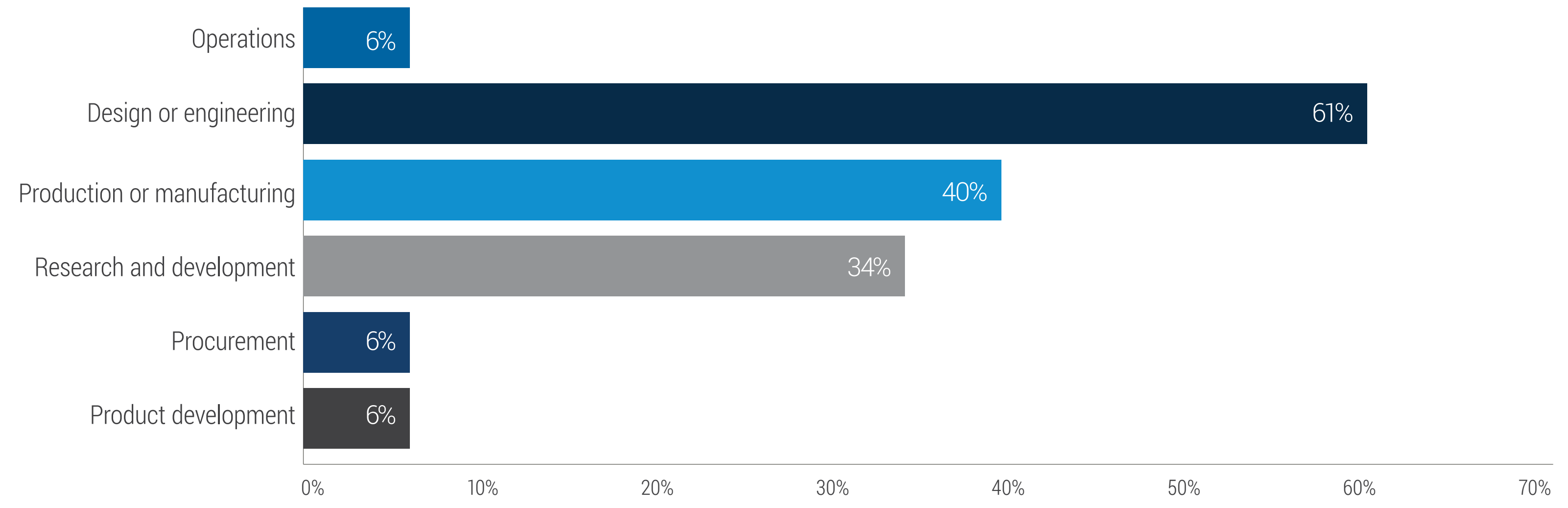
Company Size (Annual Revenue)



Job Level



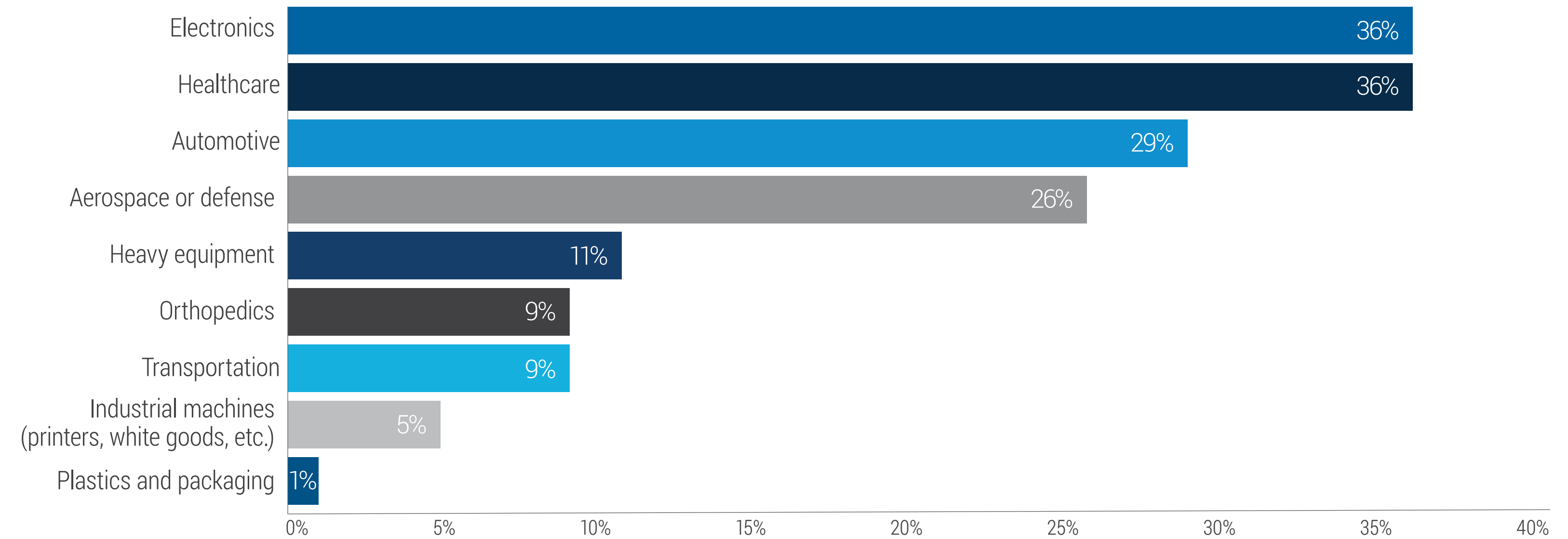
Role



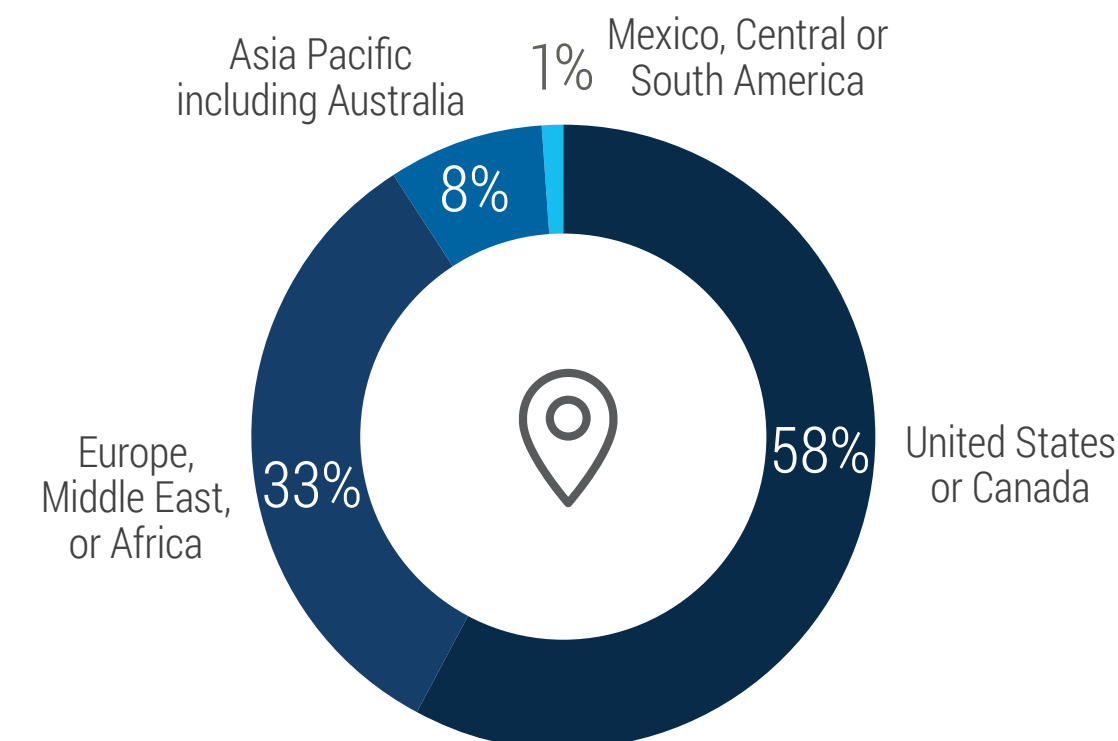


Survey Participants

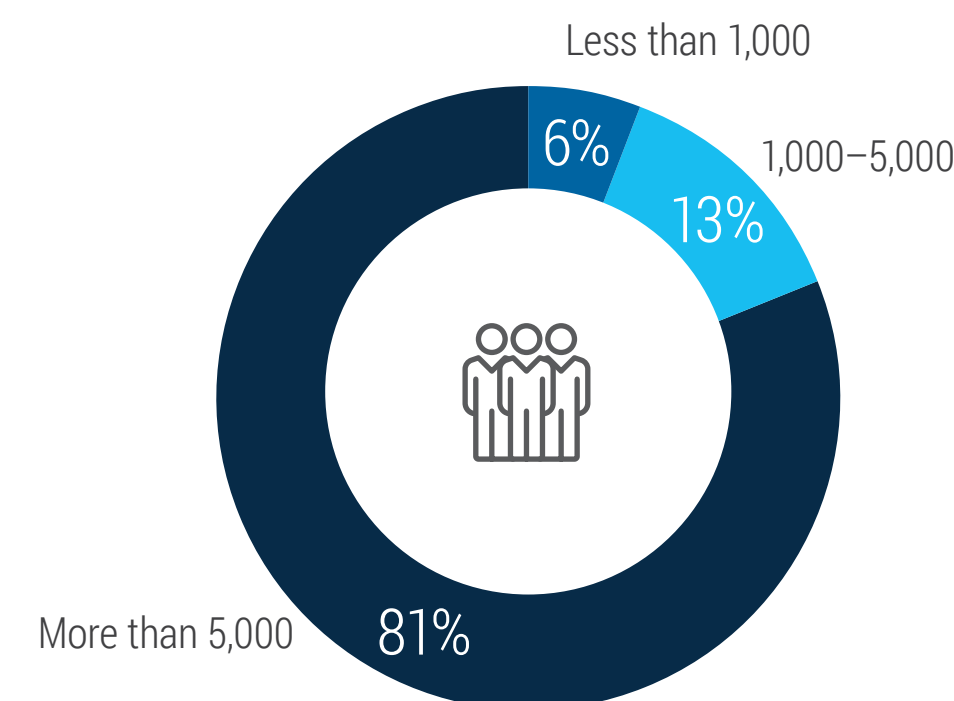
Types of Goods Produced



Region

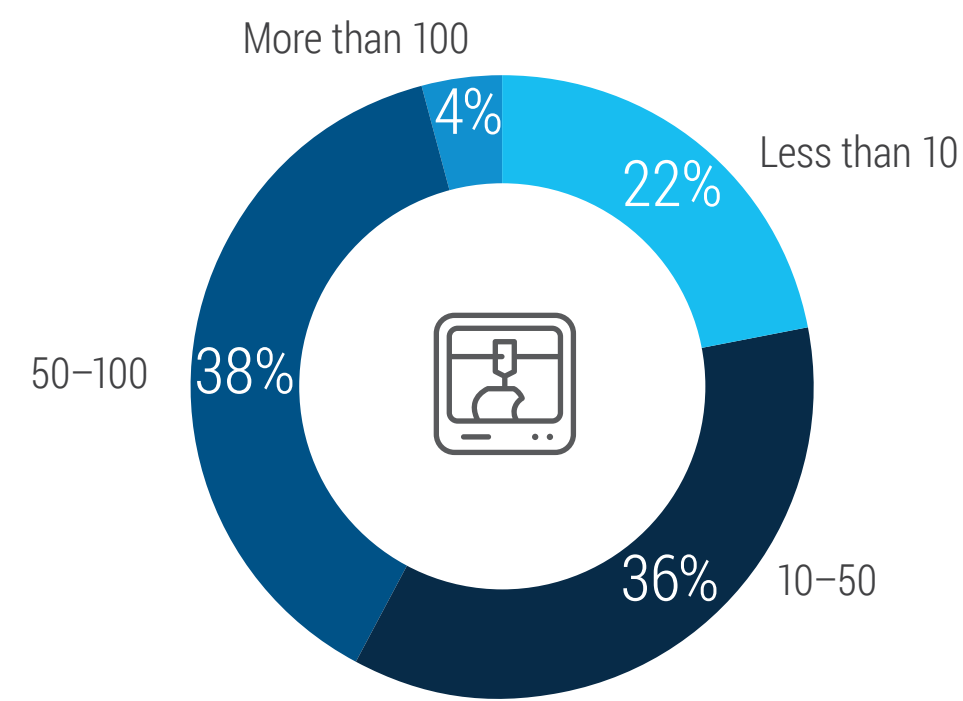


Number of Employees

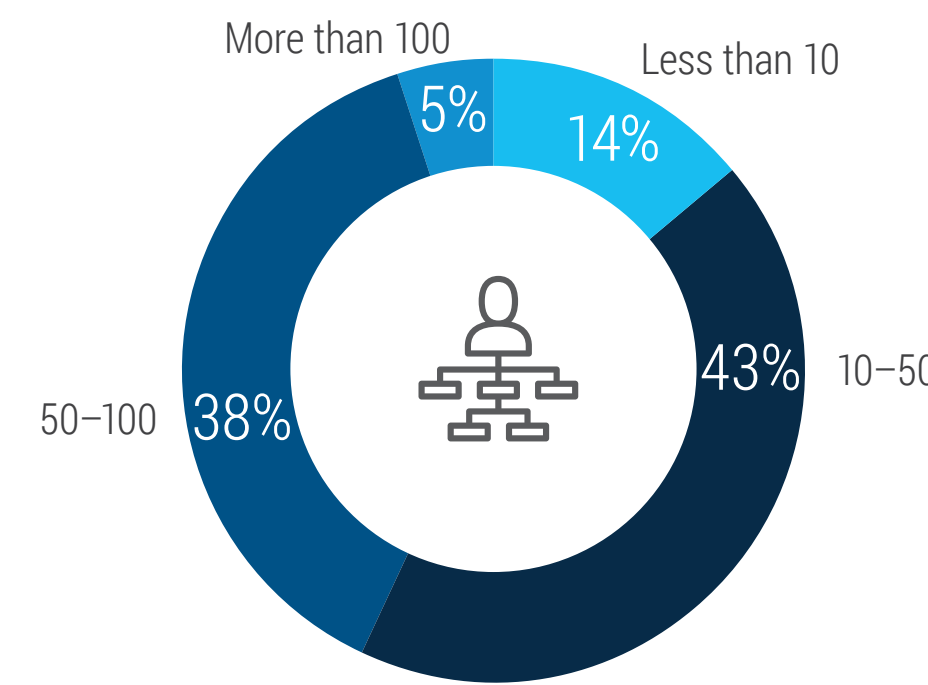


Survey Participants

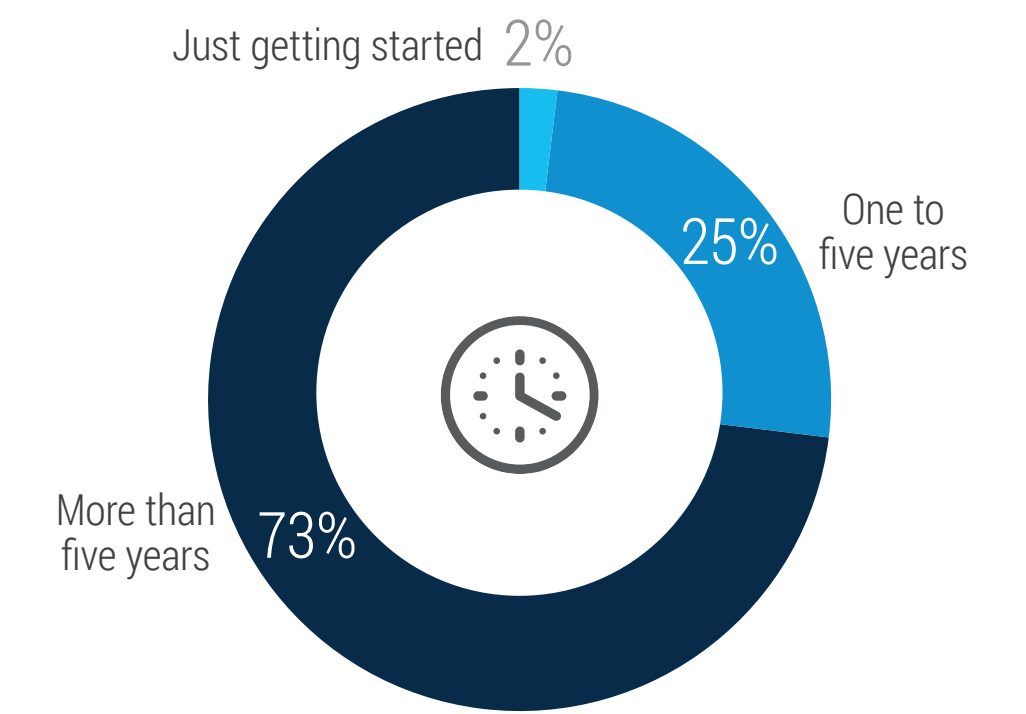
Number of in-house 3D printers



How many people within the organization are dedicated to additive manufacturing?



How long has the organization been actively using or participating in additive manufacturing?





ADDITIVE MANUFACTURING

Jabil is a flexible, high-velocity additive manufacturing partner that meets specialized materials requirements — helping customers improve how they design, make, and deliver products. From ideation to industrialization, we enable design freedom, accelerate time-to-market, and ensure compliance to industry certifications.

Our Minnesota-based Innovation Center is at the forefront of the industry, formulating and producing high-quality materials. Polymer formulations, compound developments, and material system integration are completed from start-to-finish under one roof. Highly experienced additive manufacturing engineers, chemists, materials scientists, and production experts leverage Jabil's innovations in materials science to oversee each step of the beaker-to-box process of developing customized powders and filaments, all under an ISO 9001-2015 quality management system.

In addition to advancements in materials, Jabil continues to extend its global additive manufacturing platforms and solutions to complement its world-class manufacturing capabilities. Jabil has

deployed hundreds of 3D printers — from desktop models to highly sophisticated industrial systems — to address a vast range of prototyping, tooling, and volume-scale production demands.

Jabil's rapid tooling operations, additive manufacturing labs, and tech centers in North America, Europe, and Asia are augmented by AS9100-, ISO 13485-, and ISO 9001-certified production centers for aerospace, healthcare, and other rigorous applications. Jabil is well positioned to integrate the best of additive and traditional manufacturing to produce differentiated parts and products using innovative materials, proven Design for Additive Manufacturing (DfAM) principles, and industry-leading manufacturing processes, as well as vendor-agnostic technologies and machines.

[Learn More](#) about Additive Manufacturing



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