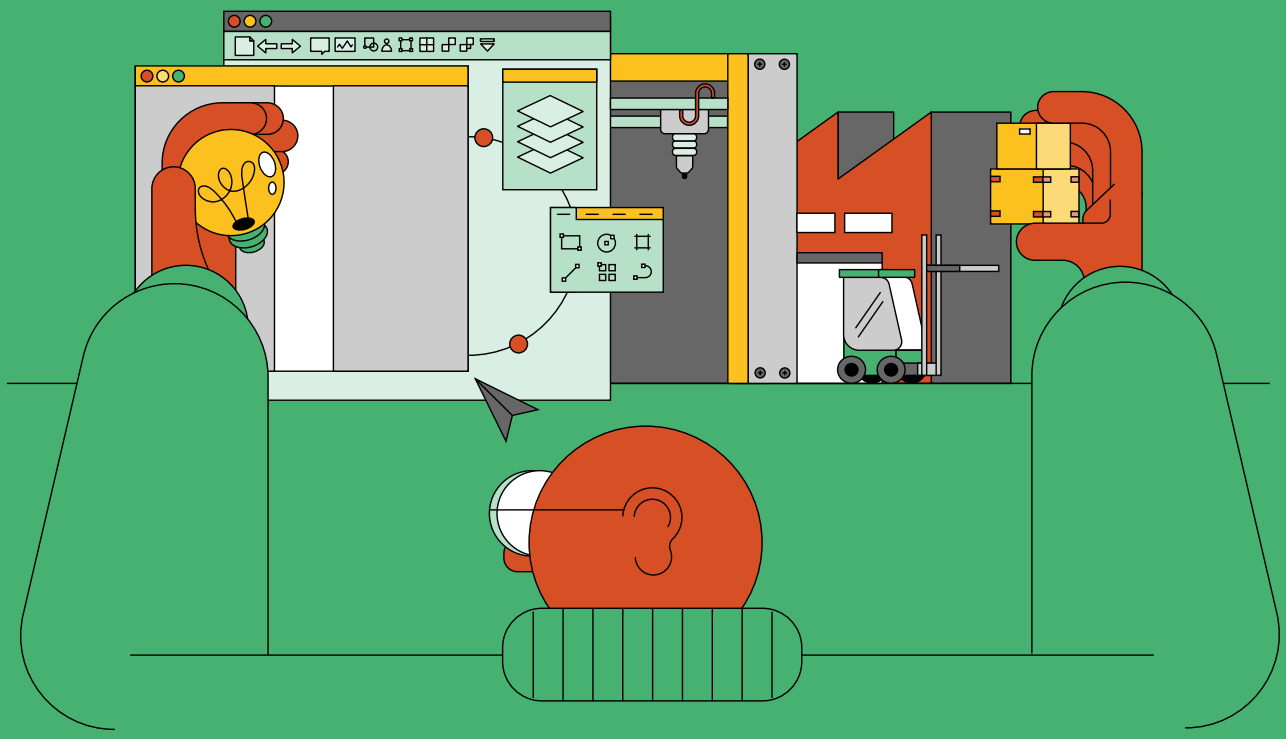
RACONTEUR

The democratisation of product design



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RACONTEUR

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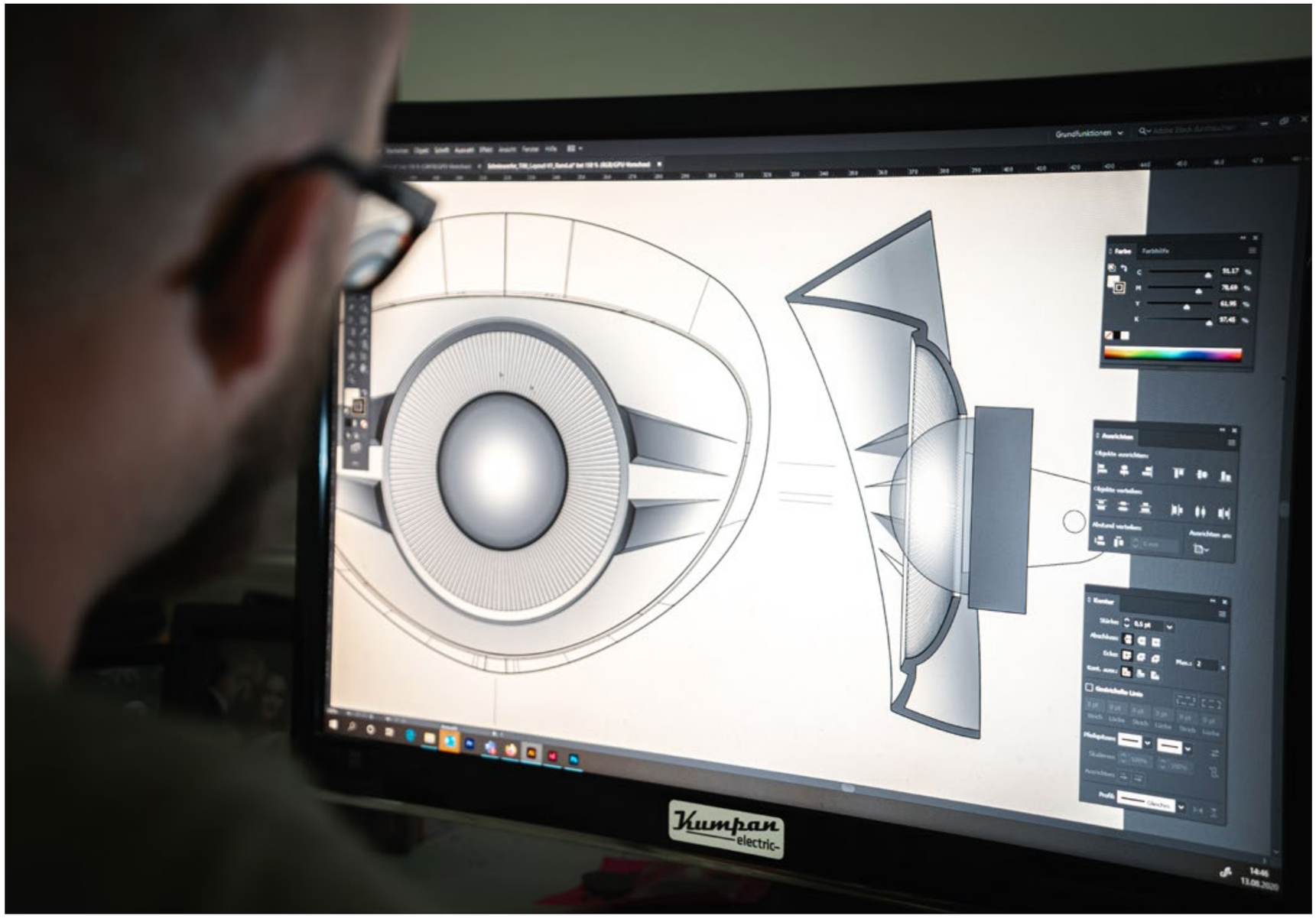


Emily Seares

Speed to market is a significant contributor to success in consumer product design. By being quick off the mark, innovators and disruptors can grab a larger slice of market share; building sales, loyalty and brand awareness while their competition is still in pre-production.

Smaller design companies are using this to their advantage, gaining an advantage over larger, more established competitors by utilising the latest technologies, software and partnerships to cut design, prototyping and manufacturing times, accelerating this journey time from concept to launch.

Adopting an agile business model can help with this, says Andy Trewin Hutt, associate director at industrial design agency Morrama. “We often get briefs that are super complicated and would take years of research and development to get to market,” he says. “Then we put on our startup hats and ask the client how we can strip it back – or if we could launch using something from off the shelf?”

As a smaller agency Morrama attracts startups, so it’s important to have a quick process. “We want projects that we can shout about, and they want products so they can get to market. This understanding means we are pushing each other with a common goal,” Trewin Hutt says.

Cormac Ó Conaire, partner and chief design officer at product design and innovation startup Design Partners, says integrated teams and a streamlined process are crucial for speed to market. “A nimble team can react on demand and are more open to wearing multiple ‘hats’ if needed,” he says.

He says integrated teams – where strategy, design, engineering and prototyping are a tight-knit unit – will deliver innovation much faster than those that are siloed. “These kinds of teams can make decisions quicker too. Software like Resource Management by Smartsheet and BambooHR are great tools to keep integrated teams up to speed, allowing them to focus on innovation,” he adds.

> **We want projects that we can shout about, and they want products so they can get to market. This understanding means we are pushing each other with a common goal**

Which technology tools work best?
His teams use tools such as Altair's simulation suite for faster problem-solving. "We can continue divergent thinking and explore ideas while we're moving through new product development processes. Simulating experiences and solutions at the right points in the process means we learn much more from the physical or interactive prototypes we make, which take time to build," he says.

Generative design tools are a key way for businesses to optimise mechanical or structural concepts in new ways.

James Melia, founder of strategy-led product design studio Blond, says prototyping technology – such as 3D-printers, rapid prototypes and virtual-quality review processes – is essential to accelerate speed to market. "If it's viable we'll use low-volume production methods that are local to us here in Europe to reduce freight and manufacture time," Melia adds.

Inside modern product design?

Andy Trewin Hutt, associate director at industrial design agency Morrama, cites the work that Morrama did for UK-based startup Wild, which is challenging the cosmetics industry with sustainable refillable bathroom products. The first product in the range was a Wild Refill deodorant, with the refill made entirely of bamboo pulp, 100% plastic-free, fully compostable and biodegradable.

Trewin Hutt says: "Our initial project for Wild Refill deodorant took seven months, which for an FMCG brand is insane – a brand like Unilever would take three to four years. But Wild is now on the market and each time they make an order, we work to improve the product and its refills. They have a much bigger market share than others in this space because they were first to market."

Trewin Hutt agrees, saying localised and low production methods not only help with speed to market, with supply chains heavily impacted over the past few years but also issues around sustainability. "We work with our office neighbour, Batch.works, who specialise in distributed manufacturing using 3D-printing. They also use recycled and responsibly sourced materials to make consumer products. So, we design products that can be ordered and made as needed."

He adds: "This idea is not new, but as the technology advances it offers the ability to utilise waste streams as the raw material required for new products is becoming a reality. Furthermore, we hope that a send back scheme would allow old products to be returned and remade into a fresh new design."

Creating so-called monster prototypes is another key way for smaller agencies to streamline and speed up the design process. Ó Conaire says: "There's a tendency in larger companies to create visually striking and expensive models from the outset, where everything appears to be resolved when it's still fiction. The process of making it real requires stepping back from the ideal vision and getting comfortable with unresolved demos – we call these monsters."

He says monsters are about building up an early picture of things, not producing the perfect finished prototype. It allows innovation to happen at velocity. Learning and iterating in this way brings speed and momentum to every project.

The key to this approach is choosing the right fidelity of the prototype, as well as the right tools, at the appropriate stage of the design process. Ó Conaire says Design Partners uses various rapid prototyping methods depending on the fidelity required: Lo-Fi FDM printing (such as Ultimaker 5) to high-resolution desktop SLA (EnvisionTEC Perfactory, Formlabs, Form 3, for example) or multi-material, full-colour polyjet (Stratasys J55Prime), to precision CNC for extreme tolerancing and real materials such as metals (5-axis DMG).

There is a tendency in the larger companies to create visually striking and expensive models from the outset, where everything appears to be resolved when it's still only fiction. The process of making it real requires stepping back from the ideal vision and getting comfortable with unresolved demos – we call these 'monsters'

Overcoming biases
But speed isn't everything, warns Marianne Waite, director of inclusive design at global brand consultancy Interbrand Group. She says FMCG brands are increasingly under pressure to ensure their products not only meet aesthetic expectations and sustainable requirements but are also inclusive and accessible. This means that if brands are using new software that relies on AI, they must ensure it is created in a way that overcomes many of the creative biases inherent in such systems.

"Agility and speed can be brilliant in terms of being first to market, but that doesn't necessarily mean a product will stand the test of time or present opportunities for change and progress at scale," she warns. "In the race to create new and game-changing products, inclusive design must be top of the creative agenda."

In this new era of rapidly evolving consumer trends, it's clear that smaller, more agile designers can hold an advantage over their larger, slower counterparts. But while focusing on innovation and disruption, they must also ensure that quality and longevity are not sacrificed for speed during the process. ●

Industrial design agency Morrama's recent product development took **7 months**

To deliver the same product, a typical FMCG brand might take **3-4 years**

Morrama, 2022

Designing with a fresh approach

In design, it pays to think outside the box. Why does adopting an outsiders' mindset reframe how the industry approaches challenges?

Rebecca Stewart

In product design, teams move fast. Their structure is often built around processes, guidelines and best practice. And success, is pinned around user experience and effectiveness, all informed by research, analysis and testing.

There's no denying that taking such a methodical approach yields results, but is it time for the industry to think outside the box?

In most disciplines, being an outsider is dismissed as an automatic disadvantage. Outsiders are unfamiliar with the rules, they don't have a grip on the systems or techniques used by a sector (or business) to find solutions. However, reframing this way of thinking can give rise to surprising results, especially in design.

Lego, which made around $8bn in 2021, is one business finding success by letting external thinking bleed into its own processes and inform product design. The Danish brickmaker famously involves children and consumers throughout the design process.

In 2017, Boeing initiated a new design practice by crowdsourcing the blueprint of its Boeing 787 Dreamliner, asking 100 engineers from its suppliers to submit ideas. Now this is a model it uses often. Nasa is another organisation that is allowing outsider thinking to permeate its way of working. The space agency has called on the innovators for design ideas on everything from moon toilets to spacesuits, through its Centre of Excellence for Collaborative Innovation (CoECI).

Embracing the outsider mindset

Outsider thinking in design doesn't just mean crowdsourcing ideas. Taking a true outsider approach means applying the same 'intelligent naivety' an unfamiliar practitioner would when approaching the brief at hand.

Tess Wicksteed, strategy partner at Here Design, explains how the multidisciplinary studio fully embraces this approach. Recent work has included branding and product creation for reimagined Victorian coaching inn hotel the Fife Arms (complete with engraved 'egg scissors') and refillable products for eco-friendly cleaning brand Homethings. "Designers are by nature questioners; we start every project by reframing the challenge. What is going on in a particular category, what is the core narrative, and what are the behaviours and habits that follow," she says.

She adds: "Intelligent naivety is a good description of the de bono type problem solving at the heart of most projects. [Designers must] think like a child [and ask] why things are done a certain way. We typically start by asking very, very practical questions and then ladder up to very high concept questions."

Here Design has found success in bringing a dynamic and original set of questions to design – questions that deliberately break with the industry's established norms.

Reimagining the process

Who better than to look to than the outsiders themselves, though, for some practical insight into how to reframe design thinking?

Darren John is a London-based artist and designer. As well as being a mural artist and owner of Absolutely Studio, John is widely known for his geometric artworks which celebrate childhood creativity. "If we travel through creative ideation with the same road map, we're not really allowing ourselves enough space to explore all the exciting possibilities on the periphery," he says.

Designers are by nature questioners; we start every project by reframing the challenge. What is going on in a particular category, what is the core narrative, and what are the behaviours and habits that follow

In his view, designing with intelligent naivety is the "cheat code to unlocking the exponential opportunities" that would otherwise be closed off when we tackle problems with our everyday ideas toolkit.

To apply this to product design, he advises disrupting the regular everyday workflow of a studio or team, or at least the patterns that might be in place when creativity is called upon in the workplace.

"It can be as simple as a change of setting or pairing employees from different disciplines or sectors," he says. "Being able curate the right individuals to generate ideas together, can be rocket fuel for the curiosity needed to boot down the doors to possibility.

For John, it also helps to have "the space and willingness to fail" to come up with something new: "It takes courage to break the mold this way but without this risk, there simply is no reward."

Freelance design director Aithche Smyth, who works for nonprofit 10 Percent For the Ocean among other clients, agrees preconceptions must be dropped when diving into any new project. She says: "If we bring these in with us, we're restricting our creativity from the outset, which runs the risk of producing derivative and uninspiring work."

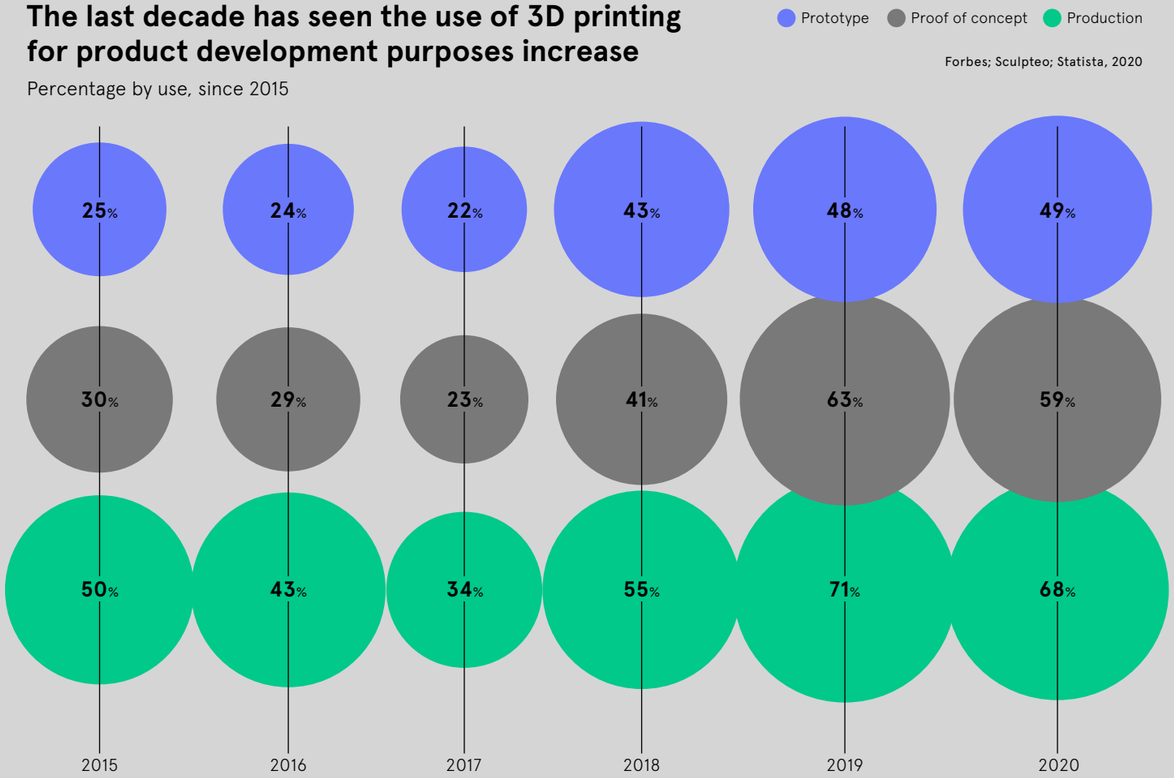
It's time for designers, to take a leaf out of the outsiders' books and reframe their thinking if design is to continue as an industry that dreams up the most effective, beautiful solutions for consumers and businesses.

Additive manufacturing has revolutionised product development and design

Changes to additive manufacturing technologies has made the medium far more accessible and widely used. How is it changing design and production practices?

The last decade has seen the use of 3D printing for product development purposes increase

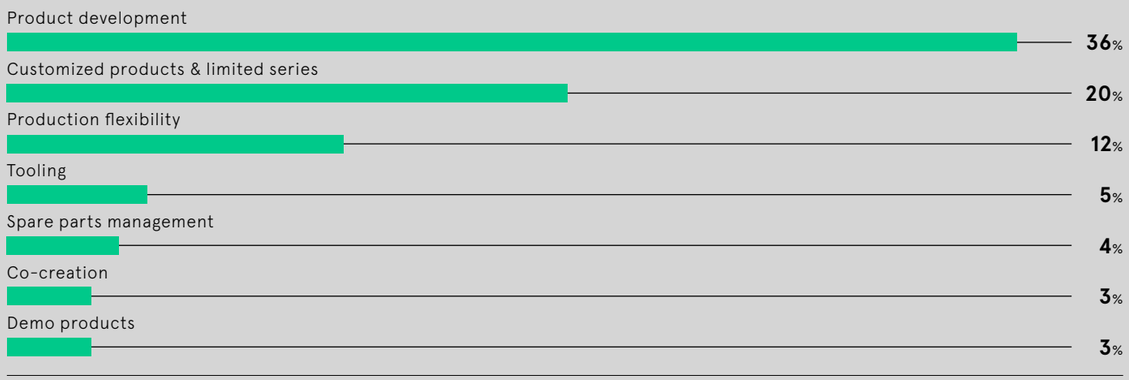
Percentage by use, since 2015



Forbes; Sculpteo; Statista, 2020

In 2021, that was no different

Top 3D printing priorities for organisations worldwide



Sculpteo, 2021

And 3D printing is contributing to an increased pace of innovation for manufacturers, large and small alike

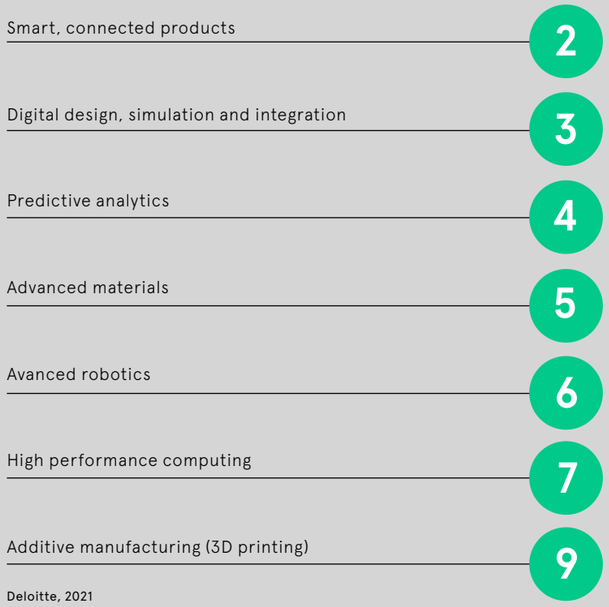
There was a

increase in patents registered on industrial manufacturing processes between 2000 and 2020

McKinsey, 2021

Manufacturing will never be the same again

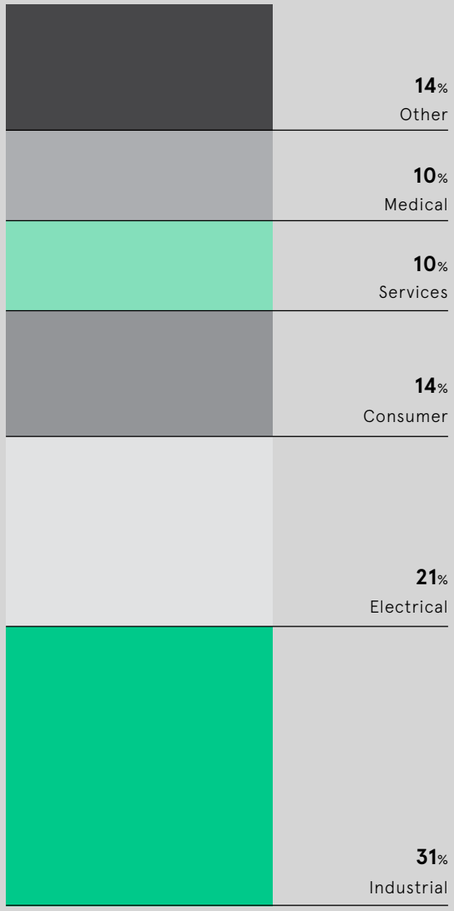
Most important advanced technologies for European companies, rated out of nine



Deloitte, 2021

3D printing is leading the way in Industry 4.0 applications

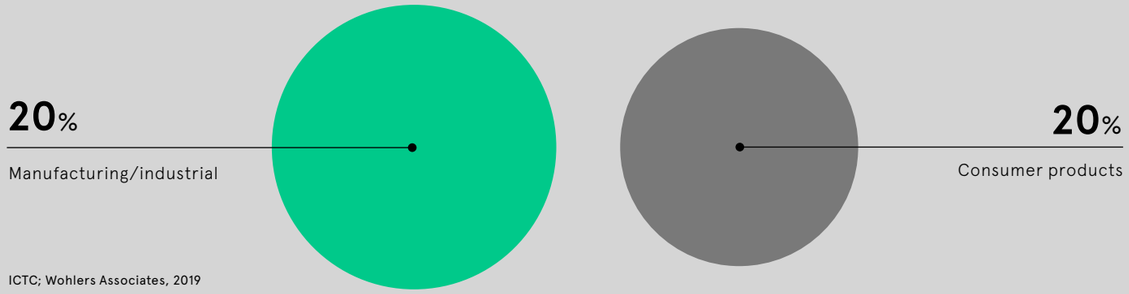
3D printing demand by industry



3Dhubs, 2021

Manufacturing and product development are in the top four industries leading the way in 3D printing

Share of sales revenue of the global additive manufacturing market by industry 2019



ICTC; Wohlers Associates, 2019

COMMERCIAL FEATURE

The agile approach to product design

Agile methodologies have revolutionised the way teams approach software development, and they could have an equally big impact on consumer product design

Duncan Jefferies

The key elements of agile methodology – rapid iteration, close collaboration and a constant focus on customer needs – are well suited to the demands of modern consumer product design.

Rather than working in a linear waterfall way, agile encourages design teams to quickly create countless designs, prototype the best of them and continue refining products – even after launch. In other words, experimentation and speed are more important than designing the perfect product straight out of the gate.

Data from ecommerce, customer accounts and CRM systems can provide the insights that fuel this kind of agile innovation. But to use data effectively, companies need to adopt a collaborative approach to product design – both within design teams and between designers, engineering and manufacturing.

This collaborative approach can only be achieved with the right platform. For example, the cloud capabilities of Autodesk's Fusion 360 product innovation solution, with the Product Design Extension, means people can collaborate on everything from conceptual designs to prototyping – no matter where they're based.

"Instead of all your data stored on your local machine, you log in, Fusion 360 picks up your licence from the web, then all the data is saved in the cloud as a single definition that includes not only the design, but also any associated manufacturing instructions, machining strategies or other data necessary to make the product," says Stephen Hooper, vice-president & general manager, design & manufacturing cloud solutions at Autodesk. "If you need to collaborate with people, it's easy to send them a link to the data and give them permission to view or edit it."

Flexibility is key

It's also easy to add, remove and reallocate licences. Firms can add additional functionality with Fusion extensions too – and without having to apply for new licences or install additional plugins. This flexibility and ease of use make the platform ideally suited to agile product design. The fact that it's cloud-based also speeds up design activities that require lots of processing power – something that is particularly relevant for SMEs.

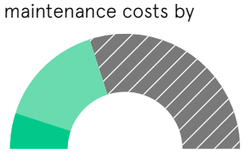
Instead of investing considerable sums in IT infrastructure to get up and running, they can turn to tools like Fusion 360 – as well as other SaaS solutions, for everything from CRM to sales – and compete with larger, well-established firms. "They don't even need an office," Hooper says. "They can put together a team, develop a product and get it out to market quickly."

Fusion 360's generative design tools and other features can help larger companies to experiment. It allows them to spin up agile product development teams to rapidly develop new product lines, for example, or tap into a new demographic. These teams are generally built out as separate business units within the company to isolate them from traditional processes, which can hinder the agile approach.

But agile design teams at both small and large firms share something in common: the need to work together, rapidly iterate on ideas, and use customer data to further refine their company's products. And that's a whole lot easier when you have the right innovation platform in place.

For more information about Fusion 360 and the Product Design Extension, and download a trial visit https://www.autodesk.co.uk/products/fusion-360/product-design-extension.com

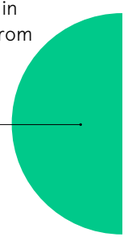
The application of predictive analytics by consumer goods companies has decreased maintenance costs by



10% - 40%

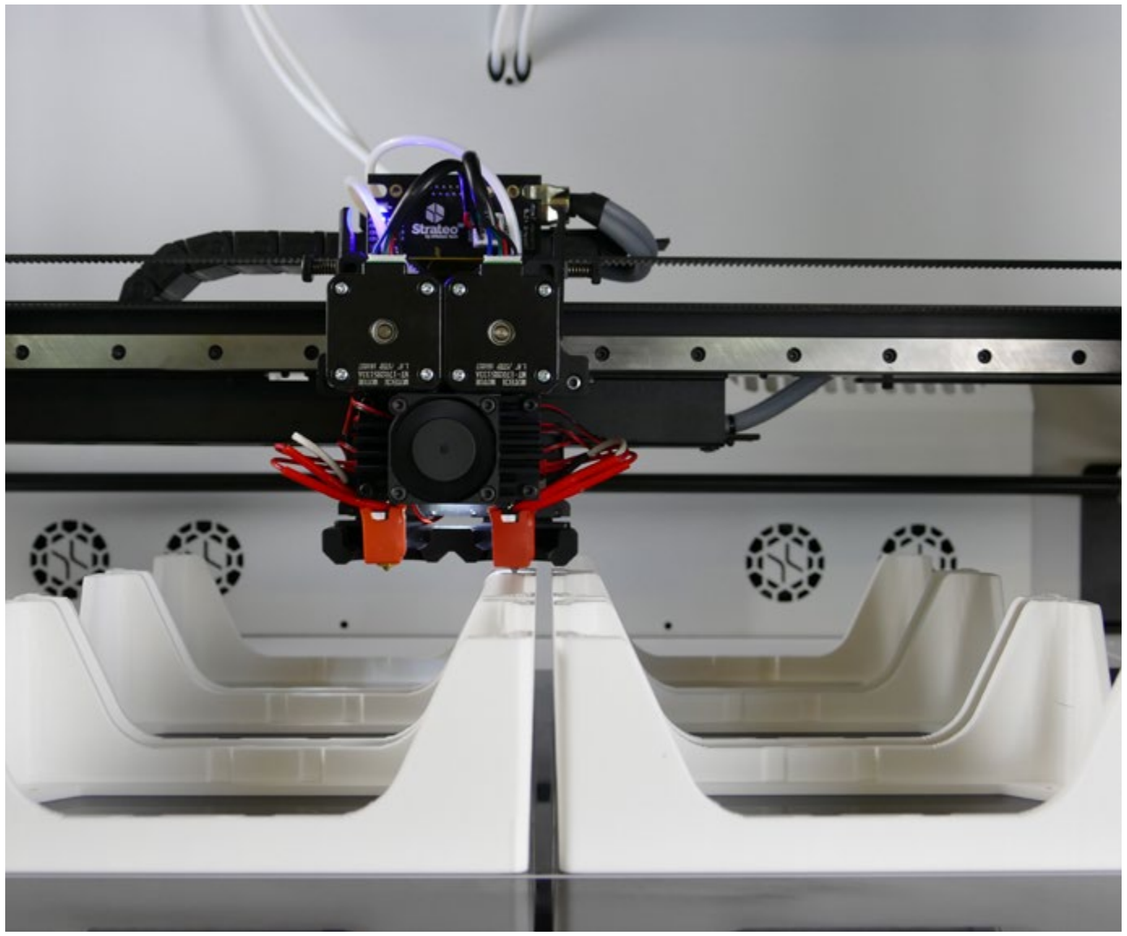
AI-based product testing resulted in a decrease in customer complaints from

7000



to less than

150



The future of design automation

Generative design tools and other technologies are changing the face of product design, augmenting the skills of human designers and improving efficiency

Duncan Jefferies

It's never been easy to design a great consumer product. But the challenges that designers face today are arguably more varied and complex than ever.

Shifting demographics, sustainability concerns and a desire for products that speak to values as well as needs have changed the game. To stay ahead of the competition, designers need to work quickly and collaboratively while producing less waste – and it's here that AI and automation tools can make a real difference.

Generative design software, for example, can automatically create countless iterations of a product or part in no time. "Rather than starting with a drawing, the designer starts with the parameters required for the

With defined parameters and an intelligent algorithmic approach, we should see generative tools not as a competitor to our skillset but more as another designer in the room

end product. Once these are entered, the system generates thousands of potential solutions in just a few hours and identifies the top few options that best fit the requirements. This means you could even be generating new consumer product designs overnight," says Peter Champneys, a research engineer at Autodesk.

Designing with AI

Generative design sees the designer take on a curative role, one that blends the speed and efficiency of AI with their own experience and knowledge.

"With defined parameters and an intelligent algorithmic approach, we should see generative tools not as a competitor to our skillset but more as another designer in the room, powered by a mathematical mind that is there to fuel inspiration and unlock creativity in a positive sense," says Rowan Williams, creative lead at Panasonic Design's strategic division, Flux.

The power of such approaches can already be seen today. Champneys cites the example of a bike-parts manufacturer that wanted to design a new kind of crank arm – the length of material that connects a bike's pedal to the crank set.

"Inputting parameters such as shape constraints – it has to keep out of the way of the bicycle frame and the rider's heel – and fabrication methods helped create futuristic designs," he says. "Some looked very similar to existing designs, but with significant portions of material removed without compromising strength. Others resembled a structural truss."

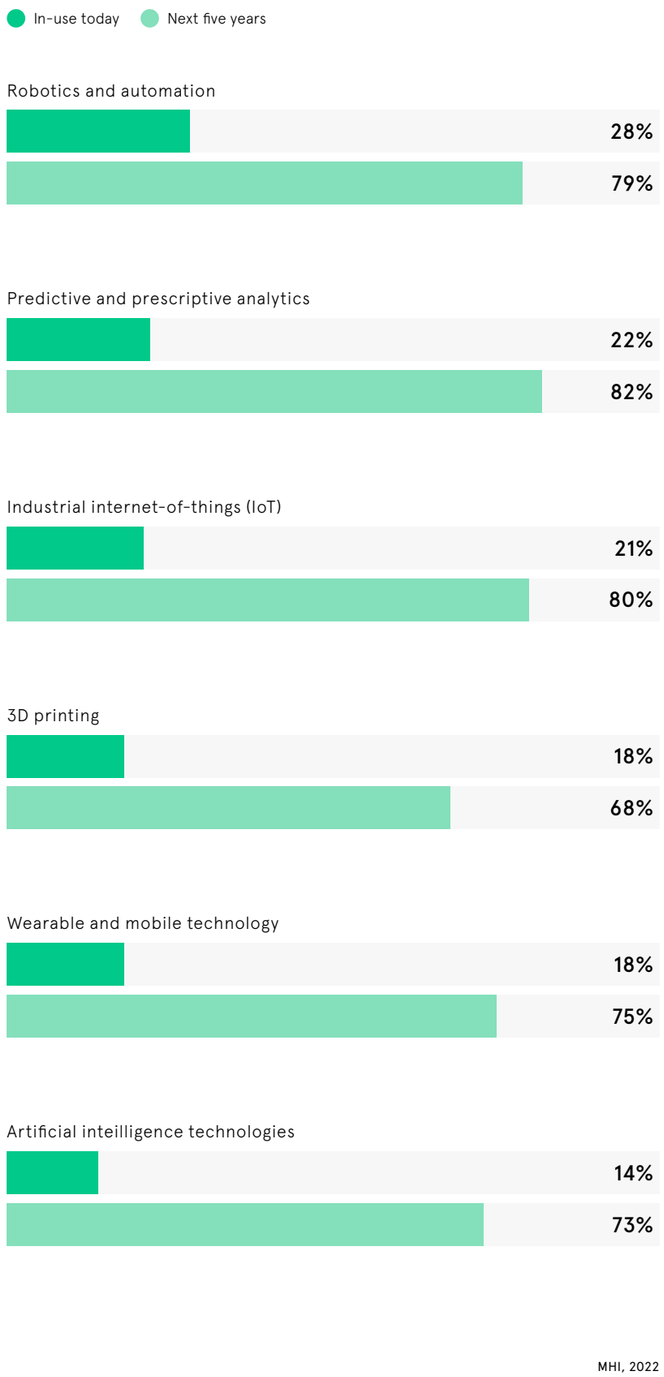
This ultimately helped the company to better understand its own products and where it could continue to push and innovate. But although it's undoubtedly hugely useful, the design aesthetics of generative design can be divisive.

"For projects that require design solutions to enhance people's performance, generative design can, for instance, create highly complex structures in the relentless pursuit of that 1% improvement to make it lighter, stronger, faster," says Eoin McNally, senior design consultant at Design Partners. "However, the results can appear quite aggressive – skeletal structures or organic interlocking forms."

This extreme aesthetic may suit sectors like high-performance sports gear, she says, but to fit into people's everyday lives in the consumer space, designers need to be conscious of how people live and ensure that designs are not only performance-enhancing but desirable too.

COMPANIES WITHIN THE SUPPLY CHAIN ARE EMBRACING NEW DESIGN TECHNOLOGIES

Adoption of cutting-edge technologies by supply chain companies in 2021



MHI, 2022

Using the latest technology to test

In addition to generative design, geometric patterning tools now allow designers to automate the process of patterning a solid shape across a flat or curved surface, such as for airflow, grip, texture or simply design flair. Volumetric lattice tools, meanwhile, can help designers to create well-designed lattices that can make 3D printed parts and products lighter and stronger while creating less waste.

The fact that 3D-printing is now widely accessible is having a massive impact on design. "We can now create consumer products that look like and work like the real thing, very cheaply, very quickly," says Damon Bonser, CEO of British Design Fund. "This means we can get to the point of real-world consumer testing in days not weeks or months. That means as a designer you can iterate and test your latest product within the same week. Ultimately this is allowing those businesses that adapt [to] these technologies the ability to fail fast and fail cheap when designing a new product."

Looking ahead, AI could have an even wider impact on consumer product design thanks to its ability to analyse vast amounts of data – perhaps even predicting the end-of-life of a product so that it can be designed with the circular economy in mind. "Imagine AI co-workers that facilitate creative brainstorming, or digital life coaches that empower us to make more informed decisions based on an analysis of our data," says Cormac Ó Conaire, chief design officer at Design Partners. "The possible benefits are endless so long as we define the most meaningful purpose for them."

But even as AI becomes more commonplace, human designers are unlikely to be automated out of the design process altogether. "It is important to note – and to some extent ensure – that generative design tools will not eliminate the need for human counterparts in the design process," says Williams. "Designers will still need to play a role in contextualising the design output and in providing the emotional input that computers and systems cannot. Well, at present that is..."

Differentiation through innovation

Designers are innovating by using new tools based in AI, cloud and VR technology to stand out in the crowded world of consumer products

David Craik

Gamers zapping and firing their way to esports glory around the globe should take a minute to think of a small design business in the countryside of County Wicklow in Ireland.

There, during the worst months of the pandemic, product design agency Design Partners teamed up with gaming legend Shroud to create one of the lightest games mouses ever – the Logitech G303 Shroud.

"We met with Shroud often, discussing his ideal grip, weight, button positioning, texture and design. He is one of the best aimers in games and we wanted this light mouse to ensure that the movement of his hand was a perfect extension of his brain," says Design Partners chief design officer Cormac Ó Conaire.

A crucial part of the process was the use of AI-powered generative design software. "When you lighten a material it becomes weaker, so we used the software to generate design variations which would make it more robust," he says. "We use technology like this as well as 3D-printing to come up with designs and prototypes much faster than we could ever do physically. We've also invested in a wearables lab, creating ECG vests and sports socks. It is a key way in which to differentiate ourselves."

Another design agency using technological innovations to improve customer products is Manyone. It is currently working on an augmented reality projector that users will be able to operate through an interactive handheld device. It is using Wikifactory – a platform for collaboratively designing, prototyping and manufacturing physical products online – to ensure it best meets customers' needs.

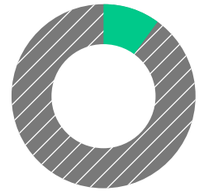
It allows Manyone to share its design concepts with creators around the world to prototype, improve and enhance them.

"Engaging and collaborating with other creators means people can share knowledge and ideas and improve the product. These tools give us a lot more leeway and options when creating targeted and personalised design solutions."

According to software group Autodesk, it is small- to medium-sized firms like Design Partners and Manyone that lead the way with product innovation and the adoption of new technologies in manufacturing. "Ideas aren't enough. To go up against a titan of industry you need to find ways to make your small company competitive," says Pooria Sohi, product marketer and industrial designer at Autodesk: its Fusion 360 is a cloud-based software platform that designers and engineers widely use in product development.

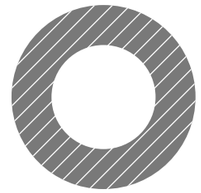
"Exchanging individual files created using fragmented software platforms that don't easily talk to each other is a thing of the past.

New technologies are still seen as a risk to large companies. Leading risks to companies worldwide in 2022, by company size:



10%

of large companies rated new technologies (e.g. impact of AI, connected/autonomous vehicles, electric/fuel vehicles, 3D printing, IoT, nanotechnology, blockchain, 5G) as key business risks



0%

of small and medium companies said the same

Allianz, 2022

> **Ideas aren't enough. To go up against a titan of industry you need to find ways to make your small company competitive**

The way it works now is that there is a single source of the design stored in the cloud, which everyone in the project can use," Sohi says. "Tools like generative design bring AI into the mix, answering complex or simple engineering questions rapidly while producing efficiently manufacturable, more sustainable designs for a project. Things can be made to order without delay, and concepts like mass customisation are becoming a reality. The evolution of these technologies, and demand for them, aren't slowing down."

Those technologies include virtual reality. Ó Conaire says his team uses tools such as Gravity Sketch, where they put on VR goggles and find themselves immersed in a virtual design studio. "It allows us to prototype large machines that in the real world limit us by scale, shape and time," he adds. "It speeds up decision-making."

Manyone is using volumetric video-capture technology, which can digitise a 3D-space or 3D-object and transfer it to the web or a virtual world. It is an essential part of the research and concept phase to create a spatial installation.

AI is also used for better onboarding client and customer opinions before, during and after the design process.

Design firm LovedBy creates health and well-being products using quantitative research, interviews with potential users and collaborative design sessions. "We have also started to use sentiment analysis software to better understand research responses. We can then incorporate these into the design," says Christel Wolthoorn, chief strategy officer at LovedBy.

"Clients want more understanding of how their products will be or are being used by customers. It is the aha moment when you discover that perhaps your design or product is being used in a different way than you first expected. It is a realisation that product development does not have a beginning, middle or end. It is a living thing."

Ó Conaire is also swift to stress the human element in all this technological growth. "We have a team of master craftsmen whose work is aided by advanced tech tools. They decide when, which and how they will be used in the design process," he says. "When we were generating the Shroud mouse, we got back some insane ideas which could never be manufactured and, frankly, some really ugly looking ones which would never sell! That's where the human touch will always be important."

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