



# THE STATE OF 3D PRINTING

The data you need to understand the 3D Printing world and build your 3D Printing strategy

MAY 2016

THE STATE OF 3D PRINTING  
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## FOREWORD

I am very pleased to present this second edition of *The State of 3D Printing*. The aim of our survey is simple: to bring together most of 3D Printing's users. We asked what they do, why they do it, how they do it, and if it's working. For me, this second measure represents a very special edition for several reasons.

First, the enthusiasm and the thousands of returns we've had on the first edition have allowed us to validate the interest of our approach. I would also like to thank each of you for your support and your input.

Thanks to you, we have once again developed the biggest statistical study on the uses and challenges of 3D Printing in the professional world. Almost 1000 participants responded and shared their experience and expectations. They come from all professions in every industry, bringing incomparable depth to this survey.

Finally, this 2<sup>nd</sup> edition has allowed us to make a comparison that I invite you to discover: there is much to learn about the evolution of our industry from the users' point of view between 2015 and 2016.

As we know, 3D Printing is creating less enthusiasm in the media than even 20 months ago. However, the survey respondents are as convinced as we are. This technology is not only promising for tomorrow, but it's also wonderful today because of the many economic benefits that users get from it every day.

In addition to the 2015/2016 evolution, we have made several changes to our report. In response to your remarks we have:

- done a better job in distinguishing professional uses from casual hobby uses. We have clearly focused our analysis on the professional respondents to our study.
- granted a large portion to the best practices in 3D Printing by devoting an entire chapter to the behavior of power users.
- developed sector-specific analysis to give you a way to better compare yourself to your peers.

Like last year, you'll find 4 sections in this report:

- Trends for 2016 have been gathered from every respondent and comprise the majority of the study
- Executing a 3D Printing strategy takes a detailed, practical look at the habits of "power users"
- The evolution insights section compares and contrasts the habits of users between 2015 and 2016
- The sector-specific insights allow you to compare yourself to others within your industry

All of these attempts to provide you with practical information that will help you in your company's development.

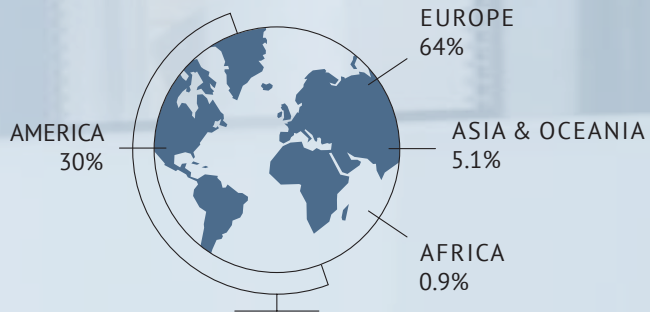
If you would like to see how you stack up compared to the panel, I invite you to visit our study at [www.sculpteo.com/en/state-of-3d-printing](http://www.sculpteo.com/en/state-of-3d-printing). The study will be open throughout 2016. I hope you enjoy reading this new State of 3D Printing!



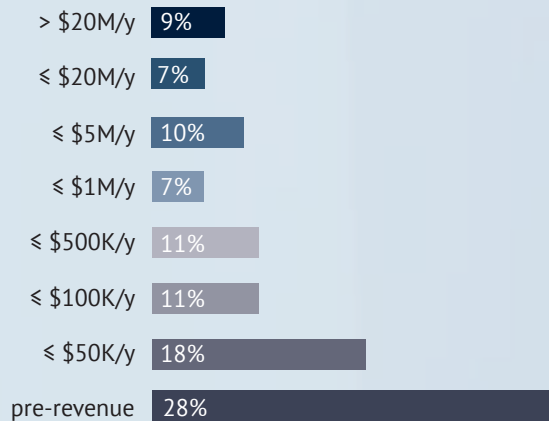
**CLÉMENT MOREAU**  
CEO & FOUNDER

# SAMPLE COMPOSITION

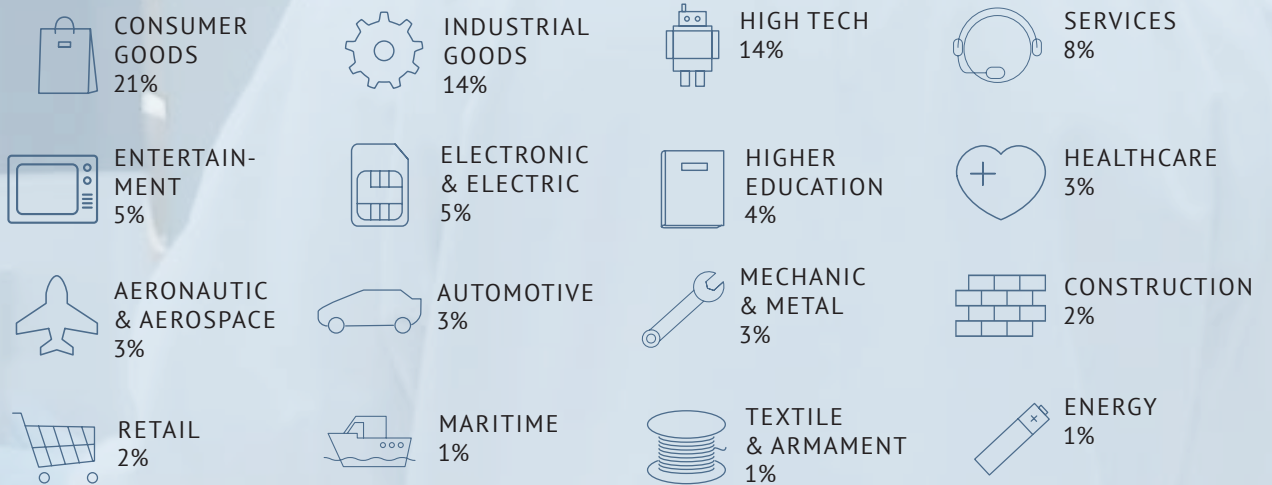
## 1,000 RESPONDENTS



## COMPANY SIZE BY ANNUAL REVENUE



## VERTICAL MARKETS



The principal objective of Sculpteo's 2016 *State of 3D Printing* report, is to share the collection of data we received from our participants in one global study. With that objective in mind **we collected data across the 3D Printing Industry to make an analysis on how businesses and individuals are using this cutting edge technology.**

This survey was opened to the general public from late January to late March 2016. We received over 1,000 participants however roughly 400 respondents partially finished the survey. This report contains the data collected from respondents who both partially and fully completed the survey. We have also asked respondents to prospect five years into the future, meaning 2021, to answer some of our questions.

Our results are based on the sample population that participated in the survey, we did not modify or amend the results for any reason, and we do not reach out to the participants to suggest that they modify their answers.

Our respondents are from **53 different countries**, with the largest population coming from Europe (64%) and the second largest population coming from America (30%). The respondents are spread across **19 different industries**; consumer goods, industrial goods, and high-tech are the most highly represented sectors this year.

It is worth noting that the majority of respondents consider themselves to be identified as Owners or CEOs (28%) followed by Engineers (23%), these are followed by Freelancers (13%) and Designers (11%).

## SPENDING KEEPS INCREASING

**+80%**

of the respondents were **already using 3D Printing** last year

**+77%**

of respondents affirmed they would **increase their spending** on additive manufacturing in 2017

**\$6,132**

is the average budget for 2015 compared to **\$3,736** in 2014

**+93%**

consider 3D Printing as a **competitive advantage** in their strategy

In 2015, the respondents forecasted a 68% increase of their fees for 2016. According to the results, their projections were almost achieved with an actual expenses increase of 64%. For 2017, they predict an increase driven by a 77% growth. This significant positive evolution shows that the respondents are loyal to 3D Printing. **They are more and more confident in integrating additive manufacturing in their process.**

Furthermore, 93% of the respondents consider 3D Printing to be a real advantage for their strategy. It is becoming a decision-making support tool, as 62% of our last year respondents have increased their use of 3D Printing. According to the sector, the survey shows that **3D Printing is expanding its scope of application inside the company organization.**

Moreover, this year, the size of the companies interviewed is larger. This indicates that 3D

Printing is gaining the interest of corporate groups and becoming a more professional and strategic technology tool.

These figures highlight a strong **positive correlation between the time spent using 3D Printing, the loyalty of the customer, and his 3D Printing budget.** The increase of the respondents' expenses reaffirmed this year that they believe 3D manufacturing is a real **competitive advantage** in their company.

# PRODUCTION DRIVES GROWTH

Accelerating the product development is a main concern for professionals using 3D Printing. In fact, when asked “Which 3D Printing related area is the top priority for your organization in 2016?”, 26% of the respondents answered “accelerating product development.”

The primary uses of 3D Printing are still at 50% prototyping and 30% proof of concept. For these uses, plastics are a suitable material, as they are

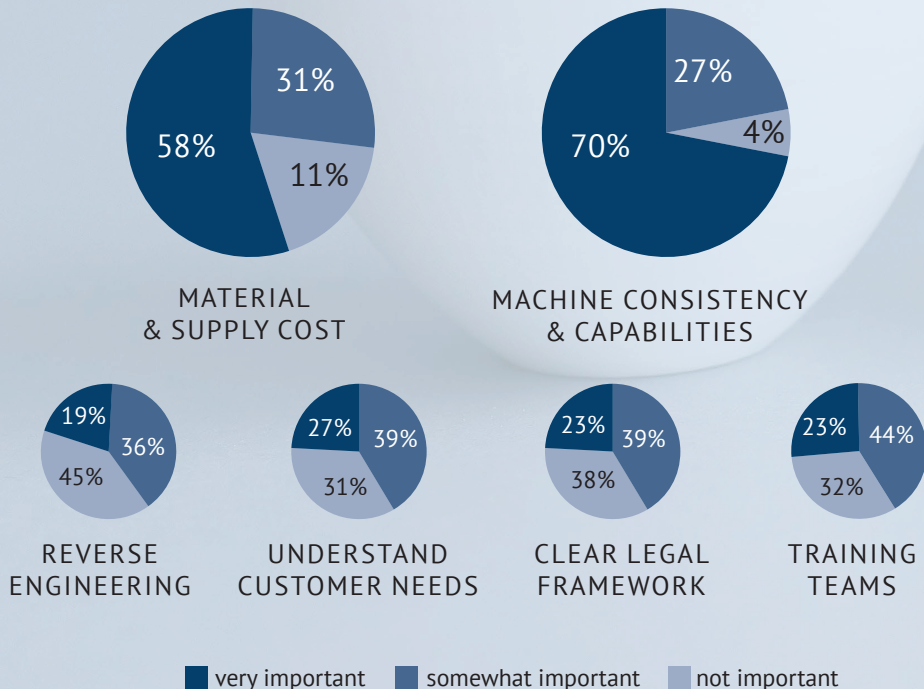
affordable and fast-to-print. All uses included, plastics represent 73% of all prints.

Production ranks next with 25%. Compared to last year, it is gaining ground. **People who answered our 2015 survey edition increased their 3D Printing production by 50%.** Among the technologies, SLS is used by 38% of the professionals. It’s mainly appreciated for its ability to create new shapes that cannot be achieved by traditional production.

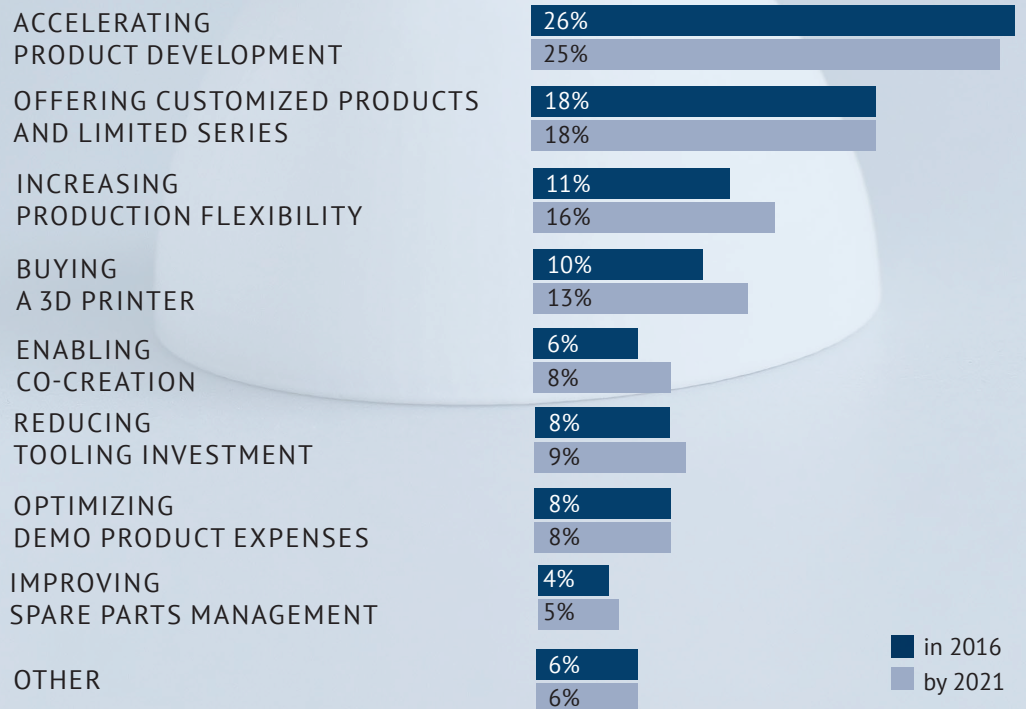
**Saving production time** is a significant factor in using 3D Printing.

While focusing on the key factors for the professional in their 3D Printing activities, 72% consider the machine capabilities and consistency of the 3D Printing parts as very important. Also 56% of our respondents consider supply costs and material investment as determining factors.

## DETERMINING FACTORS IN THE ADOPTION OF 3D PRINTING



## TOP PRIORITIES RELATED TO 3D PRINTING



## PLASTIC IS STILL THE STANDARD

For this second edition of *The State of 3D Printing*, we decided to delve into materials. The numbers clearly highlight that **plastic is still the leader** when it comes to materials used in 3D Printing (73%). Resins and metals, compared to plastic, rank far behind. Plastic parts are still the cheapest to produce, and prototyping, which is mainly done in plastic, is one of the top applications of 3D Printing. Those factors explain why plastic remains the most commonly used material. Among all the plastics available on the 3D Printing market, polyamide (PA) is one of the most popular. It is very resistant to impacts, is stable and allows a very good level of details. Other plastics available are multicolor composites. Furthermore,

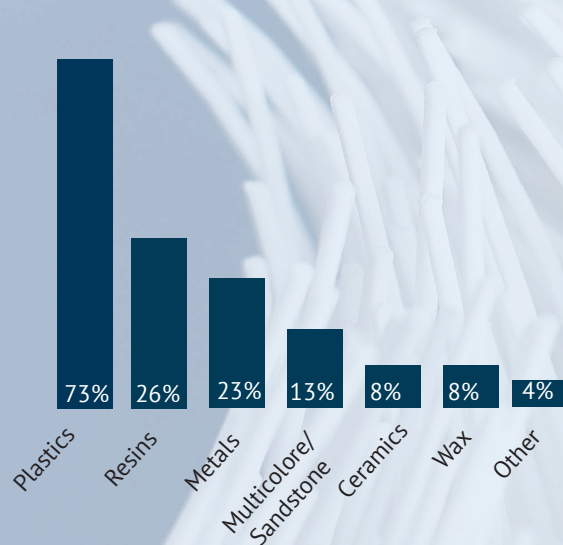
every different plastic has several interesting aspects whether it is heat resistance, flexibility, or transparency. With those requirements, prototypes can often achieve many of the functions of a final industrial part.

This year, we included a new question in the inquiry concerning the 3D technology most used by the respondents. In fact, each technology offers a different possibility and each one will possibly be used for different objectives, with a different material. The selective laser sintering (**SLS**) **technology is an undeniable favorite** among our participants. Fused depositing modeling (FDM) and SLS both use plastics, which helps their ranking.

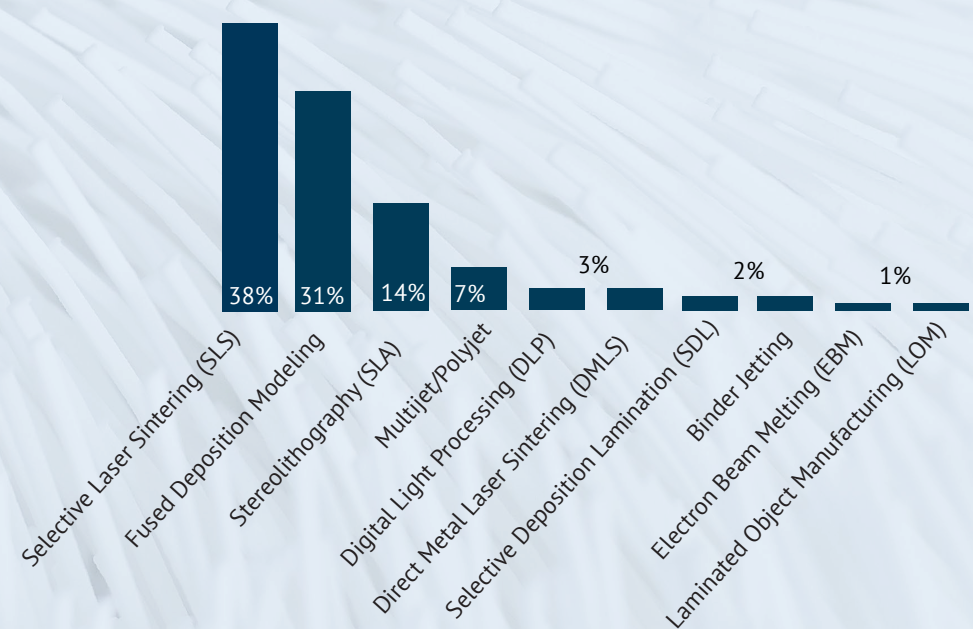
Stereolithography (SLA), which uses resins, is the next most common technology.

Materials are a good indicator of the evolution and state of the additive manufacturing industry. The diversity of new machines allows the users to employ a wider range of materials and imagine new projects. As a matter of fact, many respondents foresee more and more multimaterial 3D productions. They also wish for better resistance of the materials and more precise final results, for the years to come. In a word, **respondents believe that optimization in the use of materials is the direction 3D Printing should be heading with even better results.**

### TOP 3D PRINTING MATERIALS



### TOP 3D PRINTING TECHNOLOGIES



# PROFESSIONALIZATION ENABLES ONGOING INNOVATION

## EXPERTISE



**While 3D Printing is becoming a more professional oriented technology, it is also becoming a fully-fledged profession.** 11% of the respondents who were not using additive manufacturing last year are likely to hire new profiles especially linked to 3D Printing this year.

The additive manufacturing technologies are allowing a **gradual improvement in precision** for the final result. When respondents were asked what trends they would forecast for the years to come, 10% of the trends mentioned concerned better quality. An increasing amount of users are considering the extent of how 3D Printing could be used in their company's process and projects,

as the first trend reveals. As a consequence, the projects are becoming more and more specific and the 3D Printing files need to be even more detailed and very well constructed.

Another important number arose among the respondents : 45% consider themselves as intermediates while there are only 23% of beginners.

A supplementary noticeable point is the fact that respondents are more familiar with the 3D Printing sector as their answers gain in accuracy and get better in knowing the vocabulary of the sector. As previously mentioned, we highlighted

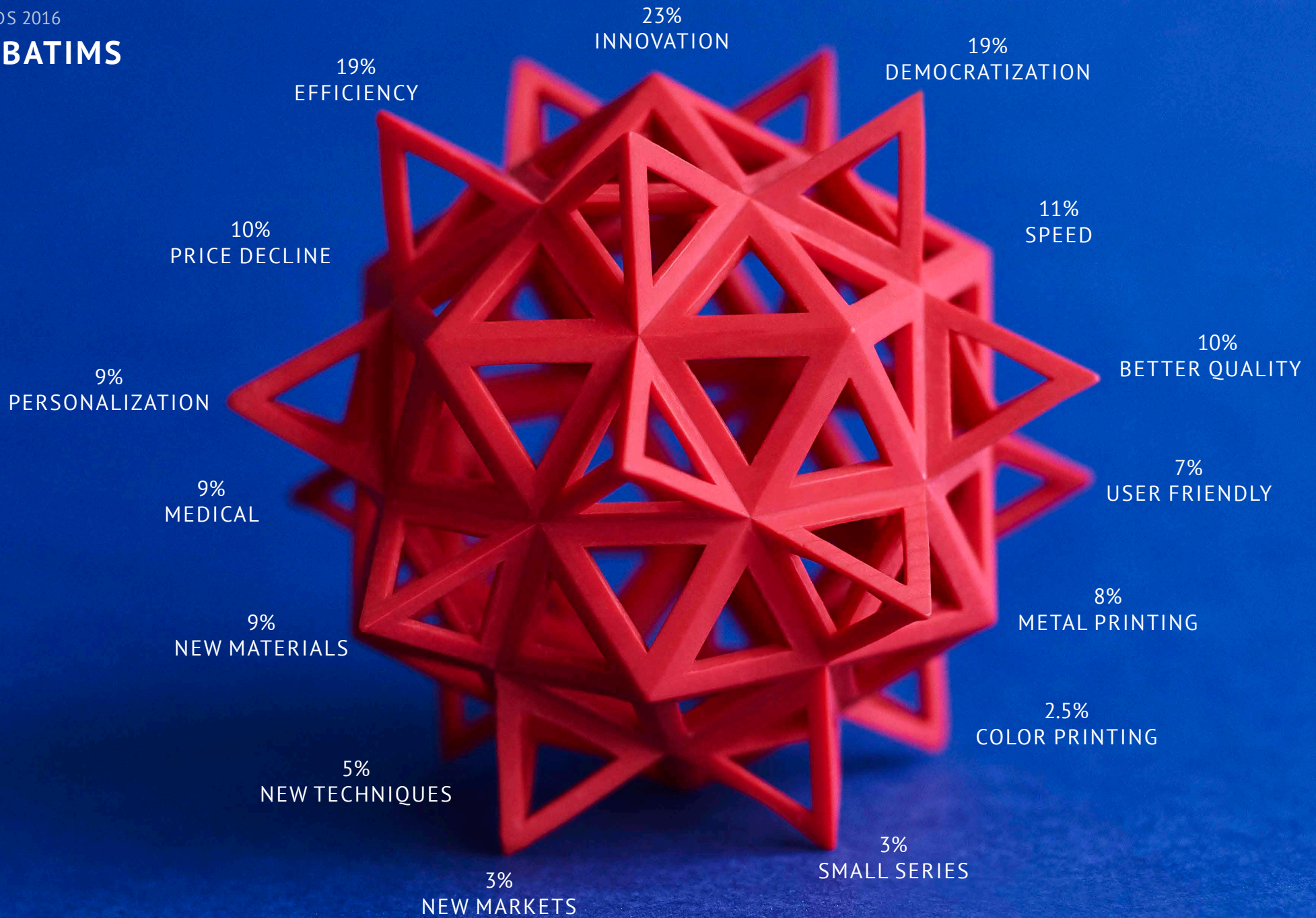
that the more you are involved in 3D Printing, the more you get involved. In the same way, **the more you get to use 3D Printing, the better you get in using the softwares and techniques.**

Although professionalization of the additive manufacturing industry cannot be denied anymore, education to 3D Printing is lacking. Many users are self-taught, despite the complexity of the specific files. The makers movement is fairly permitting such an education.

If you want to train yourself, get information, specialise or get involved in 3D Printing, you can access our e-books "[Graduate in 3D Printing](#)".



# VERBATIMS



## OPPORTUNITIES ARE LARGER THAN THREATS

Once again this year, we asked the respondents to get into position concerning trends they could anticipate for the years to come. We see two advantages in doing so. First, it gives a good overview of how the main actors in additive manufacturing feel about the future. Second, it is a way for us to give them voice in the report.

To conduct a proper text analysis, we defined the verbatims with key words and made a multi-categorical semantic classification. Altogether, 15 noticable key words and trends emerged. The percentages quoted here compare the proportion of the use of each keyword. Innovation (23%), efficiency (19%), and democratisation (19%) are the top notions used by the respondents.

### Innovation

Already very innovative, additive manufacturing will see, if we trust the respondents, new materials and new techniques grow in importance. Metal printing is considered one of the top innovations (8%), color printing also ranked in the words used by the respondents (2.5%). One respondent suggested new materials such as sol-gel, new ceramic or even glass.

### Efficiency

Efficiency can be separated into two distinct levels. First, speed (11%) is a relevant evolution foreseen by the respondents. Speed in the machinery ("Fast SLA with DLP", "CLIP technology and other fast resin printers", "reduced stocks") and speed in the process & delivery time ("rapid prototyping"). Second, a better quality (10%) is definitely a feature of additive manufacturing future development, according to the respondents. "Resistance of materials", "smooth surfaces", "completion and resistance of parts", "precision of details" are as many improvements as respondents could say.

### Democratization

"User-friendly" is quoted many times (7%). In fact, respondents are waiting for "Simplistic Software which makes 3d creation, manipulating, and printing super easy for the average", and "better UI for customers." The rise of the Makers movement, DIY, and fab labs is also seen as a major trend for 3D Printing, such as democratic 3D scanning.

**+250** respondents shared their thoughts on the topic:

*Are there any trends that you anticipate having a major impact on 3D Printing?*

### THE MOST CITED FACTORS

**54%** 3D PRINTING TECHNOLOGIES

- New materials and techniques
- Increased efficiency and accuracy
- Price drops

**46%** EXTERNAL FACTORS

- New markets and usage
- Easier 3d modeling
- Small series

# EXECUTING A 3D PRINTING STRATEGY - INTRO

It's unquestionable, the respondents are showing various levels of maturity towards 3D Printing. Even respondents that are sometimes very trained for additive manufacturing are working in companies and organizations in which the impact of 3D Printing is rather limited. This raises the question of the best practices in the additive manufacturing world.

Among Sculpteo's different customers, there are some who are rather advanced users of 3D Printing, those who make heavy use and exploit its many possibilities. We call them **"power users"**.

To assess what newcomers should look for when experimenting with additive manufacturing, it can be useful to gain a quick insight at how "power users" of 3D Printing behave. Knowing beforehand what you should do can save you from making numerous mistakes, make you save time and money, and also, even for the

most experienced, give a new impulse to their 3D Printing strategy. Studying and learning from the power users is the kind of extra help that can be a deal changer.

In the report from last year, we created a section called "Executing a 3D Printing strategy". The aim with it was to determine whether 3D Printing's power users are sharing patterns in their use of 3D Printing. They are! This allowed us to deduce the ground rules that you should follow if you want to be a frontrunner in this upcoming revolution. Learning from them is a good way to create your own 3D Printing strategy.

We calculated power users' engagement with 3D Printing based on different criterias.

Two them are:

- The profile of the users
- How intensive is the use of 3D Printing?

In our 2016 survey, we added some questions in order to establish a link between how much 3D Printing is used and the performance of a company. While we are aware this assumption is a long shot, it is, to our mind, essential to determine whether 3D Printing comes with a great Return on Investment (ROI) or not.

Finally, we try to assess the advantage and ROI of using 3D Printing.

The goal of this chapter is first to assess who are those so-called power users, to compare the 3D Printing good practices that are shared through different industries, and at last see if behind those very ambitious 3D Printing's uses, 3D Printing turns out to be a competitive advantage.

# EMPLOYEE PROFESSIONALIZATION IMPROVES OUTCOME

**95% of the power users declare themselves as professionals.** Among those power users, 48% are also considering themselves as trained professionals for 3D Printing, while it is the case for only 24% of them when we're considering the total of users.

This suggests two things. First of all, the power users' behaviors, when it comes to additive manufacturing, should reflect an **economic rationality** rather than the passionate relationship toward crafting or making things. Secondly, the higher rate of trained professionals shows that they are deeply implicated in the 3D Printing part of their business.

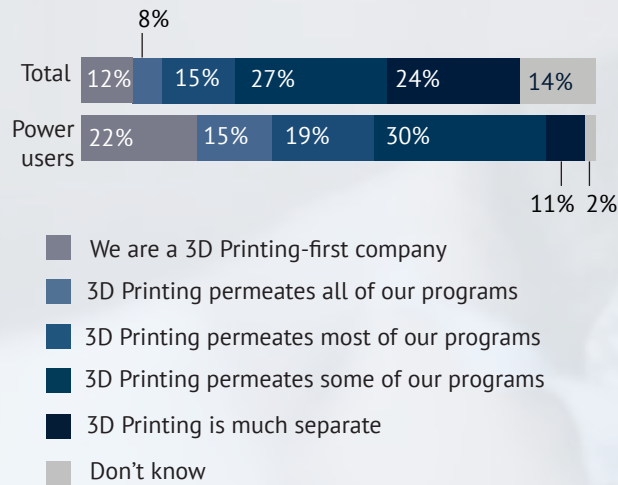
When looking at the use of 3D Printing inside the organizations they are working in, this trend of "professional additive manufacturing" is also significant, as 64% of them are declaring that they integrated 3D Printing in at least two of their programs. This figure drops to 23% for regular users.

### What should you do?

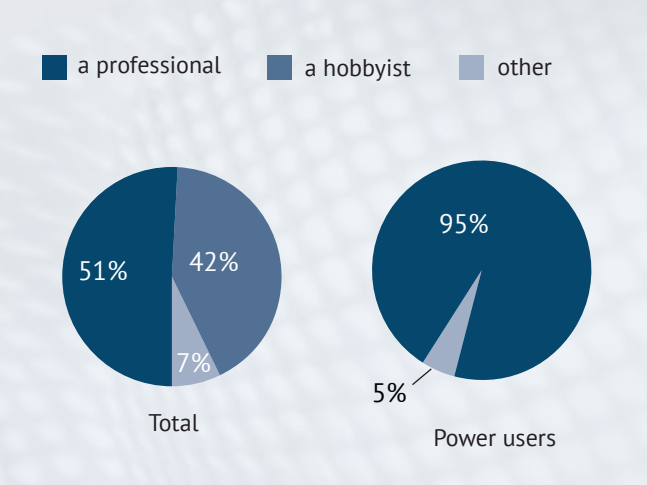
It's obvious that users who need additive manufacturing the most are doing it for professional purposes. They are often trained to handle the different technologies and are for the most part working for companies that are integrating 3D Printing not only in one project but as a solution that is viable cross department.

You should consider the different projects that could benefit from the help of additive manufacturing and never hesitate to bring people with experience in additive manufacturing to work on these projects. **You will gain in efficiency and see a better ROI than if you have to learn all from scratch.**

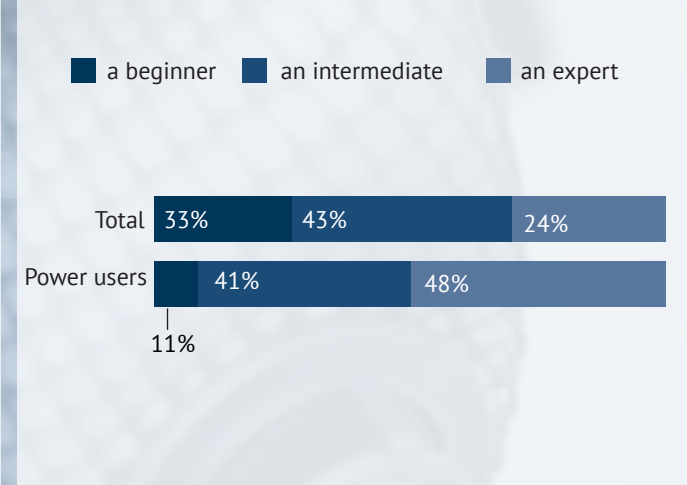
To what extent 3D Printing permeates your activity ?



Are you ... ?



You consider yourself to be ...



## 3D DESIGN IS THE CORNERSTONE OF DEVELOPMENT

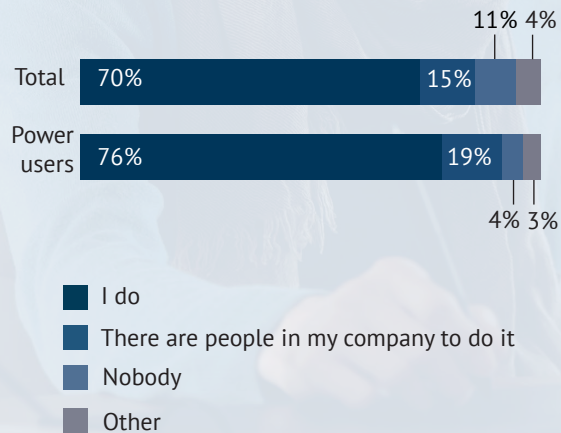
The power users share a common characteristic, they are securing the production of their 3D content for additive manufacturing. Whether it is because they are doing it themselves (75% of the power users) or because they have someone in the company to do it (19%), they are limiting the uncertainty factor on their 3D modeling. In total **93% of the power users are declaring they know how they will create their 3D files, while it drops to 84% for regular users.** Worse, 11% of regular users admit they have no solution to create 3D files.

Power users are significantly using **more materials** in their 3D Printing activities than regular users. Their use of plastic is more than 20 points higher, making it a material that is used by almost every power user. Resins and metals are also well represented with figures just under the 50%. Power users are actively using the three materials that are commonly available in additive manufacturing. On top of that, they are also testing more materials like wax, ceramics or sandstone.

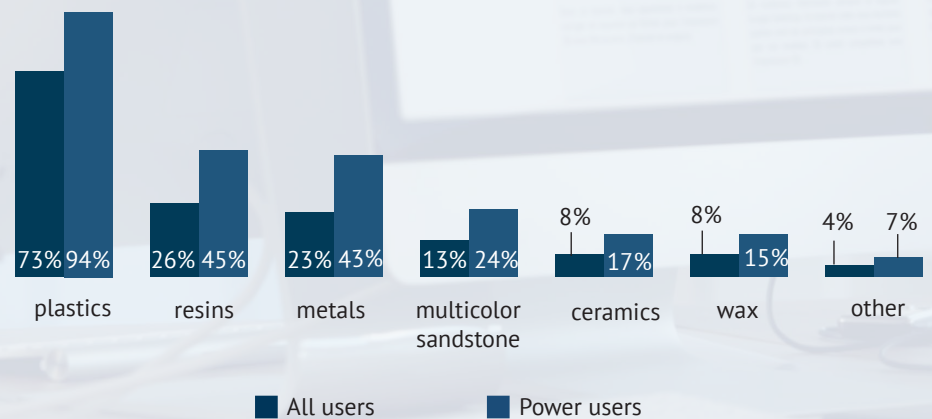
### What should you do ?

Power users share two very explicit behaviors. They **secure the key competence of creating 3D file and use a broad choice of materials for additive manufacturing.** If you want to be efficient in your 3D Printing strategy, you need to be able to iterate quickly on your 3D designs and **adapt the material** you are printing to each specific project, even sometimes blend different materials in the same project. There are many new technologies and machines (like the Carbon M1 3D printer) which were made commercially available this year. It opens a wider range of possibilities. You should take advantage of it.

Who works on 3D modeling in your company ?



Which material do you use for 3D Printing ?



# PRODUCT DEVELOPMENT IS THE TOP PRIORITY FOR HIGH PERFORMERS

For a long time, 3D printing and rapid prototyping represented almost the same reality. Both expressions were used to designate the production of prototypes with the goal to speed up production. The recent technology changes and the changes in the ecosystem itself have made this technology available for more purposes than before. This shift in the possibilities offered by 3D Printing has been fully grasped by the power users.

Looking at the top priorities declared by different participating organizations, power users systematically attribute twice as much importance to 3D Printing's impact. Their experience allows them to judge the benefits of 3D Printing in far more areas than regular users.

**They see the advantage of using 3D Printing both to develop the product and scale production thanks to additive manufacturing.** For instance, 43% of them would like to offer

customization and limited series through 3D Printing and almost 1/5 of power users is considering 3D Printing to optimize demo product expenses or reduce tooling investments.

At the end of a product's life, 10% of the power users see a solution in 3D Printing to improve spare part management.

### What should you do ?

On this particular point, power users behave quite similarly to last year. **3D Printing will help you in the development of your products first.** However you should quickly consider additive manufacturing for **production** too, especially if you are planning on releasing short series, if your products integrates complex shapes or if spare parts are essential in your activity.

Which is your top priority for your organization in 2016 ?



# THE IMPACT OF 3D PRINTING AND ROI

Inside their department, professionals are always looking for **investments that can achieve the best ROI**. Often, the first ideas that come to mind is related to sales, marketing, engineering or design. 3D Printing in itself is not what comes first. It is a mistake. Almost all of **3D Printing power users consider 3D Printing as a competitive advantage** (97%) and 61% of them are finding out that the ROI generated by 3D Printing in their activity increased since last year. In comparison, only 40% of the regular 3D Printing users are declaring a greater ROI with 3D Printing this year.

Even more interesting: not only power users are declaring a greater ROI for 3D Printing than regular users, but they are also declaring that **the company**

**they are working for is in good health**. We found it particularly interesting to measure this information through two key questions related to how good their company is doing:

- the 2015 turnover evolution
- if the company is planning on hiring

76% of the power users are working inside a company with a **growing revenue**, while it is only 47% for regular users. Moreover the “no change” answer is more than two times higher for regular users (46% against 21%) as is the “decreasing revenue” answer (7% against 3%).

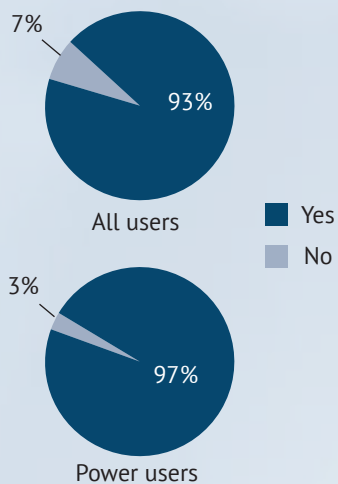
Last, power users are working inside companies with **positive hiring policies**. When 68% of the regular

users are declaring they will not hire in 2016, the figure drops to 55% for power users. When we look at the same chart in a positive way, **44% of the power users will be hiring while it is only 32% for regular users**. Power users also plan to hire more candidates for their 3D Printing activities than regular users.

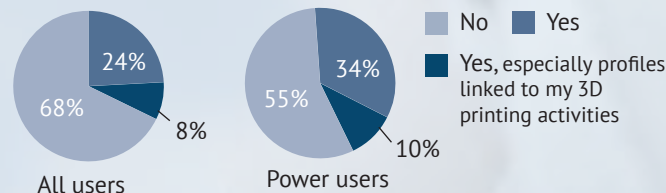
*What should you do?*

Growth is not always easy to grasp. **Do not underestimate what 3D Printing can bring to your department or your company in terms of ROI**. Power users counted on 3D Printing last year to generate revenue and they count on it even more this year. It might be a good time to try out a new lever to generate growth.

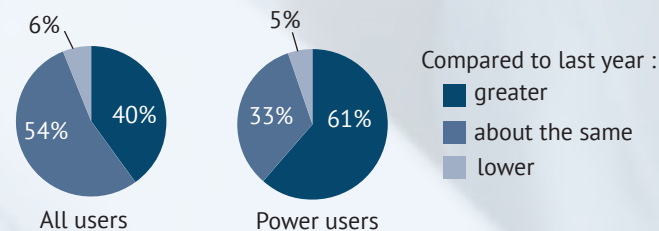
Do you consider 3D Printing as a competitive advantage in your strategy ?



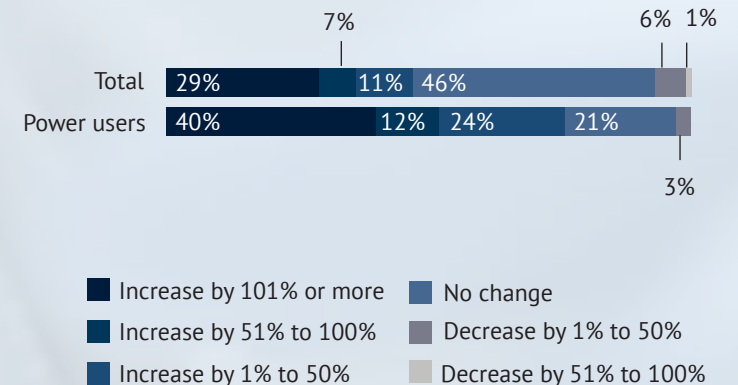
Do you plan to hire new profiles this year?



What is the ROI of 3D Printing in your activity this year?



Compared to 2014, what is the evolution of your turnover in 2015?



## YEAR-OVER-YEAR CONTRAST

3D Printing permeates **50%** of respondents' activities in 2016 against **41%** in 2015

2016 has marked an important year for additive manufacturing and its evolution, bringing in new technologies and new services. However, one cannot understand how trends will evolve and what to await out of the unexpected without looking at what has been done in the past and how it has changed in the present.

Last year we did not have a section looking at what had been said and how it had changed, as it was our first edition of our report *The State of 3D Printing*. With the number of answers we have obtained this year, we believed that we were able to compare the results, while staying on neutral ground and avoiding going into speculative commentaries. However, to fully understand

the extent of the changes, we focused on a number of questions where we believed evolution was essential to analyze and where progress was made.

These questions have been divided into 4 sections:

- The diversification of uses made of 3D Printing
- How 3D Printing permeates everywhere
- Current priorities and predictions five years from now
- The key external factors relating to the development of 3D Printing

While some chapters look at the overall results we obtained from our survey, additional filters have been added to certain sections to show the full extent of the integration of 3D Printing in global and professional settings. More than just a simple opposition, perhaps we should see these differences as a way for consumers and professionals to tailor 3D Printing to their own strengths.

It was in this spirit that we assembled the contents of this section, which combines both a statistical analysis from our 3D Printing report and an interpretive framework inspired by conversations with customers worldwide. The latter did much to enrich the qualitative aspects of this part of the study.



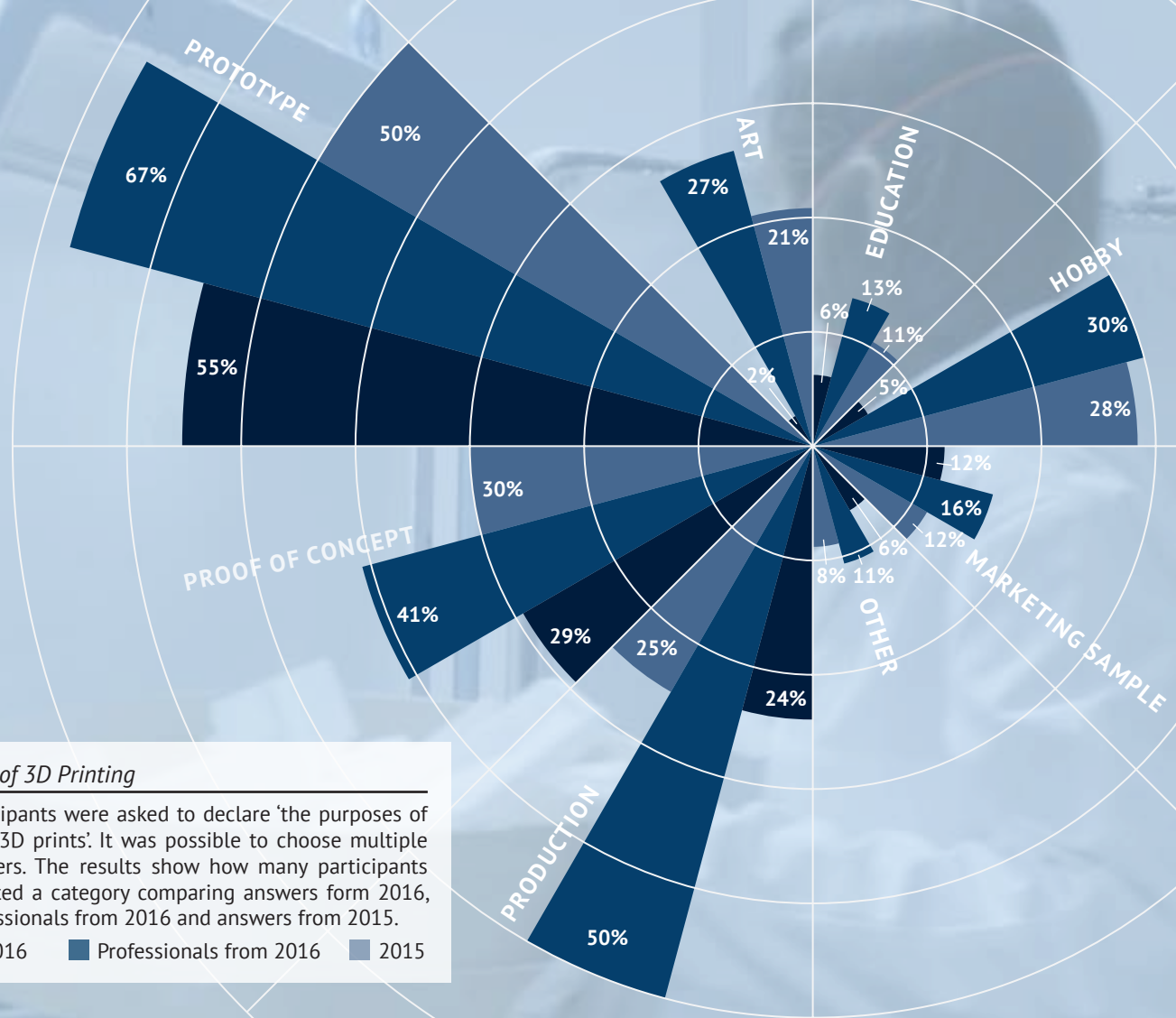
# MORE PURPOSES FOR 3D PRINTING

“**Prototype**” remains the king throughout the year while “proof of concept” follows its lead. Indeed, “prototype” and “proof of concept” continue to be what comes to mind when discussing 3D Printing. As for “production” it has gained a small increase in the overall respondents’ consensus and remains in 3<sup>rd</sup> place. In the overall results, **the purposes of 3D Printing have seen a more widespread use** than before with growth in all aspects.

However, looking at the purposes of 3D Printing for the individuals who answered the survey last year, “**production**” sets itself in second place, right behind “prototype”. It confirms that demand is present but perhaps requires prior experience to understand the full potential on a larger scale, as the production world has become porous to the point where 3D Printing has been able to enter in and provide concrete solutions. When filtering only those who use additive manufacturing services such as Sculpteo, the results stay at the same percentage levels as the ones who answered the survey last year.

Moreover, when comparing 2015 to 2016, **the tendency to use 3D Printing for only one purpose saw a decrease of 14%**, while respondents using 3D Printing for several other uses rather than just one went above the maximum number of uses in 2015. In other words, looking at the average uses per respondents, the results in 2015 were around 1.7 uses per respondent. 2016 showed an increase of this average with around 2.3 uses per respondent, which boils down to a **growth of 31% in average uses per respondent**.

The number of reported uses in 2016 show that additive manufacturing is increasingly extending its use to new sectors. Indeed, 3D Printing can ease the work of individuals, reduce production costs when necessary, and even reduce time spent to obtain a final product. With this in mind, most will not limit themselves in the uses, whether it is in after-sale, research, or production.



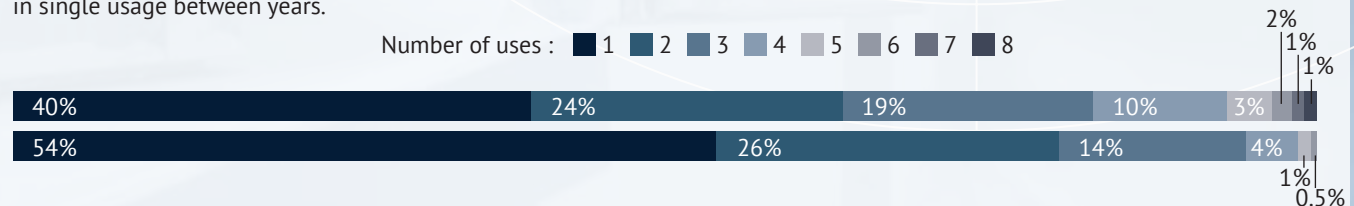
### Uses of 3D Printing

Participants were asked to declare ‘the purposes of their 3D prints’. It was possible to choose multiple answers. The results show how many participants selected a category comparing answers from 2016, professionals from 2016 and answers from 2015.

■ 2016 ■ Professionals from 2016 ■ 2015

### Number of uses per respondents

Respondents were asked how many uses for 3D Printing they exploited. The results show that there was an important decrease in single usage between years.



# 3D PRINTING PERMEATES ALL ACTIVITIES

Not only is 3D Printing being used in new ways in all sectors, but companies are also progressively integrating 3D Printing into their activities, whether it is in research, production or even marketing. In fact, results from 2015 showed that most excluded it from their program, stating that it was quite separate, while in 2016 most are stating that they are in fact integrating it in some of their programs.

Regarding those who integrate 3D Printing in most and all of their programs, their number has amplified, with an increase of 6%.

As a whole, **integration is increasing while separation is decreasing.**

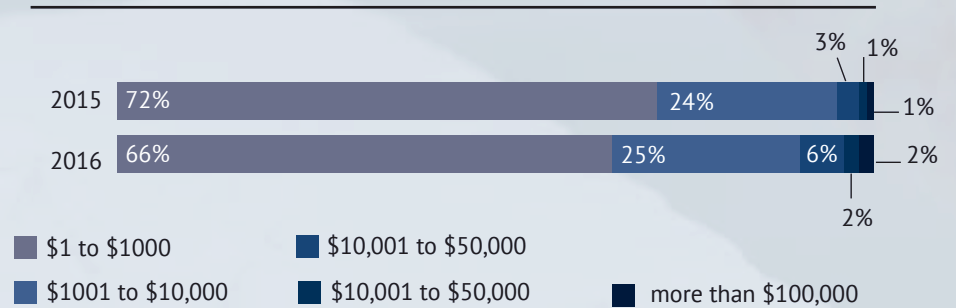
By the same token, the average budget spent per respondent in 2015 was \$3,736 and the current average budget by 2016 is \$6,132 which reflects a **significant increase of 64% in the average budget spent between the years.**

This goes with the previous trend of an increase in the purposes of 3D Printing. As one understands the potential uses of additive manufacturing, **companies integrate it more and more into their program** to ease their work and reduce their costs in prototyping, in proof of concept, and even in production.

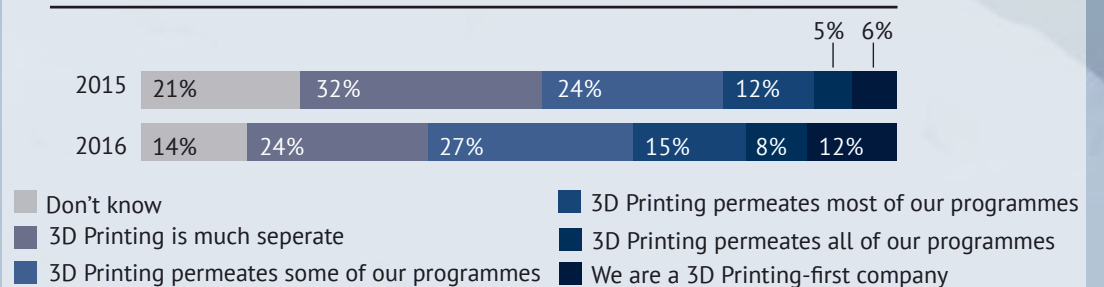
Additionally, with a stable number of professionals and a decrease in the number of beginners, respondents have more or less increased in skill with a growth of around 4% of intermediates. This trend was somewhat expected, as **3D software tools are more and more accessible and tutorials are ever more present online.** Furthermore, as the demand for 3D modeling increases, the expected outcome for the years to come would be a smaller increase in beginners and a bigger increase in intermediates, as individuals see a greater interest in 3D Printing and the uses it can provide, and perhaps a decrease in the number of professionals as skills would increase with the years.

3D Printing is gradually gaining ground; it is a fact. Not only with consumers but also mostly with businesses. From those numbers, one could only expect that the average spending will increase even more and as demand grows exponentially, the future outcome should follow a trend where businesses will eventually permeate additive manufacturing in most of their programs.

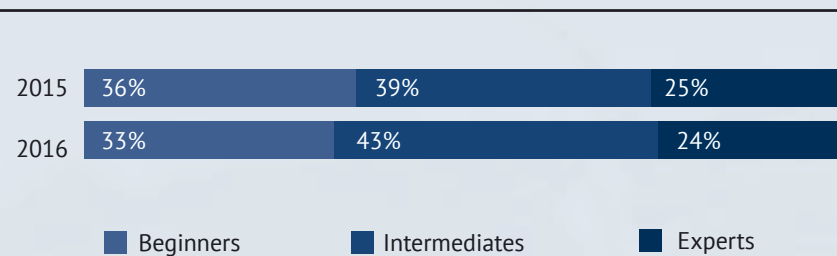
Amount spent on 3D Printing



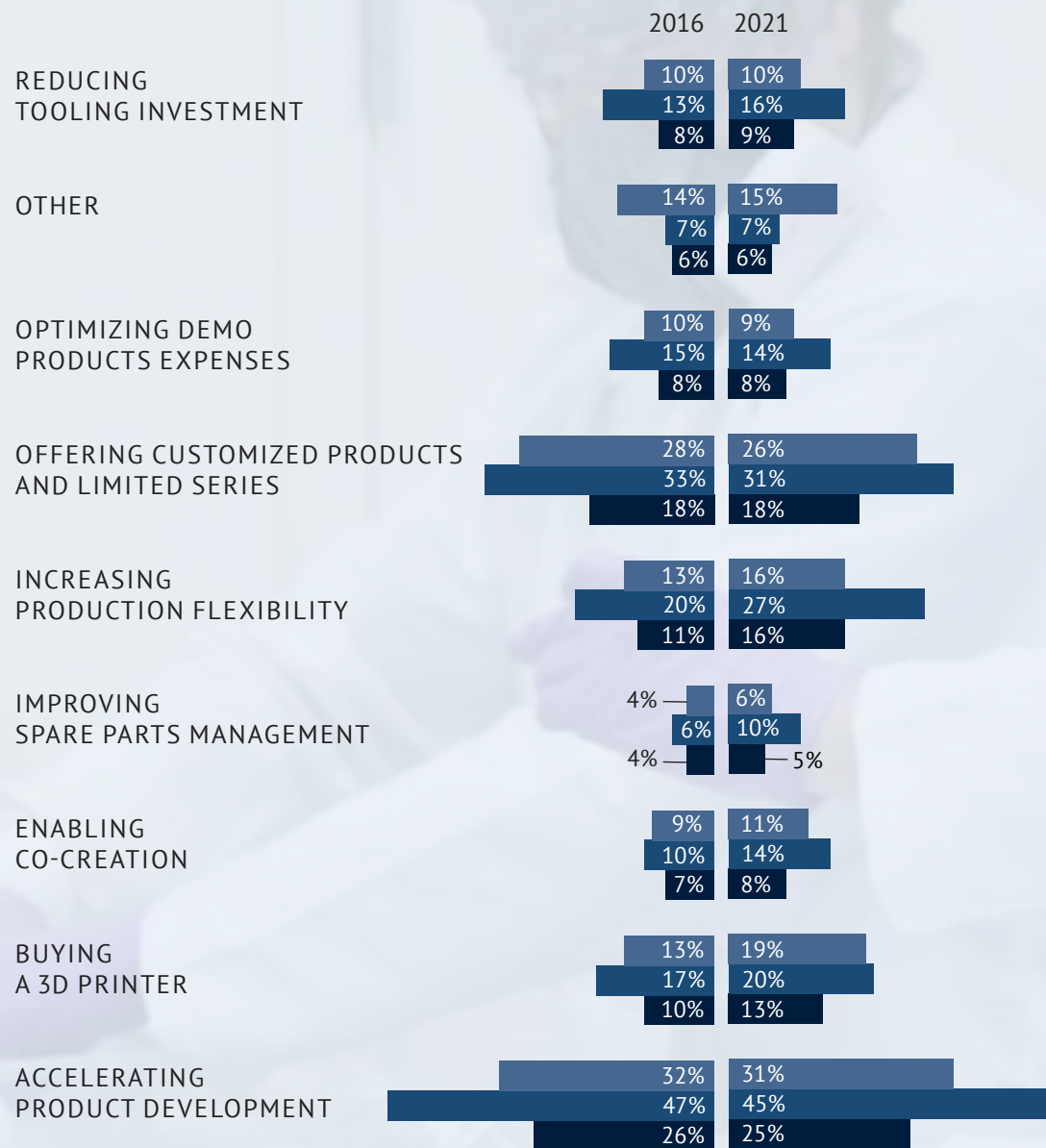
3D Printing inclusion



2016 showed more qualified respondents than 2015



# PRODUCT DEVELOPMENT KEEPS LEADING THE PACK



For each area we defined, participants decreased their evaluation of 3D Printing's impact in 2016. They have started focusing on certain traits rather than several. The biggest decrease is in "offering customized product and limited series" (-10%) and "accelerating product development" (-8%).

Conversely, limiting the importance of priorities to respondents who are professionals reveals that their demands go against the grain. Most of the factors have increased in percentage, with the **biggest increase being in "accelerating product development"**.

This goes with what was said before. First, 3D Printing is professionalizing. Second, large companies investing in additive manufacturing

require that the process becomes better than the current state of production, to be competitive on the market.

As for improvements in the long run, when looking at 2021, answers from all the respondents saw a decrease in the overall areas. However, when looking at answers from professionals, improvement in all the areas saw a growth similar to priorities for 2016, with an increase in the overall results, the biggest growth being in "accelerating product development" and "increasing production flexibility". The tendency goes with what was said before, that large companies require that **additive manufacturing should be able to compete with the current state of technology.**

- Results & forecast of 2015
- Professionals of 2016
- All users of 2016

# MATERIAL, MACHINES AND SKILLS ARE KEY EXTERNAL FACTORS

When comparing the results for what motivates respondents to use 3D Printing, two categories can be seen from a factor point of view. On one hand, there are factors relating to the technology itself, that is, machines and materials. On the other, there are external and organizational factors specific to the legal framework, in addition to factors related to training, reverse engineering, and consumer understanding.

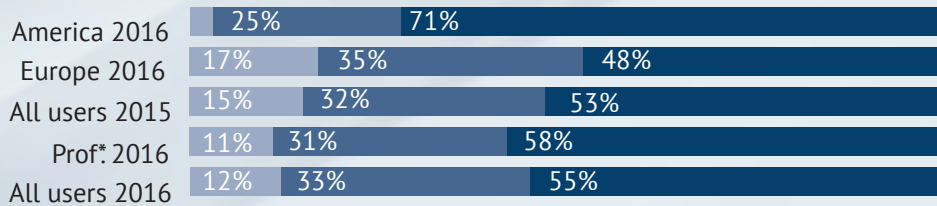
The factors have all gained in importance in the eyes of the respondents from one year to another. The most important evolutions concern “understanding customer

needs” and “training teams”, evolutions that mark the organizational factors more than technology.

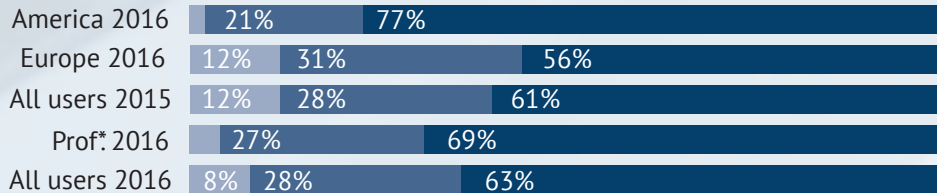
On the other hand, when looking at the results of only professionals, they believe that **“material & supply cost” and “machine consistencies and capabilities” of the 3D printed parts’ are much more important**; they see more importance in factors relating to the technology itself. Indeed, there is an 8-point difference relating to machines, and a 4-point difference concerning materials between professionals from this year and the results from last year.

Relating to geographical insights, when comparing results between years, very little has changed. As a matter of fact, **Americans, like last year, pay more attention to factors closely related to technology, whereas external factors are more valued by Europeans.** Results reveal that 77% of Americans consider that factors relating to machinery are “very important”, 21 points higher than Europeans. Similarly, there is a 23-point difference between Americans and Europeans in regards to the importance given to factors relating to materials.

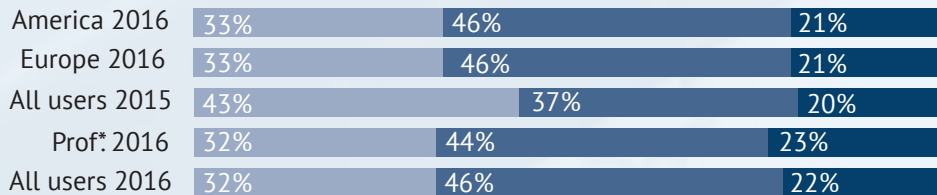
## MATERIAL SUPPLY & COST



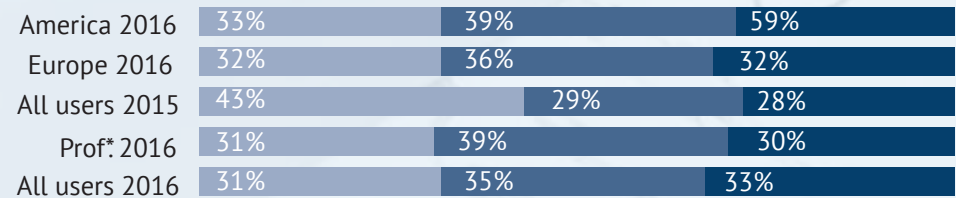
## MACHINE CONSISTENCIES & CAPABILITIES



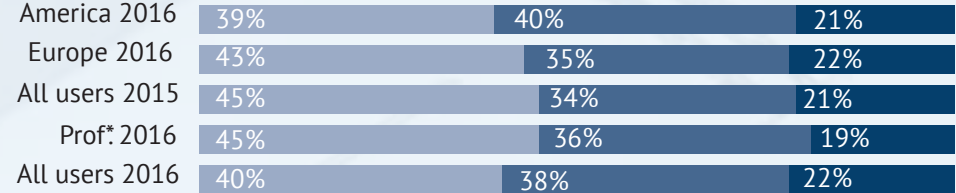
## TRAINING TEAMS



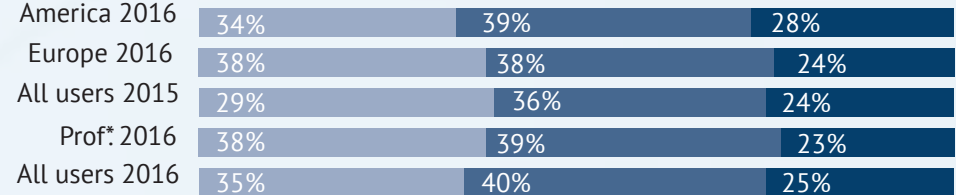
## UNDERSTAND CUSTOMER NEEDS



## REVERSE ENGINEERING



## CLEAR LEGAL FRAMEWORK



■ not important   ■ somewhat important   ■ very important

\*professionals

## SECTORIAL INSIGHTS

Continuing from the 1<sup>st</sup> edition, the second 'State of 3D Printing' survey is meant to be a real decision-making tool for you. The global overview of this year's trends, the strategy orientations, and the definition of power users are directed towards this objective. In this section, you will find a precise sector analysis. The questions are oriented in a way to give an overall idea of how each sector evolves and deals with 3D Printing. In this way, you can

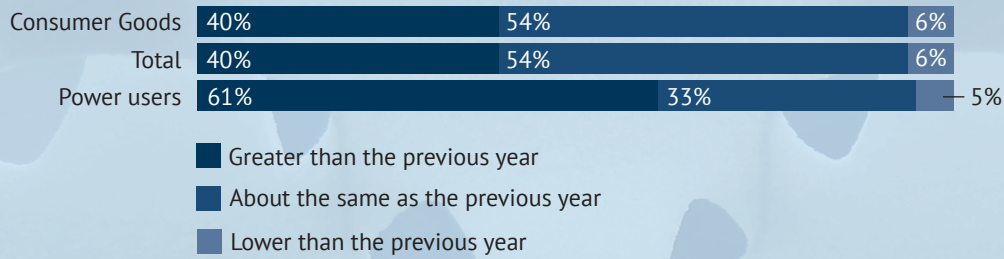
find very accurate information for your own sector and make clarified decisions. The survey reflected four main sectors among our respondents: consumer goods, industrial goods, high technologies, and services. You can refer to those key points thanks to our respondents: orientation priorities, integration in the company, expertise in 3D Printing, expenses, usage of 3D Printing in the sector, and finally the materials mainly used.

For each sector, you will find a point-by-point comparison between the sector, the total, and the power users of that sector. Therefore, you will be at ease to be well-informed in the different key points we selected.

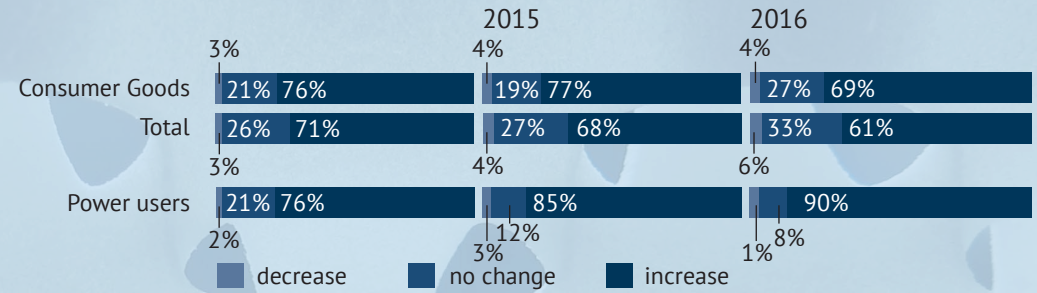
We hope that this survey helps you compare your activity wisely to other companies in your own sector, as well as 3D Printing main uses and strategies in other sectors.

# SECTORIAL INSIGHTS CONSUMER GOODS

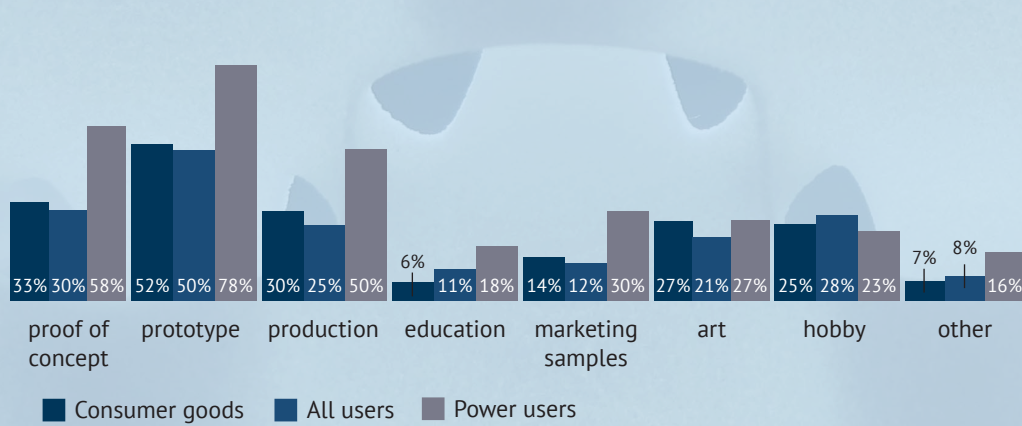
## RETURN ON INVESTMENT OF 3D PRINTING



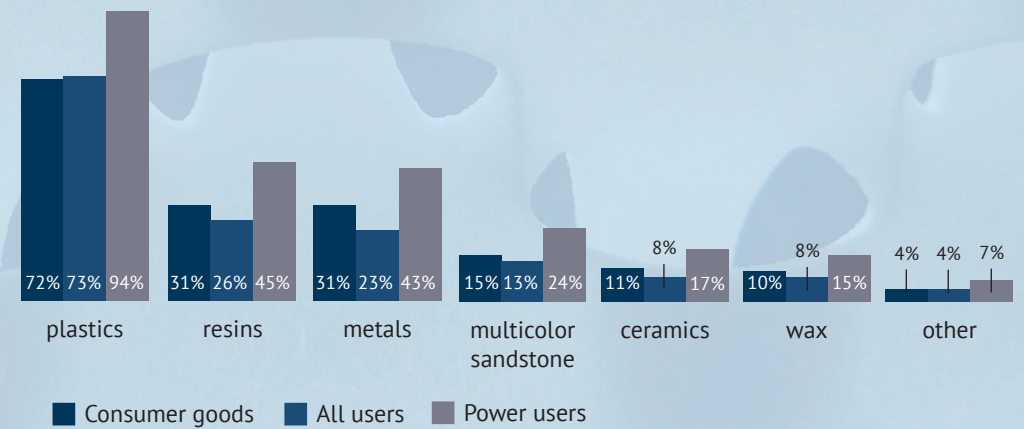
## EXPENSES



## APPLICATIONS

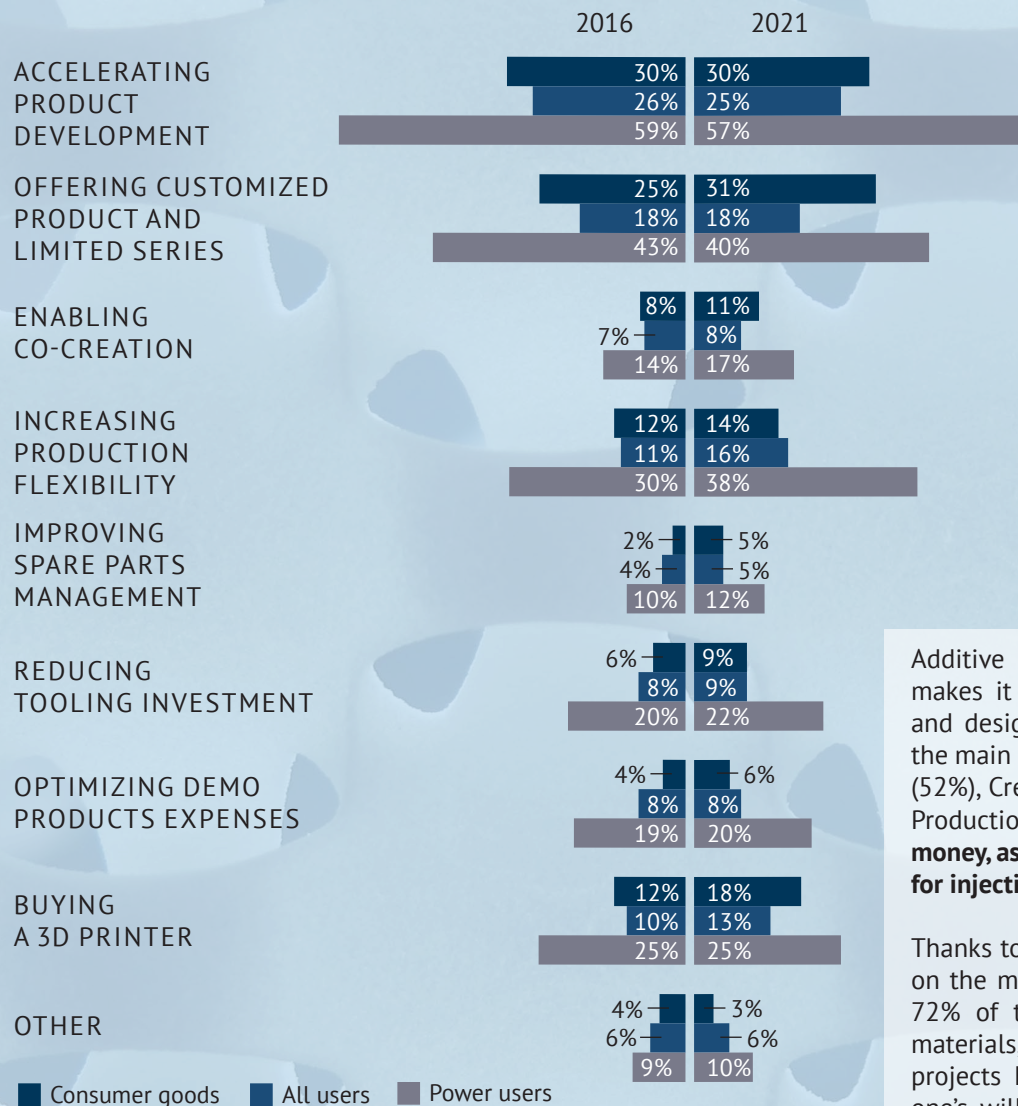


## MATERIALS

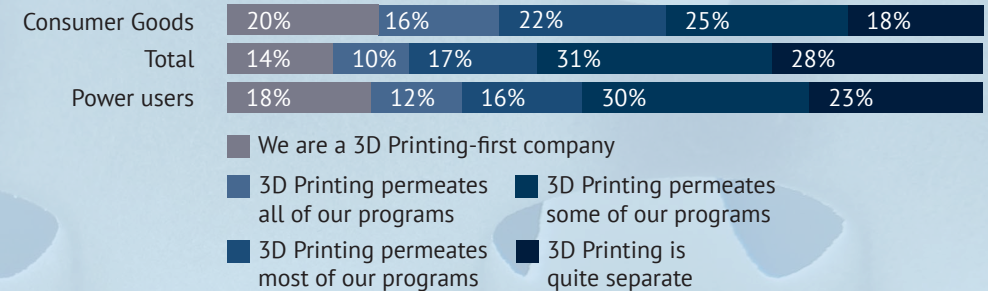


# SECTORIAL INSIGHTS CONSUMER GOODS

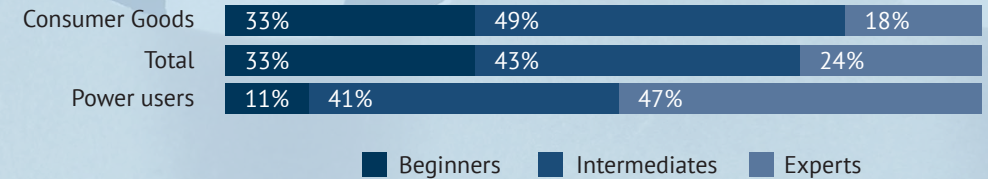
## TOP PRIORITIES



## INTEGRATION



## EXPERTISE



Additive manufacturing for consumer goods makes it easy to quickly create new structures and designs to improve existing objects. Hence the main uses in consumer goods are Prototyping (52%), Creation of a proof of concept (33%), and Production (30%). **This technology saves time and money, as you don't need to create a plastic mold for injection.**

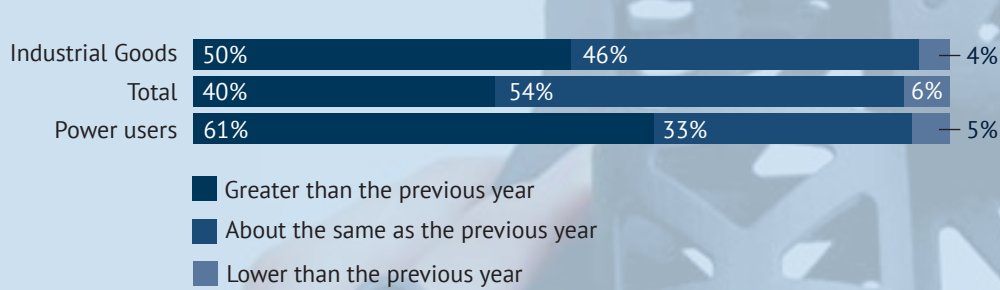
Thanks to the wide choice of materials available on the market, such as plastics that are used in 72% of the projects, resin or even multicolor materials, it is possible to 3D print ambitious projects hastily and change them according to one's will. Mass-customization is a key interest

for professionals to offer customized products and limited series. In this industry, having all new ideas mixing traditional materials and **3D Printing can help to significantly stand out from competition.**

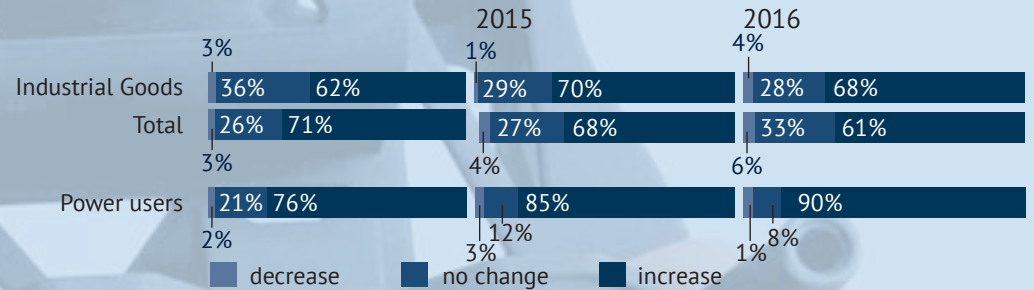
69% of the companies in this sector have increased their spending for 3D Printing, while 40% of them even consider having a better Return On Investment (ROI) of 3D Printing compared to last year. While their use of 3D Printing is increasing, they have also become more specialized in 3D Printing. This year again, additive manufacturing strengthens its position as a competitive advantage in consumer goods.

SECTORIAL INSIGHTS  
**INDUSTRIAL GOODS**

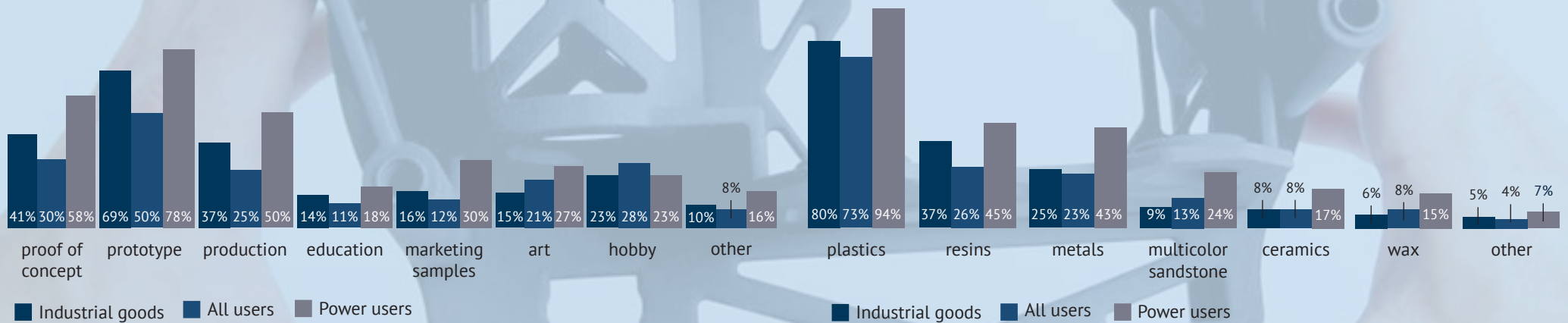
RETURN ON INVESTMENT OF 3D PRINTING



EXPENSES



APPLICATIONS

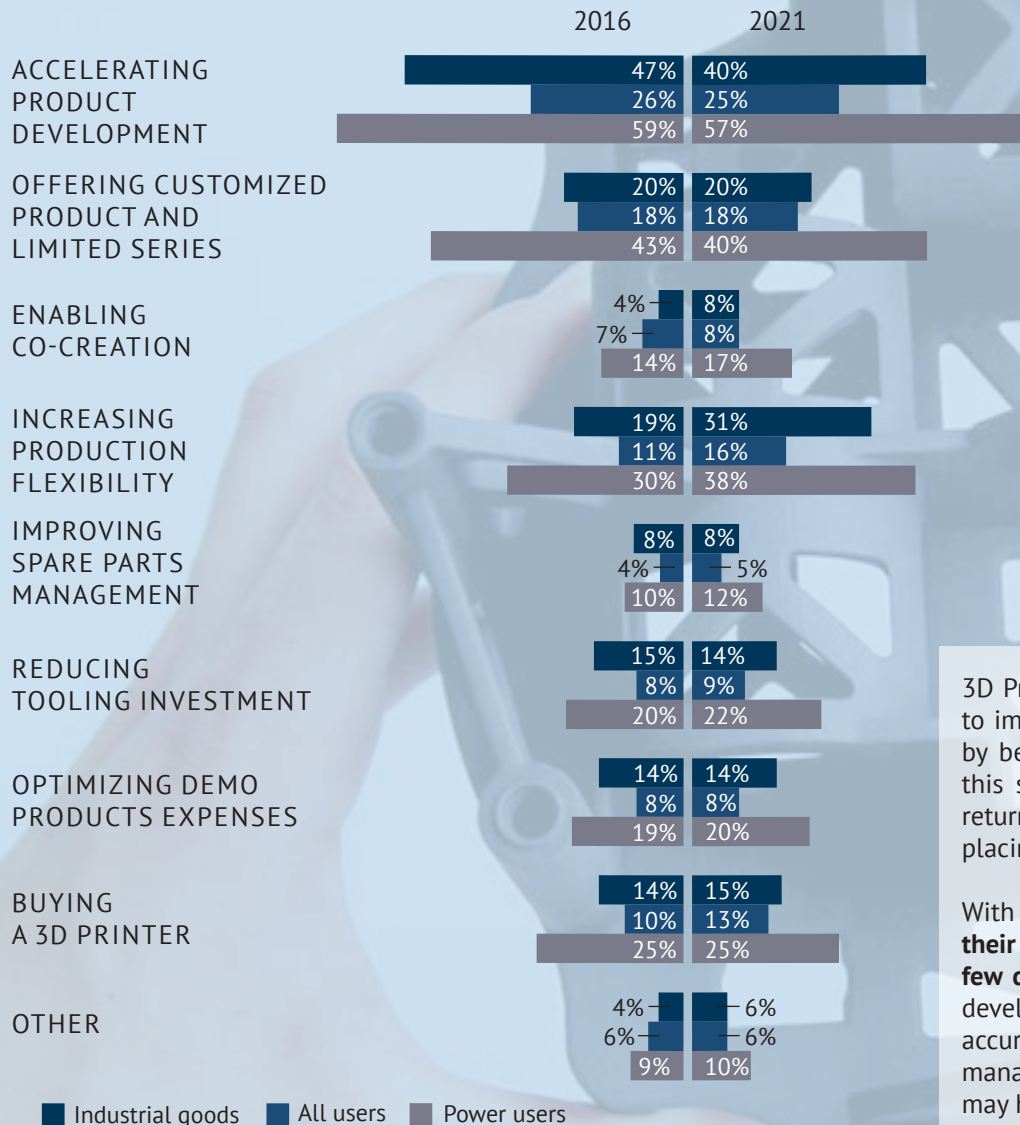


MATERIALS

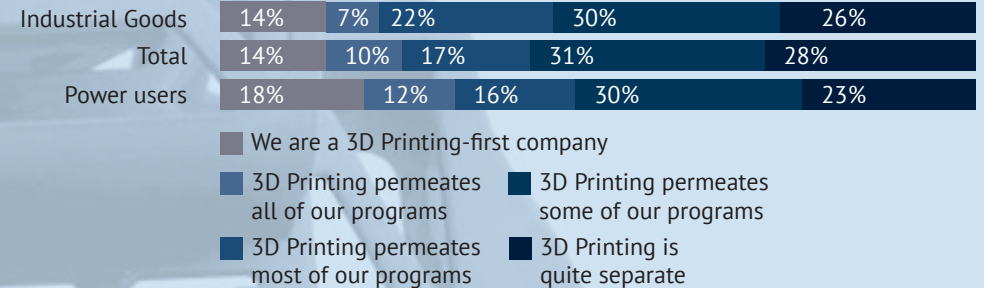


SECTORIAL INSIGHTS  
**INDUSTRIAL GOODS**

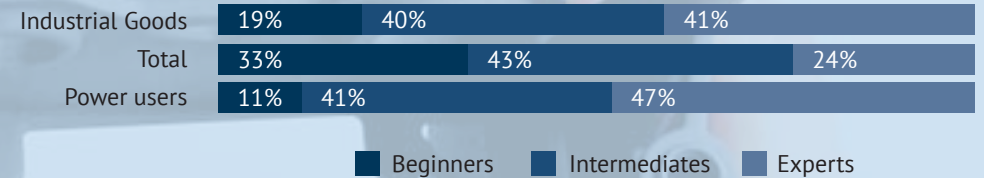
TOP PRIORITIES



INTEGRATION



EXPERTISE



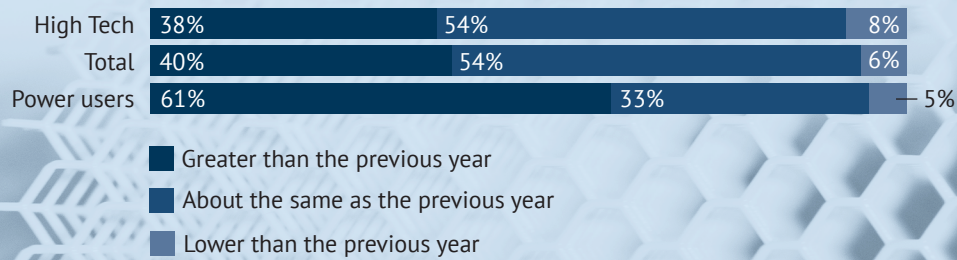
3D Printing service helps the industrial sector to improve the machine tool conception cycle by being fast and reliable. Respondents from this sector have noted that they had greater return on investment than the overall sample, placing them at 50% compared to 40%.

With rapid prototyping, **anyone can shorten their prototyping time from a few months to a few days.** This does not only shorten product development time, but it will also improve the accuracy of final prototyping thanks to a better management of all the different versions one may have on additive manufacturing platforms

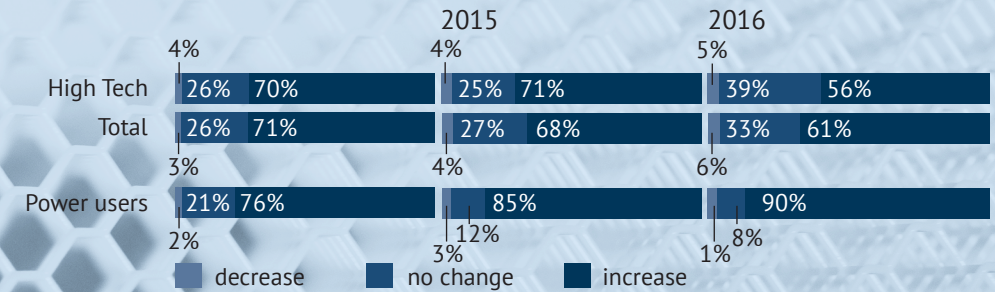
such as Sculpteo. As a matter of fact, 3D Printing is used in majority by respondents in this sector for prototyping (68%), even more than the global sample (50%).

As for material, **plastic** is both strong and slightly flexible. It is **the perfect material for prototyping functional parts**, something that has been noted for industrial goods as a greater part of respondents use it, around 80%. Additive manufacturing services, such as Sculpteo, offers also valuable resins with various technical properties in order to simulate plastics, rubbers or silicones.

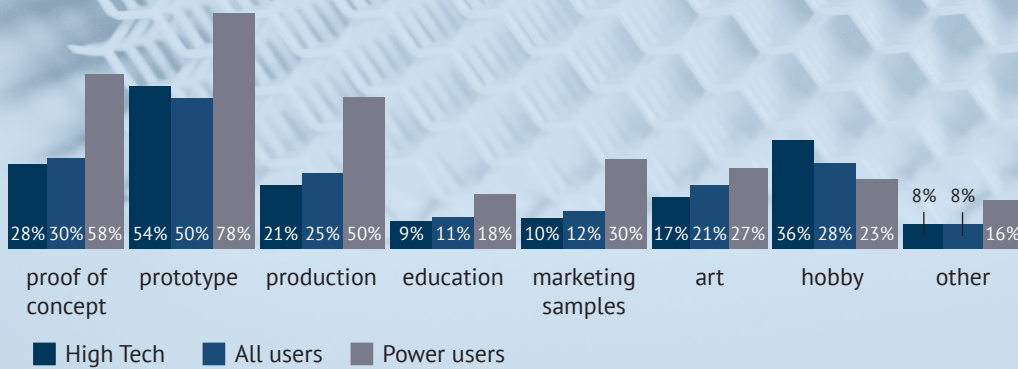
## RETURN ON INVESTMENT OF 3D PRINTING



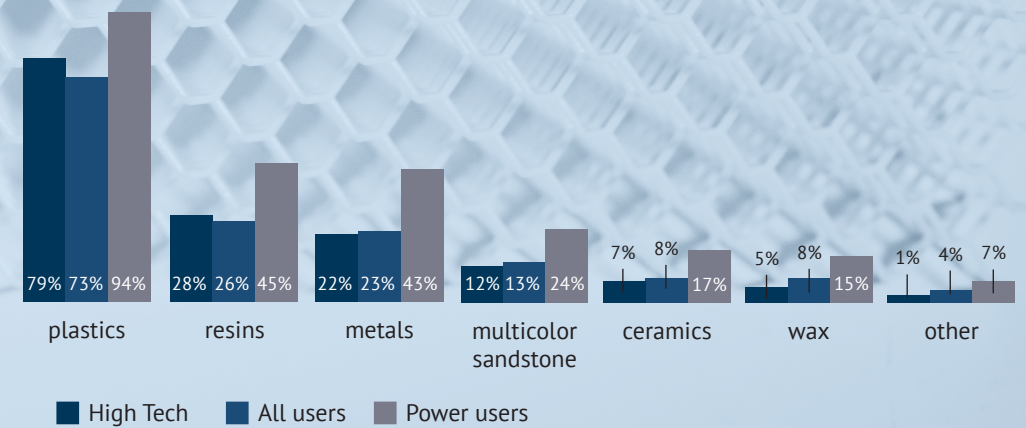
## EXPENSES



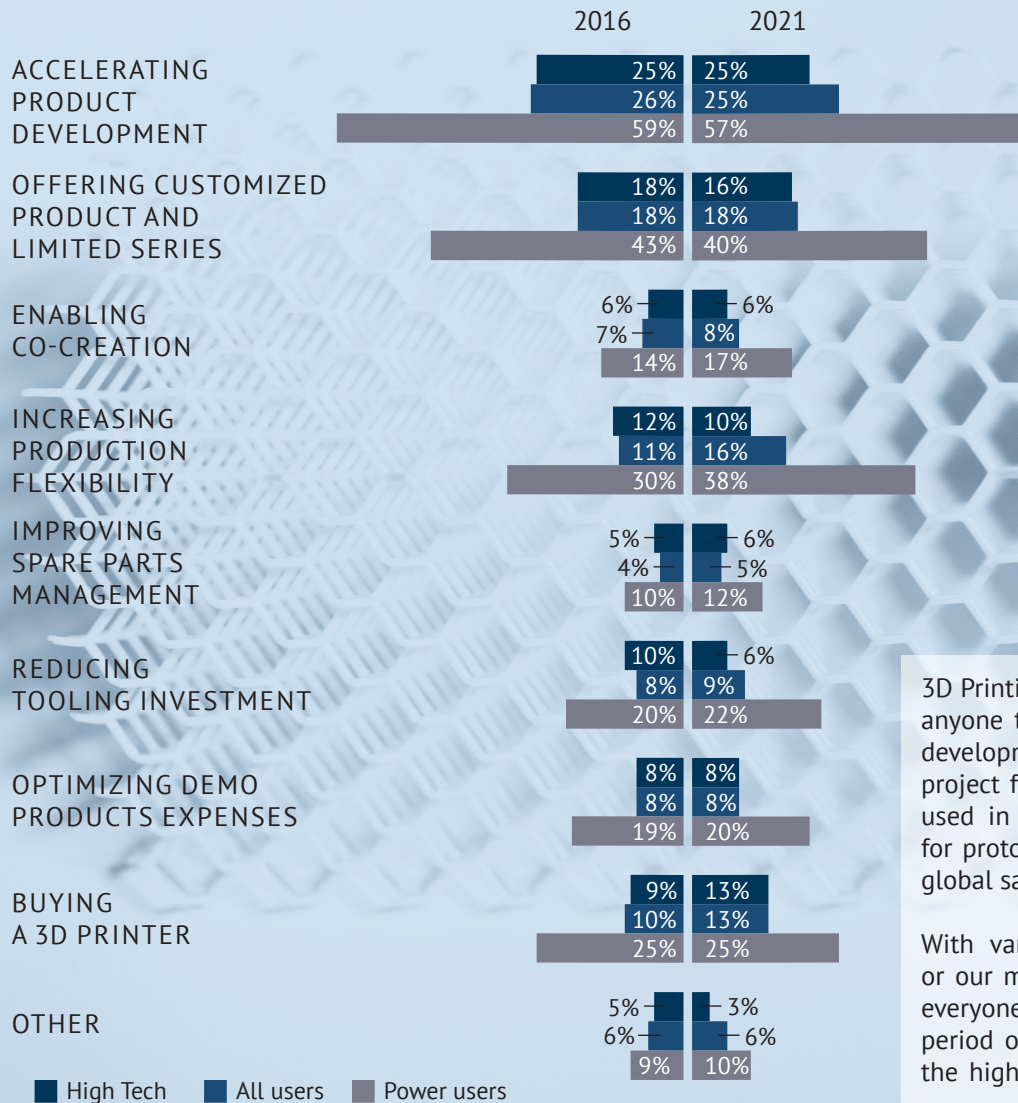
## APPLICATIONS



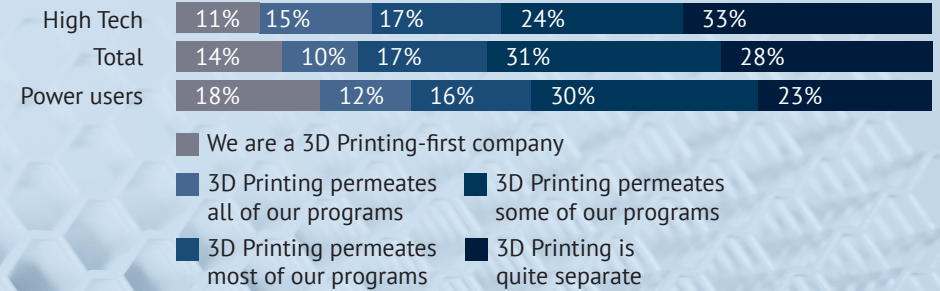
## MATERIALS



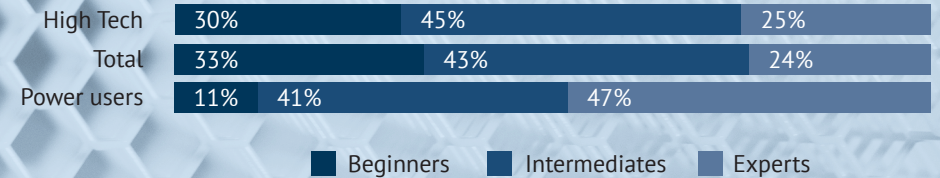
TOP PRIORITIES



INTEGRATION



EXPERTISE



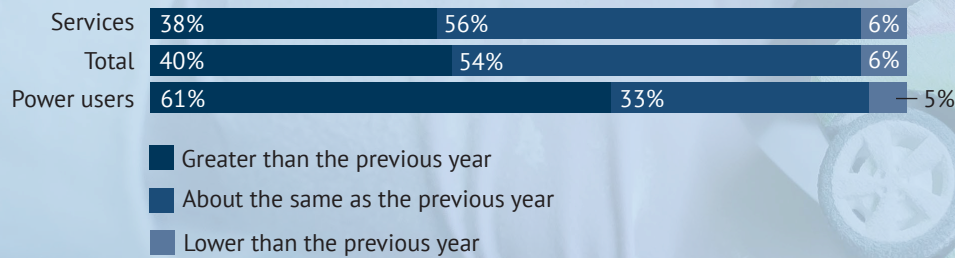
3D Printing in the High Tech industry will enable anyone to **quickly create prototypes** during the development phase and therefore complete their project faster. As a matter of fact, 3D Printing is used in majority by respondents in High Tech for prototyping (54%), a little bit more than the global sample (50%).

With various materials (such as plastic, resin or our multi-colored material), it is possible for everyone to prototype hardware in a very short period of time and to make changes at will. In the high tech industry where product design is

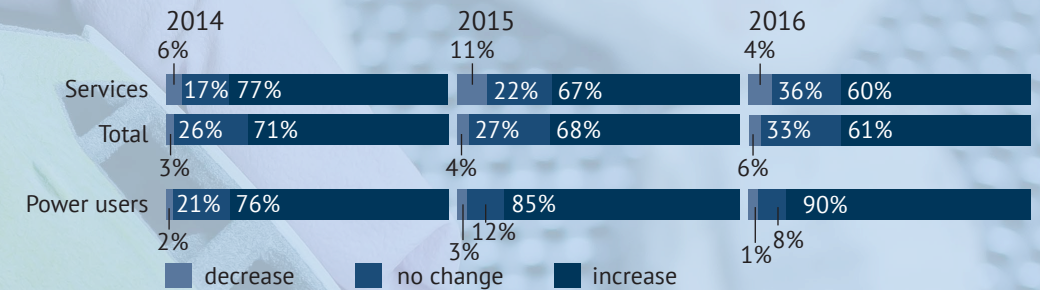
crucial, being able to have a new prototype in a few days provides a **clear competitive advantage**. Indeed, 79% of respondents in High Tech use plastics, while resins, the second most used material, stays at 28%.

**3D Printing helps create parts for the R&D phase** to validate the mechanical concepts and get the perfect piece quickly, as there's no need to waste months creating a mold for plastic injection. In just a few clicks on any additive manufacturing website, anyone can create an accurate representation of a new high tech prototype.

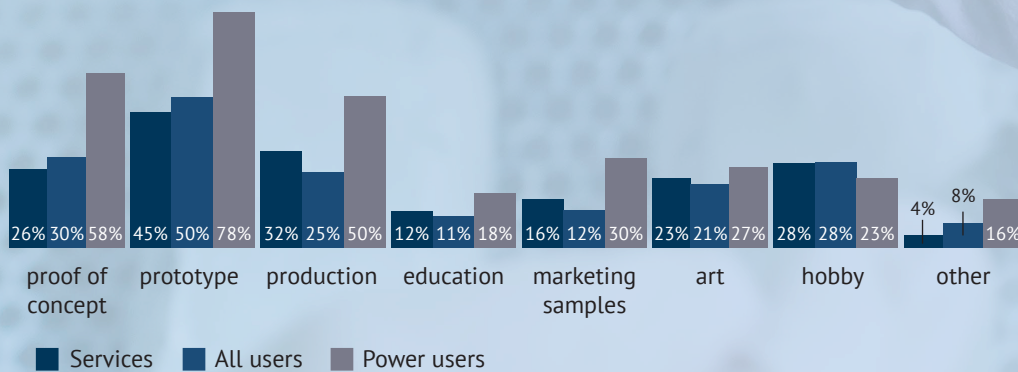
## RETURN ON INVESTMENT OF 3D PRINTING



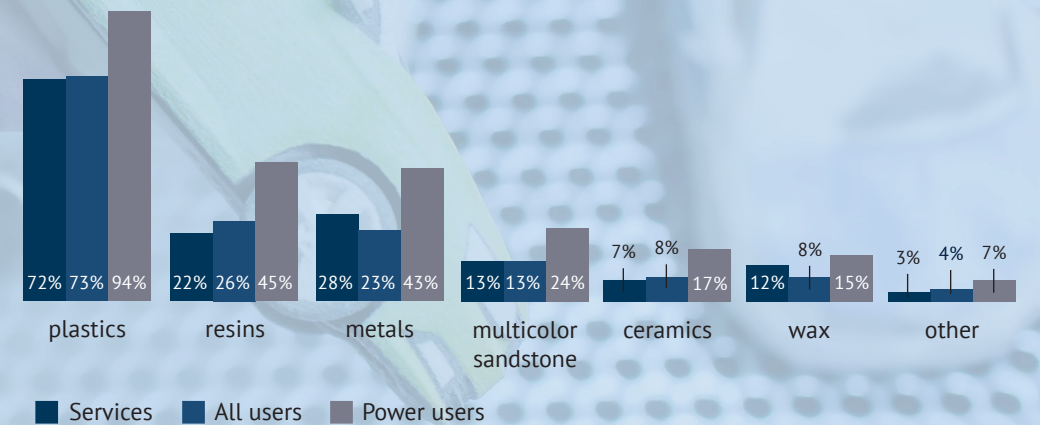
## EXPENSES



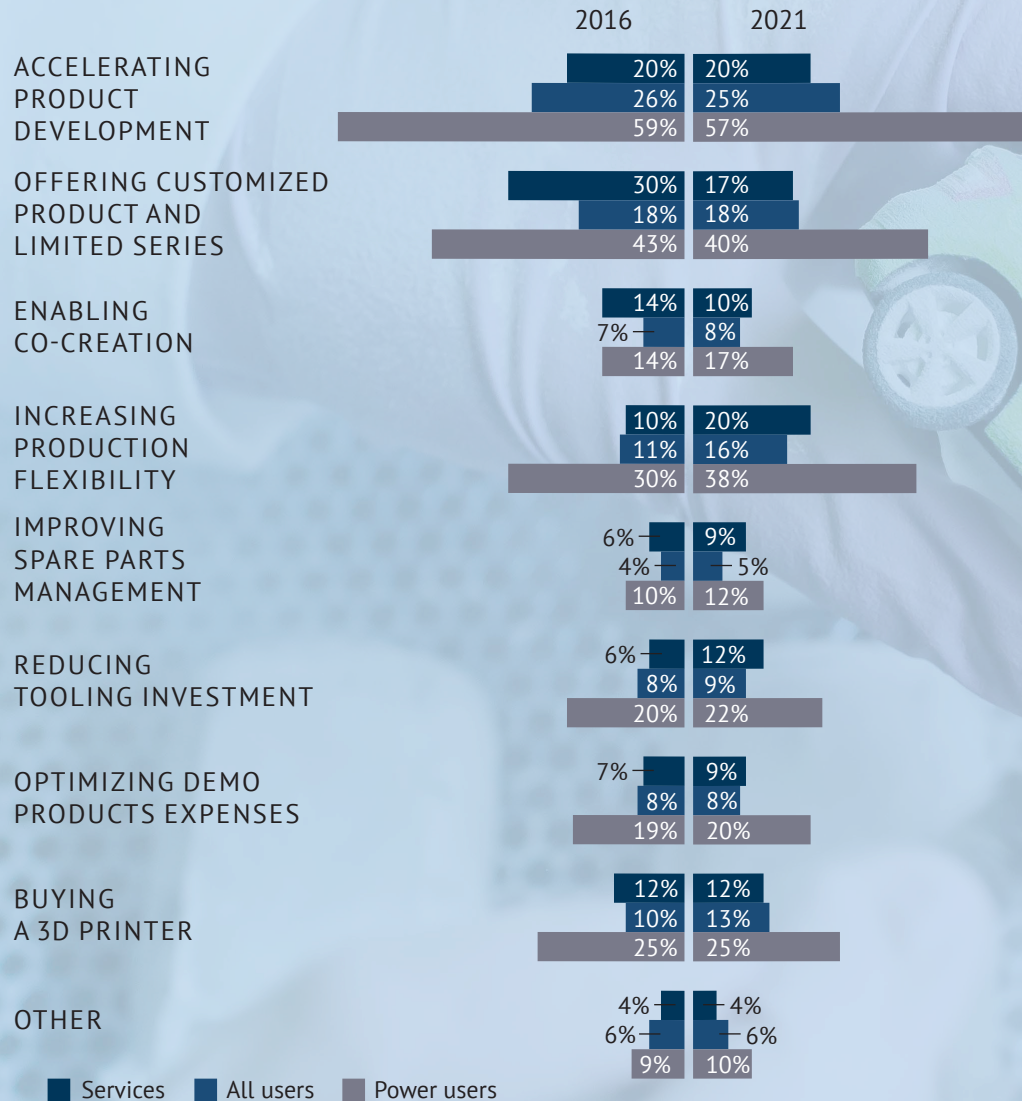
## APPLICATIONS



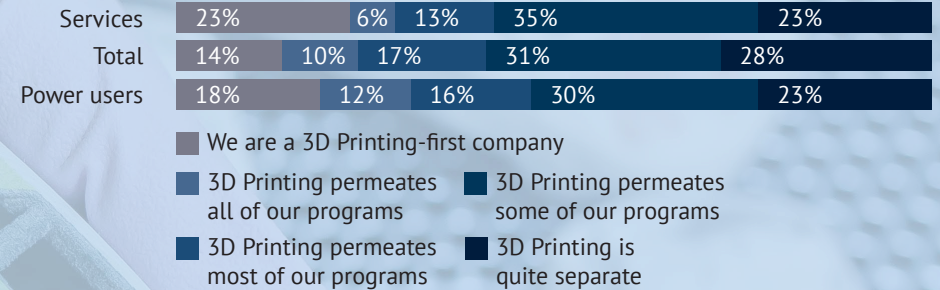
## MATERIALS



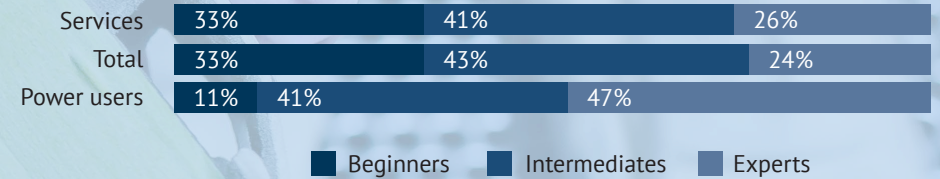
TOP PRIORITIES



INTEGRATION



EXPERTISE



As a company or a studio, creating a service of **customized objects** for your clients and taking advantage of 3D Printing to design each one of them with a slight difference is the best way to ensure customer satisfaction. 3D Printing enables personalized marketing for each customer to reinforce their **enthusiasm and passion**. Producing tooling and spare parts with 3D Printing is also a game changer for the industrial and BtoC services.



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