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2026

REPORT

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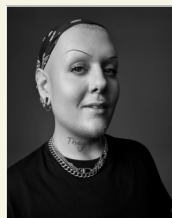
The Interline is proud to continue its partnership with **Fashion by Informa**, whose global reach and portfolio of live fashion events has helped to extend the conversations we aim to catalyse in our downloadable reports. For more on their perspective on the role that 3D plays in bridging the gaps between vision and producible reality, turn to their company foreword on the next page.

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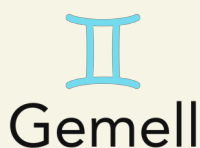
Our Fashion cover was designed by Blockschmidt, using CLO, the latest point release of Unreal Engine (5.6), the MetaHuman platform, Adobe Substance 3D, Rokoko's performance capture tools and more.



Our Beauty cover was designed by Jack Oliver using virtual cosmetics platform, V-Metics, and the MetaHuman platform.

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WELCOME TO THE DPC REPORT

BY BEN HANSON,
EDITOR-IN-CHIEF, THE INTERLINE

**BUILDING A CLEARER IDEA OF WHAT 3D IS FOR, AND WHERE IT INTERSECTS WITH AI,
AT A TRANSITIONAL POINT FOR THE SECTOR.**

Thanks for downloading The DPC Report 2026. We try not to take anything for granted when we set out to do something fresh with this publication at the end of every year, and the amazing audience we reach with each edition still surprises me, every time.

I'm glad you're here.

Now that you are, I want to get three things out of the way early: why this is called The DPC Report 2026 when it's coming out at the end of 2025; whether or not 3D in fashion is on the wane; and whether or not AI is rushing up to replace it wholesale.

The first of those is an easy answer. We release these reports as the capstone on the year, and although they get a lot of traffic each December (seriously, you folks really like downloading them right up to, and over, the holidays!) every DPC Report has had a very long tail into the following year, and when the majority of people read something in January and onwards, it's logical to assign it to that year.

So no, you haven't missed an edition if you already have the **2022**, **2023**, and **2024** DPC Reports on file. Sorry for messing up your folder naming conventions, but it's a one-time thing.

The second and third questions have progressively more nuance to each of them. It's been an interesting year for technology adoption and diffusion in a very broad sense, but in fashion in particular I've observed (sometimes first-hand) conversations about paring back 3D initiatives that haven't met their targets, and then separate discussions about scaling other strategies upwards. And you can't turn a corner today without being sold AI in your professional or personal life, with 3D definitely not being immune.

So as big of a self-attested fan of 3D as I am, I didn't want us to shy away from those conversations in this report.

I get to exercise the Editor's prerogative and spend some more time in an editorial later in this publication getting into the black, white, and grey areas of DPC / AI crossover and automation. But we also have a line-up of stories, brand case studies, executive interviews, analysis and more - a lot of which tackles some of that palpable tension in a frank way. And there's no substitute for this kind of insider perspective when it comes to gauging industry sentiment during what we might (or might not) look back on as a transitional period.

We're not in the business of keeping people in suspense, though, so I wanted to begin this year's report with my own top-level thoughts, as well as giving you a preview of what else is coming up as you read.

For that second question I asked ("is 3D dying?") I think the answer's an unequivocal no, even if individual companies are deprioritising some elements of it that were perhaps misaligned with the original intent. What's more: I think anyone making that claim is betraying a fundamental misunderstanding of what 3D is for and how far it's advanced towards serving its original purposes..

Across the four years we've produced these reports - and across my own fifteen-plus years of analysing and writing about digital transformation - we've been consistent in expressing the singular, primary use case for 3D as being a digital stand-in for the physical product, with sufficient fidelity, extensibility, and interoperability to allow anyone to make any creative or commercial decision based on a 3D asset.

Implicit in that definition is the understanding that, in order to fulfill that brief, a 3D representation of a garment, jewellery piece, cosmetic product, boot, or jacket must be able to either serve as a full digital twin of that original product from day one, or it must have those digital twin capabilities progressively architected in at the same pace of development that the demand for them is growing, across different slices of the product journey.

On that basis, 3D is a long way from falling off its original track. While it's absolutely true that the full, end-to-end vision is still a future state, we see clear industry progress in defining and refining the right use cases for 3D that align with different kinds of demand. And as broader digital maturity and industry readiness progress, and as the community of beneficiaries of 3D expand, we will continue to see companies realising additional value from 3D in scenarios it's always been well-suited for - as well as being more honest with themselves about the places where, perhaps, it wasn't the logical fit.

Which brings us to question three: is AI replacing 3D? And the answer to that is hooked into the answers above.

In some of the broad spectrum of use cases where companies have tried to deploy 3D, yes, it probably is. As some of the stories contained in this year's report show, when the task at hand is creating the shortest route from an initial sketch, or concept, to a visual representation that can be shared and communicated, AI can offer a considerably faster and far less labour-intensive method than 3D modelling, pattern simulation, and texturing.

But bringing early stage ideas to life was, by our long-running definition, only ever the tip of the iceberg for 3D. And when those visualisations are not accompanied by the foundational data that comes from working natively in 3D (which is the case with AI), their utility is definitionally limited. For making serious, data-backed creative and commercial choices with full accountability and accuracy, 3D offers by far the straightest and most robust shot from concept to producible reality.

From fit and construction, to cost and collaboration, the fundamentally fuzzy, probabilistic nature of AI generation currently runs counter to the vision for building a single, all-encompassing reference frame for decision-making.

There are, to be clear, AI tools that are reaching more deeply into patternmaking and garment engineering, but as you'll see as you read on, these require pre-existing, specialist skills to curate and discern between their outputs. And as interesting a space as computational design is, where creating art becomes more of an algorithmic exercise, that's a space we'd like to analyse separately in the coming year - as well as being one that's complementary to DPC, rather than detracting from it.

3D IS A LONG WAY FROM FALLING OFF ITS ORIGINAL TRACK

For now, to help make my opening point, I'd like to spotlight our cover designs for this year. Whether you chose to download the fashion variant or the beauty variant (the internal content is the same across both) you're seeing the output of workflows that involve no conscious generative AI use. These were 3D projects and pipelines through-and-through, for specific reasons.

Of course there are areas where our chosen artists could have incorporated AI to help automate or enhance one or more stages of their process, or to provide a rapid way for gathering inspiration, but each piece has something uniquely 3D at its core.



Our fashion cover, created by technical artist Blockschmidt, was an exercise in developing a brief in stages, with decisions taken between parties affecting character, environment, garments and more. This steady, iterative progress from a wide brief to the striking vision you see on the cover and in our profile of the artist's tools and techniques, demanded granular control over every element of not just the products themselves, but the narrative context built around them.

And having the liberty to edit and manipulate discrete parts of the simulation, and the animation cycle behind the dynamic end result, relied on fine-grained control of individual elements that would have been difficult, if not impossible, to achieve outside of 3D simulation and real-time rendering. As well as adjusting the garments themselves, at one point or another we changed the weather, the time of day, the location, the character and other variables - all in a non-destructive way, using components that remained separate, accountable, and portable.

Our beauty cover, created by Jack Oliver, is an exercise in translating skills learned and honed, by hand, in the real world to digital, where the same fine control and craft was necessary to achieve an end result that looks simple, but that required an exacting digital replica of tools and techniques. It's entirely possible to generate a visual proxy of makeup and cosmetics, but it's a different task entirely to simulate and manipulate them digitally in the same way you would physically.

The most important part, though: you don't have to take my word for any of this, whether it's the better-demarcated value of 3D, or the places where experimentation and enhancement with AI make sense as either additives or alternatives.

In this publication you'll find three very different brand stories, from Patagonia, ASOS, and ThruDark, which converge and diverge in their analysis of rolling out, evolving, or even adjusting or paring back DPC strategies. One fuels a climate mission. One prioritises the everyday realities of design work in mass market fashion. Another turns the narrative of "time saved" on its head, and makes the case for a first principles approach to 3D for product innovation.

Beyond those brand case studies, we also have stories from across the industry. A major manufacturer's take on brand maturity and attitudes towards 3D. A case for virtual reality as the logical first cut in the creative designer's toolbox. A look at how AI pattern creation is folding itself into digital product creation. And a series of senior executive interviews with companies leading the charge on 3D design and simulation, supplying essential content for DPC, pursuing a fibre-level approach to simulation, creating solutions for digital knitting instructions in exacting detail, thinking about the role of digital asset management in 3D workflows, and more.

Across all these different perspectives, it should become clear that having a grounded digital representation of the products you make has unique and far-reaching value. That value might not always be found where we feel it should, but these stories and interviews, along with my own experience and whole-industry vantage point, tell us that the companies that frame 3D correctly will continue to find value from it - as both the feature sets and integration pathways for the tools continue to mature, and as brands remind themselves of why they turned to digital product creation to begin with.



BRIDGING FASHION'S BIGGEST GAPS WITH TECHNOLOGY

BY FASHION BY INFORMA

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In the foreword to last year's DPC Report, we spotlighted the importance of 3D - and the wider ecosystem of digital design, development, and sourcing tools in general - as a way to shorten the distance between a creative or commercial idea, and the ability for fashion professionals (from solo entrepreneurs to big brand teams) to bring the best possible version of that concept to market.

As we've observed from market data captured by Fashion By Informa and The Interline, industry adoption of digital product creation tools and workflows was already widespread going into 2025, and this year the wider macroeconomic environment added even more validation to the business case.

Rising costs, stretching timelines, and perpetual uncertainty all translated into an even greater need for everyone, from individual designers to the biggest enterprises, to predict, virtualise, and control as much of a product's journey from concept to market as possible.

Our experience - gleaned from surveys and from our portfolio of marquee live events across North America - also shows us that fashion professionals in essentially every role and department are open to embracing technology to gain a competitive edge, to control their costs, to collaborate with their partners, or become more efficient in the way they work.

Not every fashion persona, however, has the same sets of foundational skills, or the same freedom to learn completely new ways of working. And while the value of 3D has become well-defined, it has also become increasingly clear that not everyone wants, or needs, to become an end user of 3D tools for themselves in order to benefit from the digital transformation of the wider industry.

Through platforms like these downloadable reports, our partnership projects with The Interline, and the educational workshops and talks that take place twice a year at SOURCING by Informa, everyone can observe how the broad trajectory of the industry is moving in the direction of technology.

But rather than mandating that every fashion professional becomes a technologist themselves, this shift shows us that everyone benefits when the right solutions land in the hands of educated specialists and people with hybrid skills, who can then bridge the gaps between vision and producible reality in a way that helps other professionals tell unique stories, measurably advance sustainability agendas, communicate better with partners, and much more.

The key metric for the success of 3D is that, from merchandisers to marketers, there are more beneficiaries of digital product creation than ever. The same is also likely to be true of AI, and especially of the various ways that we see AI crossing over with 3D in the pages of this report.

This is why we are proud to continue to support both this DPC Report (our fourth as headline sponsors and partners) and The Interline's ongoing series of AI Reports. In person, and through programmes of ongoing content, our belief is that both technologies will play a pivotal role in closing the gaps that exist - not just between individual people's visions and finished products, but between the different stakeholders who make up the extended fashion community.

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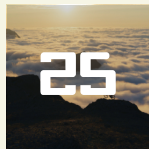
STEP INSIDE THE 3D STORY

Julian Blockschmidt, The Interline, CLO Virtual Fashion, Epic Games



BEHIND THE BRUSHSTROKES

Jack Oliver, The Interline, V-METICS, Epic Games



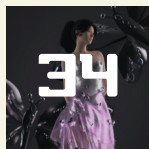
DRIVING SUSTAINABILITY THROUGH 3D DIGITAL PRODUCT CREATION AT PATAGONIA

Keala Stephan, Director of 3D Digital Product Creation and Process integration, Patagonia; Iain Finch, Senior Manager, 3D, AI, & 2D Visualization and Product Creation GTM Operations, Patagonia; Cassandra Casas, Digital Product Creation Lead, Patagonia



PRACTICAL & PRODUCIBLE - THE ROLE OF SUPPLIERS IN INDUSTRIALISING DPC & AI

Elly Cheng, Director of Digital Product Creation, Makalot



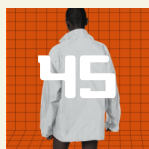
USING VIRTUAL REALITY TO WEDGE OPEN THE SHRINKING WINDOW FOR CREATIVE EXPRESSION IN 3D

Holly New, Founder, STUDIOOFNEW



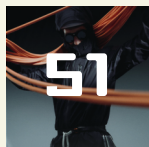
WHEN YOU HAVE A 3D HAMMER, EVERYTHING LOOKS LIKE A 3D NAIL

Nick Eley, Head of Digital Creation, ASOS



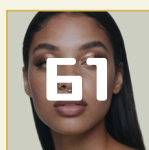
THE NEXT FRONTIER FOR DIGITAL PRODUCT CREATION: PATTERNMAKING WITH AI ASSISTANCE

Dorelle McPherson, Technical Design Manager, 3D DPC, The Fashion Tech



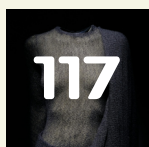
PURSUING EXCELLENCE THROUGH 3D AT THRU DARK

Louis Tinsley, Co-founder, ThruDark, Former Special Forces (SBS); Ben Hewitt, Product Director, ThruDark; Kyra Gibson, 3D Digital Developer, ThruDark



THE EVOLVING DPC ECOSYSTEM

From the pioneers and mainstays of 3D design and simulation, to disruptors across the wide spectrum of DPC, meet the companies that are working to underline and expand the business case for Digital Product Creation.



THE DPC OUTLOOK: BASELINE, BULL, AND BEAR

Ben Hanson, Editor-in-Chief, The Interline

Images created by Blockschmidt, for The Interline. Staged, animated, and rendered in Unreal Engine, on a digital human from MetaHuman, by Epic Games. Clothing created in CLO Virtual Fashion, incorporating some licensed assets from CLO-SET Connect.



**STEP INSIDE
THE 3D STORY**



JULIAN BLOCKSCHMIDT, 3D ARTIST

THIS YEAR, THE DPC REPORT FEATURES VARIANT COVER DESIGNS FOR THE FIRST TIME. THIS PROFILE EXAMINES THE WORK THAT WENT INTO OUR FASHION COVER, AND THE FOLLOWING INTERVIEW DETAILS THE BEHIND-THE-SCENES OF OUR BEAUTY COVER. IF YOU'D LIKE TO DOWNLOAD BOTH VERSIONS, VISIT THE INTERLINE TO GRAB THE ONE YOU DON'T ALREADY HAVE.

For a technology segment that targets a primarily visual output, digital product creation can sometimes be a bit static to look at - especially when its final form is typically a still image that someone will use to make a quick decision.

With each of these reports, The Interline has aimed to work with 3D artists who use their craft, and the best tools the open technology market has to offer, to tell visual stories that help 3D the idea of creating, refining, and staging 3D clothing, footwear, and accessories to jump off the PDF page.

And across 2023 and 2024 in particular, our team commissioned four terrific artists who targeted very different briefs, but whose creations were all pointed at the same target: pushing pipeline boundaries to also experiment with and advance the way we present not just digital products, but the very concept of digital product creation.

This year's fashion cover is both part of that cohort and a deeper demonstration of one of the cardinal directions that The Interline sees DPC evolving in: storytelling.

Throughout the pages of this year's report, you'll read a lot about 3D as a technical foundation, as a reference frame for truth about materials, patterns, trims, and components. All of this is both valid and essential: 3D only works if people are able to look at the results and trust that they represent reality.

But you'll also hear another mantra coming through across this year's content: that 3D cannot just be that. The recognition that, while it's essential that every story can be traced back to a manufacturable product, the state of the art in 3D storytelling must also keep advancing, beyond being a slot-in replacement for PDP photography, if the extended value of digital products is going to be realised

We only need to glance at the brands who've told their DPC stories in this report to be reminded of both the technical, specialist nature of the underlying foundations of 3D, and the strategic power of aligning it to serve brand missions and product innovation ambitions. The DPC ecosystem exists to both make sure that digital products have (or are working towards having) unimpeachable technical foundations, but

also that those foundations can be made part of extended pipelines that tell meaningful stories.

So for this year's fashion cover, we set out to commission an artist whose credentials sat squarely in the middle of that Venn diagram: bringing 3D products and scenes to life as part of a cohesive narrative, and pushing the frontiers of integrating and experimenting with different tools to achieve an end result.

Julian [Blockschmidt](#) is based in Berlin, and is a 3D artist, animator, and generalist whose work has transcended industries - from music to footwear - and who has recently made strides in applying his style and his toolkit to fashion, including a campaign with Adidas and Foot Locker.

We tasked him with applying this multi-sector experience to the goal of bringing a fully 3D streetwear scene to life in a way that captures dynamic motion in a series of stills... a tall order!

Blockschmidt's pipeline is also a testament to the cutting edge of full digital workflows for product creation, visualisation, animation, and rendering. To create this year's fashion cover, Blocki worked with CLO, the latest point release of Unreal Engine (5.6), the MetaHuman platform, Adobe Substance 3D, Rokoko's performance capture tools and more.

As well as his own perspective on how each of those tools contributes to the level of fidelity and world-building he set out to accomplish, we have also captured perspectives from people behind two of those tools: Sallyann Houghton, Senior Business Development Manager at Epic Games, and Alex Kim, Software Product Manager, CLO Virtual Fashion.

As anyone who spends time in the DPC community will know, there are a lot of "polymaths" in the space: people who are designers, animators, texture artists, environment artists, and so on. And while the narrower, more focused returns on investment we expect to define the future of DPC will lead to more specialisation within large organisations, 3D generalists have a lot to teach the industry about how they think, how the tools are evolving, and why 3D matters.

The Interline: Blocki, walk us through your career as a 3D artist. What was your first brush with 3D as a creator, and what have been the big unlocks - either technical, cultural, or in your learning journey - since then?

Blockschmidt: I started creating under the name Blocks Schmidt in 2020, initially working in a purely digital but two-dimensional space. At the time, I was creating 2D collages, piecing together album covers and magazine-style visuals - blending existing photographic material. All of this was just a hobby, and I enjoyed that phase, but after a while, it started to feel limiting. I was creating something new, and I still like collage as a medium, but the process was always based on someone else's imagery, and that began to bother me.

Around that time, a 3D colleague and friend, Chris Deroy, animated the original Blocks Schmidt logo I'd created for my website. Seeing that animation pushed me in a new direction. What really stuck with me was not just the look of it, but how much control he had over the entire process - and it was just a little animation, moving pixels but it was all new to me, with my work prior being based on non-animated 2D visuals. That filled a creative gap I had been feeling with my collages, but couldn't really put into words before. With that initial drive, I asked him how I could learn this as well, and he told me

to start signing up for an online Blender course. That's what I did, and I jumped into 3D with zero prior knowledge. That beginner phase was important. It taught me how to move through digital space, how objects, light, and materials work together, and how a very basic 3D workflow is structured. Back then, I would never have imagined that this path could lead to directing a cinematic sneaker campaign for Adidas and Foot Locker or creating and coordinating mainstage visuals for Splash!, Germany's biggest hip-hop festival. Looking back, it brings me joy to see the development from those basic first renders to where I am now.

One of the biggest early unlocks for me was realising that my motivation was not only tied to the fun of working with digital art tools, but to the desire for full creative ownership. This desire was based on wanting to tell stories through 3D animation. After that first Blender course, I added another class based on digital avatar modeling. I didn't finish this class; I quit when the sculptured avatar was to be retopologized. I shared my frustration with Marcikola, another 3D colleague, and he suggested that DAZ3D would enable me to create human avatars while eliminating tedious workflow steps. And because my digital humans also deserve to wear cool outfits, I started integrating CLO3D into my workflow for garment creation and simulation.



"ONE OF THE BIGGEST EARLY UNLOCKS FOR ME WAS REALISING THAT MY MOTIVATION WAS NOT ONLY TIED TO THE FUN OF WORKING WITH DIGITAL ART TOOLS, BUT TO THE DESIRE FOR FULL CREATIVE OWNERSHIP."

- BLOCKSCHMIDT

Ultimately, clothing was no longer just something I added in the end, but it became an integral part of my focus and workflow.

At the end of 2022, I began looking for more organic ways to bring those garments and characters to life, and discovered Rokoko's motion capture tools. Capturing my own body and facial movements and transferring that data onto digital avatars created new possibilities and new opportunities for me.

A major unlock came through a collaboration with Arseni Novo on the Spotify visualizer for A\$AP Rocky's RIOT. He directed the visualizer, and I contributed digital avatars with motion-capture-driven body and facial animation combined with garment simulations. That project not only gave me confidence that the pipeline I was building could work at an industry level, but it also opened new doors with a dream portfolio project like this in my pocket. From there, things truly started to build momentum. The A\$AP Rocky project led to garment visuals for Champion's Eco-Future campaign and numerous other capsule streetwear visuals. Around that time, I pivoted more towards stage context, creating stage visuals for tlinh, OVO's Roy Woods, and Sido's arena tour.

At the beginning of 2024, I upgraded my workflow and committed to diving into Unreal Engine. Moreover, I continued refining my pipeline by combining CLO3D with Unreal Engine and MetaHuman workflows, opening up new possibilities with real-time iteration. That workflow was put to a real test for Splash! Festival 2024. I coordinated the mainstage visuals and created a Splash!-specific MetaHuman. Using CLO3D together with Unreal through the LiveSync plugin, I produced MetaHuman-based merchandise animations for the mainstage. Seeing the pipeline hold up and the visuals come to life with 30,000 people on the ground was a personal highlight.

In early 2025, the Megaride campaign was released as a collaboration between Foot Locker and me on Instagram. I directed this Adidas x Foot Locker shoe campaign, focusing on a cinematic, storytelling approach within a commercial context. This project was fully assembled and rendered in Unreal.

Between then, and me answering these questions in December 2025, Splash! Festival went into a second project season, I contributed stage visuals for Coachella, and I had the pleasure of having numerous keynotes within the 3D and event industry, from Unreal Fests to CLO Summit.

Now I have the pleasure of wrapping up 2025 with this interview and the created visuals for the report. What has remained consistent throughout all of this is the initial spark that pulled me toward 3D. I still feel it today, especially when I hit technical walls, which often become the starting point for the next unlock. Across that timeline, I argue that simply staying at it made the most difference for me, plus building your network, surrounding yourself with the people who share the same passion.

The Interline: When did you start to gravitate towards working in 3D specifically for fashion? What was the catalyst?

Blockschmidt: I started gravitating toward fashion in 3D around 2021, when I began working with CLO3D. The initial catalyst was a desire to create visuals for artists whose work inspired me. I started building human character look-alikes and dressing them in garments that reflected specific aesthetics. One example was translating the visual language of Ye during his DONDA album era, where I recreated his masked outfits in 3D animation.

At the same time, I was not booked commercially for footwear projects, so I decided to create my own. I designed and visualised a Blockschiidt shoe as a personal project, treating it as if it were already part of a real campaign. Years later, that work became a direct reference for the Adidas x Foot Locker collaboration, after the right people had seen this body of work. From there, the shift happened organically, with brands beginning to ask me to visualize capsule collections and fashion concepts in 3D.

Looking back, fashion was never a planned pivot. I do not have a formal fashion background beyond the passion I developed along the way. It emerged naturally from my interest in artists, identity, and digital characters, and from the desire to translate cultural aesthetics into three-dimensional visuals.

The Interline: For previous DPC Report covers, we've focused on the construction and creation of clothing and footwear in relative isolation. This year we chose to mirror what we see in the wider direction for 3D strategies in industry, and to lean further into contextual storytelling - staging digital products in a way that demonstrates the flexibility and the power of using 3D assets to capture brand and product narratives. What makes 3D stand out when it comes to brand and product storytelling?

Blockschmidt: To me, 3D animation stands out in brand and product storytelling because it sits at the intersection of realism and imagination. With digital twins, you can achieve a level of material accuracy and detail that feels real and trustworthy, while still having full control over context, timing, and perspective. Products are no longer isolated objects. They can exist inside worlds that reinforce their identity and narrative.

Personally, I am very drawn to fidelity and detail, whether they are so pronounced that they immediately stand out, or so well crafted that they almost go unnoticed. Both approaches can be powerful, and both can leave a lasting impression. I make use of twisted realities in 3D, since it allows me to move seamlessly between these states. From an extreme close-up of a shoe where materials and surface behavior feel tangible, to a wider narrative moment where a MetaHuman leaps downward in slow motion while the environment shifts around it. Elements like directional sunlight can evolve, creating a sense of motion and atmosphere that blends realism with something slightly unreal.

That balance is what makes 3D such a strong storytelling tool. We see how digital humans experience their world, and we link it to our own view. Furthermore, 3D avatars ground products in something familiar, while the surrounding world can subtly bend reality without breaking credibility. The result is not just a showcase of assets, but a visual experience that challenges expectations, creates emotion, and allows brands to tell stories that feel both believable and unbelievable at the same time.

The Interline: What were the inspirations behind this year's fashion cover? What story were you aiming to tell through garments, accessories, and environment?

Blockschmidt: The inspirations for this year's fashion cover grew out of both my ongoing work and the initial moodboard and direction provided by The Interline team. Building on that foundation, I refined the moodboard by curating the garments more deliberately and developing the setting through an alley-based environment. The garments' focus shifted toward a gorpcore-inspired aesthetic, blending technical outdoor gear with everyday streetwear and emphasizing functionality, layering, and performance within an urban context.

A key reference point was the Blockschmidt MetaHuman I originally developed for the Adidas x Foot Locker Megaride trailer. I saw this as a strong opportunity to bring that character back in a new project, placing him in a different world while keeping his core identity intact. The cover also allowed me to update the avatar using newer Unreal Engine features, refining details while preserving what makes the character recognizable.

For the environment, the direction leaned toward a nighttime urban setting. I based the scene on an alley, using its depth and wall arrangement to naturally frame the viewer's gaze toward the hero character. Details such as Blockschmidt and The Interline graffiti tags help establish context while reinforcing the urban visual language.

Gorpcore aesthetics and urban environments already coexist, making the alley setting feel intuitive rather than contrasting. Hence, the mix of outdoor garments and streetwear reflects how these pieces are worn in everyday city contexts. Garments, accessories, and color were used deliberately to support this narrative. A fitted inner layer combined with a longer outer layer emphasizes movement and functionality. Gloves and running sneakers ground the performance look, while cream tones separate the character from the darker environment. Green acts as a secondary accent, with subtle red highlights adding contrast.

Overall, the cover depicts a character in motion, where urban environment and outdoor-inspired fashion naturally intersect to form a cohesive digital fashion narrative. Details like the performance nose bandaid and the flushed cheeks link the MetaHuman to the depicted story within that gorpcore performance context. Environmental details like the puddles on the ground link back to the functional outfit, and a wet-map treatment on the digital lens finishes this train of thought, grounding the scene in a lived-in, performance-driven space. A slight Dutch angle heightens the sense of motion, while the MetaHuman's gaze into the key light creates a focused, cinematic moment within the frame.

The Interline: We also set a challenge for you: to capture the essence of movement in a still image. Tell us how you approached it, as someone who's previously worked with both traditional animation and performance capture.

Blockschmidt: To approach the challenge of capturing movement in a still image, I combined elements from both traditional animation and motion capture workflows and adapted them to my needs. For me, movement feels most convincing when it is grounded in something physically plausible, even if the final result is a single frame.

For the body, I started with a dynamic running animation from Epic's Game Animation Sample project, which I retargeted onto the MetaHuman. Rather than using the motion at full speed, I deliberately slowed it down and cleaned the finger poses. That shift in timing allowed me to focus on transitional moments within the movement, such as a sidestep or change in direction, where the body is slightly off-balance. Those in-between states often carry more energy and tension than a perfectly clean pose, which also translates onto the garment's behavior.

On top of that, I incorporated facial performance capture using a Rokoko headcam, working with Unreal Engine 5.6's mono video ingest face capture data extraction. This added a subtle layer of expression and effort to the character, reinforcing the sense of physical exertion without overpowering the still image. Once the underlying motion was established, it became the driver for the garment simulations. The slowed-down movement created the right conditions for clothing to react naturally to shifts in weight and direction, allowing fabric tension, drag, and flow to sell the sense of motion.

To further enhance this feeling, I explored motion blur directly within the digital camera settings. By experimenting with longer exposure shutter speeds, I created softer, dreamlike motion blur in some of the additional renderings, while keeping the final cover image more restrained. The goal was to freeze motion in time while leaving just enough blur to suggest movement, without losing the clarity needed to showcase garment details and facial expression.



3D ANIMATION SITS AT THE INTERSECTION OF REALISM AND IMAGINATION – PRODUCTS ARE NO LONGER ISOLATED OBJECTS, THEY CAN EXIST INSIDE WORLDS THAT REINFORCE THEIR IDENTITY AND NARRATIVE."

- BLOCKSCHMIDT

The result is a still image that feels like a paused moment within a larger action, inviting the viewer to imagine what came just before and what follows next.

The Interline: Both covers for this year's report make extensive use of MetaHumans. In the case of the beauty cover, the focus is very much on facial fidelity, but for this cover we aimed to try and showcase dynamic motion, which hinges much more on the ability to dress a character in clothing created in one of the major 3D platforms, and on the way that clothing then moves as the character animates. How did you approach creating a character that fit your intent here? And what was the process of styling them, knowing that simulating movement was a key objective?

Blockschmidt: Overall, the approach was about reintroducing the Blockschmidt MetaHuman within a new context, while evolving it to serve a different narrative goal. My intent here was to create a MetaHuman that could carry energy through the body and translate that energy into believable garment behavior. Knowing that the hood would be up and that the face would be the main point of contact, expression, lighting, and subtle performance cues became especially important.

Styling was used to reinforce that performance-driven intent. Details such as the performance-style nose bandage and slightly flushed cheeks help communicate exertion and movement. The face was lit with a warmer key light, balanced by a cooler fill, to create focus and depth within a single frame. To avoid clippings during simulation, I removed the eyes and smoothed facial regions and ears in Blender, ensuring clean deformation and preventing clipping once the hood and garments were in motion.

From a pipeline perspective, character and clothing were treated as one connected system. The animated running MetaHuman was sent into CLO3D via the LiveSync plugin, where the outfit was styled, colored, textured, and simulated directly on the moving character. Safety pins were used in CLO3D to keep the hood in place during dynamic motion and prevent it from gliding away. The garments were then brought back into Unreal Engine as USD, where I further tweaked materials and surface behavior.

Layering played a key role in making motion readable. A fitted inner layer paired with a longer outer layer allowed the clothing to react clearly to changes in direction, with front and back zippers revealing the underlayer as the

outer layer glides away during a sidestep. To keep the setup efficient, socks were not added as a separate garment layer but painted directly onto the exported MetaHuman body using Substance Painter. This required additional material adjustments, including tweaking the scatter map to remove subsurface scattering in the ankle region, so the Blockschmidt monogram socks behave like fabric rather than skin.

I also adjusted the opacity map in the master body material to eliminate minor clipping artifacts that can occur with dynamic garment simulations. Finally, Substance Painter was used to blend the Blockschmidt base skin textures with Unreal's MetaHuman textures and scanned assets from The Scan Store, adding another layer of surface fidelity, accompanied by the nose bandage.

The result is a character where motion, garments, and material response are inseparable, allowing the still image to communicate performance, realism, and narrative rather than just appearance.

The Interline: Sallyann, putting together this scene relied both on Blockschmidt's own multi-hyphenate, hybrid skillset, and on the position that Unreal Engine has at the core of a growing ecosystem for real-time tools. From your perspective, what does it mean to offer useful integrations between your core engine and the widening suite of digital product creation tools, as well as expanding the interoperability, availability, and utility of platforms like MetaHuman in a way that serves real industry use cases?

Sallyann Houghton: At Epic, we want real-time workflows to feel genuinely usable, which means Unreal Engine can't stand alone. It needs to sit within an ecosystem where assets, characters, environments, and tools move easily between each stage of creation. Strong integrations and interoperability are what make that possible.

In fashion, this is especially important. Designers work across multiple applications to sketch, simulate materials, and visualise collections. By connecting Unreal Engine, MetaHuman, RealityCapture, Fab, and leading DCC tools, we help those steps function as one continuous pipeline rather than a patchwork of separate processes.

MetaHuman shows this in practice. By making high-fidelity digital humans more accessible and compatible with industry tools, tasks that once required specialist skills or long renders become far easier. That's why creators like Blockschmidt can bring characters, garments, and environments together so fluidly.

Ultimately, integration is about meeting real industry needs — reducing samples, supporting virtual collections, improving collaboration, and enabling new types of experiences. As real-time becomes more central to fashion's workflow, our role is to offer tools that are open, connected, and ready for production.

The Interline: Blocki, in a wider sense, walk us through your pipeline for this whole project - from the initial assets through to the final pixels. What different solutions and assets needed to work together to create the vision you had in mind? And how did you finalise the resulting render?

Blockschmidt: For this project, my goal was to build a pipeline that was flexible rather than reinventing every asset from scratch. I built on existing solutions where it made sense, allowing me to focus on direction, integration, and refinement. Leveraging high-quality assets from other skilled artists is an important part of how I work efficiently without compromising the final result.

The process began with asset curation. Garments were sourced from the CLO-SET platform, where I selected a cargo pant and jacket as a base and then adapted them to fit the character and performance. Additional elements, such as gloves, were sourced through Fab, while the shirt and sneakers were matched to pieces I already owned and had worked with before.

The MetaHuman was developed in Unreal Engine 5.6 using the updated MetaHuman Creator, increasing overall facial and skin fidelity. In parallel, the environment was built from an alleyway scene sourced on Fab, which I then customized with graffiti elements created in Adobe Photoshop and additional details like puddles to ground the scene.

Once the assets were in place, everything came together in Unreal Engine. The MetaHuman was animated using retargeted body motion and facial capture recorded with a Rokoko headcam. The animated character was sent into CLO3D via LiveSync, where the garments were assembled, colored, textured, and simulated directly on the moving body. Embroidered logo details were developed with Substance tools before the simulated garments were sent back into Unreal as USD and aligned with the character and environment.

Lighting and camera setup were handled directly in Unreal. I built a custom lighting rig with a warm key, cooler fill, additional lights for garment detail, a rim light for separation, and a soft overhead source to control exposure. Camera settings such as focal length, aperture, shutter speed, motion blur intensity, lens flare, bokeh, and subtle wet-map effects were used to shape the final look.

The final images were rendered as ACES EXRs and finished in DaVinci Resolve, where color, illumination, and contrast were refined to match the intended mood. Overall, the pipeline brought together CLO3D, Unreal Engine, MetaHuman, Substance, Rokoko, and DaVinci Resolve.

The Interline: Alex, as well as direct skills and core software capabilities, this project pulled on a lot of community and integration threads: the LiveSync bridge between CLO and Unreal Engine, for example, and the breadth and licensing structures of the CONNECT marketplace side of CLO-SET. There's a lot of extensibility at work there, but it's important to remember that, although 3D is showing up in more different ways than ever, each of these should be grounded in producible reality and accurate product data. How do you think about building and maintaining that common foundation between all the different places that 3D garments can show up?



Images created by Blockschmidt, for The Interline. Staged, animated, and rendered in Unreal Engine, on a digital human from MetaHuman, by Epic Games. Clothing created in CLO Virtual Fashion, incorporating some licensed assets from CLO-SET Connect.



Alex Kim: You're absolutely right. As 3D content continues to surface across an increasing variety of channels, it's essential that each instance is rooted in accurate product data and reflects a reality that can be manufactured.

CLO is built on this principle. The digital garments created in CLO are not just visual representations but precise digital twins. They capture construction logic, material behavior, and fit with high fidelity. This ensures that wherever the garments are used—whether in Unreal Engine, digital marketplaces, or virtual showrooms—they all remain connected to a single, reliable source of truth.

Instead of creating separate standards for each output channel, we believe the best way to maintain consistency is to let everything originate from the CLO asset itself. This way, extensibility becomes a strength, offering flexibility that is always grounded in validated, production-ready content.

The Interline: Blocki, what was your physical setup for this project? What local hardware were you running? What input device(s) did you use?

Blockschmidt: For this project, I worked across two local setups: a primary desktop workstation and a high-performance laptop, switching between them depending on the task and stage of production. The main workload was handled on my desktop workstation, running an AMD Ryzen 7 5800X, 64 GB of RAM, and an NVIDIA GeForce RTX 3080 Ti with 12 GB of VRAM. This machine was used for the heavy lifting, including MetaHuman development, garment simulation, lighting, and final rendering in Unreal Engine. I work across multiple SSDs for active projects and larger drives for archiving, which helps keep iteration responsive even with complex scenes.

Alongside that, I used a laptop equipped with a 13th Gen Intel Core i9-13980HX, 32 GB of RAM, and an RTX 4090 mobile GPU with 16 GB of VRAM. This setup allowed me to stay flexible and parallelize tasks. In practice, I could color grade and review renders in DaVinci Resolve on the laptop while the desktop was busy rendering, which sped up decision-making toward the final stages of the project. For facial performance capture, I used a Rokoko headcam, feeding directly into the Unreal Engine pipeline.

And while the laptop is already running an RTX 4090 mobile and holding up extremely well on the go, I'm still quietly hoping that Santa might consider a 5090 RTX for the main workstation. After this year's workload, I'd say I've been reasonably well behaved.

The Interline: The implications of a project like this one, that focuses on the bleeding edge of 3D staging and storytelling, go further than the traditional "DPC community," and stretch into a much broader range of in-house, partner, and consumer audiences. What do you believe it's going to take for fashion in particular (as well as other product-centric industries) to extend the reach of the work they've done in 3D so far to the places that other industries have already gone?

Blockschmidt: I think fashion has already started to shift in how it handles and reuses 3D visuals and assets. While the industry has opened up pre-production processes through tools such as CLO3D, it remains largely resource-intensive and, in many cases, wasteful. That reality can't be ignored. At the same time, I do see a positive direction emerging, especially in how fashion is beginning to understand the value of universal, cross-pipeline, multi-use 3D assets.

Looking at other industries, the transition from physical to digital has already arrived at the center of pop culture and the broader zeitgeist. Artists like Playboi Carti and Kim Kardashian existing inside the Fortnite universe are clear examples. It no longer feels unusual to spend real money on digital garments, investing in a playable avatar and an online persona. In-game assets have become culturally accepted, allowing people to express identity and value within digital worlds.

We're also seeing the inverse direction gain momentum, where digital assets move back into the physical world through 3D-printed elements and digitally driven production methods. Garments and accessories that originate in 3D can now be prototyped, customized, or produced physically, reinforcing the idea of 3D as a continuous loop rather than a one-way process. This is where fashion and other product-centric industries can learn most from gaming, especially through cross-connections with entertainment and music that create immersive, narrative-driven experiences.

At the same time, consumers increasingly want more than just a product. They want a story they can step into, something that links their physical life to a digital experience. In my own work, I digitized festival merchandise for Splash! and translated those pieces into 3D animations that were showcased on the festival's mainstage screens, turning fashion into a shared live moment. Similar approaches can be seen in 3D-scanned footwear experiences on mobile devices. The line between physical and digital identity is already blurred and will continue to blur further, and I'm genuinely excited to see how fashion continues to expand the reach and relevance of its 3D work.

The Interline: As someone who's worked in 3D for other media, and who's specifically worked with cross-industry tools for this project, what opportunities do you see for fashion to use 3D as a way to authentically collaborate with other sectors?

Blockschmidt: For me, the biggest opportunity lies in treating 3D as a shared language rather than a fashion-specific tool. I realized while answering some of the earlier questions that I had already started touching on this by accident, which says a lot about how naturally these ideas connect in practice. Having worked across music, live events, and entertainment, I've seen how powerful it becomes when different sectors meet on the same technical and creative ground. When teams work from shared digital assets and real-time environments, collaboration feels fluid instead of fragmented.

Fashion is in a strong position here because garments and products are inherently expressive and adaptable. Through 3D, a single asset can live across multiple contexts without being rebuilt. In the Megaride project, for example, the same 3D shoe asset used for the online website campaign was also worn by the MetaHuman in the visual campaign experience. That continuity allowed the product to exist consistently across platforms while adapting its role and storytelling to each environment.

Ultimately, I see 3D as a way for fashion to collaborate more authentically with other industries and participate more actively in culture. When 3D is introduced early and shared across creative, technical, and experiential teams, assets can travel naturally between fashion, music, entertainment, and digital spaces. When those collaborations are built on shared systems rather than surface-level integrations, 3D becomes a meaningful connector that enables richer stories, broader reach, and more immersive experiences.

The Interline: Finally, from a technical perspective, what do you want to see being developed further in the end-to-end 3D pipeline for fashion?

Blockschmidt: From a technical perspective, I would like to see the gaps between tools continue to close across the entire pipeline, especially between garment creation, character animation, and real-time usage. Plugins like LiveSync have already paved the way for how I work today. My Unreal Engine and CLO3D projects would not exist in their current form without that bridge. Cross-software connections like this make it significantly easier to move from creative intent to execution, and I hope to see them developed even further.

Garment simulation in motion is one of the most important areas for continued growth. We are already seeing strong progress, especially with GPU-accelerated simulation and cinematic-quality cloth behavior inside CLO, which opens up new possibilities for sped up workflows. Tighter integration between animation data and cloth simulation, particularly for layered garments and fast, directional movement, would make performance-driven fashion work more predictable and robust. The closer the simulation stays to the character's actual motion data, the more convincing the result becomes.

Asset exchange and consistency are equally critical. Leaning further into USD-based workflows is a major step forward, and it is encouraging to see this direction reflected in developments like LiveSync 2.0. Stable data exchange helps preserve material intent, scale, and hierarchy across tools, reducing the need for manual fixes at later stages.

More broadly, I would like to see more built-in, artist-focused tools that reduce technical overhead while increasing real-time quality. When systems communicate clearly and reliably, creatives can focus on storytelling, performance, and design rather than technical problem-solving. The strong partnership between CLO and Unreal Engine is a great example of this direction, and I'm genuinely happy to be working at a point where MetaHuman cinematic-quality fashion pipelines are becoming a practical reality rather than an exception.



Makeup created by Jack Oliver for The Interline,
Designed and rendered in V-Metics,
on a digital human from MetaHuman, by Epic Games.

BEHIND THE BRUSHSTROKES



JACK OLIVER, GLOBAL MULTI- ARTIST

THIS YEAR, THE DPC REPORT FEATURES VARIANT COVER DESIGNS FOR THE FIRST TIME. THIS PROFILE EXAMINES THE WORK THAT WENT INTO OUR BEAUTY COVER, AND THE PRECEDING INTERVIEW DETAILS THE BEHIND-THE-SCENES OF OUR FASHION COVER. IF YOU'D LIKE TO DOWNLOAD BOTH VERSIONS, VISIT THE INTERLINE TO GRAB THE ONE YOU DON'T ALREADY HAVE.

For three years, The Interline's DPC Reports have focused exclusively on the trajectory, the maturity, the technology ecosystem, and the multi-disciplinary community that has all coalesced around digital product creation for apparel, footwear, and accessories.

This was a pragmatic choice, in the sense that the tools, talent pipeline, integrations, and content ecosystem were all themselves, built with fashion and footwear in mind. To put it bluntly: nobody was really replicating any of these things in the beauty and cosmetics sector.

But as our team started to broaden our coverage of the beauty industry in 2025, it became obvious to us that there was nothing fundamental about the products, the materials, the content pipelines, or anything else that would make DPC for beauty unworkable. And, to the contrary, there was a lot about the challenges and opportunities that fashion has aimed to tackle with 3D that had close analogues in cosmetics and beauty.

In the most basic terms, both beauty and fashion are aiming to virtualise as much of the product journey as possible, and both industries need a way of accurately capturing the interaction of digital materials with digital humans - even if one focuses on the face while the other prioritises the body.

There's obviously also a huge amount that separates the two sectors - not just at the product engineering and inputs level, but culturally and technically. That being said, as we have already seen in fashion, the same tools used to design, develop, and communicate in hard goods, automotive, and other industries are now driving a lot of the advancement in fashion's own toolkit. And the same potential leapfrog opportunity - where one industry obtains a kick-start benefit from the successful digitisation of another - exists for beauty, which has the potential to borrow not just the philosophy of digital product creation

from fashion, but potentially some of its tools and infrastructure as well.

You'll see this evidenced in both of our variant covers this year: the outputs do not look much alike, but both were built on top of virtual characters from Epic Games' MetaHuman platform, and both simulate the aesthetics and the behaviour of real products, digitally.

So, to better understand what might be coming next for behind-the-scenes technology in beauty, and how effectively the philosophies and the principles of DPC can transfer from one sector to another, we commissioned makeup artist Jack Oliver, who also sits on the British Beauty Council, to put physical skills into practice using new DPC tools dedicated to the beauty sector.

Below, we quiz Jack on their inspirations, their workflows, and their pipeline to provide behind the scenes insights into one of our two cover designs this year. We also spoke to [Dr. Alex Box](#), another member of the British Beauty Council, and one of the Founders of [V-Metics](#), the virtual cosmetics platform Jack used, along with [Tony Lacey](#) from Epic Games, whose [MetaHuman platform](#) provided the unifying digital avatar layer across both our covers.

Candidly: The Interline doesn't know if DPC for beauty has the same long-term potential that it's demonstrated for fashion. As you'll learn from Jack's answers, digital tools clearly provide a new outlet and an uplift for seasoned and emerging makeup artists, and the conditions for major cosmetic brands to achieve similar results to the ones we've seen in fashion are present, but there are no guarantees.

We do know, though, that beauty technology is on a marked upward trajectory in both B2C and B2B use cases, and on that basis we believe that DPC deserves the same opportunity for discussion, exposure, and development in beauty that it's had in fashion.

The Interline: Jack, walk us through your career as a makeup artist. Where did you start and what do you see as being the milestones that have defined your skill progression and your personal style?

Jack Oliver: From a young age I was introduced to the world of difference-making and expressiveness in self image. I first really took notice of makeup being a creative space thanks to the people I grew up with from the alternative community, who would wear expressive makeup and make dramatic changes to their appearances to reflect who they were.

As a young artist, this opened up a world for me where I sought a new way to express my creativity and my personality. In terms of media, I played with art, photography, and graphic design during my education, but I then moved into higher education wanting to learn makeup specifically.

At that point, I started working in the retail side of makeup, and I had the opportunity to hone my craft as a makeup artist. To me, that meant learning about every face that I had the opportunity to use as a canvas, and developing my work to the point where I was able to achieve what I wanted physically, which then lead me into wanting to see how to work with the same aims and the same materials digitally, or phytically, where the digital and the physical makeup reflect one another exactly.

The Interline: What was your first introduction to working on makeup digitally? And how did the tools available to you then differ from where they are now, maturity and capability-wise?

Jack Oliver: [V-Metics](#), which is the platform I used to create this makeup, was my first experience of working digitally in the sense of the canvas being a 3D face and a digital twin of the materials. Prior to this, I'd learned Photoshop as part of a photography qualification, and I'd had an experience I suspect a lot of people reading this report have had: designing an avatar in a videogame character creator, which in my case was The Sims.

It was actually The Sims that brought me here. Not too long ago, I was taking some downtime between projects, and I found myself missing the playfulness of makeup, so I'd started creating makeup selections on Sims (the generic name for the characters from the game) and posting them on social media as a bit of an experiment. That lead to Dr. Alex Box, one of the founders of V-Metics, reaching out to me and inviting me to go hands-on with a closed beta.

That gave me the chance to take some of the same playfulness I'd found in videogames, and to pair it with the real craft, precision, and artistry of physical makeup - using the tools I was familiar with in the real world to create digital looks. From there, I've worked on learning the tools, developing my skills, and also being an advocate for the way that digital product creation in beauty and cosmetics can help both preserve and protect the artists' touch, and also give those same artists a new way to connect physical and digital spaces, to learn, and to experiment.

The Interline: Needless to say, given that this is the fourth digital product creation report, fashion is now at the point where brands, suppliers, and consumers all regularly interact with digital representations of materials and products. Those different touchpoints may not always



Makeup created by Jack Oliver for The Interline, Designed and rendered in V-Metics, on a digital human from MetaHuman, by Epic Games.

"IT WAS IMPORTANT TO ME TO MAKE SURE THAT THE FINE DETAILS OF KIKO'S SKIN WERE VISIBLE, BECAUSE I THINK WE YEARN FOR AUTHENTICITY AND IMPERFECTIONS IN DIGITAL REPRESENTATIONS MORE THAN WE DO IN THE REAL WORLD."

- JACK OLIVER

share a common foundation, which is one of the challenges of pursuing end-to-end 3D in apparel, but in discrete areas clothing has come a long way towards having 3D be the reference frame for a lot of creative work and commercial decision-making. Dr. Alex, why do you think that's not been the case for beauty?

Dr. Alex Box: They might exist side-by-side in retail, but fashion and beauty are very different industries in terms of what they are actually selling. The way I look at it, fashion is sculpture while beauty is painting - and fashion creates products, while beauty creates promises.

Any digital tools that want to be adopted in beauty need to recognise that distinction, and frankly the reason that the beauty industry hasn't adopted a 3D framework is because the software hasn't been able to measure up to representing real products and materials, or to the high bar needed to allow artists and product developers to create, pre-visualise, and refine looks and formulations, virtually.

In fashion, 3D pattern and form-making software hinges on a lot of the same principles that 3D CAD does in rigid, hard-body automotive and engineering design. Size, soft materials, and fit are really the only variables that change in that equation.

Beauty is a different proposition in the physical world, so it also needs to be treated the same way in the digital one. While fashion can obviously be styled and worn in artistic and unique ways, formula-based beauty products are really only actually realised when they undergo a process of highly nuanced, individual interpretation and application in the hands of the artist and the consumer.

That latter part really is key, too: the beauty industry has focused heavily on B2C technology, because the final expression of a beauty product happens in studios and in customers' homes. Now, I believe the industry is waking up to the B2B applications as well, for all the reasons Jack has already mentioned.

The Interline: What was your inspiration and your intent behind the makeup you created for this first-ever beauty cover for a DPC Report? What were you aiming to express, and how did you go about it?

Jack Oliver: I really wanted to explore colour and texture. For the MetaHuman model I picked, Kioko, the goal was to appreciate and showcase the skin, with all its tone and textures. I picked the colours - muted mustards and graphic golds - to complement the model, and I worked on shapes and placements that would bring light to where it

was needed, and would also make a striking statement that captured a feeling of happiness and reflection.

The key thing, for me, was to really test how effectively I could use digital tools to reflect the entire makeup journey of capturing a moment in time, and then bringing in elements and materials that can really evolve what they express through changes in lighting.

The Interline: What materials did you work with to create the final look? And how confident are you that you could replicate this digital creation with the same physical palette?

Jack Oliver: I tried to select materials that pushed boundaries, and that felt exciting and experimental - both metallics and mattes. For the eyes, I started by crafting a soft base with the perfect shades and tones, and then the overlaid geometric lines by using different digital brush tools and palettes. After this, I moved onto the skin and lips, where I wanted to create a very soft, demi-matte finish that would contrast with the highlighted gold in the eyes.

It was also important to me to make sure that the fine details of Kioko's skin were visible, because I think we yearn for authenticity and imperfections in digital representations more than we do in the real world. In the physical world we pluck brows and remove baby hairs, but working digitally it felt right to highlight these instead, and to adapt the makeup and create around them.

Although I've chosen to spotlight some different elements digitally than I would with a physical makeup, I think it'd be exciting to recreate this look physically. It would involve the same materials I've worked with virtually: laying down matte mustard tones in a dry-down cream, blending the edges with soft tonal shadows, and then using a liquid gold graphic to create the exaggerated liner. I'd also still want to show real skin through the makeup, so I'd work with demi-matte finishes and soft matte lipliner to create a full lip look that's then blended out into the skin.

The Interline: Tell us what your technical pipeline for this project looked like, from initial idea through to finished renders.

Jack Oliver: As I mentioned, after working on a brief together with the team at The Interline (this being the first ever beauty cover for one of these reports!), I started work in V-Metics. At that early stage, when you're developing ideas, there's a lot of value in being able to move back and forth through timeframes, and to easily start over - all without the sunk time and the waste of trialling makeup physically, or even on a paper face chart.

At the same time I was experimenting with the makeup, I was also able to change models until I landed on using Kioko, and was able to quickly develop a new direction that highlighted her skin tone, eye shape, and colour.

The final renders were run within V-Metics.

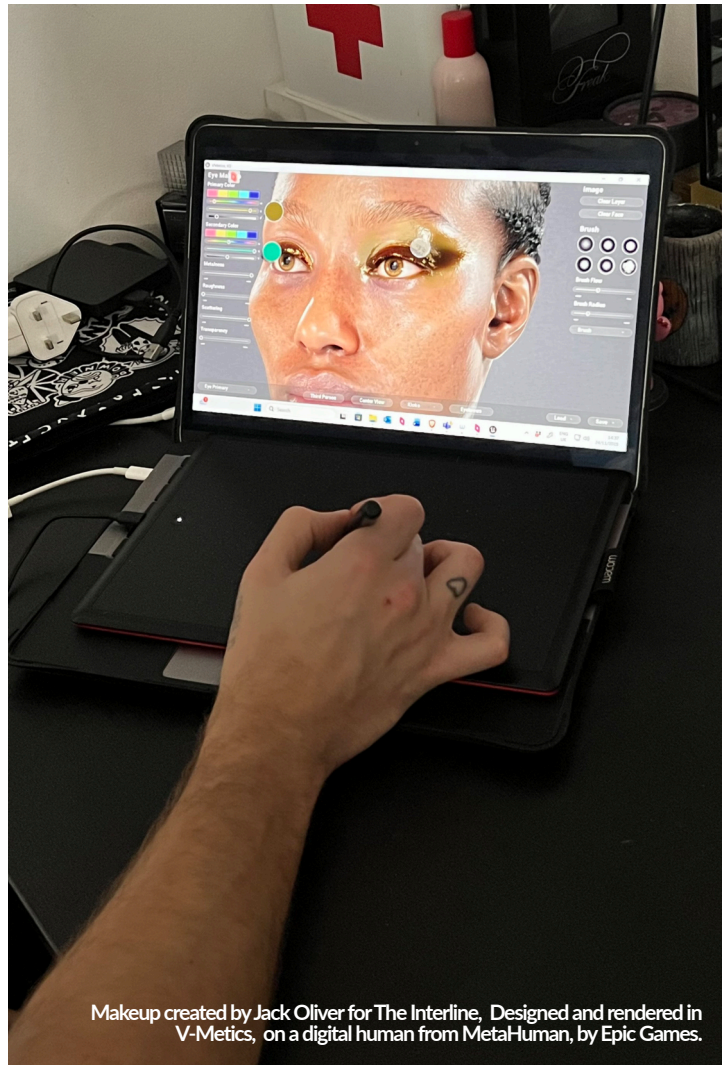
The Interline: Walk us through your physical setup as well. What local hardware were you running? What input device(s) did you use?

Jack Oliver: I currently use V-Metics as a Pixel Streaming application, so I'm able to create wherever there's an internet connection, but without needing a lot of local processing power.

I have a graphic tablet and pen that I'm able to use the same way I would use a real makeup brush, in real-time. So provided I carry that and my MacBook with me, I'm able to keep working on projects without being tethered to a studio. I even put some finishing touches to this look while I was visiting family around the holidays.

This is an area where digital has a clear edge over physical. As well as not needing to be in the same physical space as a model, I also don't need to open up a makeup kit, or make sure that I have the right physical materials to hand.

It's important to me that working digitally truly reflects my movements, my intent, and my capabilities. But it's also incredibly freeing to be able to pair that accuracy and craft with the flexibility to work almost anywhere, with no overheads besides the hardware that I already owned.



Makeup created by Jack Oliver for The Interline, Designed and rendered in V-Metics, on a digital human from MetaHuman, by Epic Games.

The Interline: As well as representing the cosmetic materials, any digital platform or pipeline that's going to meet the high bar for actually being a viable place to test, develop, and refine not just individual looks but products and collections needs to incorporate a robust visual representation and physical simulation of the skin. Are we at the stage where you think this is ready? As an artist, are you confident working digitally?

Jack Oliver: As an artist who's been doing makeup physically for many years on a freelance basis, I do feel as though working digitally is something I could make a part of my everyday creating. Despite being grounded in realistic skin and materials, the digital canvas feels more like experimentation, or gameplay - a platform I can approach with a clear mind, and then interact with, applying products virtually, and generating new ideas.

On that basis, having access to digital creation tools for beauty has already helped to level up my design and application skills, and I can see plenty of potential in the future where makeup artists like me turn to digital as their first port of call, and as a way to develop their art and their careers.

I mentioned the experiments I did designing characters in The Sims earlier, but I want to emphasise that, while digital creation in makeup has the feel of "gameplay" to it (and while I'm sure games will be where some of the younger generation finds their own passion for makeup) I see it as a serious tool that can play a role in makeup artists' skill development, and that can help preserve the craft, as well as giving makeup designers new opportunities to practice it.

The Interline: Tony, when it comes to deploying digital humans, fidelity has always been a primary barrier. Whether we're talking about consumer-facing scenarios, or we're aiming to put virtual faces or bodies in the hands of experienced artists and engineers, the limiting factor is how effectively digital can represent physical - both as a self-contained representation, and as a canvas for creative and technical work.

We've seen this tension lead to innovation in soft body avatars, where fit and athletic performance in garments are concerned, but the bar is arguably set even higher for cosmetics and beauty, which demand both an extremely granular understanding of the human face, and a reliably accurate surface that makeup artists can apply complex materials to, with confidence that the results will mirror the real world.



"HAVING ACCESS TO DIGITAL CREATION TOOLS FOR BEAUTY HAS ALREADY HELPED TO LEVEL UP MY DESIGN AND APPLICATION SKILLS, AND I CAN SEE PLENTY OF POTENTIAL IN THE FUTURE WHERE MAKEUP ARTISTS LIKE ME TURN TO DIGITAL AS THEIR FIRST PORT OF CALL."

- JACK OLIVER

How far have we come towards that vision, with MetaHuman, and what, technically speaking, is going on behind the simultaneous pursuit of photoreal final pixels and uncompromising fidelity in skin and materials?

Tony Lacey: MetaHuman has already brought us much closer to faithfully representing real humans through final pixels that deliver richly expressive and emotionally credible characters. That comes from grounding the entire system (geometry, materials, animation, shading, etc) in high-fidelity scan data and physically based rendering. The engine isn't just drawing a face; it's simulating how light interacts with layered skin, micro detail, and expressive movement, so that creators can treat the surface with the same confidence they would in the real world. This is why makeup, complexion work, and other beauty-specific materials now behave predictably across a wide range of faces.

But our ambition for MetaHuman goes much further than reproducing the physical world. Yes, one of our goals is to represent real people in a way that feels authentic and believable, but the broader vision is to let anyone create any character they can imagine. MetaHuman is evolving toward a system where stylisation, identity, and self-expression are all first-class citizens, not edge cases. Ultimately, we want everyone to represent themselves digitally in the way they feel inside, not just how they appear externally, and we want digital makeup and beauty workflows to come on that journey with us; supporting realism when needed, but equally enabling creative freedom, transformation, and self-authored digital identity.

The Interline: Dr. Alex, what does the onramp for new makeup artists, and the career development opportunities for existing ones, look like as we go into 2026? What in-points are there to learn the craft, either from entry-level opportunities, or from existing subject matter experts and icons? In fashion, we've seen 3D make significant inroads into education at least partly because of industry demand, but it feels as though perhaps there's a "chicken and egg" situation here, where digital product creation needs to take off in-industry for it to be taught at an institutional level, and vice versa.

Dr. Alex Box: This is an area where I agree that beauty has a lot to learn from fashion, as well as where fashion's uptake of DPC tools is creating new career development opportunities for aspiring and professional makeup artists.

As we go into 2026, digital product creation pipelines for garments and footwear are getting more mature, and we're starting to see much more in the way of real-time engines being adopted across design, production, and content creation pipelines. Now that those ecosystems are becoming better-connected, we're also seeing major brands in luxury (LVMH for example) wanting to treat them as holistic, complete workflows that include apparel, styling, makeup and hair - all being represented digitally.

This gives makeup artists a new entry point to the future of digital product creation and content creation, as well as providing them with transferable skills to apply their craft in cross-disciplinary ways, across digital marketing, gaming, and film.

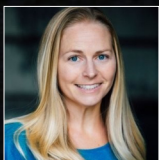
At the moment, there's a broad selection of new elective courses, as well as greater integration into mainstream curriculums, covering digital fashion, and we clearly need to see equivalents in beauty.

Right now, that education and upskilling pipeline is held back by limitations in the hands-on tools and ecosystem for digital beauty. This, I believe, is going to change quickly as a result of demand, and as we can see from the way Jack has been able to translate real-world skill into digital platforms, and vice versa, there are makeup artists already hungry to find new ways to practice their craft that offer a non-destructive means of moving from digital to physical and back again.

I expect that we're going to see digital product creation become a much larger fixture of beauty strategies in the very near future, so having that pool of hybrid talent (and the tooling to allow them to work digitally, natively) is going to become critical very soon.

DRIVING SUSTAINABILITY THROUGH 3D DIGITAL PRODUCT CREATION AT PATAGONIA

MORE THAN JUST A DIFFERENT APPROACH TO DESIGN AND DEVELOPMENT, 3D HAS BECOME ONE OF THE KEY LEVERS THAT INDUSTRY LEADERS CAN PULL TO ALIGN TALENT, TECHNOLOGY, AND PROCESS INNOVATION TO STRATEGIC OBJECTIVES AND DEEPLY-HELD BUSINESS VALUES. BUT PULLING IT THE RIGHT WAY CAN TAKE TIME.



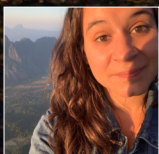
BY KEALA STEPHAN, DIRECTOR OF 3D DIGITAL PRODUCT CREATION AND PROCESS INTEGRATION AT PATAGONIA

As the Director of 3D Digital Product Creation, Keala leverages her extensive knowledge of product creation to lead Patagonia's 3D digital product creation strategy and execution.



BY IAIN FINCH, SENIOR MANAGER, 3D, AI, & 2D VISUALIZATION AND PRODUCT CREATION GTM OPERATIONS AT PATAGONIA

Iain leads visualization infrastructure at Patagonia, connecting product creation intention and craft to end user by leveraging digital assets as a powerful storytelling tool. He blends this vision with global sourcing and product expertise to evolve processes, enable creation in the 3D digital space, and reduce development impact on the planet.



BY CASSANDRA CASAS, DIGITAL PRODUCT CREATION LEAD AT PATAGONIA

Cassandra has spent the past 12 years working in the Digital Product Creation space. Drawing on her background as a pattern maker and Technical Designer, she brings a deep focus to user experience, product integrity, and scalability of process. She is equally committed to ensuring that Digital Product Creation supports Patagonia's broader environmental goals.



At Patagonia, we are in business to save our home planet. Our fundamental belief is that we're all part of nature, and every decision we make is in the context of the environmental crisis challenging humanity. We work to reduce our impact, share solutions, and embrace regenerative practices. This commitment shapes every decision we make, including how we approach 3D digital product creation.

For us, 3D digital product creation is more than a technological advancement. It's a strategic tool to reduce the environmental impact of the product creation process. By rethinking traditional processes, 3D is helping us reshape the entire product lifecycle, from initial concept to final consumer experience.



OUR DPC TEAM MISSION: “REVOLUTIONISE HOW PATAGONIA CREATES PRODUCT.”

BUILDING A DIFFERENT PATH FOR A DIFFERENT PURPOSE

While many brands adopt 3D primarily for marketing, sell-in, or other revenue-driven initiatives, Patagonia has intentionally taken a different approach. From the start, our focus has been on leveraging 3D to create efficiencies and minimise environmental impact throughout the product lifecycle.

For digital garments to be sustainable, we identified the need for a scalable and seasonally-integrated infrastructure. This means standards and processes that meet the unique needs of Patagonia, and libraries that we can iterate on each season as technology changes and the business needs grow.

It also means prioritising skill development for our product creation teams and fostering a close collaboration with our finished goods suppliers. This allows us to deliver the highest quality digital product that is not only embedded in our seasonal process but can be trusted by our cross functional partners – not because it just looks like the product in question, but because it's a true representation of what we produce. Our goal is not pretty images, but accurate garments.

This deliberate approach to the way we've deployed 3D digital product creation has required more time (we have nearly told this story through The Interline several times before!), but we firmly believe it's been worth it in the long run. By laying out a strong foundation instead of solely pursuing visual accuracy, we've created a scalable, sustainable framework for 3D adoption that we were able to effectively align with our values and our communities.

**“WE WANT, AND
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WAY POSSIBLE.
IN ORDER TO DO
THAT WE HAVE
TO MAKE OUR
OWN PROCESS
OF CREATION
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BUILDING A
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CORE TO OUR
MISSION
STATEMENT.”**

FROM RELUCTANCE TO RESPONSIBLE ADOPTION

Patagonia's history of innovation has always centred on product quality, sustainability, and pioneering performance - not chasing the latest tech trend. For years, we approached digital tools cautiously, prioritising craftsmanship and environmental responsibility. We wouldn't say we were late to digital product creation, but neither were we the first.

But a big part of being a mission-driven company is recognising that, when the world is changing, so must we. Embracing technology isn't about abandoning our roots; it's about amplifying them using tools that are carefully-chosen and sensibly and sensitively deployed.

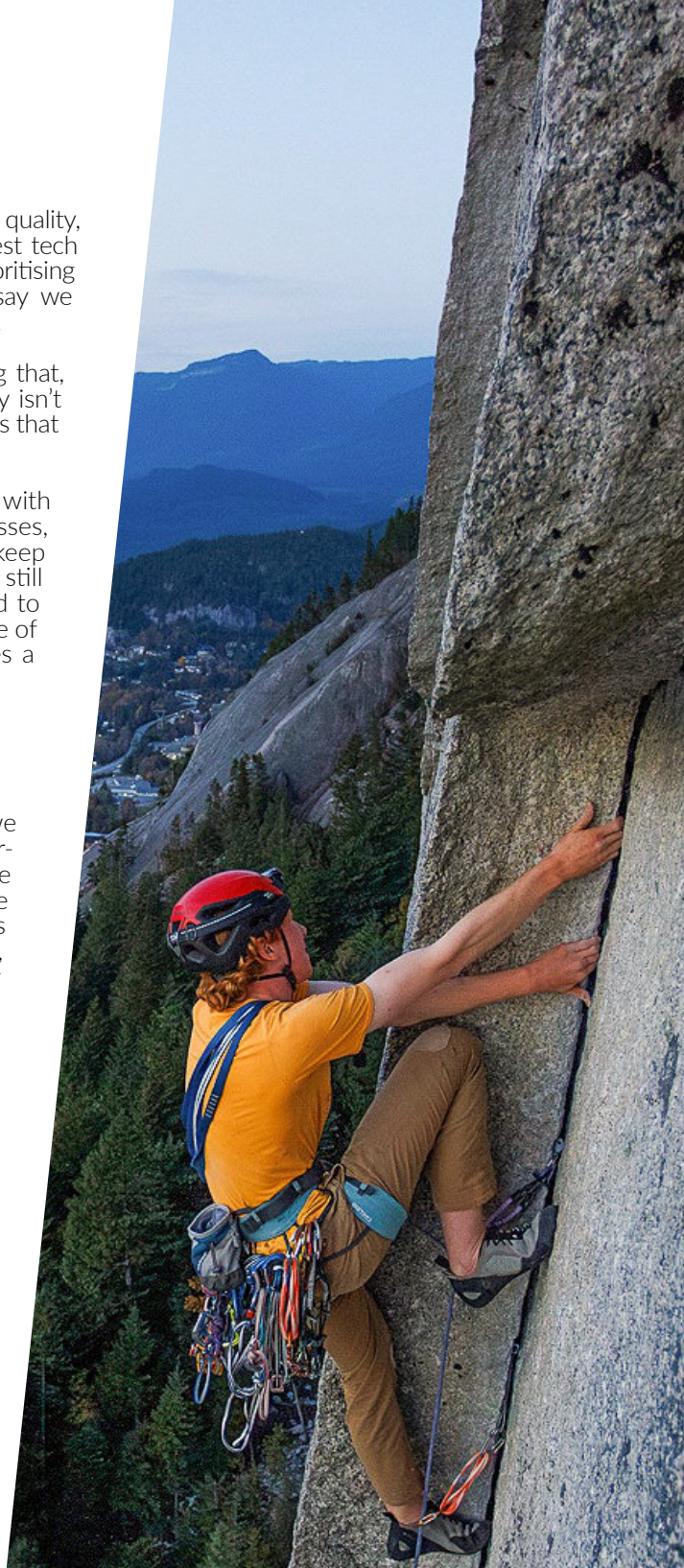
We have the experience to know, first-hand, that when used with intention, digital tools can free us from wasteful processes, measurably accelerate responsible decision-making, and keep people where they belong - outdoors, not behind a desk. We still take the time to understand the effects of our technology, and to make sure we are optimising our processes and taking advantage of new ideas when they meet our standards, but it now becomes a catalyst for connection with nature, not a barrier to it.

LEARNING THE HARD WAY (AND LAUGHING ABOUT IT)

We'll admit it - when we first stepped into the world of DPC, we weren't exactly crushing it. Let's just say we had a few "character-building" moments. To create compelling visuals and products, we had to learn from other industries, including the VFX space - the same space that powers blockbuster movies with massive teams and specialised roles. At first glance, we thought to ourselves, surely those sectors will be so massively far ahead of our ambition that we'll be hopelessly behind the curve?

But one thing we've learned, when it comes to DPC, and 3D in general, is that everyone is approaching things their own way, building their own workflows and workarounds. From the outside, the way the movie industry or the automotive industry tackled 3D looked seamless. On the inside? We quickly realized that tool integration and file formats weren't as dialled-in as we imagined they'd be. And we also learned that people who work in 3D are usually very candid about where and why their vision for end-to-end digital working wasn't being realised.

So there we were, adapting tools originally designed for cinematic worlds, to fit the realities of apparel, including small, agile teams working at scale - where product accuracy, speed and precision matter much more than the Hollywood-polished visual sheen. It was humbling, but it also taught us how to innovate under pressure and build processes that work for Patagonia, not a movie set.



Learning Curve



Illustration



Proficiency Improvements



Photography

PEOPLE AND PROCESS FOCUSED TRANSFORMATION

When you've been through the work the way we have, and you've emerged the other side with a clear-eyed alignment between digital product creation and business direction, everyone wants to know your secret sauce. What did Patagonia do to make DPC work, not just for our internal teams, but for the commitment we've made to people and planet?

Here's the truth: it doesn't exist. DPC success isn't about shortcuts; it's about consistency, perseverance, and people. You want to go fast? Go alone. You want to go far? Go together.

We know the key challenges that anyone building out a digital product creation strategy will encounter. Without leadership alignment and sponsorship, progress will stall. Without change agents embedded across teams, the whole thing will feel like an uphill climb. True success will come when top-down alignment meets a focused, intentional approach to tools - combined with time and trust in the process. There's real transformation to be had, but everyone has to trust and believe in it.

And here's another truth: sometimes 3D is the solution, and sometimes it's the problem. Technology doesn't live in isolation - it's woven into processes. When things feel broken, it's rarely just the tool; it's often the way the process is designed around it. Re-examining workflows can uncover hidden friction points and unlock opportunities for improvement, which sometimes get made in the processes around a solution, but sometimes they do require directed development of the tools themselves.

At Patagonia, we've also learned that success isn't about forcing 3D everywhere. It's about asking the right questions, refining the processes, and ensuring every application serves our mission and the planet by putting the benefits of 3D in the places they make the most sense.



Using digital assets to drive impact incl. design ideation, prototyping, and graphic placement.

LOOKING AHEAD / LEANING IN

Beyond product creation, we are now expanding the use of 3D assets to meet visualisation and storytelling needs across the business. Thanks to our talented team of 3D experts, and the proof points we have in place at the foundational level of garment accuracy, we now have a strong infrastructure and cutting-edge tools that give us the expanded benefit of enabling state-of-the-art product renders for a variety of internal applications.

Through streamlined digital workflows and accelerated decision-making, we're now enhancing efficiency and agility across teams. With in-depth exploration of DPC tools and a focus on upskilling, our technical capabilities are advancing rapidly, enabling us to craft best-in-class products while using fewer resources, minimising environmental impact, and enriching the global experience for both our internal teams and our customers.

For Patagonia, this whole initiative really is about more than just a shift in tools. It's a company with a clear, time-tested mission figuring out how to take bold steps to work smarter and more sustainability, turning technology to our advance when it comes to accomplishing our goals.

Looking ahead, Patagonia is going to continue to explore emerging technologies that align with our core values – inside DPC and beyond. Our focus is going to continue to drive our decision-making frameworks, and we'll always strive to adopt innovations that reduce environmental impact, improve workflow efficiency, and deliver meaningful product experiences to our communities.

At Patagonia, technology is never an end in and of itself. We have spent a lot of time understanding, testing, and refining what digital product creation should be, and we've landed on the conclusion that it's an important way of making sure that we're creating products and supporting communities that help protect the planet we all share.

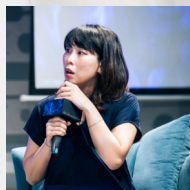
Our commitment is to use technology as a force for good, ensuring that every advancement strengthens our mission rather than distracts from it. Your mission might not be exactly the same as ours, but that central philosophy should be something you can take away and apply to your 3D strategies as well.

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PRACTICAL & PRODUCIBLE - THE ROLE OF SUPPLIERS IN INDUSTRIALISING DPC & AI

WITH MORE DIGITAL TALENT AND STRATEGIC VISION RESIDING UPSTREAM THAN EVER, SUPPLIERS ARE IN THE UNIQUE POSITION OF BEING ABLE TO UNDERSTAND WHAT BRANDS ARE ACTUALLY TRYING TO ACCOMPLISH WITH DIGITAL PRODUCT CREATION - AND TO FILTER THE VIABLE AND VALUE-CREATING APPLICATIONS FROM THE REST.



**BY ELLY CHENG,
DIRECTOR OF
DIGITAL PRODUCT
CREATION,
MAKALOT**

Elly Cheng is Director of Digital Product Creation at Makalot and product lead of Portal:M, a digital innovation studio born from the garment supply chain in Taiwan. With nearly 20 years of experience across brands, mills and manufacturing, she focuses on turning 3D, AI and XR from buzzwords into reliable tools for industrial use. Her work spans digital garments, fabric testing and immersive experiences, building pipelines that connect design, production and culture while challenging traditional suppliers to rethink their role in a physical-digital future.

THE DIGITAL GOLD RUSH VS. THE FACTORY FLOOR

The fashion industry is living through a digital gold rush. From C-suites to showrooms, everyone is talking about 3D, DPC, and AI as if they were talismans of transformation. Yet from the supplier side, the view is more pragmatic. Behind every bold presentation lies a maze of disconnected pilots, unaligned data, and technologies that dazzle in theory but struggle to survive production realities, where success is measured in rework, cycle time, and cost. At Makalot, we see both the promise and the friction every day. The truth is not controversial but remains under-acknowledged: the success or failure of digital transformation across the global supply chain depends on whether suppliers can integrate it effectively into their workflows. Tools create value only when they meet the high bars set for real garments, real constraints, and real deadlines. That is why the supplier's role is not merely to execute, but to filter—not to chase the hype, but to determine which elements of digital transformation will meet expectations.

TWO KINDS OF DIGITAL DEMAND

Every brand approaches digitisation differently, but our experience as a global supply chain partner experience has led us to group them into two different personas: the All-In Architect & the Innovation-Driven Explorer.

The All-In Architect. Typically large wholesalers, these partners treat 3D as a single source of truth and push us for end-to-end digitisation with continuous data flow. From their vantage point, DPC is not just a 3D object but a convertible, extensible visual language: 3D files carry through from proto to colour sampling, fitting, and into PP (Pre-Production) sample, ideally culminating in a 3D tech pack that streamlines PLM communication.

Companies that fit into this bucket have scaled their 3D initiatives to include enterprise-wide digital fabric and trim libraries, 3D quality and process standardisation, structured talent training, and integrating a 3D DAM with their existing PLM.

The outcomes they're looking for are quantifiable and repeatable: sample reduction (e.g., virtual-proto-only for first rounds; for colour runs, keep one physical sample for construction review and shift the rest to 3D; use digital twins as the baseline for next-season development), sustainability gains from reduced materials and sample shipments, faster decision cycles driven by standardised workflows and information transparency, and shorter ramp-up through asset re-use that improves team reusability and efficiency.

Urban
Pursuits


MAKALOT



But as persuasive as this vision is, there are practical constraints that these companies find themselves clashing with.

From a systems standpoint, 3D is not a PLM: it does not natively carry structured data such as BOM (Bill of Material), POM (Point of Measurement), colour, or construction details, nor does it support true co-authoring. When these limits meet high licence costs, steep skill requirements, and weak auditability, even the most all-in teams quickly end up with isolated 3D data silos, despite their best intentions.

In fitting, avatars cannot reproduce or assess comfort or hand feel, so expert fit-model feedback remains essential. At the same time, 3D still struggles to represent production-grade internals and stitch order with reliable fidelity. Fully digitising the “inside” of a garment often takes longer than sewing one precise physical sample, and even requires making that physical sample first before “copying” it into 3D.

These are people and brands that are organised around a big picture strategy for digital product creation that’s measurable, ambitious, and that, a lot of the time, exceeds the capabilities of the technology ecosystem. And what these companies find is that 3D is a powerful process optimiser, but not a magic wand that can overturn an entire workflow.

The Innovation-Driven Explorer. These cross-functional teams typically run a top-down playbook: first aligning real process needs with concrete pain points, then pursuing multiple parallel prototypes and using POCs to determine what actually works. Their workflows and roadmaps get iterated on seasonally, they absorb new technology in an agile way, and their flexibility drives them to extended-value opportunities such as extending DPC into virtual showrooms and in-store interactive experiences, and applying AI to trend forecasting and marketing.

As compelling as this kind of multi-frontier approach is from the perspective of pure innovation, the frictions and potential pitfalls are also clear: pilots often get terminated before measurable outcomes can appear; data structures and process governance are not solidified within most organisations, making assets hard

to reuse; and internal gates are misaligned, creating a many-horses, many-drivers execution problem. Even so, exploration is valuable. Used well, new tools can deliver real process improvements: for example, API/plugin automation that strengthens 3D quality and data consistency while reducing human error.

To translate this energy onto the production line, three conditions matter:

- First, suppliers must keep pace on capabilities, upgrading tools, infrastructure, and skills so the line can actually run what the pilots require.
- Second, communication loops must be real, frequent, and bilateral, so requirements, data, and versions close the loop.
- Third, supplier processes must be agile in operation, with change control, version governance, and fast SOP updates that absorb tool and standard changes without chaos.

Without these, where we arrive at a broken chain: the front wagon races ahead while the back end fails to evolve.

A SUPPLIER-LED FILTER: FROM HYPE TO INDUSTRIALISATION

The answer as to which of these is the right philosophy is not either/or. To continue advancing the cause of DPC, the industry needs both: let All-In Architects build a measurable, scalable digital backbone while Explorers keep the metabolism high and stretch the boundaries. However, they each demand different supplier mindsets.

It might be framed this way in a lot of conversations, but the supplier’s job is not to say yes to everything, or to build out endless digital capabilities on the off-chance that they might be advantageous - it is to distinguish what can be industrialised from what is merely digital theatre.

“THE SUPPLIER’S JOB IS NOT TO SAY YES TO EVERYTHING - IT IS TO DISTINGUISH WHAT CAN BE INDUSTRIALISED FROM WHAT IS MERELY DIGITAL THEATRE.”

To do this, at Makalot, we evaluate every digital initiative through two effective filters:

- **Filter 1:** Does it solve a real problem? Real means reducing total physical samples, lifting first-time approval rates, or creating a shared visual language across teams and partners. False problems are what we call un-industrial-grade beauty, perfect renders that cannot be converted into pattern pieces, stitch order, or machine-readable specs. Or over-investment at the wrong stage, like polishing textures and lighting before a silhouette is even approved.
- **Filter 2:** Is it ready for industrialisation? In our world that means scalability, reliability, cost-effectiveness, and above all, data interoperability. If a 3D system locks data in a proprietary ecosystem, it becomes a digital island. Beauty without data flow is dead weight.

These filters turn abstract enthusiasm into operational choices - what to scale now, what to park, what to retire - and give brands and suppliers a shared language that replaces aesthetic debate with clarity on throughput, quality, and risk.

This is why I believe suppliers have to take the lead. Most successful brands excel at creativity, merchandising, and marketing, not manufacturing technology. The responsibility for industrial innovation - turning technology initiatives into practical, producible reality - falls to those closest to materials, processes, variability, and scale. Suppliers must research deeper, move faster, and think further ahead, so when a brand asks whether something can be done, we already know how to do it reliably, or where it should not be forced.

Our principle, as strategic partners who have dedicated years to understanding and integrating the tools and technologies that make sense, is to face a changing world with an unchanging foundation: systems and standards built to adapt, grounded in data interoperability, open standards, and robust API layers. We see this as readiness, not rigidity, and it creates the conditions for value to compound across seasons and categories.

FROM ORDER-TAKER TO INTEGRATOR

3D was never meant to replace physical craft; inner structures, stitch order, hand feel, and durability still have to be verified on the floor. Its real value is leverage: a compact, editable, easily delivered visual language that locks silhouette and intent early, maintains a shared cross-functional context mid-stream, and, over time, settles into a reusable asset library. In other words, 3D is the visual anchor of a staged, reuse-oriented workflow.

Meanwhile, AI's disruptive power is definitely upon us, and its most useful forms are often the invisible ones: demand sensing, quality control, automation, anomaly detection. As for the dazzling side, generative AI, it only becomes production-grade when pixels can write back into structured data, such as BOM, yardage estimation, or GSD. Otherwise it remains an inspiration wall, not a cutting plan. And from an industrialisation perspective, it's clear which of these will stand up to scrutiny.

With any DPC strategy, whether it's restricted to just 3D, or whether it also incorporates AI, the real watershed is not which tools you purchase, but whether design is truly connected to the line: with clean, consistent identifiers that let 3D serve as a visual key rather than the database, and with AI strengthening judgment and integration.

For suppliers, this isn't a spectator topic; it is a supply-side industrial revolution: upgrading 3D from a "virtual sample" to a manufacturable digital twin that enterprise systems can read, write, trace, and estimate, and shifting the role from order-taker to digital manufacturing partner—operating data flows, producing insights, and co-optimising with brands. For those still watching, now is the window to invest in process redesign and cross-disciplinary digital talent. The future's speed, flexibility, and sustainability will belong to teams, and to partnerships, that understand how to convert creativity and innovation into manufacturing with the least friction.



USING VIRTUAL REALITY TO WEDGE OPEN THE SHRINKING WINDOW FOR CREATIVE EXPRESSION IN 3D



BY HOLLY NEW / FOUNDER / STUDIOOFNEW

Recognised by the BBC as the world's first VR fashion designer, Holly New is the founder of STUDIOOFNEW, the world's first VR fashion studio. Her work includes designing digital costumes for major artists through Copper Candle for Fortnite, and won CLO's 2025 Best Technical Designer Award for creating "The Dress That Shouldn't Exist" featuring over 6,000 VR created diamonds, showcasing how she is pioneering VR-to-CAD workflows. Her work sits at the intersection of fashion, gaming and immersive technology, establishing her as a leading figure in the next era of digital creation.

Fashion has spent the last decade perfecting its digital tools. But even though that process has successfully expanded the canvas for whole-lifecycle design and development, on aggregate this roll-out has also, kind of paradoxically, narrowed the spaces where creativity begins.

There's no denying that platforms like CLO and Browzwear have transformed accuracy, efficiency and sustainability across the product lifecycle. These platforms, and others, are now the essential foundations of digital product creation as a complete ecosystem, yet the more *precise* these systems have become, the earlier designers are being asked to commit to construction logic, seam placement and proportion. As digital transformation has rolled onwards, the already-small window for free, creative expression has started to shrink even further. Technical decisions now need to be made at a point in the process that once belonged to unfettered exploration, and the instinctive, sculptural part of design has become harder to access within screen-based workflows because, at least in part, digital product creation has brought the rigours of engineering forwards to where they coincide with the space that used to be reserved for creativity.

Is there a way to claim some of that back, whilst still holding onto the benefits of DPC? I think so: and I think the answer could be virtual reality.

This raises an exciting prospect: if VR can revolutionise vehicle prototyping and performance footwear, why not garment design? As fashion and gaming converge through shared assets and real-time 3D environments, immersive creation may soon become a standard part of digital design, opening up new horizons for the industry.

The Persistence of Two-Dimensional Logic

During the pandemic, virtual reality had a brief "moment", with immersive catwalks and interactive showrooms generating headlines as substitutes for things we used to do in the world. When we all emerged from lockdown, though, VR wound up being sidelined as a temporary fad, or an optional storytelling tool – at least in fashion. Very few apparel brands carried on using VR as anything more than a passive viewing system.

By contrast, other industries like automotive, architecture and performance footwear took a divergent approach and continued to evolve VR as a valuable design tool, using it for spatial testing of early decisions, before precision was required. Designers in those industries carried on working in VR as a way to experiment with form, primitives, ideas, and experiments that could then become part of the digital lifecycle of products thereafter.

Why did this happen? Why did other industries successfully take on immersive creation as a cornerstone of digital design? And why did fashion turn away from it?

Despite the realistic garments 3D software can create, the answer, I believe, is that underlying fashion workflows were too rooted in 2D. Even when people work in 3D for patternmaking, fitting, and garment engineering, designs typically start as flat patterns



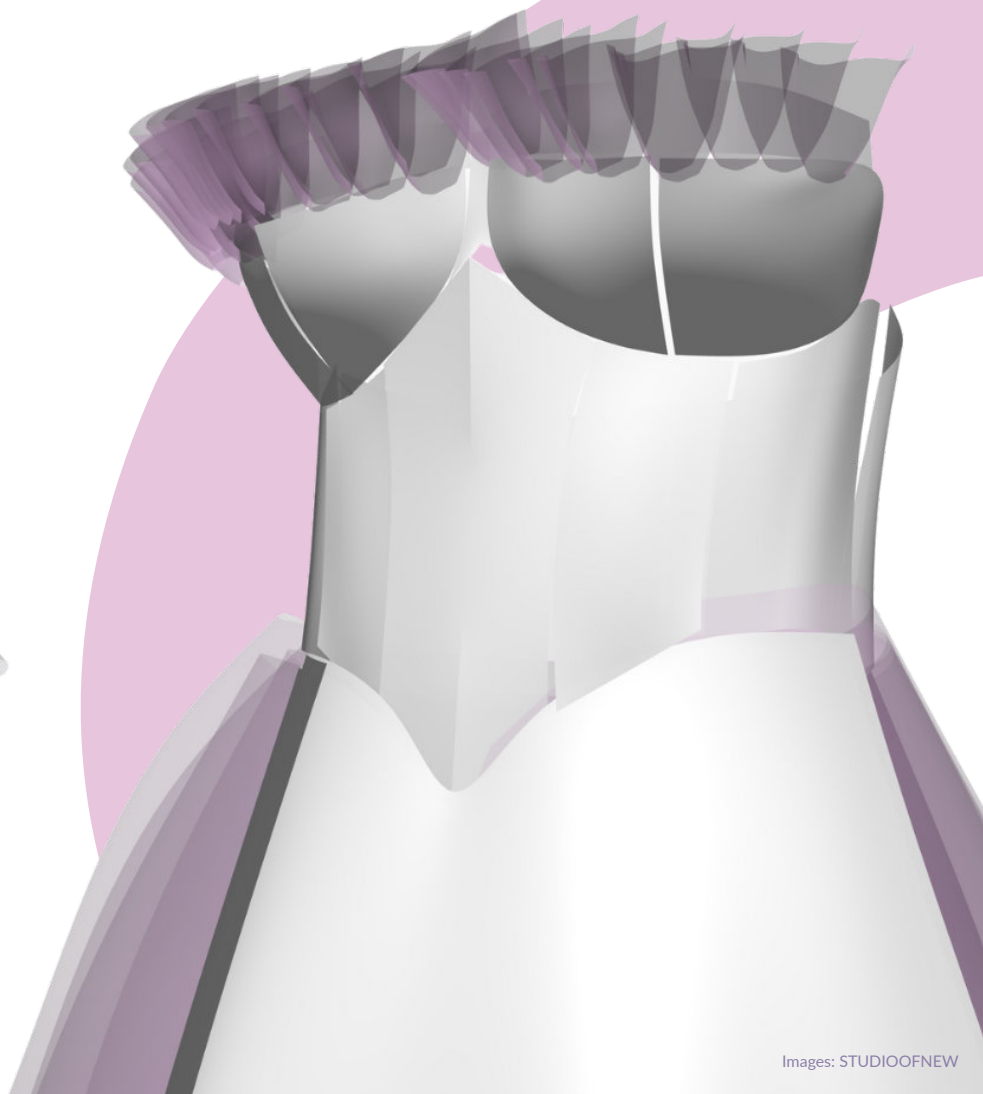
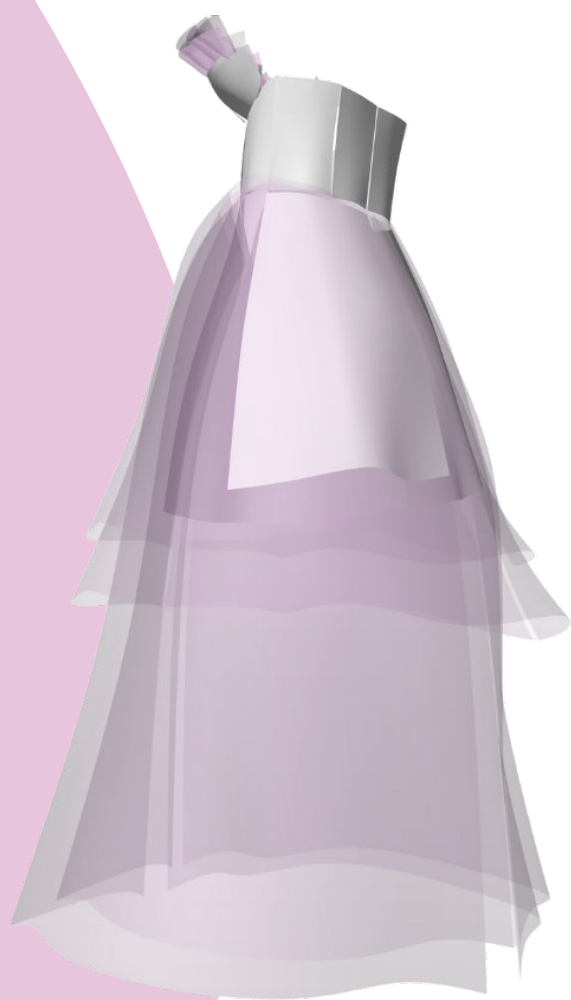
wrapped onto a digital avatar, and get adjusted and re-simulated until they behave correctly on screen. Even with on-avatar sketching, designers often find themselves estimating depth, scale and balance (the parts of 3D that have no exact analogue in flat-plane design) rather than experiencing them. And while digital blocks provide consistency, any inaccuracy in a base block can quietly carry through an entire collection, so the challenges of getting 3D wrong from first principles then cascaded out across the extended product lifecycle.

The challenges also go beyond just the blocks. CAD viewports often create unrealistic simulations: fabric appears to stretch far beyond what would happen in reality, proportions seem stable until they are sampled, and minor distortions through drafting typically reveal themselves only later in the process. When the foundational block is either missing or inaccurate, these issues quickly accumulate.

The 2D design cycle trap became particularly evident during a project I worked on with SCIMM, Decathlon, and the Antwerp Giants basketball team back in April of 2025. (For more on Decathlon's work in 3D and DPC in general, refer to *the DPC Report 2024 - Editor*) To give you some context, SCIMM had previously delivered custom-fitted uniforms to players through a body-scanning pilot project aimed at creating better-fitting apparel. They intended to market this initiative, but faced a major setback: the original digital files were missing. This left them with tangible results but no means to showcase their creation beyond a few photographs of the physical garments, a true marketing nightmare.

I was brought on board to help recreate the pieces using VR technology. If we had tried to recreate those pieces through a traditional CAD workflow (without the original blocks), we would have encountered all the limitations of a 2D-centric process: extensive guesswork, repeated simulations and a significant risk of deviating from the original fit. SCIMM's goal was for the digital uniforms to match the custom fit as closely as possible, which meant we needed to rebuild the garment logic from the ground up. Fortunately, VR made this possible primarily because it represents reality in a way that flatscreen 3D can't. By working with the body-scanned avatars of the athletes, I could construct new 3D blocks directly on the avatars, enabling a far more accurate reconstruction of fit, proportions and panel logic than would have been possible with traditional screens alone. Once the spatial structure was established, the garments were moved into CLO for refinement. What would have typically taken weeks of trial and error was completed in just a matter of days.

It's important to note that VR doesn't replace pattern logic, nor does it eliminate the need for technical refinement, nor remove any of the skills that 3D designers and developers have honed. What it *does* is restore the spatial understanding that screen-based tools can obscure. It brings creative intent and proportion back into CAD - something that I think has the power to strengthen the entire workflow from the outset.



Sketching as the Missing Link

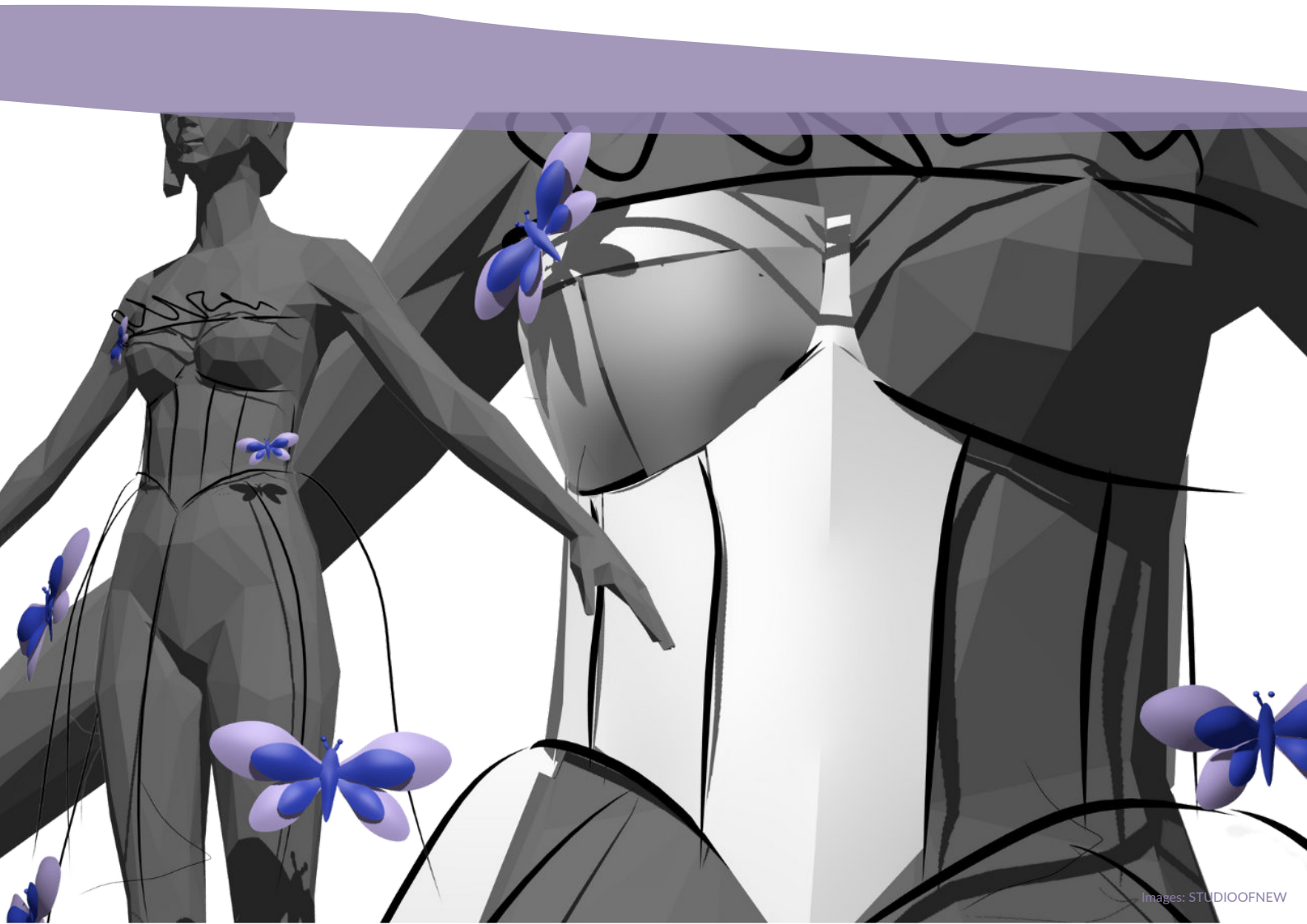
So, if VR can restore spatial understanding before a garment reaches what we think of as the “CAD stage” today, the next question is: how should ideas begin? Sketching has always been fashion's most instinctive stage: fast, expressive and unburdened by technical constraints. Yet in digital workflows, it often becomes a point of friction because it represents one of the most obvious disconnects between what logic dictates should be the “right way” to design fashion, as a physical thing occupying space, and the reality of creative workflows and tool. An idea is drawn in 2D, tested in 3D, sampled and then refined again in CAD. By the time the design reaches maturity, much of its original energy has already been reshaped by a process of iteration, translation, and re-translation. We draw in 2D with a clear intent in mind, only for that intent to be slowly squeezed out of the process because it only existed in 2D, and the rest of the lifecycle demands 3D.

Immersive sketching, of the kind I've been advocating for people to practice in VR, bridges the gap between design and execution by allowing designers to create at full scale around an avatar, as seen in the Decathlon work. This method provides immediate volume and intent, making the process feel more like sculpting and less like drawing on paper that someone else is then going to try and re-interpret into a 3D model. In VR, it's common to quickly produce numerous silhouettes without the constraints of traditional tools, allowing you to sketch well over 100 different designs within just a few hours – designs that are all 3D by their very

nature, even if they require additional work in dedicated 3D design and simulation tools before they become part of the DPC ecosystem.

Most importantly, fit is not sacrificed in the process. VR sketching works with 3D pattern blocks (*skeletons*), that surround the avatar and maintain correct proportions from the outset. Just like 2D blocks, these 3D blocks provide structure to creative freedom, ensuring that silhouettes developed in VR do not unravel when they are moved into CAD. Instead of guessing fit from a flat sketch, designers begin with a spatially accurate foundation that remains reliable throughout the workflow.

The layered dress I developed specifically for this report is a clear example. Starting as loose sketches around an avatar, silhouette and colour was explored, from there the form was modelled in layers using the 3D block as a template, accessories created and only then taken into CLO for technical refinement. The entire process, from first sketch to a complete digital garment, took four hours. And because the proportions were established in space rather than on paper, the CAD stage focused on refinement rather than repair. This approach doesn't replace technical skills (mine or anyone else's); it prioritises creative exploration first, ensuring that ideas are infused with clarity and spatial logic as they move into the technical phase of their lifecycle – something that doesn't happen when those ideas begin life in 2D.



Experimentation: Efficiency and Waste Reduction

One of the most compelling strengths of immersive design is the speed at which ideas can progress before they enter a simulation environment. CAD tools excel at technical accuracy, but they also depend on detailed materials, shaders and what I often call 'digital stickers' to communicate colour and surface detail. Any adjustment: a new print, an altered hue, a shifted placement etc. requires reassigning assets and re-rendering to get accurate visuals. It's ideal for refinement and development, but naturally slower for early-stage exploration.

VR, on the other hand, allows ideas to evolve quickly, potentially saving you valuable time in your work, but without needing to sacrifice the "3D" element, and while retaining the ability to instantly test colour, print, placement and silhouette. Reference images, AI art, and textures can be integrated directly into garments, facilitating fluid iteration and experimentation without losing creative momentum.

The layered dress I developed for the report highlights this process. After establishing the silhouette in VR, I quickly explored various print and trim options, including AI-generated motifs, ultimately choosing custom designed butterflies as accessories. These were exported out to Blender to join material colours and easily integrated into CLO. This speed not only enhances approval time, by resolving silhouette, surface and colour choices in VR before going to CAD, you can reduce sampling by up to 66% and decrease pipelines from three weeks to just three days, all thanks to the clarity gained during the exploratory phase.



Image: STUDIOOFNEW

Collaboration and Real-Time Co-Creation

Traditional digital product development still relies heavily on back-and-forth communication. Files are exported, reviewed and returned with notes; screenshots move through inboxes; and time zones can stretch simple decisions across days. The process works, but it rarely feels very fluid. More importantly, it doesn't always feel collaborative, at least not in a creative sense, because what people are looking at is not the working file, but rather a 2D export of it.

Immersive environments offer a different slant on collaboration, by enabling teams to work together in a shared virtual space, making real-time design modifications, on the same object, at the same time.



Image: STUDIOOFNEW

For example, a designer in Paris and a developer in Seoul can collaborate on a digital outfit side by side, while external stakeholders join the conversation via Teams or Zoom without needing a headset.

In my partnership with Copper Candle to create Fortnite outfits for artists like Noelle and Michael Aldag, we aimed to showcase how VR can facilitate more intuitive design, giving artists a clearer voice in their design views and enabling remote working, speeding up the design process. Even though the artists didn't have formal fashion training, they instinctively guided the design process, resulting in quick adjustments to fit and colour. This approach made their stage outfits feel more personal and a true reflection of their identities. Likewise, during my jewellery collaboration with NYC artist Jonathan Cuji, we communicated, brainstormed, built and designed Amazon Rainforest inspired jewellery in real time in VR, even with a six-hour time zone difference between us.

Why Virtual Reality Has Not Yet Scaled

So, If VR can deliver this level of speed and spatial clarity, and if specific brands have successfully incorporated it into their workflows, why isn't it already a standard part of the design pipeline?

In my experience, the hesitation is less about the technology itself and more about the systems that surround it. Fashion's digital tools operate within closed or semi-closed ecosystems, and fashion 3D CAD platforms rely on proprietary files, simulation engines and construction-aware metadata. When VR models are brought into this environment, they arrive without embedded garment logic, meaning it's more complex to get fabric or texture simulation working the way that people expect 3D to work out of the box today. In practice, this creates extra work before they a design that started its life in VR can actually be used in the same way that a current 3D asset can.

Material behaviour adds its own complexity. CAD tools simulate cloth physics with impressive precision; VR tools, built primarily for modelling and ideation, focus on form rather than gravity, meaning no fabric simulation at all. For technical designers, this can feel limiting, while for creatives, it can feel liberating, either way, it reinforces VR's role upstream, at the point where silhouette, proportion and direction are set, and before technical accuracy takes over. In practice, this means the handoff between VR design and established 3D work is both more streamlined than it is in purely 2D-to-3D workflows, but more demanding in the one respect that it places a disconnect between the fragmented DPC ecosystem and the VR tools that exist today.

Education and perception also shape adoption. Most designers entering the industry are trained through pattern-first, screen-based workflows and have limited exposure to immersive design. As a result, like much of the industry, VR is often assumed to be unready, or suited only to experiencing content, even though those who try it are often surprised by how intuitive and natural it feels to actually work on forms and ideas in virtual space.

All in all, younger designers tend to embrace VR more readily; established workflows, shaped by legacy tools and timelines, approach it more cautiously.

Which brings us to a conclusion: that the limitations holding VR adoption back in fashion are more systemic and less technological. As interoperability improves, garment-aware modelling evolves, and immersive design becomes more visible in education, VR will, I expect, move naturally from the margins of digital product creation into the upstream phases where it can have the greatest impact.

I'm obviously speaking as an advocate here, but I firmly believe that what VR offers is not a replacement for CAD but a complementary stage, one that restores spatial intuition to a workflow that has become increasingly screen-bound. It should empower designers to resolve silhouette, proportion and creative intent before technical decisions are required, reducing rework, strengthening the accuracy of the tools that follow, and also answering the well-worn question of what it means to "scale DPC" without mandating that everyone who touches a 3D asset must also be a 3D designer.

VR can also connect teams in real time, encourage participation from non-technical collaborators, and keep creativity active throughout the process rather than compressing it into early sketches. The value here lies in a new kind of balance between creating digitally and building digital assets that can be the foundations for more end-to-end workflows – a blending where intuition and computation can coexist, where creativity and accuracy reinforce one another and where the human element of design, spatial thinking, collaboration, instinct, has space to thrive alongside technological precision, instead of working against it.

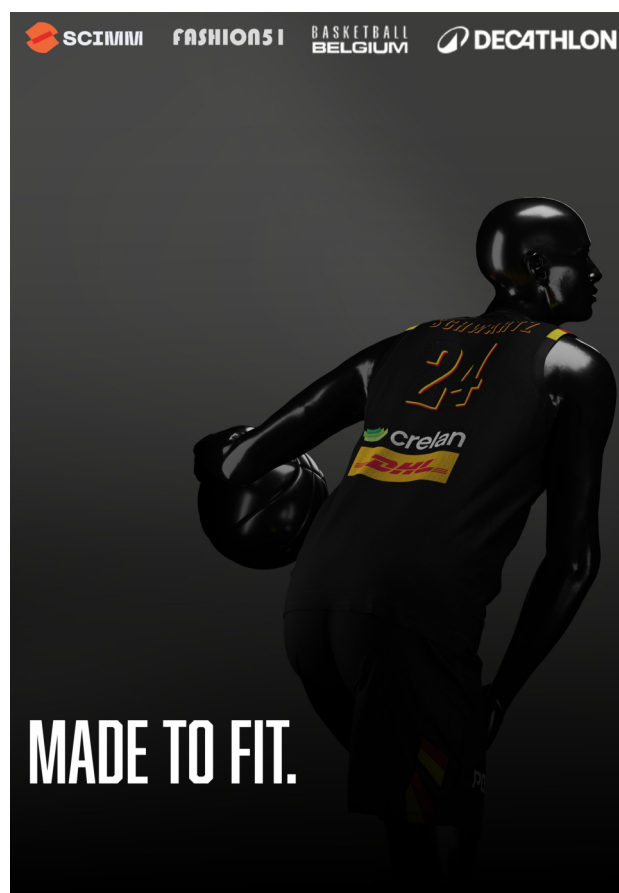


Image: SCIMM, Decathlon, Fashion51, Basketball Belgium, STUDIOOFNEW

WHEN YOU HAVE A 3D HAMMER, EVERYTHING LOOKS LIKE A 3D NAIL

FOR THE CORE PROMISE OF DIGITAL PRODUCT CREATION TO REALLY TAKE ROOT IN THE EXTENDED USER COMMUNITY FOR DESIGN AND DEVELOPMENT, DIFFERENT FASHION SEGMENTS NEED TO BE WILLING TO INTERROGATE THEMSELVES AND UNDERSTAND WHERE 3D REMAINS THE BEST TOOL FOR THE TASK AT HAND, AND WHERE STANDALONE AI OR AI / 3D HYBRID WORKFLOWS MIGHT MAKE MORE SENSE.



BY NICK ELEY / HEAD OF DIGITAL CREATION / ASOS

As Head of Digital Creation at ASOS, Nick leads hands on AI and 3D innovation across product design, studio content, and marketing. He embeds new workflows, upskills teams, and works to bring boardroom goals to life through real team output. Nick has spent 20 years in design, leading teams and delivering to tight deadlines and evolving brand standards. He knows what creatives need, what slows them down, and how to introduce technology that empowers them, not replaces them. His sweet spot is where strategy meets application. He advises directors and executives on how GenAI can align with creative and commercial priorities, runs workshops and experiments that embed AI in real design, content and storytelling workflows and helps shift creative team mindsets from cautious to curious to confident.

Over the past decade or more, fashion has invested huge energy, money, and optimism into 3D design and development. The promise was compelling: faster samples, fewer errors, improved fit accuracy, clearer supplier communication, quicker content creation, and a more sustainable product pipeline. And in theory, 3D is still capable of delivering all of that.

But after six years trying to embed 3D design across the extended design community here at ASOS, I've arrived at a question that I think the wider industry also needs to ask itself: is 3D always the right digital tool for every one of those objectives? Or can some of those benefits be realised more quickly or more easily by using other tools – especially, today, with the help of generative AI?

An important caveat: asking this question is not the same thing as saying that 3D is obsolete, or walking back from the deeper drive to digitise the way our product creation teams work. It means, at least to my mind, that by pursuing a “generalist” approach, and tasking DPC with doing all the heavy lifting across the product journey, we, as an industry, misunderstood where 3D actually creates value, which companies and teams benefit from it the most, and that we tried to over-index on places where that value just isn't being found.

And it also means – again, to me – that the future of digital product creation lies mapping and zeroing in on the areas where specialism, technical accuracy, and depth of capability matter. This can be a by-department exercise or, in cases like ours, it can be something that's influenced by market segment.

In mass market fashion, with its constant push for speed, option width, and newness, our experience has shown that the steep learning curve of 3D, and the requirement to work with technical precision from the very beginning of the product lifecycle, simply doesn't match the realities of how designers need to work. By contrast, AI has arrived with minimal onboarding friction and slotted naturally into the parts of the design process that genuinely needed transformation, but that were always going to be resistant to the kind of fundamental architectural and talent re-think that 3D demands.

So this opinion piece is not an argument for AI over 3D, or vice versa. The case I want to make is for choosing the right digital tool for the right task, and allowing designers, not technologies, to dictate how digital creation evolves from here.

THE PRESSURES ON MODERN PRODUCT TEAMS

To understand why AI has taken off so quickly and to identify the cases where 3D has struggled in our sector, we need to look at the environment today's fashion designers actually operate in.

Across our segment, product teams come into work every day and stare down three intensifying pressures:

The first is speed. The cycle from idea to sample has tightened relentlessly. Designers are asked to create more, faster, with less room for exploration or experimentation.

The second is option count. Our approach to fashion thrives on breadth in a way that simply isn't reflected in other market lanes. Every week brings new themes, new drops, new categories to react to. Designers often work across dozens of styles simultaneously.

Finally, we have the weight of data that comes from the first two points. The availability, velocity, and sheer variety of sales data; click-throughs, add-to-basket rates, returns has shifted decision-making for fashion companies. Where instinct once guided design, the pressure now is to “play the odds,” replicating proven winners and minimising perceived risk.

I've often heard people express the concern that technology is turning creatives into robots. Anyone who's been in 3D long enough has had that opinion put to them, by creative professionals who feel as though their jobs are being tilted towards administration and data-entry. And everyone today has been asked, or has asked themselves, whether AI is about to change creators into curators of machine output.

The real irony, though, is that many designers have already been behaving like robots long before AI arrived – not by choice, but because the structures around them de-emphasise the parts of their roles that we broadly consider to be “creative”.

What gets squeezed out in this environment? The highest-value creative activities, basically. Things like visiting vintage markets, discovering new references, or exploring physical archives. These are the activities that lead to genuine originality, they're the ones designers consistently tell me they miss the most, and they've received very short shrift in conversations around both 3D and AI.

So let's keep this concept in mind when we think about how any digital tool is going to be able to prove its value, or otherwise.

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FOR SOME SECTORS, A FULLY DIGITAL PIPELINE MIGHT NOT BE PRACTICAL

When 3D first hit its stride in fashion, the wider industry (not just mass market fashion) saw it as the future of design and product creation. The end-to-end pitch, as I've said, was seductive: hyper-accurate fit; digital prototypes replacing samples; frictionless supplier collaboration; a fully digital pipeline from design to production.

Many years into the journey, those are still the objectives. And there are plenty of brands that have made big and measurable strides towards them, but there are also companies that tried to apply the end-to-end 3D philosophy universally and technology-first, and then encountered barriers that had nothing to do with vision or enthusiasm, and everything to do with practical deployment and user fit.

At ASOS, we found that the learning curve for 3D was, in most cases, simply too steep to fit into the time available. Our designers are exceptional at what they do, but they also work at extraordinary pace. They simply don't have the time to spend months becoming competent 3D specialists. The ramp-up period was incompatible with the speed of their day job.

Another key challenge was that our approach to fashion lacks stable blocks. 3D, as we've learnt, excels when blocks remain consistent season after season. For market segments like sportswear, leisurewear, tailoring, luxury and so on, this creates a significant business case and a clear user fit for DPC, but at ASOS, newness is the primary model. Shapes change constantly. Blocks are updated constantly. There is very little "repeatability" for designers to anchor to, and consequently precious little purchase for 3D to hold onto.

In our specific case, governance barriers and gatekeepers also created structural friction. Patterns and foundational blocks sit naturally with garment technologists, and their responsibility is to maintain accuracy and fit integrity. This meant that designers couldn't freely change blocks in 3D without risking the consistency of calibrated fit. The result here was structural, not anything that can be attributed to the solutions. We had the tools, but no one could use them.

We explored a tiered approach that allowed designers to make minor changes, but that required collaboration for major ones, and even discussed a modular system of sleeves, collars, and components. But the governance model alone slowed our progress.

Finally, we found that 3D in isolation wasn't where the real value would lie – it was going to be in the entire DPC ecosystem. So we set out to explore fabric scanning, materials libraries, avatar refinement, and more. Each one helped get us closer to the vision, but each also added new complexity.

3D, we came to realise, just doesn't make sense in isolation; it requires this infrastructure, and while some brands are built for that (wholesale brands, sportswear, footwear and others), other segments of fashion simply aren't there yet because of the demands of speed and scale that it places on each of those different components.

Again: this doesn't mean 3D has *no* place in fashion the way we create it. It means that we need to be careful, as a whole industry, to really understand which environments, market segment, roles, and organisational structures it fits best.



“AI HAS ARRIVED WITH MINIMAL ONBOARDING FRICTION AND SLOTTED NATURALLY INTO THE PARTS OF THE DESIGN PROCESS THAT GENUINELY NEEDED TRANSFORMATION, BUT THAT WERE ALWAYS GOING TO BE RESISTANT TO THE KIND OF FUNDAMENTAL ARCHITECTURAL AND TALENT RE-THINK THAT 3D DEMANDS.”

WHY SOME DESIGNERS HAVE EMBRACED AI AS AN EASIER ENTRYPOINT TO DIGITAL CREATION

As we'll see in a moment, I don't believe that AI is going to replace 3D. In fact, as you'll read elsewhere in this report, it's becoming progressively clearer where the two technology strands complement each other, where they converge, where they diverge, and where they can, sometimes, exist in tension.

But from the point of view of wanting to document our experiences with digital product creation, and to start understanding why the wider industry is pitting these things against one another, it's important to know where and why generative AI has slotted into our designers' workflows in places that 3D eventually ended up not making sense.

The most obvious of these is that AI is relatively frictionless. It's slotted into designers' natural workflows rather than asking them to learn entirely new ones. And today at ASOS, almost all designers use AI in some part of their process. Not because they were told to, or as part of a whole end-to-end transformation initiatives, but because it solves one or more of their everyday pain points.

For designers whose objective is to make the leap from sketch to photoreal visual, the clearest benefit is speed. What they want to accomplish can be done in minutes, rather than hours or days, and if they're capable of sketching then they're able to work with AI, without acquiring any additional skills.

In an environment where breadth and rapid-fire iteration matter a lot, the fact that AI doesn't think programmatically or linearly is a benefit rather than a drawback. That lack of predictability would, obviously, be anathema to a 3D pipeline, but with AI it allows our teams to find unexpected outputs and “happy accidents” that are invaluable for sparking ideas at the start of the process.

Perhaps the biggest difference, though, is in the flexibility of AI tools when it comes to providing solutions for a wider audience. Where 3D designers needed to fit a specific mould, and their work had to be exported and shared with other people in order to create value for a wider audience, we've seen three different ‘archetypes’ of AI users naturally emerge:

Ideators, who represent about 30% of our user base, and who use AI to rapidly explore shape, proportion, and newness. Visualisers (which is almost everyone) who want to make sketches photoreal, iterate on

materials, colours, and trims, and who use AI output it for internal sign-off and supplier clarity. And finally storytellers – about 10% of the userbase – who build full looks, backgrounds, environments, using AI imagery to convey mood and styling.

And one unexpected, but significant, area has been that putting AI first has allowed us to build better relationships with our buyers. Because visualisation is now effectively instant, designers can show far more wildcard ideas without investing hours sketching them. Buyers see broader ranges, faster, with clearer rationale and decision-making has become more dynamic and collaborative as a result.

WHERE 3D STILL WINS (AND WHY DPC STILL VERY MUCH MATTERS)

Despite the results we've obtained from our designers working with AI, and the relative ease of adoption, I'm under no illusion that AI is a replacement for 3D.

And the reasons for this all have one common root: fit, technical, and pattern accuracy remain out of the reach of AI. Generative visuals do not accurately represent pattern-piece integrity, fabric behaviour, weight, or stretch.

For one set of use cases this delta between visual representation and accuracy isn't a big barrier. For other categories, like performance wear, tailoring, dresses, suiting etc. this accuracy is non-negotiable.

And from that same foundation of accuracy come several other places where 3D will remain the right choice for not just specialist teams, or designers with more runway to learn different methods, but also top-level strategic objectives for their parent brands:

- Digital product passports
- True digital twins
- Physics-based simulation
- Downstream automation
- AI × 3D hybrid workflows

We're actually already experimenting with early hybrids: simple garments created in 3D, fitted to ASOS avatars, rendered into a variety of poses, and then made photoreal through AI post-processing. This is something I expect we're going to see much more of the near future, too, as different design, development, and product teams find the right tools for their workflows, rather than being asked to conform to a vision that might not be right for the way they actually work.

From here, based on our experience, I see the market dividing along logical lines:

- Mass market fashion → mostly AI-first
- Technical categories → 3D-first
- The wider future → hybrid, with AI providing the easy onramp and offramp, and 3D providing precision where it matters

To put it as succinctly as I can: 3D isn't disappearing, it's becoming correctly embedded into the parts of the industry where it truly belongs and where it can create transformational value, without necessarily needing overstretched designers to learn how to become part of a complete digital pipeline.

DESIGNER-FIRST, NOT TOOL-FIRST

One of the biggest mistakes of the past decade, I believe, was assuming 3D was "for everyone."

If we reframe this statement to "the value of 3D is for everyone" then it continues to hold water, because the beneficiaries of everything I've just written about (technical accuracy, DPPs, true simulation, automation) will be scattered across the extended product journey.

But if we confine ourselves to looking at which tools specific teams want to use, then the statement can be made even simpler: tools should adapt to designers, not designers to tools.

This is something that I think the DPC community tends to overlook, and it's also part of the reason that the design community has such a strong emotional reaction to AI along two very different axes.

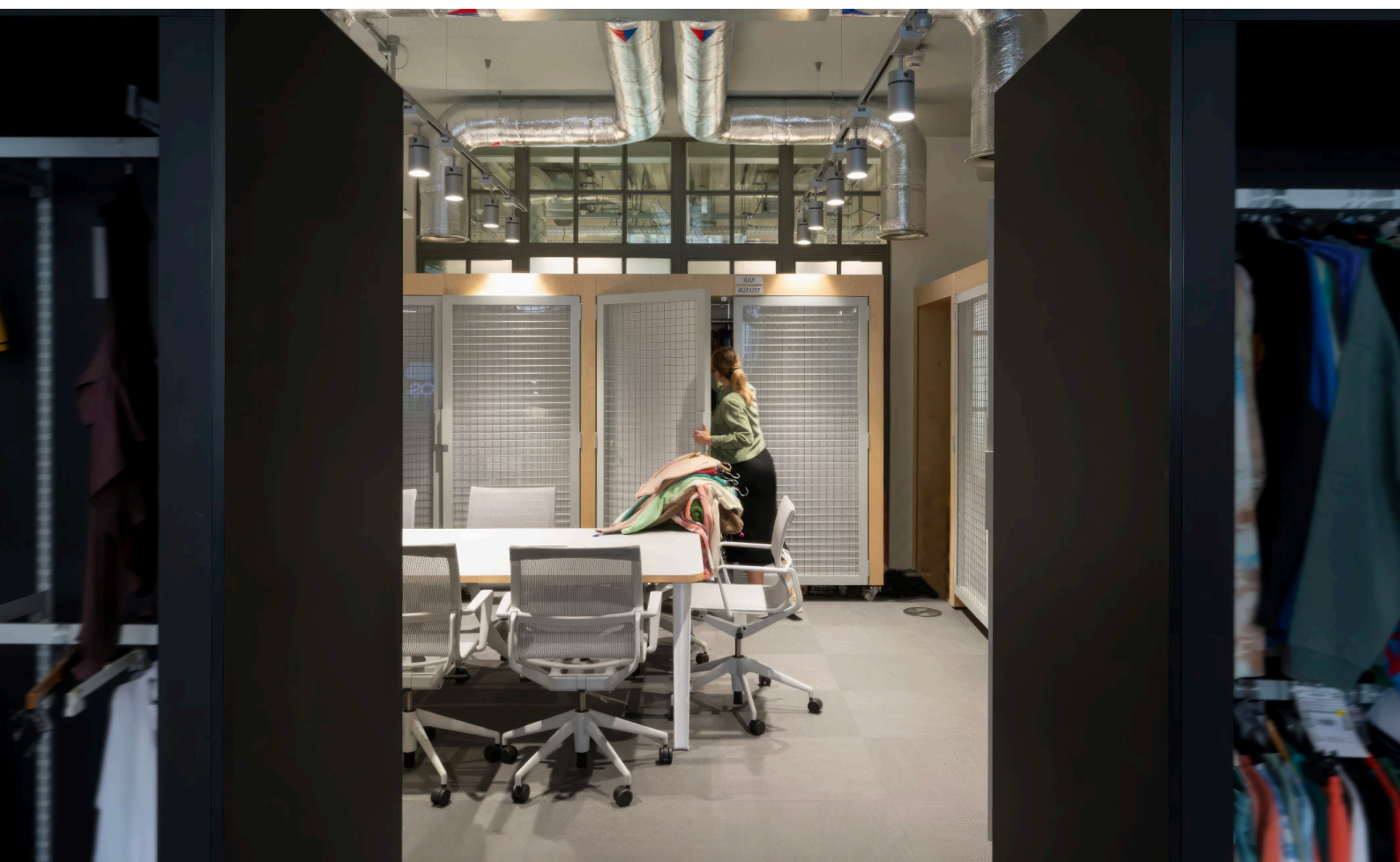
I'll never forget a hand-painted print designer I spent time with, who was upset the first time she realised AI could mimic her "style" in seconds. Her fear wasn't irrational at all: it was deeply human, and it existed on the complete opposite end of the spectrum to the reaction that creative professionals can sometimes have to 3D. She wasn't concerned that what she was seeing was too hard to use, or that it would create too much of a burden on her time. She wanted reassurance that a tool that seemed so easy to use was going to complement her eye – not replace. She wanted to know that her composition, detail, and brand handwriting weren't just going to be replicated by a model, but that the model could become a useful collaborator for her.

Creatives understand that their value is foundational. They have skills in fit, function, fabric behaviour, art, and other specialist areas that they want to be able to express, to elevate, and to communicate using technology. This is how they judge the value of design and development solutions, and it's how we should judge them as well.

Neither 3D nor AI is about *creating* talent, but rather it's about amplifying it in ways that make sense to the people who have acquired those skills and who use them to create value for brands like ours.

If I was given the task of redesigning fashion education today, I'd mandate those foundations first, followed by AI literacy to give people the widest possible pool of technology options with the lowest skill floor.

In that curriculum, 3D would remain a high-value specialist discipline with a high skill ceiling, and a key data and technical foundation for the broader transformation initiatives that are slowly reshaping the industry, because in most environments, that's where it works best.



THE NEXT FRONTIER FOR DIGITAL PRODUCT CREATION: PATTERNMAKING WITH AI ASSISTANCE

**AS AI PATTERNMAKING BECOMES A LARGER
FIXTURE IN DIGITAL WORKFLOWS, BOTH IN
STANDALONE SOLUTIONS AND AS AN ADDED
CAPABILITY OF EXISTING 3D TOOLS, SPECIALISTS
HAVE A NEW OPPORTUNITY TO DIRECT THE NEXT
TURN IN THE DIGITISATION OF THEIR CRAFT.**



**BY DORELLE MCPHERSON,
TECHNICAL DESIGN MANAGER, 3D DPC, THE FASHION TECH**

Dorelle is a 3D technical designer and digital-twin strategist with 30 years in fit, patternmaking, and product creation. A proud Fashion Design Alumni from FIT in New York, she specializes in translating traditional garment construction into scalable digital systems, empowering fashion brands to improve accuracy, speed, and creative control. She is the founder of 3D Style Lab, her consultancy focused on digital development, virtual fit, and production-ready 3D pipelines. Dorelle also works as a 3D Design Manager at Delta Galil, leading digital development for intimates and swim categories where structure, precision, and true-to-body simulation matter most. She is trained and certified in Shima Seiki, certified in Style3D, and a Verified User for CLO. She trains teams across all three major platforms — CLO, Browzwear, and Style3D — with a focus on practical, production-aligned digital workflows. She also mentors emerging talent and guides brands through the realities of fashion's digital transformation.

When I look back at how far the digital transformation of fashion has come, it's clear that what we now think of as "digital product creation" didn't actually start with 3D visualisation, simulation, or automation. It began decades earlier with the quiet digitisation of the pattern room.

If you'll indulge me a brief walk down memory lane: the earliest computer automated design or CAD systems in the 1980s and 1990s were revolutionary back then, in the same way that 3D has felt for a lot of the younger readers of reports like this one over the last decade. The move from manual drawing to 2D CAD allowed patternmakers to trace, grade, and mark patterns on screens instead of on paper. For those of us who lived through that shift, it wasn't glamorous—it was a matter of survival – but it was fundamentally different from anything that had gone before, and those of us on the ground also had the opportunity to not just learn on the job, but to actually influence the development of the software.

At the time, we needed to adapt to screens, plotters, and software that didn't always understand what we were trying to make (this was partly due to the global transfer of manufacturing, and patternmaking being outsourced) but we also had the opportunity for our expertise to make its way into technology products. And that first wave of digitalisation then laid the groundwork for a lot of what we're seeing in Digital Product Creation today – both in terms of what fashion wants to accomplish with technology, and from the perspective of how software tools need to meet the real needs of specialist professionals in order to create value.

The goal has stayed consistent between then and now: accuracy, speed, simulation, and better communication between design and production. What's changed is that now the existing technology is catching up to creative intent and an incredibly high bar for technical precision, at the exact moment that a new technology wave (generative AI) is heading for us.

From a patternmaker's point of view, 3D has already become something close to a universal design language, enabling real-time global collaboration in modern design rooms. Digital patterns won out over physical drawing, because they can be instantly simulated and even fit-approved, speeding up timelines, reducing waste, and shoring up the pipeline for converting creative intent into finished products.

Now we're approaching what both long established patternmakers and the new crop of 3D and DPC-native designers and garment technicians will recognise as the next turn: AI patternmaking. And while, at first glance, those words will feel like a threat, I believe there's now the same opportunity for the people who've helped shape two generations of digital product creation to also inform and steer the next one.

With the combination of 3D simulation and AI tools that seems to be the standard for the next wave of capabilities being added to existing platforms, the objective isn't, I don't believe, to replace patternmakers any more than the shift from manual drawing to 2D CAD was. Instead, it's a new window of opportunity for specialists to define the rules for a new set of smarter systems, and to inject decades' worth of expertise into



the code that will both preserve and protect their knowledge, and provide new tools to assist them in coping with the volume and velocity of work that's coming their way.

There's beauty in this idea, but also responsibility on the part of patternmakers, software developers, and brands. If we, together, teach these systems poorly, unbalancing the equilibrium of art and science that informs patternmaking, then the AI tools that will increasingly make up the tech environment will repeat our mistakes. If we train them thoughtfully, they should amplify our strengths.

This isn't a new idea, because it's also the way things worked in the transition from 2D to 3D. One constant, primary challenge in 3D workflows has been the pattern itself, which is simultaneously the foundation and the finish line for a garment. Even with the best simulations, fabric scans, or high-quality renders, an inaccurate pattern can throw off the whole process. Garments might not fit avatars, proportions could be off, and the intended style may be lost. This is why patternmakers and owners have been (rightfully) positioned as the gatekeepers for determining what constitutes a complete "digital twin" versus 3D assets that are better suited to being storytelling content or visualisation exercises.

The promise of AI patternmaking systems – whether they're standalone or, now part of the software suites that the DPC community already relies on day-to-day – is to give those gatekeepers new sets of keys, and to automate the repetitive, non-value-add tasks—drafting, measuring, adjusting, and re-drawing – so that patternmakers can concentrate on what matters most: refining, validating, and solving creative challenges.

It's important for me to note that I'm not talking about theory here. AI patternmaking may not be proven and stress-tested the way that 3D design and simulation has been, but it is already available. Today, in real time, brands can digitise their entire legacy pattern archive or create a fit block system with generative AI. From there, companies engaged in these pilots can analyse measurement deviations and cluster similar fits together, can easily learn valuable analytical data from across their products, collections, and sizes, and have a new opportunity to reveal the evolution of their brand's fit identity, and to set new, higher bars for customer satisfaction.

On the other end of the spectrum, independent designers are also already using pattern automation tools to start their first collections. With nothing more than an avatar, a vision, and a prompt to the right tool, they can create patterns and visualise collections before they sew a single sample.

For professionals in both cohorts, AI pattern tools are removing limitations and, in the same way that the shift from 2D to 3D did, allowing them to iterate, test, and refine ideas. Deployed correctly, AI pattern tools can be a gateway to understanding the logic of construction just as 3D tools have opened up different horizons and disciplines for designers.



EACH VALIDATED PATTERN, FIT-TESTED BLOCK, AND MINOR CORRECTION CAN, EFFECTIVELY, ADD TO A DYNAMIC AI RESOURCE THAT GETS SMARTER WITH EVERY PROJECT.

And again, just as the move from 2D to 3D did, AI patternmaking is promising significant speed increases in a market that sorely needs them. Instead of spending hours manually building a pattern draft, designers can create, adjust and visualise results on an avatar in minutes.

I recently chatted to Sylwia Szymczyk, a prominent figure in the DPC community who's now building her own AI patternmaking tool, and she told me that the objective of AI here is to speed up and streamline digital product creation, rather than to sidestep it, and to help push the industry further along a trajectory it's already on, rather than redirecting it.

"There is something more important behind all of this — to finally make the fashion industry what it should be: a place where creativity thrives and garments really fit people"

But something else Sylwia said also resonated with me: a reminder that the early stage of the adoption / diffusion curve for software is also the opportunity to influence its direction, and a wake-up call to the fact that how this will manifest itself in reinforcement learning for AI systems might follow a familiar trajectory, but it has the potential to happen at an unprecedented speed. Each validated pattern, fit-tested block, and minor correction can, effectively, add to a dynamic AI resource that gets smarter with every project - retaining successful garment elements, avoiding past issues, and integrate each new garment into a broader, more intelligent pattern narrative that, over time, becomes unique to each brand.

But this conversation – and others I'll quote from in a moment – also spotlighted an essential truth: no matter how advanced the tools become, or how much pattern history they ingest, the fundamentals of craftsmanship, and the demand for specialist curation, will remain the same. The people who get the real results from AI patternmaking, as integrated into the digital product creation ecosystem, will still need to be patternmakers.

They will still need an eye for proportion. They will still need to feel balance and shape. They will still need to understand fabric behaviour and human movement.

Automated systems might calculate fit, but they cannot perceive it. They lack the ability to recognise elegance on a runway, or to understand the comfort experienced by a customer. Subtle design changes and their expressed impact remain within the design and development team's domain, and in this respect the roll-out of AI could be a dual-edged sword in the sense that it promises speed and efficiency in the medium term, but it requires the input and the curation of an incredibly scarce pool of hybrid traditional / digital talent in the here and now.

When you see seasoned patternmakers interact with both digital and physical prototypes, they are the experts in spotting subtleties in drape, balance, and proportion that algorithms miss. In a discussion I had with Matt Bakhoun, who's the Director of US Operations for DPC vendor Style3D, about their AIGS platform, this theme came up again: that digital product creation has created bottlenecks that AI has the potential to loosen, provided it's deployed in the right places and that it recognises the value that patternmakers bring to unifying the product journey:

"The clearest win for us was in fixing this broken link between design intention & production."

For the team at Style3D, the approach with AI is to produce designs that require technical review by specialist patternmakers before becoming wearable garments. The initial AIGS platform draws on a library of existing 3D blocks, tagged with brand-specific metadata, which



designers can then modify. Most large brands and retailers can integrate their own 3D catalogues, and the objective is to streamline the path from design concept to 3D asset with minimal setup.

As well as brand pilots and live deployments, AI patternmaking is also set to have a significant impact on the way traditional skills and DPC proficiencies are taught in education. After years of making digital skills optional to acquire, institutions now seem to be recognising that students should learn, early in their education, 3D and AI as their first design-language, not as an elective.

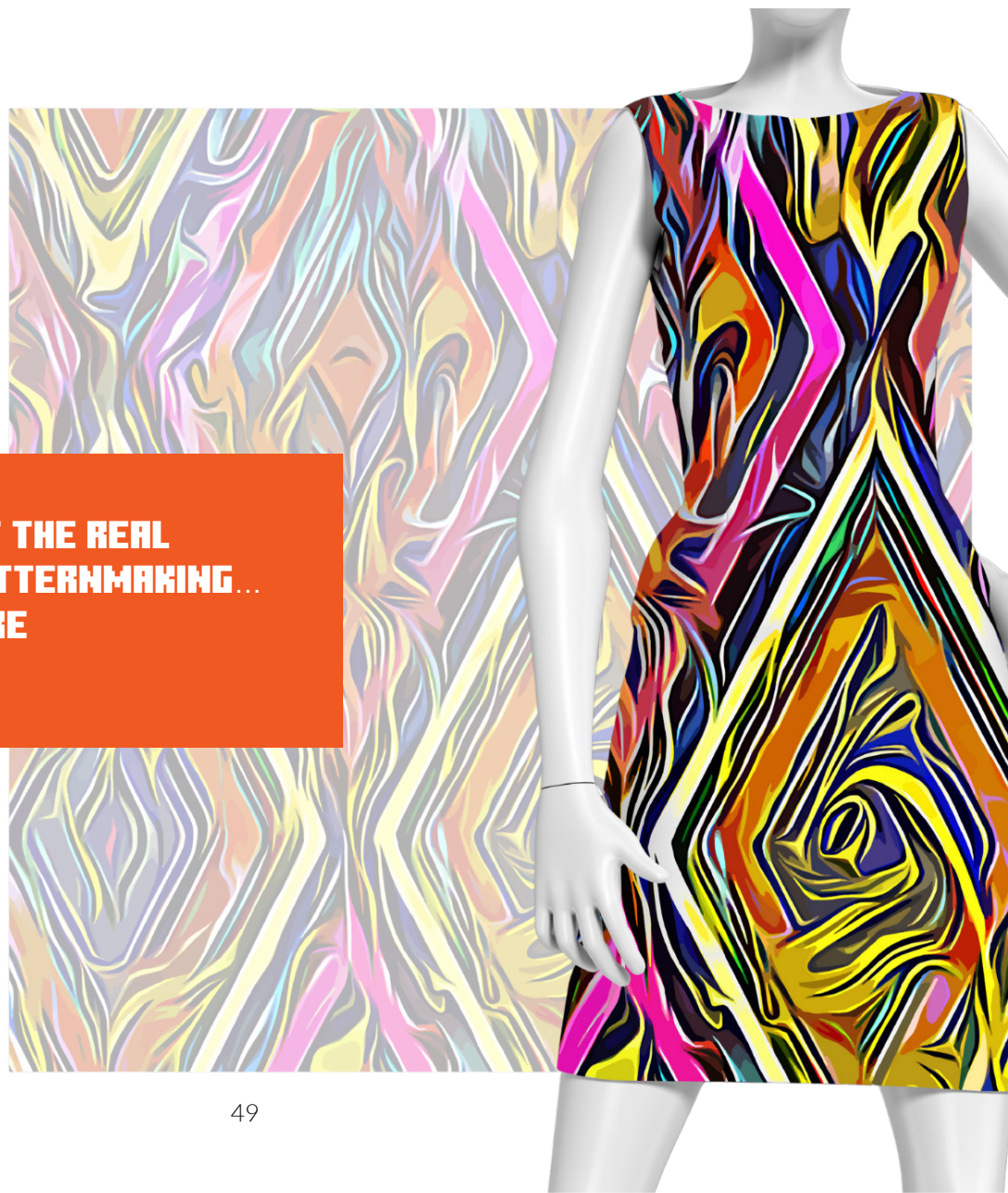
While traditional patternmaking remains indispensable, digital tools can significantly enhance the learning process and also prepare students for the realities of work. For example, teaching measurement logic alongside real-time demonstrations of how changes affect drape on a 3D avatar accelerates intuition and bridges the gap between conceptualization and outcome. Early adopters will enter the industry fluent in digital product creation, and prepared to interact with AI as discerning partners, rather than as people blindly prompting a system they had no say in the development of, and that they have very limited understandings of the inner workings of.

This evolution is not solely about increasing the speed with which brands and suppliers can onboard new talent following the next turn in digital product creation; it also

enhances comprehension. The objective is to enable new patternmakers to understand the underlying reasons for design decisions, rather than merely learning the mechanics of drafting patterns, so that, as intelligent systems take on more of the technical heavy lifting, designers and patternmakers are freer to focus on innovation, narrative, and the artistry that sets great fashion apart – safe in the knowledge that they can actually trust what AI is bringing to the DPC pipeline.

Large brands should, then, be looking to these AI advances not as a way to supplant patternmakers and garment engineers, but as a method of ensuring consistency, accelerating sampling even further than they already have with DPC, and strengthen their product pipelines. Independent designers should gain access to powerful tools that let their creativity shine without technical barriers. In education, digital patternmaking will become as fundamental as the dress form, giving the next generation of makers a head start in both logic and intuition, potentially with an AI assistant by their side.

THE PEOPLE WHO GET THE REAL RESULTS FROM AI PATTERNMAKING... WILL STILL NEED TO BE PATTERNMAKERS.



This diversity is also likely to see multiple technology players co-existing in the AI patternmaking space, the same way that the 3D ecosystem has expanded. As well as fitting into existing tools, I don't expect that we'll see a single de facto AI patternmaking application emerge, because the DPC field encompasses so many distinct approaches already.

One company that knows this well is CLO Virtual Fashion, which has released several AI Tools over the past few releases of their 3D portfolio, including the AI Studio Pattern Drafter. Patterns are generated from prompting with image upload, or by the user entering specific pattern data that is then translated to a 2D pattern, with AI creating instant sewing relationships.

Joon Lee, who leads Brand Communications at CLO, had this to say about how these features are organically becoming embedded into the tools that designers already rely on:

"At CLO, our core focus has always been developing features that truly aid the designer, and our latest AI-enabled tools reflect this commitment. While these features in the latest releases may feel really new to some of our users, we have utilised AI and machine learning within CLO for many years. Tools like auto arrangement, nesting, and digital fabric creation have been smartly automating processes behind the scenes for designers & patternmakers at brands, vendors and suppliers."

This is also a philosophy that others share: the need to ensure that the next turn in digital product creation safeguards the voice of patternmakers at the same time as making it easier for professionals to take advantage of the potential that exists inside software, but that isn't immediately apparent how to access.

"Using AI to get software interfaces out of users' way and including more people in the process by lowering barriers to entry - is central to our long-term vision" says Matt Bakhom of Style3D. "If we can make the lives of those users easier by making the lift a bit lighter, or empowering one user to achieve more - that's what we're striving for."

But when it comes to bringing AI into the fold, and into the solutions that designers and patternmakers already use every day, usability is only part of the puzzle: one of the most pressing issues is trust. It's fair to say that while 3D faced an uphill battle when it came to convincing different departments that what they saw was what they were going to get, AI is likely to face an even more pitched fight because of both the public discourse around AI, and because of the prevailing lack of clarity around how generative models really work. And on that basis, I think it's essential that we, as patternmakers, play an active role in determining where AI becomes part of the design and engineering workflow, so that it can be deployed in a way that serves the specific needs of our craft, and the specific objectives of our brands.

"Legacy-based, brand-specific generation; This is what we do" says . Sylwia Szymczyk. "AI patternmaking is for companies that already have strong blocks, and for professionals that already care deeply about continuity and fit."

Looking ahead, then, I don't expect machines to replace patternmakers. Instead, I see patternmakers having a unique chance to shape, direct, and optimise the next step in digital product creation.





PURSUING EXCELLENCE THROUGH 3D AT THRU D ARK

HOW A PERFORMANCE-FIRST BRAND IS APPROACHING THE POTENTIAL OF
DIGITAL PRODUCT CREATION FROM FIRST PRINCIPLES, PUTTING PRODUCT
INNOVATION FIRST.

As a technical outdoor wear and performance-wear brand with uncompromising standards born out of its founders' military history, British company **ThruDark** is a different proposition to a lot of 3D case studies.

For most brands, a key indicator for the success of DPC strategies is a reduction in time to market, with the rationale being that shrinking the commercialisation calendar better aligns supply with demand. But ThruDark are bucking the trend of "time saved" and instead see an opportunity to reinvest time in architecting innovation into products, and putting those products through the most rigorous testing regimes in the world, from Mount Everest to the Arctic Circle.

This doesn't mean that ThruDark shuns other opportunities, like using 3D for content creation and experiential marketing, or even finding logical areas to integrate AI into their workflows. But it does make the brand a fascinating example of how 3D can help meet an incredibly high bar for product quality and performance, at the same time as potentially delivering a bottom-line saving.

To get a feel for how the journey from "kicking doors" to pursuing technology innovation developed, The Interline spoke to Co-Founder **Louis Tinsley** (a former member of the Special Forces), **Ben Hewitt**, ThruDark's Product Director, and **Kyra Gibson**, 3D Digital Developer, who - along with **Penelope Norman**, Programme leader for the school of Arts Media and Creative Industries Management at Arts University Bournemouth - has assisted ThruDark, through a knowledge transfer partnership, in its ongoing journey to build a digital product creation strategy from first principles.



LOUIS TINSLEY,
CO-FOUNDER,
THRUDARK,
FORMER SPECIAL
FORCES (SBS)



BEN HEWITT,
PRODUCT
DIRECTOR,
THRUDARK



KYRA GIBSON,
3D DIGITAL
DEVELOPER,
THRUDARK

Walk us through the history of ThruDark, because it's a unique brand that some of our readers won't be familiar with.

Louis Tinsley: Anthony "Staz" Stazicker and I met in the Marines in 2006 and immediately bonded over one thing: we were always modifying our kit. Even tiny details – threading copper wire into jacket hoods so they'd hold a peak in the rain, reinforcing our trousers, sewing bits of cold-weather socks onto jackets. We were constantly trying to make our gear more functional.

We ended up in the same Special Forces squadron during what I'd call the "rockstar years" – constant deployments in every environment imaginable. And despite having the best military equipment you can get, failures still happened.

Staz had a parachute malfunction on a night jump in the US. Total darkness, spinning out of control – and the zip on his jacket blew open at the same time. He managed to deploy the reserve chute and landed safely, but miles off target. That moment stuck with us. If mission-critical kit can fail when everything depends on it, you know there's room to do better.

And that planted the seed. We thought: what if we took everything we'd learned about robustness from the military and built outdoor gear that genuinely never lets you down? It was a naïve thought at the time, but it pushed us into the idea.

So we left the military in 2017 and tried to break into the outdoor industry – which was, to put it simply, pretty brutal. Huge brands dominate the space. I flew to China

thinking I'd learn how manufacturing worked, but no one wanted to speak to a guy making 50 units. Then we met Jeff Griffin, a brilliant designer who'd worked with Chanel, Diesel, and all sorts of other brands. At first he told us we had no chance. Two weeks later he emailed saying he wanted in.

Jeff connected us with our first Italian factory, and we launched four products in 2018 – including an Arctic parka we somehow launched in May. But we had a strong aesthetic from the start: dark, moody, grounded in our military background. We even released a launch film narrated by Tom Hardy. That really put us on the map.

What defines a ThruDark product now, and what do you see as your brand promise to customers?

Louis Tinsley: The business has grown quickly – we're about 40 people now, with a ten-person product team. We moved from doing absolutely everything ourselves to working with some of the world's best factories. It's been eight years of steady building, refining, and surrounding ourselves with real experts - all of which has been in service of staying focused on creating highly durable, capability-driven products.

Ben Hewitt: As Louis said, at ThruDark we build products to last. We design aesthetically fantastic garments that function extremely well and that are durable, and we manufacture them to the highest standards using world-leading technical fabrics. Our mantra is that everything we make is fit for purpose, whether that purpose is climbing to the top of Everest at record speed (which our other Co-Founder, Staz, did recently) or pursuing a personal target in the gym.

Given that uncompromising attitude, when it came to 3D was there a benchmark that you felt the tools and the results needed to hit so that you and your teams could trust them to meet that promise?

Ben Hewitt: There's a Special Forces mantra that we've internalised into, which is "an unrelenting pursuit of excellence". We take that to heart, and everything we do, we strive to be the best at.

One of the things that holds us back from that goal is the time it takes to actually test and verify it. Every single garment we make is tested by Louis, Staz, or an ambassador with similarly sky-high standards for form and function - people like Aldo Kaine, a former Commando, Jason Fox, formerly of the SAS, or two-time Olympic gold medallist Victoria Pendleton.

No matter what a product's purpose is, we know someone who can test it to the limits, in its intended environment. But for that testing to be effective we need to have the essential details of the product already squared away.

The worst outcome, for our aim of creating the best possible product, is for a tester to get out there in something that doesn't fit properly the first time, or where the fabrics or trims aren't quite right - or where a similar issue that we could have caught earlier ends up detracting from what should be the focus on performance and excellence. If you're up the side of a mountain and the sleeves on your jacket are too short, all the other characteristics of the product will be irrelevant until that's fixed.



The way I see it: we should be able to catch and solve those things early, digitally, and if we can then we've met the high bar that I think we've set for 3D. Our aim is to deploy 3D in the design and development process, and then to spend, say, eight to twelve weeks defining and refining fit and function virtually, before we make a sample. That then means that the first sample is better. And that, in turn, allows us to test and improve the attributes that matter, to recapture time we'd have otherwise spent doing multiple rounds of sampling, and to deploy it to put more innovation and performance into our products.

The added benefit is that reducing those samples also helps save the world a little bit, as well as giving us better products. If we have the buttons, the angles of the pockets, the fabric drape, the zipper positioning etc. all tested and refined digitally, then we're no longer going through four rounds of sampling, and shipping each of those iterative samples around the world.

That's an interesting angle. We often hear people talk about saving time in the go-to-market calendar, but usually that time is deployed in service of getting styles on shelves faster - not reinvested in service of improving product innovation.

Ben Hewitt: And there's the added benefit that 3D looks cool as fuck, as well!

I'm being cheeky, but there's something serious there. We see a split in the way companies are using 3D: some seem to focus on using it behind the scenes, to make better products, where others concentrate more on creating cool images and content for eCommerce. I don't think there's a right or a wrong way, and I'd like to do both. I'm really excited by the potential to lean more into 3D for storytelling over time, or as a tool to help people like me (who fall between a medium and a large) who are browsing our website to understand how things fit.

The consumer-facing visual and communications side of things isn't our primary focus right now, just because we think the biggest immediate value is going to be found in pursuing product excellence, but in the longer term I'm all for it.

How does that stacking-up of priorities align with what you actually expected 3D to do for you, or with your preconceptions about what it was going to be, or where it was likely to deliver value? Have things changed as you've been progressing this initiative and rolling things out, or are these priorities largely what you thought you'd be going after, in the expected order?

Ben Hewitt: Everyone tries not to have preconceived ideas about things, but I suppose we all do. In my case, I think I assumed 3D would be more rigid and more formulaic: that it would come with a very vanilla, out-of-the-box set of building blocks and definitions of what, for example, a jacket or a pair of trousers looks like, and the user would be limited to tweaking rather than authoring from scratch. I picked this up through some very light-touch interactions with 3D tools over the years, which were obviously being demo'd using generic templates, patterns, and trims.

The short answer is that I'm glad to have been proven wrong there! We really did have the opportunity to start from first principles. With the help of Kyra we digitised our own fit models at the very beginning (so we now have accurate avatars of Louis and Staz), and we asked the big questions early about what works for our brand, so we've been on a journey since of building everything from the bottom up, rather than architecting backwards. I think that's what's allowed us to see that 3D really can support our unique commitment to product excellence, because we're not attempting to conform ourselves to someone else's rigid way of working, or someone else's product ideas, just so we can "go digital".



I've also been really impressed with the level of detail we can obtain through 3D visualisation and simulation. Together with Kyra we've spent a lot of time talking to fabric suppliers, trim suppliers like YKK (who I know are featured later in this report) and other key partners, so that we could get the garments looking as good as they do in real life.

There's the perennial debate between depth versus accessibility in what you've just said. From the point of view of end users and 3D technology vendors, people really are being careful to not to immediately expose the full capability set of 3D, or the complete spread of the extended ecosystem, because putting large-scale digital transformation and digital twins in people's hands straight away feels like inviting them to just bounce off it. But showing too little means selling the potential short. The other brands who are telling their stories in this year's report are good examples of how communication, roll-out, and a fit between capabilities and achievability can determine the direction of DPC strategies.

Kyra Gibson: I think it's about having a scope that makes sense for the brand. Starting from first principles doesn't have to mean doing everything, but it does mean that the foundational pieces will be in place to allow you to do more over time.

The way ThruDark are approaching 3D is what I'd class as strategic, in that it has clear near-term goals as well as pathways to future potential. In the short term, the expectation is that we'll make better products by eliminating the need for interpretation and iteration between the brand and their partners, and that that technical understanding will be codified into libraries and best practices. But in the longer term the same level of detail and accuracy behind that outcome is what could also allow ThruDark to do exciting things with visualisation, or with content creation for new channels.

We're trying to put the infrastructure in place so that, when ThruDark starts working on a new product, all the opportunities of 3D are available to them, even if they're going after a very singular outcome at first.

How are you managing the workload? Obviously there's a knowledge partnership in place right now, but in the slightly longer term how much 3D work do you think will be done by ThruDark's in-house teams compared to external partners and agencies?

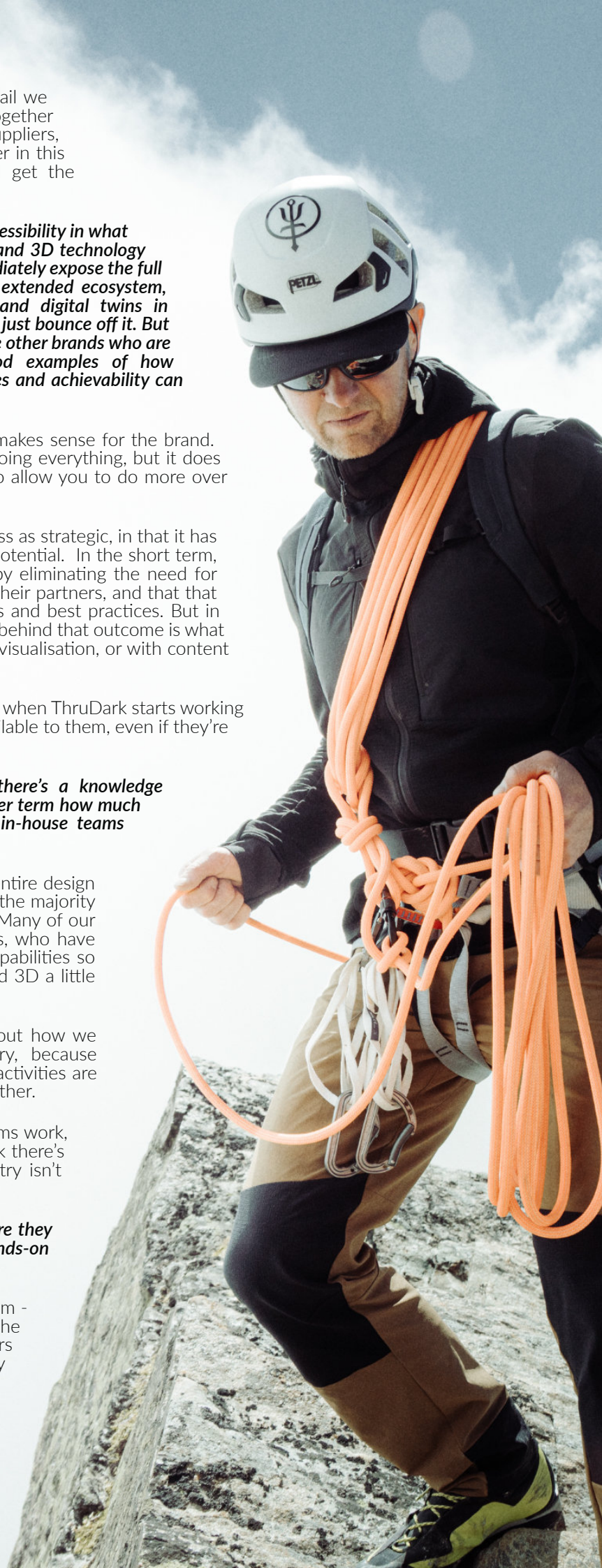
Ben Hewitt: By December 2026, I fully expect our entire design and development team to be using CLO 3D, and for the majority of our suppliers and partners to be doing the same. Many of our suppliers already do - especially the bigger factories, who have spent years at this point building out their digital capabilities so they can support other brands who maybe embraced 3D a little earlier than we have.

I'm confident that's going to change everything about how we work, from inception through to product delivery, because collaboration, sign-off, and all the other multi-party activities are going to align around the 3D asset in one way or another.

I very much see 3D as the future of the way our teams work, and of how they work with our partners. I don't think there's a world where, in five or ten years time, the industry isn't aligned on 3D being the standard.

What's the sentiment like within your design team? Are they coming into this exercise with any of their own hands-on experience or their own preconceptions?

Ben Hewitt: We have some younger folks on the team - younger than me, at least - who've already learned the ropes in 3D at university. Then the rest of the designers are on board with wanting to use it, because they understand the direction of travel, and I think they also see this sort of digitisation as inevitable.





A lot of designers, across the industry, have been doing it long enough to remember what it felt like to transition from drawing by hand to drawing in illustrator, and this is just the next step down that road. And our team is universally open to adopting new ideas, and they're always looking forwards, so I don't think there are any barriers to making 3D the foundation of how we work - more that everyone wants to do it right away, because they see the benefits.

We've talked a lot about performance garments, and that's something that very much hinges on fabrics. Modelling a genuinely mountain-ready jacket in 3D, means having extremely accurate representations of the outer layers, inner lining, loft filling and so on. Given that you see really taking deep root in the design, engineering, and production side of things, how are you making sure that all those pieces - along with the trims you mentioned earlier - are there for your design and development team to use in 3D?

Kyra Gibson: It's important to be aware of the strengths and limitations of the tools here, as well as being realistic about which components you have digital representations of, and which ones might not be available yet.

For example: a lot of ThruDark garments use magnetic closures, and right now we don't have a true representation of those in CLO, which means that, for the time being, we need to find a way to approximate those through sewing in 3D - and perhaps that doesn't pull the fabric in quite the same that that a natural magnetic popper would.

The point here is that you'll almost always have a continuum, where some components have direct representations in 3D and some don't, so the challenge is to make the right decisions about how to work with what you have, and how to prioritise digitising new materials and trims over time.

When it comes to fabrics, there's obviously a visual side, but also the full spectrum of physical properties we need to capture. The first of those is something we've been doing ourselves, using a Vizoo scanner, but we've also carved out a section of the project to support that aesthetic scanning with rigorous fabric testing and lab partnerships. We have the libraries ready, and based on ThruDark's aim of winning back more time to innovate at the product level, we're obviously moving towards maximising digital fit capabilities.

As part of that we're talking to fabric suppliers, and it's fair to say that some are much further ahead than others, and have assets ready to go. Others have told us they're working on projects in the future. So I think, medium-term, there's going to be a mix between what we digitise ourselves and what can be supplied by the industry, and a top priority will be keeping consistency between those channels.

Ben Hewitt: We've found that the big mills and the major suppliers already understand that 3D design and development is the way forward, and they've already invested in those capabilities. The companies that supply the kinds of technical fabrics we work with are often already set up to share 3D files with you when you select a fabric.

And how are you managing digital fit standards? You mentioned having scanned the brand's Co-Founders, and testing products with extreme athletes, but how about the typical customer?

Kyra Gibson: I think it's evident, industry-wide, that there's a lack of consistency in sizing. I actually presented a research paper on exactly that challenge, digitising fit models to maximise 3D fitting capabilities, at the 3D Body Tech conference, and it's a primary culprit behind the rising return rates on a lot of clothing.

It's also something we really want to tackle by developing our own base size digital avatars. Because of the intended use case for the products, a lot of our fit models are more muscular than the average shopper, and after doing a lot of research and development work, we determined that existing avatar sets and systems weren't going to meet our needs, so we digitised all our fit models - creating digital twins of each of them - and then developed a base size from there.

Now, when we're creating a new product on the base size, we can virtually try it on fit models as well, to make sure that, for example, a medium t-shirt in the base size fits models who identify as that size as well. And when it comes to getting a first sample, as Ben mentioned, the fit should be signed off and finalised much earlier, since we're also sharing those digital avatars with our suppliers as well, for fit consistency purposes.

Ben Hewitt: Just yesterday, in fact, we were reviewing a slight tweak to a pattern with one of our suppliers, and because we'd translated it into 3D, and because we were aligned on the same avatars, we were able to sign it off instantly.

Last year, one of the brands that told their 3D story in our DPC Report 2024, talked about the opportunity they saw to virtualise even more of the product and material testing process, and their vision for growing the simulation capabilities of the DPC ecosystem. Given the importance you place on product innovation that's forged in testing, would you see potential in doing at least some of it virtually?

Ben Hewitt: I'm not ruling it out if I thought the technology was ready, but for now I think we'd prefer to spend the time making products as good as we can make them at the first sample stage, and then doing that testing out in the real world.

Right now, I think our requirements for product testing are so specific and so extreme, that I don't believe you can replicate them virtually. Our rubrics for proving the value of our products are things like being trapped in an avalanche just above the Khumbu Icefall, or wearing a jacket for a 500-kilometer trek in the Arctic Circle over ten days.

If the technology does mature to where we can virtualise some of that, we're open to evaluating it. We do already collaborate with Arts University Bournemouth to make use of their "ageing lab" where you can age buckles or rubber fittings by twenty years in the space of a month, to prove out their durability, so if there's a way to blend that kind of physical testing with simulation then it's absolutely something we'd entertain as first-stage testing. But today I don't think there's any replacement for putting a product out there in the real world - especially if you've taken the opportunity to absolutely hone it in 3D ahead of time.



On the complete opposite end of the spectrum, technically speaking, is the use of 3D for content creation. This is already incredibly widespread in other sectors, like the automotive and home industries, and you'll also see adverts for cars in extreme environments that are fully CG, and based on the same 3D assets that were used at other stages of the journey to market. Presumably it's not exactly easy to take photos around the vertical faces of Everest, so would you consider using 3D to put those kind of in-context experiences and content in front of consumers?

Ben Hewitt: As a matter of fact, when we first started this partnership with the University, one of the first things I asked was whether we'd eventually be able to develop a virtual showroom that put the whole ThruDark collection at Everest Base Camp, and let consumers explore the environment and the products.

That's still something I think would be incredible. We want to innovate at the product level, as I've already said, but we also want to make sure that that innovation is easy for the shopper to see and understand. We want people to be able to buy with confidence - not just because they trust that the garment will perform, but because we've been able to successfully and authentically communicate to them that the garment is going to fit exactly how they expect it to fit, look how they expect it to look, and do what they expect it to do.

That's a long-term goal now, and I think there's going to be a high bar to clear for parts of our audience when it comes to building trust. We know that younger audiences are more comfortable shopping online, whereas people my age (or maybe just me, specifically) and athletes and adventurers are old school and insist on trying things on - especially if they're going to potentially trust their lives to them in extreme scenarios.

A related question: would you consider using AI for any outward-facing content? When people are reading through this report, they're going to encounter some different perspectives on where AI and DPC cross over, but generally speaking everyone is aligned on the idea that having 3D as a robust and accurate technical foundation is the best possible starting point for layering AI on top of to create that kind of storytelling and marketing content at speed and scale.

Ben Hewitt: This feels like a minefield to talk about, but I think we'd be stupid not to look at what AI can do for us at the moment. We never want to obfuscate anything about our products, and with the kind of use cases and the kind of audience we're engaging, we can't afford inaccuracies, but it's hard to ignore the potential of AI for fast-tracking the visualisation of things.

I took a 2D line drawing last week and used AI to create a proxy of a 3D render for it, just to understand some things about pocket placement and colours, and that was an exercise that took a minute.

Since I was just experimenting with ideas, if I'd asked one of our design and development team to visualise it in 3D instead, that would have been a labour-intensive exercise that would have taken them away from other valuable 3D work. From that point of view, it's a big phrase, but I think we have a moral obligation to use the easiest tool that can get us to the intended use case, and that allows our expert teams to focus on their specific domains.

Why would I, for instance, spend three weeks waiting for a lab dip to visualise how a colour might look on a jacket if I can do it in 30 seconds with AI? Why would I get a specialist to do it in 3D for me, if the purpose is just a quick creative choice, and not something that influences the excellence of the end product?



Kyra Gibson: The key thing is that, when we're producing digital content that people will use to make decisions, we have to stay true to the product, and right now 3D gives you that strong element of control, and that consistency that runs from design all the way to consumer-facing materials.

I have seen AI used successfully in some cases as an enhancement for the output of 3D, but I think it still needs a lot of work if we're going to be able to keep the accuracy of fit, materials and so on to a level where we're comfortable asking customers, or internal audiences, to trust it.

How do you measure the value of working in 3D? We've already talked about the difference between time saved and time reinvested, but does that capture it all?

Ben Hewitt: Maybe a better explanation is that we're looking at it as time used in a different way. If it takes two years to get something to market, and we can use 3D to shorten that time by six months... we won't do that. Instead, we'll use that time for testing and innovation.

We're going to save money, too, on multiple fronts. I'm confident in that. People tend to forget that it costs money to sample, and it costs money (and carbon) to ship things around the world. It certainly costs money to process returns, which, for a company like us is around 10% for size-related reasons.

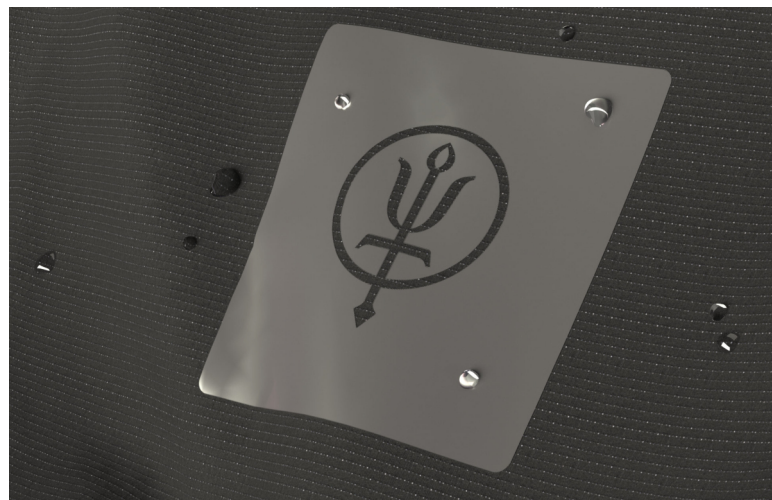
What's next for ThruDark when it comes to 3D and digital product creation? Within that same twelve-month timeline you'd talked about, for bringing all your designers and developers on board, what else do you want to accomplish?

Ben Hewitt: We're committed to taking proof of concepts and showing both our business and the wider world that what we're doing, approaching 3D from first principles, actually makes a difference, and bringing empirical evidence to back it up. We're creative folks, but we're also very data-driven as a company, and we'll find out within the next year just how much money we're saving this way, and how much better our product is becoming when we track sales and returns.

We have another internal mantra at ThruDark, which is that a product's ready when it's ready. That results in great products, but it can also be a bit of a crutch in that it allows us to paper over calendar cracks with a commitment to quality, and sometimes that matters more than others.

If a timeless product should have launched in February, and instead we tweaked it based on testing, and we sampled, and sampled again and again, and then it launched in April... that doesn't affect things too much. However, if we're trying to launch a down jacket in October, that's a pretty concrete seasonal target. If that runs late, and we launch a down jacket in January, we've lost a pretty clear market opportunity. So there are time pressures as well as monetary value, and I believe that implementing 3D will reduce our risks there massively.

Our brand is built on making cool stuff. We see 3D as a lever to help us make even cooler stuff, more efficiently, and to make it on time.





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THE EVOLVING DPC ECOSYSTEM

FROM THE PIONEERS AND MAINSTAYS OF 3D DESIGN AND SIMULATION, TO DISRUPTORS ACROSS THE WIDE SPECTRUM OF DIGITAL PRODUCT CREATION, MEET THE COMPANIES THAT ARE WORKING TO UNDERLINE AND EXPAND THE BUSINESS CASE FOR DPC.

Digital product creation has been part of our coverage long enough to see its early ambitions and debates turn into everyday realities, and new questions take their place.

What began as an effort to digitise processes and represent products virtually has matured into a connected ecosystem of tools that link design, development, and production. That foundation now underpins many day to day workflows across design and development.

But the landscape is changing again. The arrival of generative AI's "application era," as defined in The Interline's own AI Report 2025, has introduced a new layer of competition and potentially convergence. The same goals that once defined DPC alone - scaling users, increasing utility, and streamlining product creation - now overlap with AI-driven systems capable of generating content, automating visualisation, and optimising decisions.

Rather than displacing 3D, this evolution has, in many ways, clarified its role. Digital product creation provides structured geometry, critical data, and process logic that other systems use to produce workflow-ready results - especially when assets move from screen to production.

Around it, other forms of progress are gathering pace. Manufacturers are wiring DPC into machinery and materials management; educators and industry programs are building the next wave of digital specialists; and standards bodies are pushing for cleaner data exchange. Together, these efforts are extending what DPC can do as a foundational layer for digital transformation.

That's the landscape reflected in this year's report, and the editorials that precede this section have already demonstrated the diversity of opinion when it comes to where 3D can deliver the greatest value - from pure creative expression through to fine-grained technical simulation. Across the following pages, you'll find perspectives from the companies helping to define what digital product creation means in 2026: expanding interoperability and automation, refining workflows, and helping brands extract real business value from their digital assets, skills, and partnerships.



Each vendor featured here has contributed to keeping this report, and The Interline's wider work, free to read. They've also provided the data and insight that fashion businesses rely on when evaluating technology partners and planning for the future, as well as inviting us to quiz senior executives on the philosophies and the pipelines that are going to define the future.

To support the process of identifying the right partner(s) for your needs, every vendor profiled in this section was asked to provide:

- An overview of their solution
- A list of headline customers
- Estimated monthly active users
- A breakdown of their pricing model
- A summary of technology partnerships and integrations

Each vendor has supplied a direct point of contact, so if a platform aligns with your priorities, more information is only a click away.

Please note: The data in these profiles remains the property of the vendors, each of whom is a paid sponsor of this report. While The Interline checks data for clarity and consistency, we do not independently verify customer engagements, user figures, or technology partnerships. All advertisements are provided by the advertiser.

AVP

BROWZWEAR

**CLO VIRTUAL
FASHION**

GEMELL

HYLAND

KALYPSO

SHIMA SEIKI

YKK



AVP's DPC work centers on helping organizations — especially in fashion, footwear, consumer goods, and manufacturing — manage complex 2D and 3D product design assets and related workflows. These digital assets often exist across siloed systems. Therefore we operate across the full DPC ecosystem.

HEADLINE CUSTOMERS

[How a Global Apparel Company transformed the way they managed 3D assets](#)

[How a Global Footwear Brand Transformed their DAM System into a Creative Workspace](#)

Many organizations' DPC processes feel chaotic and disconnected, leaving the promises of Digital Product Creation feeling like a distant dream.

AVP helps bring order to the chaos. We're a vendor-neutral consulting firm specializing in digital asset management (DAM), the missing foundation for most DPC struggles.

We partner with organizations that manage complex 3D assets, product design files, and cross-functional workflows to help them deliver on the promises of DPC and 3D.

The truth is, many challenges experienced in DPC operations are actually DAM challenges in disguise. Visual assets such as material scans, product designs, and models, are scattered, metadata is inconsistent, and teams can't find what they need. AVP helps

organizations connect DAM, PLM, and other systems in the DPC ecosystem, creating a single, governed source of truth for digital assets across the entire product lifecycle.

We help organizations plan, implement, optimize, and scale their operations with DAM. The result? A DPC ecosystem that finally works together: seamless, scalable, and ready for what's next.

3D asset management, 3D asset versioning, tech pack creation, materials management, color management, visual line planning, 3D prototyping, SMS rendering, seasonal palette creation

DPC SERVICES

2D AND 3D DIGITAL ASSET MANAGEMENT TO SUPPORT MATERIALS AND
COLOR MANAGEMENT, VISUAL LINE PLANNING, TECH PACK CREATION,
AND MORE.

WHY DO YOU BELIEVE DIGITAL PRODUCT CREATION WILL PLAY A CRITICAL ROLE IN FASHION AND / OR BEAUTY OVER THE COMING YEAR.

Digital Product Creation will continue to play an increasingly critical role in fashion and beauty as the promises of DPC are realized, enabled, and empowered through digital asset management (DAM). As early adopters of DPC+DAM+PLM/PIM share their case studies demonstrating the achievement of faster time to market, improved bottom line, and sustainability goals the path for others to get there will come into focus.

When every DPC asset is discoverable, governed, and usable by the right people, in the right place, at the right time the promises of DPC become reality. A modern DAM with proper strategy and governance behind it provides the single source of truth for 3D models, textures, renders, copy, and compliance docs along with version control, rights/usage, appropriate access permissions, and lineage. It synchronizes metadata with PLM/PIM, automates derivatives for each channel, and delivers assets via APIs to marketplaces, PDPs, and retail partners. This prevents duplication, eliminates "which file is final?" friction, and ensures speed doesn't compromise brand integrity or IP security.

And as the success of leveraging DAM to get there will shine a light on DPC, the overarching product creation operations within organizations, encompassing both 2D and 3D assets, will realize the extended benefits of DAM overall. As DPC and other product creation assets are more effectively managed through digital asset management practices and platforms within fashion and beauty brands, these assets will be recognized as having utility for enterprise purposes, and will be made available to other key stakeholders to generate greater return on investment from these assets.

Brands that invest in DAM to support their DPC, and larger product creation, operations will launch faster, waste less, generate more value, and meet consumers where they are. They will be confident that every pixel is on-brand, in-rights, and measurably performing.

CONTACT

Using SharePoint in your DPC workflow?

Your 3D assets deserve better.



If you're using SharePoint or other general file storage, chances are you've experienced problems finding assets efficiently, version control issues, duplicate file dilemmas, etc. Fortunately, there's a better way.

AVP is a digital asset management consulting firm that designs DAM foundations to deliver on the promise of DPC. We help you choose the right technology and develop systems that make assets instantly findable, reusable, and manufacture and commerce-ready.



**Discover the advantage of DAM
in DPC.**



avp

INTERVIEW WITH



KARA VAN MALSEN, PARTNER & MD, AVP

For a while now the broad shape and scope of 3D and DPC strategies have been generally accepted, but now companies are asking some fundamental questions about how far those initiatives should stretch. Some see a clear opportunity to take them further. Others potentially see arguments for either ringfencing them where they stand, or possibly even scaling them back. Technology footprints will always morph over time, but this feels like a deviation from the standard. What's your perspective?

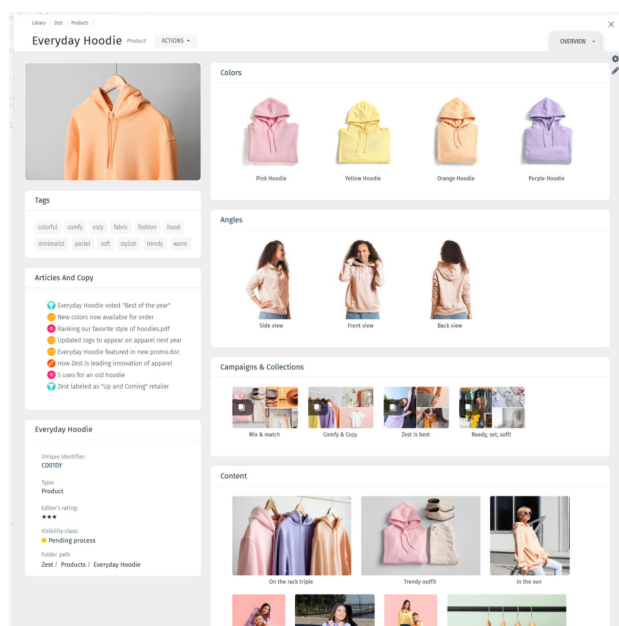
What we have seen is less a sharp deviation from the standard and more a natural ebb and flow. Companies push forward when conditions are right and pull back when the ecosystem, the economy, or their internal structures make it difficult to keep momentum.

A few forces tend to show up at once. First, digital transformations of this scale are extremely hard to execute end to end. Teams often try to build the airplane as they fly it, but if processes, skills, and technologies are not ready in the right sequence, the whole effort becomes fragile. Second, in fashion and footwear especially, the technology stack for DPC has not matured at the same speed as the ambition. And third, many companies went through significant financial and organizational contraction over the past few years, which paused or eliminated innovation initiatives and reshuffled teams who were key to 3D workflows.

When all of that converges, a pullback can look like a strategic shift, but we see it as more of a recalibration. Companies focus on the places where the return is clearest, refine proof of concept work, build capacity back up, and wait for the surrounding ecosystem to mature. As skills develop, tools improve, and economic pressure lightens, we believe we'll see the pendulum swing forward again.

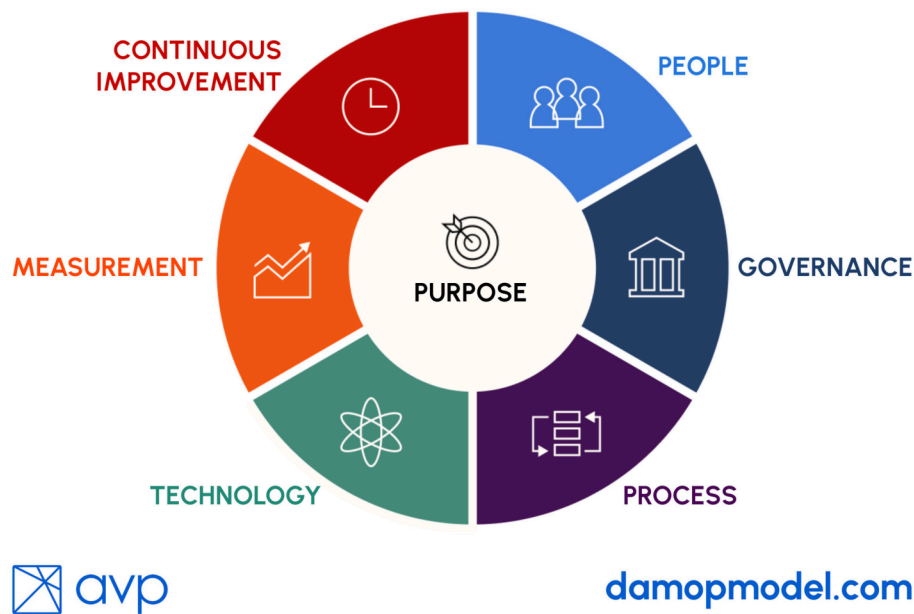
Rather than asking whether 3D should stretch further or be ringfenced, the more useful framing is to remember that 3D is simply a tool. You use it where it has utility and a clear return, and you pause on using it where conditions are not ready. Over time, as ROI increases, teams get more skilled, technologies become better integrated, and the broader environment strengthens, the relevance of 3D as a tool will naturally grow.

The shape and scope of digital asset management (DAM) can feel hard to pin down - especially when there are so many different permutations of what constitutes an "asset," and so many demographics that can make use of them. What's your clearest working definition of DAM? And what are fashion and beauty companies using it for?



Courtesy of Orange Logic

AVP's DAM Operational Model



You are right that DAM can feel slippery. As DAM has evolved and the capabilities of tech platforms have increased, DAM as both a practice and a technology has become very adaptable and can take many different shapes. Here's a definition I'll offer:

DAM is the practice of organizing, storing, and managing digital files such as images, videos, documents, and other media so they can be easily accessed, retrieved, distributed, etc.

A few things in that definition are worth drilling down on further:

- We talk about DAM as a practice, not just a piece of software. A DAM system is a tool that supports the practice, but you can "do DAM" with a wide variety of systems, including ones that don't have the DAM label, if you otherwise have the right governance, structure, and processes in place. The real question is how well it is working, not what the tool is called. For a deeper dive into this, take a look at our [Operational Model for DAM Success](#).
- The word "asset" is deliberately broad and necessitates the attribution of value. It can mean images, video, documents, design files, and more. Each department, business unit, and organization has to define which of these has enough value to be treated as an asset in its context. And which of these are important and valuable enough at the enterprise level to be treated as enterprise assets. Note that an asset doesn't just have value when you say it does. It has to have the metadata,

governance, and utility around it in order for you to leverage its value and for it to be an actual asset to your organization.

- The word "management" hides a lot of complexity. Managing assets can include version control, metadata and tagging, rights and usage information, transformations into different formats, workflow, approvals, delivery to downstream channels and partners, and more. The definition is simple. The implementation is where things get complicated. And this relates to both technological capabilities as well as human endeavors (e.g., governance). Again, check out our DAM Operational Model linked to above for more information.

Historically, in fashion and beauty, DAM as a formal practice has mostly lived on the marketing side. In fact, many people to this day think of DAM as being the sole domain of marketing, which couldn't be further from the truth.

We're starting to see a DAM evolution within fashion and beauty companies who are looking across the entire product lifecycle and realizing just how many of the files they are working with are, in fact, assets. And they face the same core challenges, such as inability to find things, having to navigate multiple siloed storage locations, engaging in rework to recreate assets they can't find, duplication of assets across silos, version control challenges, poor collaboration capabilities, lack of interoperability, security issues, and so on. Anywhere you find a set of problems that looks like this revolving around things that have been identified as assets, digital asset management is the solution.

When we pair that definition with the ambitions that our readers have for digital product creation, it's clear there's a fit purely on the basis that working in 3D involves the creation of a lot of different assets - from meshes and materials to components and final-pixel renders. Starting from that fundamental level, where do you believe digital asset management slots into the DPC technology and process ecosystem?

DAM sits at the connective layer of DPC. It can serve as a backbone, a federation point across multiple platforms, or a set of good practices applied in several systems. The architecture varies, but the role is consistent: it fills the gaps that surrounding systems do not solve well.

Design tools are excellent at creating assets but not at managing them. PLM and PIM systems are excellent at managing product and commerce data but are not designed for rich visual assets. And 3D tools have strong internal libraries but often operate in proprietary formats that are hard to connect across brands, teams, and seasons. DAM bridges these gaps. It ensures that assets are versioned, searchable, governed, reusable, and available to downstream teams when they need them.

This matters because the promises of DPC, like faster time to market, better collaboration, and improved margins, depend on more than 3D alone. Many of the pain points companies face in DPC stem from poor digital asset management. Teams cannot find what

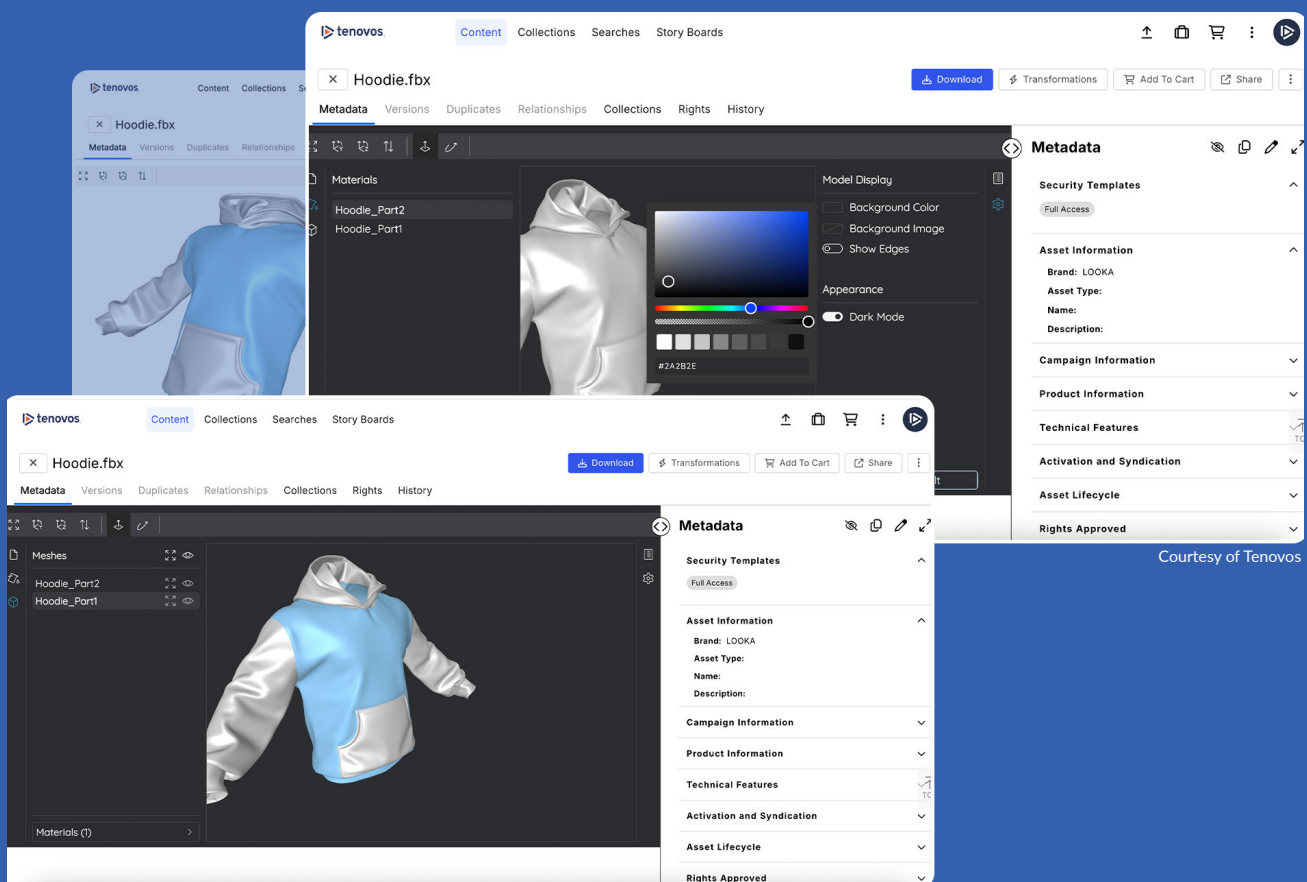
they need, cannot reuse what already exists, or cannot collaborate easily across functions. DAM helps deliver on the promises of DPC by providing the structure that the process and the technology need in order to work well.

That structure also helps unify DAM practices within an organization. Most companies today have multiple small, informal DAMS living in SharePoint, design tool libraries, or departmental file shares. Formalizing the practice brings order, shared governance, and consistency. It also creates the libraries that 3D workflows rely on most. Meshes, materials, trims, and components are reusable by nature. When they are easy to find and trust, 3D becomes faster, cleaner, and more reliable.

DAM also enhances the value of PLM and PIM. Those systems rely on accurate visual assets at specific milestones. When DAM handles the asset side effectively, PLM and PIM can shine at what they do best.

Finally, DAM is not about saving everything. For one-off outputs, like final pixel renders with no future reuse, there may be little reason to store them long term. But when you need a library of reusable assets, DAM becomes essential.

In short, DAM is the connective tissue that enables DPC to function as a real ecosystem rather than a set of disconnected tools.



The conversation around 3D often over-indexes on the marketing assets: polished renders and other content designed to showcase finished products to consumer or retail buyers. The reality is much more cross-functional and multi-domain, and a lot of the real, differentiated value of working in 3D lies upstream. Is this same trend of talking about one use case, but being able to observe much broader enterprise impact, visible in DAM as well?

Yes, absolutely. DAM has long been seen as a marketing tool, even though the value is much broader. That is similar to how 3D is often discussed primarily in terms of final renders, even though its most differentiated value lives upstream.

In both cases, the most mature use case gets the most attention, but the most strategic value appears when the practice expands across the lifecycle. In fashion and beauty, upstream design files, construction details, 3D prototypes, and 3D components and working tools are all valuable assets. They support collaboration, reduce rework, inform decision making, and accelerate downstream work.

The broader enterprise impact becomes visible as soon as teams start looking beyond the end of the process. Once companies see the volume of assets created upstream, and the amount of friction caused by storing them in scattered repositories, the case for treating them as enterprise assets becomes clear.

The trend in DAM mirrors the trend in DPC: a shift from thinking about a single use case to understanding how visual assets shape the entire lifecycle.

Where are fashion and beauty companies most likely to be able to point to a return on investment from digital asset management today? What's the current matrix that companies use to make decisions about what to adopt, and where to deploy it? And how do you see those factors changing in the future?

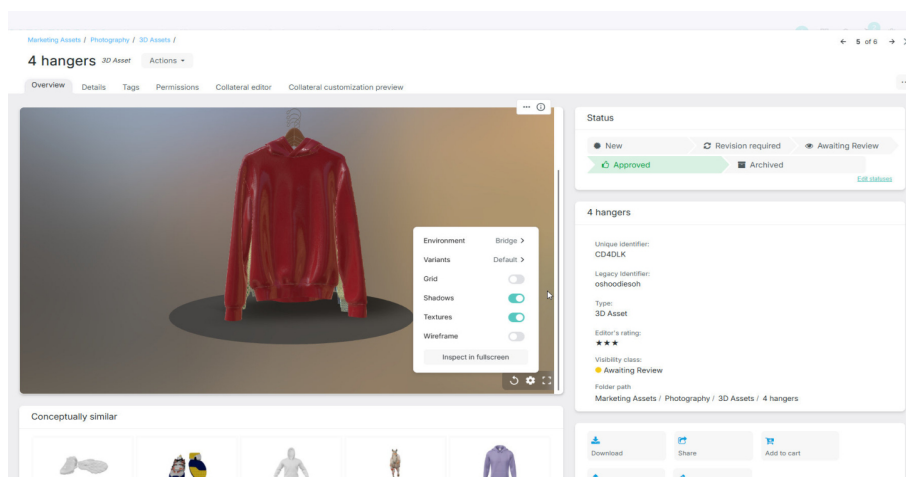
There is no universal ROI formula because every company's workflows, budgets, teams, and structures differ. What we do see is a recurring problem set. Wherever those problems appear and digital assets are involved, when you solve them through stronger DAM

practice, you see ROI. The problems usually look like this: people cannot find what they need, reusable assets are being recreated, files are duplicated in uncontrolled ways, teams are not confident in versions, and security of assets is at risk.

When companies fix that, value tends to show up in several places.

- **Asset reuse and reduced rework:** Teams stop recreating things they already have. That applies to marketing images, but also to 3D meshes, materials, trims, and components. Reusable assets behave like a library. When the library works, time and money stop leaking out of the process.
- **Marketing productivity and templating:** For marketing teams, templating is a major efficiency lever. Once assets are clean and governed, modern tools can generate high-volume, on-brand marketing output quickly, without recreating every variation from scratch.
- **Faster, less painful DPC and 3D workflows:** One of the biggest hidden costs in DPC is the time spent finding and gathering assets. Teams often spend weeks tracking down every 3D file for every style and colorway to create seasonal renders for all regions. With DAM, those assets are already organized. You can request renders directly from a central library instead of hunting across teams.
- **Preserving and leveraging intellectual property:** Without DAM, organizational memory lives in people's heads, personal drives, SharePoint folders, and cryptic naming structures. Turnover, restructuring, or simple oversight can make important work disappear. Treating assets as enterprise assets preserves IP and makes it usable for new teams and new use cases.
- **Reducing duplication, storage bloat, and risk:** Every special project creates new copies in new locations. Storage costs rise, and exposure increases because no one knows where all the files live. DAM consolidates this and restores control.

- **Vendor collaboration, security, and leak protection:** Fashion and beauty depend on a large network of suppliers. Effective DAM provides functions like tight access control, embargo management, and audit trails that SharePoint alone simply does not offer. That reduces the risk of leaks, mis-ships, and competitive exposure.



Courtesy of Orange Logic

As for the matrix companies use, few start with a perfect framework. Most use a “matrix” that looks something like identifying where there are assets that are truly worth managing as assets, evaluating where pain around managing those assets is the highest, and seeing where there is a strong enough business case to justify the investment.

Over time, the matrix will evolve as DAM becomes more embedded in product creation. The most important shift is this: companies are beginning to recognize that files worth managing as assets deserve DAM. The clearer that becomes, the more strategic the ROI becomes.

What's the most useful question that companies can ask themselves, right now, to better understand what they want to accomplish next with 3D - whether that's driven by their own ambitions, or by changes in the market?

Don't ask: “where should we use 3D next?”. Ask: “where in our product creation lifecycle do we have real pain or opportunity, and what tools in our toolbox, including 3D, will be most useful for solving those problems and seizing those opportunities given our current readiness and ecosystem?” The answer may or may not be 3D. But it may be activities and initiatives that allow you to be able to better leverage 3D when the time is right.

Companies are learning where 3D genuinely delivers value and where it does not. It does not make sense everywhere, and starting in the wrong place can create delays rather than improvements. The right starting point is the point of friction. Is the challenge in design, prototyping, sampling, sharing with partners, or creating sales visuals? Once you know where the bottleneck is, you can ask whether 3D is the right tool for that job.

Readiness also matters. 3D workflows depend on robust asset libraries: materials, components, blocks, white models, and other foundational assets. Companies that have invested in building that library have a head start. Those who are just getting started may need to digitize their core components before 3D can operate efficiently.

Market forces matter too. Upstream and downstream partners may influence your direction if they begin to rely on 3D for their own workflows. Retailers, distributors, and suppliers may set expectations that create a pull toward more 3D adoption.

Finally, companies should consider how 3D fits into the broader digital supply chain. 2D assets support 3D. PLM and PIM need consistent visuals. AI models require clean, structured data and large volumes of assets to train against. In other words, the next step with 3D may actually be strengthening the foundations around it so that when the ecosystem leaps forward, you are prepared to take advantage of it.

"3D IS SIMPLY A TOOL. YOU USE IT WHERE IT HAS UTILITY AND A CLEAR RETURN, AND YOU PAUSE ON USING IT WHERE CONDITIONS ARE NOT READY."

Browzwear is a leading product development platform trusted by over 1,000 apparel companies worldwide. We provide end-to-end digital solutions that speed up time-to-market, drive customer satisfaction, and boost revenue.

Our advanced tools empower fashion brands to automate the creation of trusted virtual twins with precision, support seamless collaboration, and enable smart merchandising - all while leveraging AI in a secure, thoughtful way to protect your digital assets.

With our unique Open Approach, companies can easily connect Browzwear with the best-in-class software the fashion industry has to offer, tailoring workflows to fit their specific needs.

Together with our customers, partners, and employees, we're building a smarter, more connected fashion industry - one digital garment at a time.

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JORDACHE
MAS HOLDINGS
NORDSTROM
ODLO
OTTO

PERRY ELLIS INTERNATIONAL
PUMA
PVH
TARGET
TENDAM
THE NORTH FACE
UNDER ARMOUR
WALMART

PRICING MODEL

Our pricing model is tailored according to each client's needs

USERS WORLDWIDE

Browzwear has a large and growing user base that includes a diverse range of businesses across various industries, from small enterprises to large corporations. Our software is trusted by users globally, with hundreds of active organizations relying on it each month.

TECHNOLOGY PARTNERSHIPS INCLUDE:

4D PIPELINE	DESL	KNITWEAR LAB	SUBSTANCE BY ADOBE
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AVERY DENNISON	EPIC GAMES	POLARTEC	THE FABRICANT
BEMIS ASSOCIATES	FERMAT	PTC	THE LYCRA COMPANY
BEPRODUCT	FIGURE FORMS	RASPBERRY AI	THREEDIUM
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CAIMERA.AI	GEMELL	RENDERSTREET	VITALMECHANICS
CENTRIC SOFTWARE	GRAFIS	REVOBIT	VIZOO
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COLORO	INFOR	STRAIGHTLINES	YKK
COTTON INCORPORATED	JEANOLOGIA	STYLECAD	YOONA.AI

WHAT ROLE DO YOU SEE YOURSELF PLAYING IN THE 'DIGITAL PRODUCT CREATION' JOURNEY?

Browzwear plays a pivotal role in the Digital Product Creation (DPC) journey by helping brands move from concept to consumer with speed, precision, and scalability.

As DPC reaches a new phase of scale and industrialization, Browzwear's AI-guided workflows bridge the gap between traditional methods and digital innovation. These workflows empower teams to achieve 95% **First Time Right** with trusted fit, reducing sampling cycles, minimizing rework, and ensuring consistent quality across collections. By delivering highly realistic virtual twins and seamless integration across supply chain platforms, Browzwear supports the industry's transition to a fully digital product lifecycle.

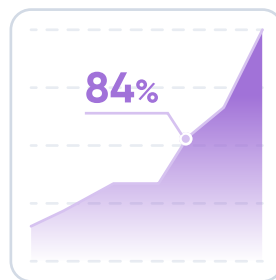
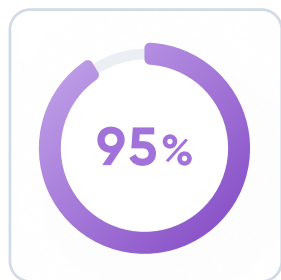
Automation of repetitive tasks and batch processes frees teams from manual work, enabling designers, pattern makers, and production teams to focus on creativity, collaboration, and faster decision-making. Beyond digitizing design, Browzwear is helping brands reimagine the entire production ecosystem — from on-demand manufacturing to hyper-personalized offerings — while maintaining alignment between physical and digital products.

In the coming year, Digital Product Creation will be critical to fashion and beauty brands striving for efficiency, speed, and sustainability. By leveraging AI-guided workflows, trusted virtual fit, and real-time collaboration, brands can reduce waste, accelerate time to market, and deliver high-quality products that meet consumer expectations, all while transforming traditional processes into smarter, more connected operations.

CONTACT

Real Value. Real Results

Achieve 95% First Time Right with AI-powered fit accuracy, reduced sampling, and faster development. Browzwear delivers the automation, intelligence, and flexibility today's brands need to create with confidence.



Browzwear is transforming how products develop by providing designers, pattern makers, and supply-chain partners with a shared, precise virtual version of each garment that they can all draw from. Instead of guesswork or waiting around for physical samples, teams can review fit, identify problems, and verify accuracy straight in the workflow.

This early alignment cuts down on revisions, helps maintain consistent fit across styles and sizes, and saves significant development time and resources from the first sketch all the way to production.

Backed by AI that integrates seamlessly into crucial steps in the process, Browzwear's platform supports a faster, more flexible, and far more sustainable approach to product creation. A challenge once that required repeated sampling rounds can now be solved quickly (often nearing 95% First-Time-Right), allowing teams to proceed much more confident in their progress.

The ripple effects are significant: lower sample costs, clearer demand planning, stronger sell-through — along with fewer returns and better decision-making across every stage of the value chain.

Talk to our team today to find out more

Born in the fashion industry, Browzwear has transformed tedious physical processes into efficient, collaborative digital workflows.

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INTERVIEW WITH

GREG
HANSON

CEO,
BROWZWEAR

For a while now, the broad shape and scope of 3D and DPC strategies have been generally accepted, but now companies are asking some fundamental questions about how far those initiatives should stretch. Some see a clear opportunity to take them further. Others potentially see arguments for either ringfencing them where they stand, or possibly even scaling them back. Technology footprints will always morph over time, but this feels like a deviation from the standard. What's your perspective?

This shift is healthy. For years, teams focused on simply "getting 3D in place." Now they're asking whether it solves the problems that matter, such as cycle time, sampling, waste, and collaboration across teams. Companies who are pushing further aren't expanding for the sake of it; they expand because the results are real and repeatable. When 3D is accurate, stable, and integrated into the supply chain, it grows naturally. When it is superficial or siloed, it stalls. What we're seeing is not a question of scaling up or down, but a demand for higher performance. Browzwear meets that demand: we design our technology for daily production decisions, not just visuals. That's why the most mature DPC programs continue to expand on our platform.

At any point of technology introspection and re-evaluation, it's important to actually test the business cases and evaluate the returns. Whether it's time saved, cost reduced, or samples eliminated, what are the metrics that you and your customers use to quantify success? And are those results still holding over time?

The most important metrics are those tied directly to operations: sample reduction, fewer rounds of corrections, shorter development cycles, and cleaner vendor communication. These numbers matter because they show up in time, money, and predictability. Once teams trust the accuracy of the digital twin, they stop relying on physical processes, and efficiencies compound. Customers consistently report fewer physical prototypes, faster approvals, and fewer late-stage surprises. That consistency shows that the technology is achieving precisely what it was designed to do.

The next port of call is to look to future value, and it's here that we believe that there's likely to be a fork in the road between 3D for visualisation purposes, as 3D as a viable, feature-complete "virtual twin". What additional value, across the extended supply chain, do you think could be built from having 3D representations of products serve as those complete virtual twins? And how close are we to that goal of more comprehensive 3D twins?

A virtual twin is a valuable tool in helping the design and evaluation process move from initial style visualization to more and more complete and accurate details. Used properly, the digital twin can be created quickly and easily for early visualization and then take on more and more detail as the product development process continues. Currently, many image generation AI tools exist to aid in the initial visual idea phase. Those ideas need to be quickly translated into more accurate and precise virtual twins for further development. The ultimate expression of that twin is a completely accurate and true to life representation of the style which can be rendered into video or image on lifelike avatars for use as samples or in e-commerce.



Incredibly, this can mostly be automated today on Browzwear's platform. The hurdle that companies need to jump to make this efficient and easy for themselves is to see that the digital process is not an exact replica of the physical process. A digital prototype can start off with nothing but an image of an idea, but then must quickly evolve to something more accurate and realistic. Browzwear's AI capabilities can enable a design team to avoid technical development of a more robust digital twin until it is necessary for the next step of development. This enables more time on ideation and efficient use of technical resources for the detailed development of those early ideas.

One of the key drawbacks that we hear brands and their upstream partners talking about, when it comes to digital product creation, is the labour-intensive

nature of the typical workflow and toolchain. It feels as though so much of 3D work is either re-engineering or restarting, product by product. What potential do you see to meaningfully smooth this onramp out, and to collapse some of the design-to-production timeline through automation and integration?

The tools to dramatically reduce labor intensive work already exist in Browzwear. Automation or repetitive tasks as well as re-use of core assets and templates are key to taking advantage of what is currently available. Much of the inefficiency in digital product creation comes from repetitive work that could be automated or reused across multiple seasons. Many times, teams are essentially starting over for each style, which is time-consuming and error-prone. Workflows where

digital assets connect directly with downstream systems—PLM, costing, material management, and production—combined with automation and guided workflows such as intelligent pattern prep, grading, and reusable components, dramatically reduce repetitive work. This does not replace human decision-making; it frees teams to focus on the most important decisions. Over time, these features reduce the time from the point of first sketch to final production, giving processes higher predictability, scalability, and consistency.

What do you see as the near-future balance between 3D and AI? On the surface, it feels like the probabilistic nature of generative models and the full simulation required to do “95% right first time,” are at odds with one another. Are those two things actually in tension with one another? And what will it take to adopt AI in a way that’s not depletive to the objectives of digital product creation, and that makes practical sense considering the current capabilities of generative and non-generative models?

There is no conflict if we define the advantages of AI and 3D in terms of how to best achieve getting great products into the market quickly, easily, sustainably, creatively, and with a high level of technical precision and accuracy on a brand-by-brand basis. AI is currently amazing at quickly helping to generate ideas. It is not currently amazing at precision and accuracy or at analyzing fit or making judgements a human might make on these issues let alone what is best for a brand and the trend in the market. AI is really only as good as the person who is prompting and evaluating it. 3D is similar in that way. Creating a virtual twin is fast and easy for a digitally mature organization with a library of blocks, real fabrics, trims, avatars, rendering templates, and experience with trusting and approving twins to quickly take initial visual ideas to something more complete as a digital twin and to get a first time right physical prototype back if necessary. Less mature organizations without this foundation and without a

trust and process to use digital twins, have to do more work on each style. The mistake in these cases is to not build the foundation with every approved style. At Browzwear we see a similarity between AI and 3D in that companies who take the time to build a foundation of assets will accelerate their advantage with these technologies as they evolve. While those who just use them as one-time items will continue to have to create them as one-time items and will not unlock the larger benefits for their organizations.

At Browzwear, our vision is to enable the development of an “Idea to Twin in Minutes.” To achieve that, we see value and advantages in both 3D and AI based on a strong foundation of assets that include patterns, blocks, fabrics, trims, avatars, poses and a variety of visual standards that enable fast and efficient decision making for each stage of the product development cycle.

What’s the most useful question that companies can ask themselves, right now, to better understand what they want to accomplish next with 3D - whether that’s driven by their own ambitions, or by changes in the market?

The most productive question is: “Where is uncertainty or inefficiency costing us the most?” That could be excessive sampling, delays in approvals, misalignment with vendors, or repeated corrections. Locating those areas highlights areas where 3D can truly make an impact. The next step is tangible: focus on outcomes that improve accuracy, reduce re-work, and integrate into existing workflows. Consider where virtual twins serve as a single source of truth, where AI speeds up repetitive processes, and where digital assets weave seamlessly into downstream tools. Companies that take this approach don’t just adopt technology—they tie it to the problems that truly matter, creating measurable improvement across the entire product development process.





CLO Virtual Fashion
www.clo3d.com

FOUNDING: Since 2009, we have been revolutionizing the fashion industry by creating a digital ecosystem that streamlines workflows and promotes sustainability.

CLO Virtual Fashion's mission is to empower everything related to garments, from concept to design, manufacturing to marketing, and fitting to styling. With more than 20 years of research and development in accurate garment simulation, CLO is leading the market by digitally creating, merging, and converging all aspects related to digital garments through our state-of-the-art 3D cloth simulation algorithm.

CLO's Ecosystem of products and services include: Material digitization solutions, 3D garment design software, digital asset management systems and a collaborative design platform. In addition, we offer consumer-facing solutions such as e-commerce virtual fittings.

Its latest additions to CLO's comprehensive ecosystem include the [CLO zFab Kit](#), CLO's all-new fabric digitization solution, and the [acquisition of swatchbook](#), an innovative digital materials solutions provider based in California, which positions CLO as the largest digital fabric

database company in the world, enhancing the fabric content and design experience for all users. The new 'swatchbook by CLO Material Digitization Service (MDS)' will be launched on December 9th, 2025, and will enable users to digitize their material library into 3D assets to accelerate design, streamline sampling, and shorten overall development lead time.

With our latest drop of [CLO 2025.2](#), designers gain powerful new tools to speed up garment creation, improve accuracy, and deliver highly realistic results ready for use across entertainment, gaming, and the metaverse. Highlights include the Pattern Drafter for trousers and skirts (automating base block creation), the Trim Tool (for precise detailing and accessories), and the AI Studio (accelerating design iterations with generative workflows). Enhancements such as the Knit Swatch Editor (for advanced knit customization), GPU-powered Softbody Simulation (for faster, more realistic drape and movement), and MetaHuman DNA import (for seamless avatar integration) further expand creative possibilities.

HEADLINE CUSTOMERS

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Nike
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 Salewa
 University of the Arts London (Central Saint Martins & London College of Fashion)
 Vivienne Westwood
 YKK
 Zara

*Our comprehensive list of industry and academic clients can be found [here](#).

We have a wide variety of options and tiers based on types of users. **PLANS / PRICING**



CLO Virtual Fashion
WWW.CLO3D.COM

FOUNDING: Since 2009, we have been revolutionizing the fashion industry by creating a digital ecosystem that streamlines workflows and promotes sustainability.

NEW ADDITIONS TO CLO'S EPP PROGRAM IN 2025:

APTEAN
Bamboo Rose
Bandicoot

DeSL
EnhanceThat
Humanetics
Jeanologia

KOTITI
SGS
SHIMA SEIKI

CLO'S EPP PARTNERSHIP PROGRAM:

BeProduct (PLM), Tronog (Applications), Revobit (Scanner), SixAtomic (Pipeline Software), KM.ON by KARL MAYER (Knitwear Solution), Frontier (Materials), and DMIx by ColorDigital GmbH (Color & Materials).

OTHER STRATEGIC PARTNERS:

Adobe, Alvanon, Epic Games, GoVise Technologies, Lectra, Meshcapade, NVIDIA, Pantone, PixelPool, YKK

Our comprehensive list of partners can be found [here](#).

WHAT ROLE DO YOU SEE YOURSELF PLAYING IN THE 'DIGITAL PRODUCT CREATION' JOURNEY?

CLO's 3D technology trusted by a wide range of industry leaders for its realistic simulations of fabrics, draping and garment movement. With CLO, designers and brands can take advantage of reduced time and cost associated with traditional sample-making processes, all while unleashing their creativity with ease, which can accelerate the product development process and improve the overall quality of their designs.

CLO's ecosystem of products and services has the potential to be a game-changer for many across the entire Digital Product Creation pipeline – including, but not limited to, designers, manufacturers, as well as marketers. For example, designers can create digital twins to physical samples to enable virtual fit sessions, online merchandising assortments, internal sales reviews, digital photoshoots and even marketing campaigns, to name just a few applications - all while collecting data points and metadata to generate analytics and tech packs. CLO's offerings have helped entire organisations to collaborate more efficiently and effectively by speaking the same (3D) language.

3D assets are already becoming foundational building blocks for the industry, as they combine visuals and data, acting as 'Dynamic Data Containers' throughout the product lifecycle. Our focus on standardization and interoperability aims to ensure these rich assets can flow seamlessly, acting as a single source of truth. As 3D assets grow in value, they will transform brand-vendor relationships from a transactional dynamic to a collaborative one, allowing vendors to use shared assets for improved execution. The technology layer will help maximize the value of both the brand's intellectual property and the vendor's technical expertise. We recognize the need for secure platforms to manage this exchange of information effectively.

CONTACT



CLO 2025.2 is here
Smart. Powerful. Magical.



JADEN OH, FOUNDER, CLO VIRTUAL FASHION INC.

For a while now the broad shape and scope of 3D and DPC strategies have been generally accepted, but now companies are asking some fundamental questions about how far those initiatives should stretch. Some see a clear opportunity to take them further. Others potentially see arguments for either ringfencing them where they stand, or possibly even scaling them back. Technology footprints will always morph over time, but this feels like a deviation from the standard. What's your perspective?

I don't view this as a deviation, but rather as a necessary phase of optimization and maturity for the industry. We are transitioning from a phase of 'blind adoption'—where companies rushed in due to hype—to a phase of 'strategic calibration.'

The divergence you see is actually a sign that the market is evolving:

The companies scaling back are likely realizing that implementing 3D as a standalone tool isn't enough. They are pausing to realign their strategies because they haven't yet connected the technology to their core business data.

On the other hand, the companies pushing further have successfully moved past the experimentation phase. They are integrating 3D as the backbone of their entire value chain, linking it to manufacturing, costing, and consumer engagement.

So, this is not a stagnation of the technology itself. It is the industry refining its roadmap, moving towards a more practical and high-impact application of DPC. It's a classic example of a market maturing to find the most efficient path forward.

Almost every strategic priority that fashion businesses share relies on having the ability to architect greater availability, accuracy, and interoperability into data. Whether we're talking about upstream visibility or end-consumer marketing, we're talking fundamentally about the same thing: tapping into a single source that captures everything about a product. Do you see the 3D asset becoming that common touchpoint? And if so, how?

Yes, and I see this as the most natural progression because the 3D asset is the only entity that inherently fuses 'Visuals' with 'Data'.

Unlike abstract rows in an Excel sheet or traditional text-based platforms, a 3D asset provides immediate visual context alongside technical specifications. This makes it the most efficient, intuitive medium for communication across the entire lifecycle, significantly reducing the manual interpretation and data entry that legacy tools require.

Because 3D is so much easier to use and understand, when it is adopted across the workflow, it naturally evolves into a 'Dynamic Data Container.' As the asset travels from design to sourcing and production, it organically aggregates layers of critical information—production details, communication history, ESG metrics, and costing data. It doesn't just store the 'look' of the product; it captures its entire history.

To accelerate this reality, our core mission is to enforce Standardization and Interoperability. We are focused on building the infrastructure that allows this rich, data-heavy 3D asset to flow frictionlessly through every stage, cementing its role as the true single source of truth.



Right now, brands and their vendor partners exchange 3D assets - full products, or meshes, materials, components etc. - with the objective of aligning everyone as quickly and effectively as possible on key product outcomes like fit, performance, and quality. If we think of a near-term future where those 3D assets also embody a much wider set of datapoints that can serve different objectives, such as supply chain transparency, how do you see that exchange affecting the dynamics and the relationships between brands and their partners, if the 3D objects they're collaborating on become more valuable than before?

This shift signifies the end of the 'Black Box' era and the beginning of a 'Glass Box' partnership; 3D assets evolving to carry transparent data regarding supply chains.

I see it as a transformation into a higher-value relationship. The dynamic shifts from being transactional (simply buying a product) to being collaborative and technical.

In this transparent environment, a vendor's value is no longer defined by 'who they know' (sourcing secrets), but by 'how well they execute' using the shared 3D data. Vendors become technical engineering partners who use the 3D asset to simulate production, optimize costs, and solve problems before physical manufacturing begins.

Because the 3D object itself becomes so valuable—containing the intellectual property of the brand and the technical know-how of the vendor—the 'exchange' mechanism becomes critical. We need secure platforms that allow for granular permission control. Brands need to share the design without exposing sensitive margins, and vendors need to input production data without losing their IP.

Ultimately, the relationship evolves from a negotiation based on hidden information to a collaboration based on a shared, transparent reality (the 3D asset).

By the same token, this “data-fication” of 3D also places greater emphasis on vendors’ ability to work in 3D - and elevates those suppliers that have already built-out digital product creation capabilities even further. How do you see this transition playing out in a sourcing landscape that’s, right now, primarily driven by price competitiveness and capacity rather than digital capabilities?

In the DPC era, the definition of price competitiveness is being completely redefined.

Vendors with digital capabilities aren't just offering 'tech'; they are offering efficiency that translates directly into cost savings. By using 3D, they eliminate physical sampling rounds, reduce material waste, and drastically shorten lead times. This means the 'Total Cost' for the buyer goes down, even if the manufacturing unit price remains the same.

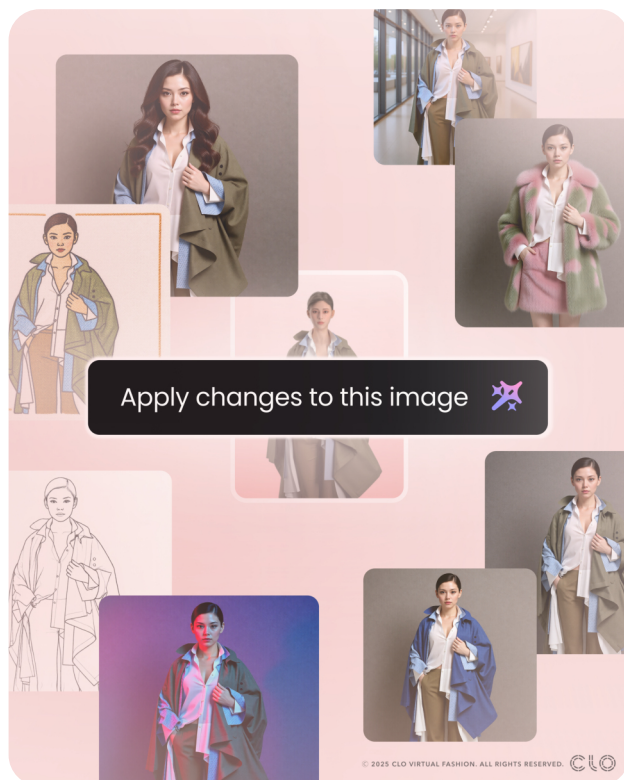
Those who adopt 3D will evolve from simple manufacturers into 'Solution Providers.' They will say to brands, 'Send us your 3D file, and we will optimize the pattern for yield and simulate production to give you the best price and speed.'

In this new landscape, digital capability IS the new price competitiveness. Brands will inevitably flock to vendors who speak the language of data, because that is where the true efficiency—and profitability—now lies.

The other key beneficiary of 3D becoming more of a data foundation is the buyer, whether that's an end consumer or a retail partner. Other consumer-facing, product-centric industries have put 3D representations in front of their buyers, but fashion garments a unique proposition in their variety, their velocity to market, and the subjective elements of fit, touch, feel and self-identity. Beyond digital product passports, where there's a clear through-line from 3D as a data layer to disclosure and communication, how do you see 3D developing as a multi-faceted touchpoint for consumers that communicates more than just aesthetics?

I see 3D evolving from a static visualization into a medium of 'Experience' and 'Trust.' Because fashion is so personal and tactile, 3D must bridge the gap between the digital screen and physical sensation.

First, 3D communicates 'Physical Confidence.' Unlike a 2D photo, a physics-based 3D asset communicates weight, drape, and fit. It moves beyond aesthetics to answer the consumer's most critical question: 'How will this behave on me?' By providing accurate virtual try-ons and physics simulations, 3D serves as a functional touchpoint that drastically reduces the 'imagination gap' and, consequently, returns.



Second, 3D becomes a vessel for 'Verified Transparency.' Consumers today want to know the story behind the product. Instead of reading a boring label, 3D allows them to interact with the garment's digital twin—clicking on a fabric to see its carbon footprint or origin. Here, 3D transforms dry data into an engaging narrative, building deeper brand trust.

Finally, it serves as a platform for 'Co-creation and Identity.' Fashion is about self-expression. 3D empowers consumers to become creators—customizing colors, mixing and matching components, or even owning the digital asset in virtual spaces.

In essence, 3D shifts the consumer role from a passive viewer of a product image to an active participant in the product's journey and experience.

What's the most useful question that companies can ask themselves, right now, to better understand what they want to accomplish next with 3D - whether that's driven by their own ambitions, or by changes in the market?

The most critical question companies must ask themselves is:

'If we were to strip away the visual rendering from our 3D file, would it still hold value?'

This question cuts to the core of the strategy. If the answer is 'No', then you are using 3D merely for visualization—essentially replacing a photograph with a digital image. While this offers some aesthetic benefits, it limits the technology's potential to a single silo.

If the answer is 'Yes'—meaning that underneath the visual layer, there remains a rich foundation of data: patterns, BOMs, costing, and ESG metrics—then you are building a true 'Digital Asset.'

Companies need to decide right now: Are we building a gallery of digital images, or are we constructing a database of digital twins that can power our supply chain, ensure compliance, and automate our business? The future belongs to those who answer 'Yes' to the value of the data, not just the pixel.

Gemell enables manufacturers to create photorealistic digital twins of fibre, yarn, and fabric directly from production data. We cover the earliest stages of the 3D/DPC pipeline: material generation, material varianting, and procedural asset creation, all the way through to delivering fully editable PBR-based digital fabrics for product design tools.

Our process begins at fiber level, where we build 3D representations from lab data and technical sheets. At yarn level, users can model fiber blends, colour recipes, and all manufacturing parameters, then digitally spin the yarn to match real production conditions. At fabric level, Gemell ingests the weave or knit data that would normally drive the loom, and virtually manufactures the textile with geometric accuracy.

Using our VFX-grade render pipeline, Gemell outputs 9 PBR maps and digital asset packs compatible with CLO, Browzwear and PLM workflows. Designers can update yarns, colours, or weave structures in minutes rather than waiting weeks for remade physical samples or rescanning.

This gives manufacturers the ability to evaluate and approve materials digitally, reducing up to 70 percent of unnecessary physical samples and enabling a far cleaner, faster development cycle.

New capabilities introduced this year include our collaborative 3D yarn design platform, a melange reverse colour solver, spectral colour measurement, palette analysis, and expanded integrations with fabric design CAD systems. Together, these tools allow suppliers and brands to work from a single digital material truth across the entire DPC pipeline.

SERVICES

3D yarn design tool

Yarn recipe & fiber blending

Modelling

Render yarns as a yarn,
yarn card knit or weave

Full fabric front and back rendering

Digital asset pack creation
(9 PBR maps)

Browzwear and CLO plug-ins

Fabric design CAD integrations

Colour lab - Melange yarn reverse
colour solver, spectral colour
measurement, palette analysis

Data Insights - Production line
analytics and quality prediction

PRICING MODEL

Gemell has a SaaS pricing model on a per seat per year basis.

Enterprise flexible licensing available.

Custom build work considered.

CUSTOMERS

GEMELL WORKS WITH CUSTOMERS AT EVERY STAGE OF THE CHAIN INCLUDING FIBER MANUFACTURERS, YARN SPINNERS, FABRIC MILLS, DESIGNERS AND BRANDS.

TECHNOLOGY PARTNERSHIPS INCLUDE:

Arahne - 2024

Browzwear - 2025

DMix - 2024

Gemell can work with all fabric design CAD and garment design CAD tools. SDK available for tight integration.

WHAT ROLE DO YOU SEE YOURSELF PLAYING IN THE 'DIGITAL PRODUCT CREATION' JOURNEY?

Digital Product Creation is moving from a "nice to have" to a commercial and sustainability necessity. Over the next year, it will play a critical role for two reasons: how brands address circularity, and how they rethink the creation and presentation of products.

Regulation and buyer pressure are forcing suppliers to prove how they reduce waste long before production begins. A digital workflow, from fiber to finished garment, is the clearest way to demonstrate that. When a mill or manufacturer can show they have cut out physical sampling, shortened development cycles, and made decisions from accurate digital twins, it becomes a genuine USP. It's also quickly becoming a requirement as brands look to partner with suppliers who can support lower-impact development.

The second shift is commercial. The race to reduce content costs, speed up launches, and feed AI-driven merchandising is pushing brands to adopt digital assets that are good enough to replace product photography. A full DPC workflow delivers consistent lighting, instant colourway updates, and imagery that can move straight into e-commerce, marketing, or virtual try-on. It removes weeks from timelines and opens the door to digital-only storytelling on models generated in real time.

Both forces, environmental responsibility and digital-first brand expression are converging. The winners will be the companies that treat DPC not as an experiment, but as the core engine of how products are designed, approved, and sold.

CONTACT



Digital Twins, Reinvented.

Made from 100% data.

No samples. No scanning.

No waste.

- 70% less waste
- Fiber level detail of yarn & fabric
- Design change to on-model render in minutes

Learn more at www.gemell.io



INTERVIEW WITH
**ADAM HANKIN,
CO-FOUNDER,
GEMELL**

For a while now the broad shape and scope of 3D and DPC strategies have been generally accepted, but now companies are asking some fundamental questions about how far those initiatives should stretch. Some see a clear opportunity to take them further. Others potentially see arguments for either ringfencing them where they stand, or possibly even scaling them back. Technology footprints will always morph over time, but this feels like a deviation from the standard. What's your perspective?

My perspective? We have a huge opportunity in front of us. The only reason any company would consider scaling back the use of digital tools is because the technology they have today is not benefitting them in real manufacturing scenarios. Using DPC tools can be fun, but if the output does not translate into something manufacturable, where the physical product actually resembles the digital design, then what was the point?

Technology in DPC has to earn its place. It needs to make you more efficient, more accurate, reduce cost, shorten timelines, cut waste, and stay connected to the realities of production. If it cannot support real decisions, companies will naturally question how far they should take it.

Gemell is a new-age technology business. We are not held back by legacy systems or scanning-based limitations. We can rethink the pipeline from the ground up and push DPC further upstream into the places where most sampling, cost and waste occurs. Once you start modelling at the fiber, yarn, and fabric level using real manufacturing data, the digital output becomes something you can trust. And when you can trust it, you stop asking whether DPC should be scaled back. You start realising how far it can go.

Different parties might not always agree on whose responsibility the actual work is, but the industry has nevertheless largely standardised on the idea that getting fabrics into the digital product ecosystem means scanning physical samples or swatches that already exist. You're proposing a different approach based on simulation and digital twins of fibers and yarns. Why take that route when the rest of the industry is set up a different way?

All good ideas come from experiencing pain, and for us that pain was scanning thousands of physical samples. We saw first-hand how frustrating, slow, unscalable, and restrictive it was. And in the corner of the room, there were the boxes of samples waiting to be thrown out. It was obvious the industry needed a better approach.



My cofounder, Rathe Hollingum, has a deep technical, mathematical and VFX background, paired with an almost obsessive curiosity about how textiles are made. When you look closely at textiles, you realise the entire process is built on data. Fibers come with lab test information. Yarns are spun to exact technical parameters. Fabrics are woven or knitted from design files that run directly on the machines. None of that data was being used in DPC.

We realised that if we could 3D model the fiber, digitally spin the yarn, and digitally weave or knit the fabric using the same manufacturing data mills already rely on, we could create a fully procedural workflow with photorealistic, fiber-level accuracy. No samples. No scanning. No post-production. No waste.

This unlocks a different way of working. Designers get editable digital twins of yarn and fabric that behave like real materials inside CLO or Browzwear. If someone wants to change a yarn or adjust a colourway, they no longer have to wait two weeks for a new sample to be produced and scanned. They update it in Gemell, re-render, and continue designing within minutes.

Walk us through how you're aiming to improve the accuracy of yarn and fabric representation in 3D, not just at the construction level, but in aesthetic areas - especially colour.

Accurate digital materials start with accurate colour, and you cannot get that from scanning or surface photography. Colour in textiles does not live on the surface. It is the result of how thousands of fibers, each with their own colour response, blend and scatter light through a yarn.

This is why we start at the fiber level. We capture fiber material, length, diameter, luster and how the fiber scatters and absorbs light. We use spectral colour data rather than RGB values so the colour behaves correctly

under different lighting conditions. That is essential for apparel because the same fabric looks different in daylight, in store lighting and under studio lights.

Once the fibers are modelled, we generate the yarn using the actual manufacturing parameters. Blend ratios, twist, yarn count and melange recipes all influence how colour mixes inside the yarn. For example, melange yarns are not simply grey with flecks of colour. They are the result of multiple coloured fibers interlocking and catching light differently at every angle. Our system recreates that behaviour rather than painting a texture on top.

After that, we build the fabric using the real weave or knit design file. Colour behaves differently in a twill compared with a jersey knit because the yarn paths change and light scatters in different directions across the structure. By modelling the structure in 3D, we produce colour that shifts naturally with lighting, scale and viewing angle.

The result is colour accuracy that is not only visually correct, but grounded in how the material is actually constructed. This is what allows designers to trust what they see on screen and make decisions with confidence.

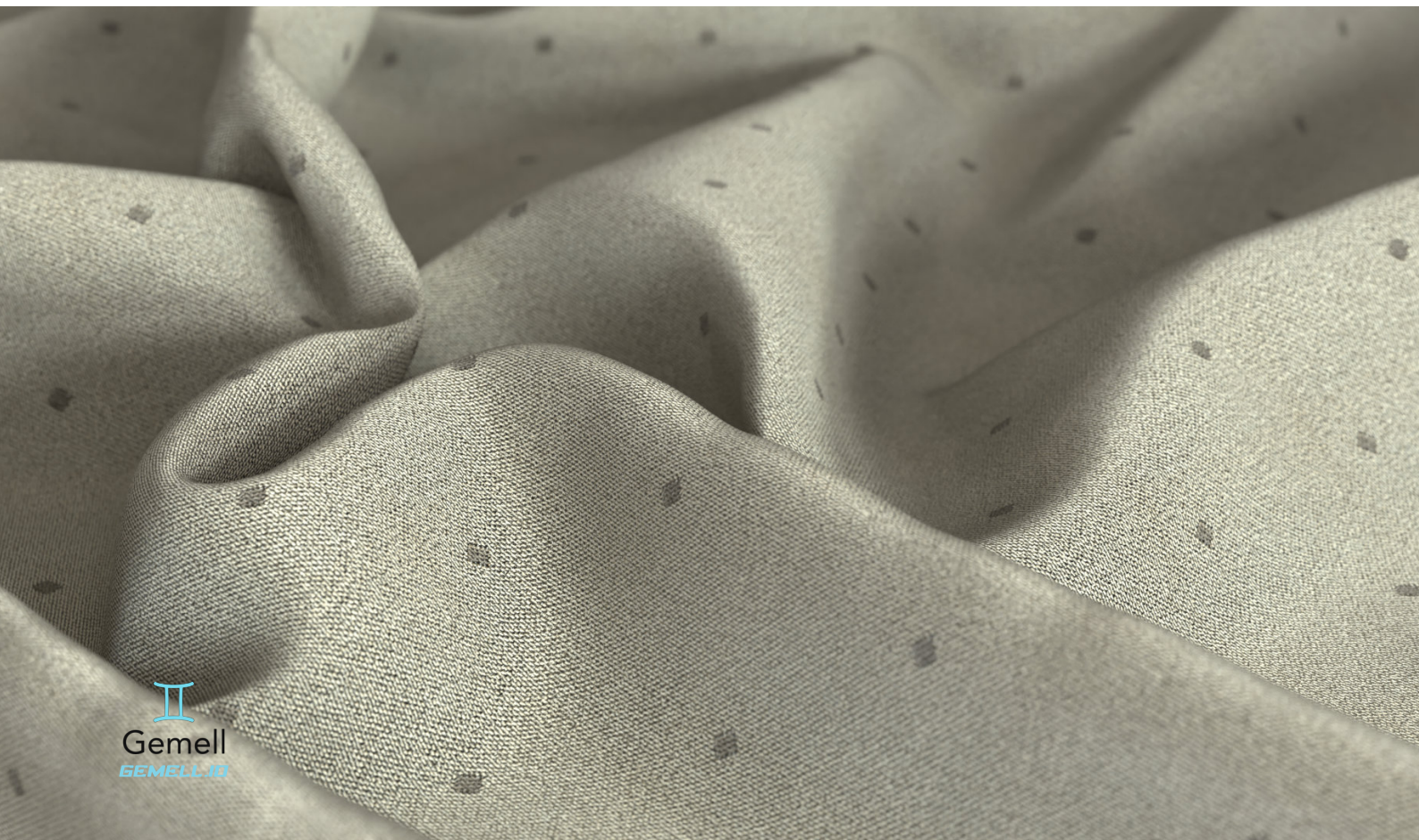
As any company with enough digital product creation experience under their belt will tell you, there's a fundamental difference between visually representing something and actually simulating the physical properties that govern the way it behaves. With the ideal end goal of DPC being a full-blown digital twin that can stand in for its physical counterpart wherever decisions need to be made, it seems clear that any fiber-forward simulation would need to include both aesthetic and physical characteristics, in order for the yarn or fabric to be considered "complete". How far are you covering both elements right now?

Our initial focus has been on visualisation, but the major step forward comes in 2026 with the release of our fully procedural physics simulation for yarn and fabric. This becomes especially important as recycled and next-gen fibers grow, because their behaviour depends heavily on fiber-level properties and blend ratios.

Since Gemell models materials from the fiber upward, we already capture the data needed for real physics: fiber length, density, tenacity, elongation, plus yarn characteristics like the recipe, yarn count, ply count, and twist. Using these inputs, we have demonstrated the ability to simulate stretch and even the breaking point of yarn digitally.

When you combine that with the weave or knit structure, you can simulate stretch, drape, and deformation at the fabric level without producing a physical sample or using testing equipment. That is the direction we are moving in. Visuals help you recognise a material. Physics lets you trust it. Our goal is to bring both together so that digital twins can support real production decisions.

A clear picture is emerging - both in this year's DPC Report and in the wider industry - of where 3D and AI are likely to specialise and diverge, and the key edge for 3D feels like its ability to simulate rather than just visualise, and to provide the foundational data layer behind a lot of other initiatives and ideas. Given that Gemell is emphasising full simulation, it seems like perhaps you're in the right place to go after that new distinction and definition for DPC. Do you see that opportunity? And what else do you believe your approach puts you in the right position to go after in the next few years?



AI can generate an endless stream of images, but it cannot replace the technical understanding required for production decisions. That is the line that matters. If you are choosing a yarn, a fabric construction, or a supplier, you need more than a nice picture. You need to know how that material is built and how it will behave in the real world.

Right now, one of the biggest reasons brands are cautious about AI is that most AI tools invent texture. They fake the weave, the yarn structure, the fiber mix. For a brand that spends time and money developing beautiful, complex surfaces, that is a non-starter. Nobody wants a system that "guesses" what their hero fabric should look like.

The only way to make AI genuinely useful is to ground it in real, production based knowledge. That is where Gemell sits. We know the fiber data, the yarn recipes, the constructions and the lab results. We can use AI to speed up workflows, not to alter geometry or appearance. It becomes a way to enhance what we already know, not overwrite it.

And visualisation and simulation are only the first layer. Once you understand materials at this level, you can start to analyse entire manufacturing chains. For example, with a yarn spinner in India we have taken their raw fiber test data, their yarn lab results and their production settings, then shown them how to optimise sourcing and processing for better yield and consistency.

So yes, we see the opportunity in using simulation as the foundation for DPC. But we also see something bigger. The same skill set lets you turn material simulation into process intelligence, and that is where things get really interesting.

What's the most useful question that companies can ask themselves, right now, to better understand what they want to accomplish next with 3D - whether that's driven by their own ambitions, or by changes in the market?

How much time and money would you save, and how much quicker to market would you be if you could fully trust what you are looking at on a screen?

My biggest piece of advice is to question every process. Imagine you arrived in this industry with no prior knowledge and were asked to design a workflow from scratch. With the technology available today, there is no chance you would build the same analogue, sample driven pipeline that we still see across most of the supply chain. You would design something faster, cleaner and more digital from the beginning.

Asking that question helps teams understand what they really want from 3D and where the biggest opportunities sit. Once you identify the places where you rely on physical samples to make decisions, you also identify where digital materials can make the most impact.



Hyland empowers organizations with unified content, process and application intelligence solutions, unlocking profound insights that fuel innovations. Trusted by thousands of organizations worldwide, including more than half of the Fortune 100, Hyland's solutions fundamentally redefine how teams operate and engage with those they serve.

Hyland's flagship solution for DAM is Nuxeo, which is a cloud-native offering that relates operational data with digital content throughout the product supply chain - from ideation through to market. This solution can capture, process and manage high volumes of 2D & 3D content to improve, accelerate and automate operational decisions and workflows.

Nuxeo makes upstream systems for materials scanning and texture mapping visible to designers, so texture is easily visible in design previews. Design tools (like Adobe Illustrator, Photoshop, 3D rendering software, etc.) can be enhanced with connectivity to the materials reference library information that product

designers depend on. Designers can drag-and-drop chosen materials onto their designs for faster ideation and design times. They can keep design files connected in their master formats and easy-to-share previews for review and approval, using the platform's native capabilities for handling compound file types.

They can establish consistent review workflows and make approvals easier, using built-in annotation tools and a configurable, low-code studio to build and modify workflows. Nuxeo federates search across systems and teams all over the globe, making it easy and fast for your teams to discover and modify existing designs from sister brands, other teams or past seasons.

Designers can also use Hyland's Nuxeo Platform to put design in the context of the overall supply chain, automatically verifying that all created designs can be manufactured with current supply chain constraints or available ingredients.

HEADLINE CUSTOMERS

AWS
HANES BRANDS., INC.
LULULEMON

MAD ENGINE GLOBAL
NIKE
ON

PRICING MODEL

The Nuxeo platform has a capacity-based licensing model. In terms of core consumers: we target brands, retailers, and suppliers that all collaborate or play an active role in the end-to-end supply chain.

USERS WORLDWIDE

North America: **60%**
LATAM: **<5%**
EMEA: **30%**
APAC: **<5%**

TECHNOLOGY PARTNERSHIPS INCLUDE:

CLOUD VENDORS:

AWS Suite

Google Cloud Platform

Microsoft Azure

BROWZWEAR

CLO

VNTANA

ECHO3D

FADEL

**Various PLM, PIM, & MDM
Vendors**

WHAT ROLE DO YOU SEE YOURSELF PLAYING IN THE ‘DIGITAL PRODUCT CREATION’ JOURNEY?

Digital Product Creation (DPC) will be a critical driver of transformation in fashion and beauty because it enables brands to meet the dual challenge of speed and sustainability while unlocking new value streams across the product lifecycle. As consumer expectations evolve and economic pressures mount, brands need agile, connected processes that reduce costs, accelerate time-to-market, and ensure compliance.

Hyland is uniquely positioned to deliver these outcomes through its Nuxeo Platform, which serves as the digital backbone for DPC. Unlike point solutions, Hyland connects fragmented data and content ecosystems - PLM, PIM, shared drives - into a governed, searchable environment. This ensures version control, accurate metadata, and defensible audit trails, which are essential for global brands managing complex supply chains.

Our platform goes beyond asset storage. It transforms 3D packages into enterprise assets, enabling reuse across merchandising, eCommerce, and marketing channels. With native support for compound 3D files, AI-driven metadata enrichment, and low-code workflow automation, Hyland empowers teams to orchestrate content at scale.

Hyland also addresses adoption challenges by providing configurable workflows, role-based interfaces, and governance frameworks that promote consistency across multi-category brands. Combined with our integrations to creative tools and enterprise systems, this flexibility accelerates digital-first culture without forcing rigid process changes.

In short, Hyland enables brands to move from content creation to content orchestration, delivering agility, sustainability, and omnichannel storytelling—capabilities that will define competitive advantage in 2025 and beyond.

CONTACT

TRANSFORM YOUR ENTERPRISE DIGITAL CONTENT SUPPLY CHAIN



Accelerate concept to consumer
Make content actionable



Automate your go-to-market
Ensure data-driven decisions



Democratize and contextualize data access
Connect fragmented data sources
to speed decisions

[Explore Hyland's Nuxeo Platform for DAM](#)

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CHAD MALLEY

GLOBAL DIRECTOR DIGITAL ASSET MANAGEMENT PRACTICE, HYLAND

For a while now the broad shape and scope of 3D and DPC strategies have been generally accepted, but now companies are asking some fundamental questions about how far those initiatives should stretch. Some see a clear opportunity to take them further. Others potentially see arguments for either ringfencing them where they stand, or possibly even scaling them back. Technology footprints will always morph over time, but this feels like a deviation from the standard. What's your perspective?

Our immediate reaction is one of frustration. Any process transformation involves changes in people, process, and technology. In this case, there is a disproportionate view on the technology, but the reality is that brands continue to deemphasize focus on the people and the process.

3D is just another content type. The big distinction is its ability to serve multiple purposes throughout the supply chain. The ignorance comes from its isolation in the DPC strategies as it pertains to the over-all supply chain. For instance, most of the focus with 3D to date has been confined to ideation, development and prototyping. These stages are just the tip of the spear when it comes to the end-to-end supply chain.

If we shift focus to the downstream consumption of the 3D file, its value and overall prominence becomes magnified. And in turn, a broader set of stakeholders become invested in its creation and its relevance to their functions (eCommerce, merchandising, line-planning, sell-in/sell-out)

Our view is that organizations remain myopic, and their teams operate with an insular, siloed focus that limits broader problem-solving across industry's challenges.

Reorienting around the basics shouldn't take a back seat to the seductive promise of Artificial Intelligence and advancements in technology.

People often talk about digital product creation as though it exists in isolation, as a fundamental piece of design and development workflows, but with limited hooks into other strategic areas. As more companies have started to evaluate what it means to extend the value of DPC initiatives and assets, it's becoming clear that DPC actually has deep, foundational links into priorities like sustainability, supply chain agility, speed to market, and plenty more. How are you seeing the business cases for 3D and DPC evolving to reflect this wider horizon?

The funny thing about the fashion industry, and most industries for that matter, is that people get caught up with acronyms and using them as catch phrases instead of honing them into meaningful strategies for their business. Take DPC, Digital Product Creation has an inherent meaning that is often overlooked. Product Creation is a staple to business growth and expansion. Your product portfolio is a foundational tenant of the retail business model and so often evaluated mainly through the lens of operational cost savings via digital enablement rather than their potential to increase product output or the acceleration of new products to market.

If we step back and evaluate DPC in the greater context of the supply chain, you begin to realize all of its potential benefits and the key performance indicators (KPIs) it can influence.

The problem we often see is that DPC is often confined to one part of the business, while the largest value opportunities emerge across functions and along

the full supply chain - visibility that typically exists only at higher organizational levels. When DPC isn't led from that vantage point, those cross-functional gains are overlooked.

Our view is that the 3D package remains one of the most important and highest-value corporate assets that an organization can possess. And the reason is its ability to serve multiple derivative purposes across the enterprise and yet its equity remains largely unrealized.

When we think about that much broader utility, it also underlines the ongoing need for digital product creation to be better-integrated into the extended technology ecosystem. We've seen some bridges already being built, but in order for 3D to become a real foundation layer for wider enterprise transformation and decision-making, there's a strong mandate for centralising, consolidating, and connecting data sources to make them available to a wider spectrum of end users. At the philosophical and infrastructure levels, how does Hyland think about this challenge of crossing the gap between the 3D ecosystem and DPC as part of the wider tech estate?

Part of the fragmentation in the DPC ecosystem is driven by vendors trying to claim the largest possible footprint across the supply chain. Hyland's view is that our role should be democratized and abstracted wherever feasible to ensure that data and content are widely distributed, enabling intelligence and insight across every stage and branch of the assembly line. Too many vendors try to pull the center of gravity into their own applications, creating barriers to adoption across the broader user population. And while all-in-one solutions are attractive for their perceived simplicity, true operational effectiveness comes from an integrated backbone that distributes data and content across an ecosystem of best-of-breed tools, such as design and rendering software, PLM, visual-assortment platforms, merchandising suites, and sales portals, ensuring each stage uses the technology built for it.

Centralization and standardization don't always mean one unified experience or platform. The objective should continue to be to get the right information into the right people's hands at the right time of the process flow to ensure expedited decisions and reduced cycle times.

Unlike more standardized enterprise workflows, 3D pipelines and DPC workstreams are far from commoditized; every organization assembles its own mix of tools, processes, and team models. The reality is that 3D management has inherent challenges that have to be contemplated. There is a lack of file standards across the 3D landscape. 3D packages tend to be very heavy and resource intensive when data is transferred and shared. 3D rendering continues to be a struggle for many organizations and when you look at those challenges in concert of a heterogeneous landscape, it is often an overwhelming situation for organizations to take on.

We typically think of digital asset management as a downstream discipline, focused on visuals, but we're talking here about using 3D objects as foundations for not just content creation but merchandising, eCommerce, and more - all of which is reliant on metadata. Practically speaking, what does it look like to actually connect 3D assets to all those different workflows?

We are so glad you brought up this topic. The reality is that the content management piece is the easier part to solve than the data management piece. Many systems can house files but most systems have poor data management controls. As you look across the various applications that exist across the supply chain, each of them represents a data source but none of them is particularly good at flexibly exchanging their data outside of their applications. Hyland sees its role in providing the connective data layer between these systems, aligning the digital assets with the operational data that drive decision-making. We often serve as the data intermediary between these systems to establish

Nuxeo, Hyland material search, supplier.

Nuxeo, Hyland material search, status.

the relationships between the pertinent operational data and the digital content for accelerating the decisions and tasks that were alluded to before.

We increasingly observe organizations turning to AI assuming it will automatically solve the metadata problem for them, but the reality is that AI hasn't solved the data connectivity equation in its entirety. Critical business relationships are often not something that can be extracted from content itself nor is extracted metadata often valuable without context of other operational data in adjacent enterprise systems. AI doesn't handle judgement or association very well. In other words, some one needs to tell the AI service how the metadata relates to an object or to make the value association with how the data will inform the process. Fortunately, firms often already have the key information, it's just orphaned in isolated systems.

The connectivity of the assets to the different workflows starts with inspecting the prioritized outcomes for the different teams collaborating in the process. The data connectivity should map to the acceleration of those deliverables and how the data can create efficiency in the task completion.

It's fair to say that the expanded possibility space for 3D also takes us further into the same realms that our readers are evaluating AI against. From your perspective, as a company that's providing an infrastructure and workflow layer behind the promise of extended value for 3D, what does it look like to start integrating AI with DPC in a way that leans into the current value in generation and decision-making, but avoids the risks?

There is a lot to unpack in the AI topic, but I would direct the attention of the readers to two main considerations when it comes to AI. The first is "value." This can be distilled into two inspections – is the perceived impact worth the level of effort required to adopt the AI service and is there a viable return on investment for the required budgetary allocation to make it happen?

AI has garnered a ton of attention, but very rarely is cost contemplated up front. I was having a conversation the other day with one of the major hyperscalers in the market. We are fortunate to have them as a customer and a technology partner. For them cost is rarely a concern because they are a purveyor of the AI technology. Few organizations find themselves in that fortunate position. So, when leadership continues to ask your team to do more with less, the question must be asked as to whether the AI investment really supports that objective.

The second inspection is whether the AI service can achieve the level of decision-making you are asking it to perform. AI is not magic despite its tremendous allure. There is only so much that it can take on autonomously and it requires training, monitoring and data quality to ensure it can do what you are asking it to do.

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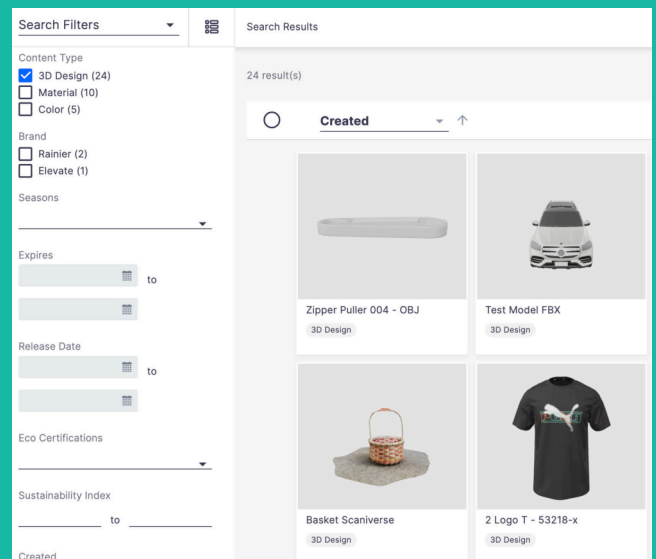
Resourcing is another critical factor that organizations must approach with eyes wide open. Enterprise-grade AI implementations require substantial configuration, tuning, governance, and ongoing “care and feeding”, all of which are additive to the existing workload of managing enterprise applications. Even if the AI tools in use are primarily prompt-driven rather than code-driven, the question remains: who will maintain the expanding network of prompts, workflows, data pipelines, evaluation frameworks, and result-capture mechanisms that emerge over time? AI does not eliminate operational overhead; it shifts it. And while there are undeniably AI use cases capable of transforming specific workflows, organizations must prioritize the highest-value opportunities and invest in disciplined experimentation, rather than opening the floodgates to every conceivable application of AI, a path that would be operationally unsustainable without significant, ongoing investment well beyond the cost of technology licensing. The risks in many cases are obvious but should be mentioned. AI isn't cheap. AI is like any other enterprise software. It requires change management, oversight, program management, and governance. Risks of overpromising, underdelivering and misestimation of investment are significant, but our advice is to experiment, iterate and fail fast like any other project.

What's the most useful question that companies can ask themselves, right now, to better understand what they want to accomplish next with 3D - whether that's driven by their own ambitions, or by changes in the market?

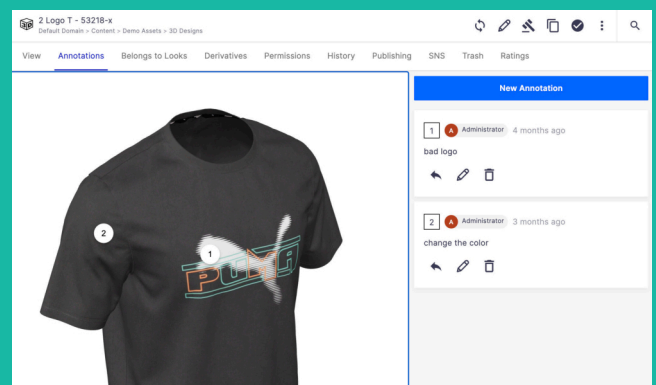
Don't over complicate the conversation. Think about what bottlenecks and inefficiencies exist in your current processes. Map out those processes and identify where 3D enablement can reduce or replace manual activities and provide extended intelligence that can be used to accelerate tasks and cycle times. Consider the entire content supply chain not just the activities of existing teams leveraging 3D/DPC tools and especially consider engaging with downstream content operations team leaders to surface opportunities.

3D & DPC should be about process optimization and not simply a means to automate. There are no shortage of competing interests in the business and decisions should be made on what can be accomplished internally vs. doing what the market (or vendors) says you should be doing. While AI capabilities attract enormous interest and can enhance potential benefits and operational gains, they are most effective when embedded components of foundational and integrated systems rather than standalone tools or services.

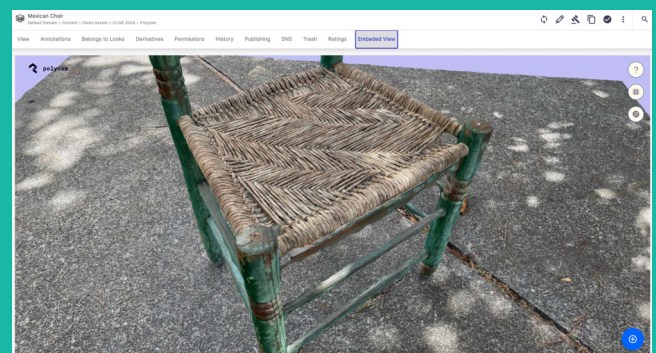
Having said that, 3D & DPC continues to represent significant benefits even in undesirable market conditions. Increased profitability, faster time to market and effortless collaboration should be viewed as operational imperatives regardless of the 2026 forecast.



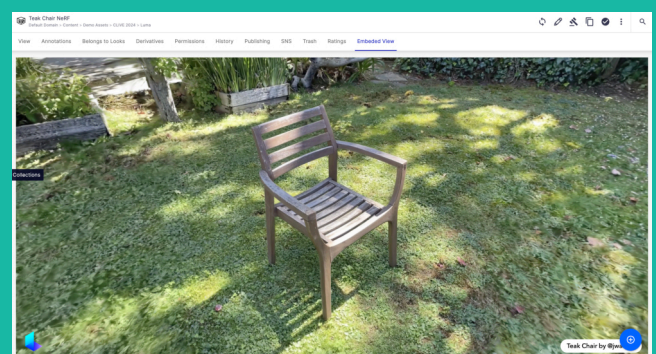
Nuxeo, Hyland 3D search.



Nuxeo, Hyland 3D view, 3D annotation.



Nuxeo, Hyland generative 3D custom viewer.



Nuxeo, Hyland generative 3D scene viewer.

Kalypso, a Rockwell Automation Business, provides world-class digital transformation and industrial automation solutions where you need it.

At Kalypso, we bring digital solutions to product problems. We are the leading digital product creation (DPC) consultancy in the retail industry. Leading with a value-first, lean startup approach, we support leading brands in their digital programs at any stage of maturity.

We help rapidly accelerate and optimize DPC transformation. Our people are innovators, strategists, data scientists and technologists, and we leverage their deep expertise in product creation process, organizational change management, foundational technologies such as PLM, along with knowledge of 3D technologies and experience.

We help companies create an end-to-end solution and connected ecosystem to digitally create, manufacture and move products.

ACTIVE DPC AREAS

We support our clients with world-class capability through acquisitions, investments and partnerships across the digital thread, from concept to consumer.

Our expertise helps clients define their needs and build the appropriate digital product creation ecosystem. We partner with a wide variety of technology providers to support unique needs and to co-innovate industry-leading solutions. Below are the types of solutions that we have helped explore or implement:

Market & Product Insights

Generative Design

Concept & Brief Management

3D Material Design & Scanning

Intelligent Line Planning

Operating Model, Product Processes & RACI

Render Pipeline

3D Product Design

Digital Color & Artwork Design

Change Management, Education & Training

Voice of Consumer Analytics

Digital Product Development

Virtual Fit Testing

Development Task Automation

Foundational Product Technologies (e.g. PLM, DAM)

DPC Sustaining Governance Model

Virtual Testing & Simulation

Visual Assortment & Line Review

Inventory Planning & Localization

Traceability & Sustainability Management

Component Libraries (Materials, Trims, Avatars, Blocks, etc.)

Uniform Visual Quality Standards

Virtual Showroom & Store Planning

Virtual Try-On

Digital Assets for eCommerce

Product Customization Platforms

Digital Assets for Marketing & Retail

Production Automation

Digital Direct Manufacturing

Product Platform Integrations

DPC STRATEGIC SERVICES

DPC DIGITAL VALUE ACCELERATOR:

- Establish a vision, strategy, justified roadmap, and mobilization plan to start realizing value from digital transformation
- Foresight capabilities for a proprietary view of the future of product creation
- Evaluation of current capabilities and future aspirations
- Tailoring a DPC strategy aligned with business needs

STRATEGY & ROADMAP:

- Formulation of strategy, scope, business case, and strategic roadmap
- Ensuring alignment, readiness, platform architecture, data governance, and vendor selection
- Development of a comprehensive plan for DPC program success

OPERATIONS & ORGANIZATIONAL CHANGE MANAGEMENT:

- Process redesign, program management, and stakeholder alignment
- Organization readiness and redesign
- Process and solution training, communications, and change management
- Workshops for team alignment and educational support for digital process adoption

TECHNOLOGY & DATA:

- Crafting technology strategy, proof of concepts, and requirements definition
- Vendor selection, platform architecture, and integrations with PLM and voice of customer platforms
- Implementation of data governance and digital asset management
- Connecting the digital thread across the value chain for an efficient, collaborative digital environment tailored to workflows and sustainable transformation

CASE STUDIES

At Kalypso, our clients remain confidential, but we have served 20 major retail brands on 70+ projects in digital transformation initiatives across product categories including apparel, footwear, accessories and hardlines.

100% apparel sampled first round in 3D within 2 years of program launch
\$5B+ European Luxury Fashion Brand

\$24M CapEx & 12M OpEx in investment in return for \$113M in Margin Gains
\$10B+ Multinational Apparel Retailer

Reduced wait to time to review and assess updated samples from 8 weeks (for physical) to 2 weeks (for virtual)
\$45B+ Multinational Footwear & Apparel Retailer

280 Proofs of Value DPC projects completed in first 60 days
\$24B+ European Fast-Fashion Retailer

Full case studies are available upon request. Please reach out to hadley.bauer@rockwellautomation.com to schedule time to walk through the approach and full set of results of our top case studies

WHY DO YOU BELIEVE DIGITAL PRODUCT CREATION WILL PLAY A CRITICAL ROLE IN FASHION AND / OR BEAUTY OVER THE COMING YEAR?

Digital Product Creation (DPC) will play a critical role in fashion and beauty over the coming year because it provides the foundation for agility in an increasingly technology-driven landscape.

As AI and automation reshape the industry, brands need flexible, digital-first processes to adapt quickly. DPC enables this by digitizing core product development workflows—creating virtual assets that reduce sample cycles, accelerate time-to-market, and minimize waste. These efficiencies are essential as sustainability pressures grow and consumer expectations for speed and personalization intensify.

Beyond operational gains, DPC creates a scalable backbone for integrating emerging technologies. AI-powered trend forecasting, material optimization, and predictive analytics can only deliver value when built on accurate, accessible digital product data. By investing in DPC now, brands position themselves to leverage these innovations without disrupting their core processes.

In short, DPC is not just about digitizing today's workflows—it's about future-proofing the business. It enables brands to move at the speed of technology, respond to market shifts with confidence, and deliver better products faster and more sustainably. Those who prioritize DPC will lead the next wave of transformation in fashion and beauty.

CONTACT

We are Rockwell's digital services arm.

KALYPSO

A ROCKWELL AUTOMATION BUSINESS

Our people are innovators, strategists, data scientists and technologists.



We bring **digital solutions** to product problems.



Speed time to market



Improve quality



Increase productivity



Ensure compliance



Reduce waste



Increase profitability



INTERVIEW WITH JOSHUA YOUNG RETAIL INDUSTRY LEAD, KALYPSO

For a while now the broad shape and scope of 3D and DPC strategies have been generally accepted, but now companies are asking some fundamental questions about how far those initiatives should stretch. Some see a clear opportunity to take them further. Others potentially see arguments for either ringfencing them where they stand, or possibly even scaling them back. Technology footprints will always morph over time, but this feels like a deviation from the standard. What's your perspective?

Digital Product Creation has taken many shapes over the last decade, but the long term value of these programs, and their ability to last, depends entirely on how they were defined at the start. If you define DPC as a technology program, it may eventually stall. If you define it as a business model shift, it will continue to evolve and flourish.

Guy Kawasaki tells a cautionary story from the early ice industry. Ice harvesters defined their businesses as cutting blocks of ice from frozen lakes. Ice factories defined their businesses as freezing ice in buildings and delivering it. Both models, and the companies behind them, died because they defined their work by the method rather than the value. The true consumer benefit, as Kawasaki put it, was **cleanliness and convenience**.

DPC has the same vulnerability. When it is defined by a specific tool or workflow, it will always be limited by that tool.

Consider **Company ABC**. Their goal is to reduce sample costs through 3D prototyping. They select a tool, train their team, and expect quick wins. The team struggles with complexity and merchandisers cannot easily review digital samples. Even though physical samples are reduced, leadership does not see enough value to justify continued investment. The project ends.

Company XYZ begins with a different definition. Leadership wants faster decisions, more relevant product, better forecasting, and less financial strain from excess inventory and carrying costs. They build an agile go to market model centered on detailed consumer insights, shared product data, fast and inexpensive sampling, and accurate visual decision making. The goal is outcomes, not tools. It just so happens that 3D digital sampling and AI assisted insights provide the best results for the job.

Because the strategy is defined around business value and process, new technologies fold in naturally. When a generative AI design capability emerges that dramatically speeds concepting and aids decision making, their teams adopt it quickly. It aligns with the process rather than forcing a new strategy.

Executives do not fixate on individual technologies. They care about profitable growth, compelling product, and the speed to make accurate decisions. DPC thrives when it is defined as the engine that delivers these outcomes. When framed this way, it does not need to stretch or retract. It simply evolves with the business.

A big part of determining the future of digital product creation is taking a read on how successfully embedded it's become within the existing technology ecosystem. This means understanding the shape and the scope of the integration requests seen and worked on this year, of course, but it also means understanding the appetite to make 3D a foundation of the next wave of enterprise technologies as they get rolled out. Based on your hands-on experience of working at major brands like Nike and VF Corporation, where are companies at on this process of embedding and institutionalising DPC - and what do you think it looks like to accelerate that process?

For most of the industry, the foundational layer of Digital Product Creation is already embedded. Digital sampling and visual decision making have become table stakes for companies at one billion dollars in revenue or higher, and for those aspiring to reach that scale. The majority have already made the core investment and are now looking for ways to enhance, scale, or extend its value. This may mean improving the speed of design concepting and quality of product visuals through AI driven tools. It may also mean connecting those visuals to data so that teams in Merchandising and Sales can make better decisions and share them in real time.

For companies that want to accelerate this change, the single most important focus should be to make their efforts **human centered** to ensure adoption. Adoption is not limited to whether someone is using a tool. It is also about whether teams believe in the new process, understand its purpose, and feel supported in the change. This requires a strong and fully funded **organizational change management (OCM)** program that operates across all levels of the business. It must go beyond training to include process alignment, leadership communication, and a sense that everyone is moving forward together.

Ease of use is critical. Too many technology projects unintentionally make the process slower or more complex because the original workflow was never benchmarked. Ideally, these projects should result in a net reduction in time and effort for everyone, be enjoyable to use, and automate as much of the process as possible.

There is also a practical point that leaders often overlook. Teams need to understand that supporting innovation will give them a deeper skillset, increase their effectiveness, and allow the company to grow. You want a motivated, experienced team that knows the business, can work at a higher level, and deliver long term value. This becomes nearly impossible if the team believes that a transformation program may also be about headcount reduction. Teams will hesitate to participate in any project that could threaten their roles, and if layoffs follow such a project, the remaining team will be far more resistant to future change.

The bottom line is simple. A DPC strategy that is embedded into the company's business process model, supported enthusiastically by its people, and aligned to growth and profitability goals is well positioned to succeed.

Last year, we talked to you about automation, and the vision to have one or more parts of the typical DPC pipeline, or the typical product creation process, be able to run with little or manual intervention. Given that a lot of the draw of AI, across sectors and specialisms, is to reduce overheads and automate as much as possible, it feels like that word has taken on a different definition this year. What's your read on what automation actually means to fashion and beauty companies today? And with an automation hat on, what do you think the ideal end-to-end digital product creation process looks like?

WHEN IT COMES TO DIGITAL PRODUCT CREATION, THE HIGHEST VALUE AUTOMATION IS OFTEN FOUND IN BRIDGING THE GAPS BETWEEN SYSTEMS.

The ideal end-to-end digital product creation process looks different for every company and depends on its business goals, but one theme is consistent across nearly every brand we talk to at Kalypso. Speed is the number one priority. In that sense, automation is a requirement, not a luxury.

The definition of automation has expanded. In the past, people imagined automation as a software function that completed a task on behalf of a user. In 2025, automation also means integration, orchestration, and AI driven capabilities that remove manual rework, eliminate repetitive tasks, and ensure that product information flows cleanly across the enterprise.

Automation can be as simple as a well-designed interface that pre-populates known business data, so a user does not have to type the same details into multiple systems. Or it can be as complex as AI orchestrating supply chain decisions based on material availability, tariffs, production and material costs, capacity, geopolitical stability, speed, sustainability, quality, and many other variables that shift daily. This is exactly where AI driven orchestration becomes valuable. What matters is not the sophistication of the automation, but whether it accelerates decision making along the **critical path** of the product creation process.

When it comes to Digital Product Creation, the highest value automation is often found in bridging the gaps between systems. Most brands rely on a patchwork of PLM, 3D authoring tools, material and block libraries, render pipelines, vendor portals, merchandising systems, and sales tools. These systems rarely talk to each other. Something as routine as a color change can require hundreds of manual updates, followed by emails, screenshots, re-renders, and version tracking. I have seen situations where a product went into production in the wrong color simply because one system was never updated. That should not be all on the user. Systems need to empower people, not increase the burden.

In an integrated, orchestrated environment, that same color change would automatically propagate to the systems that reference it, notify the people and vendors working with those products, and generate fresh digital imagery wherever needed. Automation protects data integrity as much as it improves speed.

There is one caution. **Over-automation is a real risk.** I have also seen systems so rigid and automated that they broke the moment an edge case appeared. Life happens. People need the ability to override, adjust, or take a different path when required. Automation must serve real workflows, not force the organization into an inflexible model.

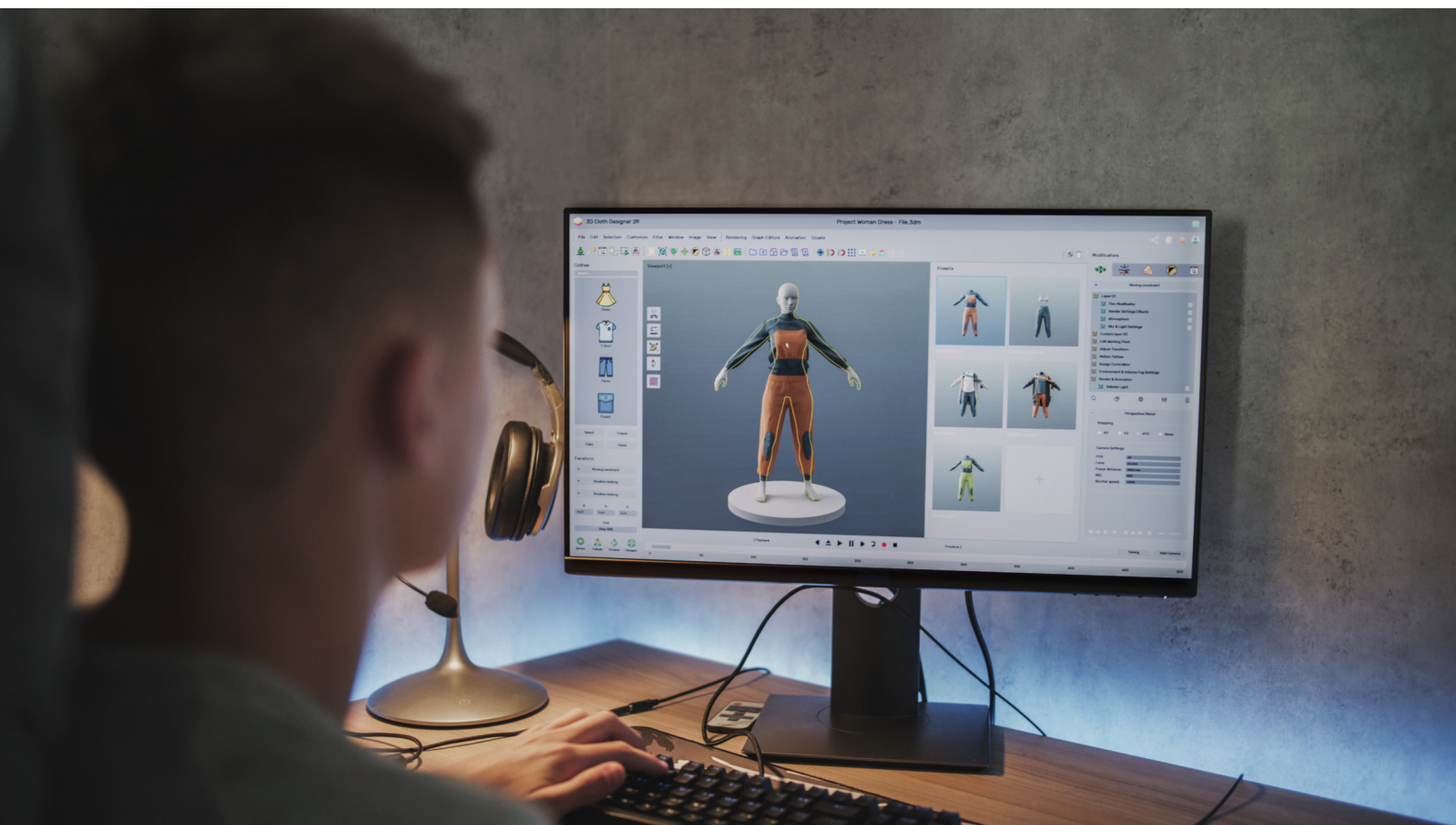
Automation in 2025 is broad. It spans task automation, workflow automation, data automation, AI assisted decision making, and automated metadata generation. The priority is to focus on the parts of the process that sit on the **critical path of the product creation process** and accelerate decision making without sacrificing accuracy or flexibility. The companies that do this well will unlock speed, reliability, and a scalable product creation model that works at enterprise level.

We talk a lot about the brand perspective when we're assessing technology maturity, but 3D is arguably one of the biggest success stories when we think about how brands have shared the balance of work, and the weight of embracing technology, with their

suppliers. That is, in theory at least, a net positive for those suppliers if demand remains consistent from their brand customers, but less so if it starts to look spikier or more sporadic. What are you seeing happen in what you've referred to in the past as the "make" space?

Vendor and supplier involvement is a critical component of any DPC program. Early on, experienced vendors provide the content needed for evaluation, testing, and validation. As programs scale, vendors supply the capacity required to meet the full needs of the business. Most brands cannot create all digital samples internally, and outsourcing everything to a third party is expensive. The most practical model is to focus internal teams on high value work while enabling vendors to produce the bulk of the digital samples, since the vendor making the physical garment is best positioned to create a high-fidelity digital version.

This does not reduce the need for internal capability. It allows internal teams to focus on work that drives outsized value, such as recoloring, maintaining digital block and last libraries, and building what I call a **Digital Sample Room**. Historically, physical sample rooms allowed teams to test ideas or produce quick prototypes. A digital sample room plays the same role but at far greater speed, enabling teams to explore concepts, test material changes instantly, and generate fast visuals for decision making.



A DIGITAL SOURCING STRATEGY HELPS BOTH VENDORS AND INTERNAL SOURCING TEAMS UNDERSTAND THE REQUIREMENTS AND IMPORTANCE OF DPC.

Bringing vendors along on the journey is essential. I have seen brands ask a vendor about a specific software tool, only to receive an incorrect answer because the question never reached the right person. Most major vendors today have digital capability, and many have had it for ten years or more, although capabilities vary significantly in skill, tool maturity, and consistency. The same level of change management applied internally needs to extend to vendors. They must understand the goals, expectations, and the role they play.

A **Digital Sourcing Strategy** helps both vendors and internal sourcing teams understand the requirements and importance of DPC. Too often digital sampling is treated as a side show rather than the natural evolution of the sourcing process. The goal should be for digital and physical sampling to sit side by side and eventually be unified within the sourcing function. The only difference to the business should be selecting digital or physical on the prototype request. This requires the same rigor, or more, than is applied to physical sampling. A Digital Sourcing Strategy establishes metrics such as capacity, on time delivery, quality, and accuracy while aligning the digital process with the physical one. Capacity, in particular, is one of the most important metrics and one that brands often overlook. Vendors typically have many customers and a limited number of staff. Building internal speed and capacity takes time, and the same is true for vendors.

The value to the vendor is often overlooked. The most chaotic and least profitable area of a factory is usually the physical sample room. Vendors do not make money on sampling. They make money when a product goes into production. A shift to digital can reduce sample room burden and free resources for production, but only if the brand truly adopts the digital process. I have seen brands order digital samples and still request the same number of physical samples because the entire organization was not aligned with the process change.

Many vendors have been burned by digital efforts that stalled or disappeared. This is why it is critical to visit key vendors, share the strategy early, understand their constraints, and learn what works and what does not in order to build a shared plan for success. Digital capability is not free for the vendor. They must invest in staff, software, hardware, and training to support a brand's request. Involving partners early and fully is essential. The "make" space is evolving. Vendors are becoming digital development partners. Brands that recognize this and build true partnerships, rather than transactional expectations, will see the greatest success.

Last year we asked about what it means for DPC to scale, and for that scale to be supported by investment, skills, change management, libraries, standards and several other elements. Do we think that scaling has happened in the last year? Do you expect it to happen in 2026? What form will it take? And how will the results be judged across speed, sustainability, consumer engagement, and other metrics?

Scaling will continue if brands see measurable value across multiple teams and functional silos, from concept to consumer. DPC efforts scale when they are established to change the way a company brings product to market, not simply to solve isolated problems. Training, libraries, and standards enable scale, but they only matter if the underlying process delivers business results. For most brands, the real indicators of scale are in business KPIs.

Does the DPC effort:

- reduce the total calendar
- improve product quality
- provide accurate concept and sample visuals earlier
- link product data to visuals to ensure speed and data integrity
- enable Sales to engage accounts earlier
- give Marketing content for richer consumer experiences
- supply eCommerce PDP imagery without photography

During COVID, many DPC efforts expanded rapidly out of necessity. Some contraction afterward was inevitable as companies returned to a more physical way of working. That contraction should not be read as failure. It demonstrated the value DPC can unlock when a business needs to shift to a process that requires speed, clarity, and coordinated decision making.

In 2025, we saw more brands move DPC out of an isolated workflow and into their broader digital transformation programs, connecting it across silos as part of the core business plan. We also saw companies measure success based on improvements in KPIs, not on arbitrary deployment targets. Targets help measure

THE MOST USEFUL QUESTION A COMPANY CAN ASK IS: HOW DOES YOUR COMPANY OR PROGRAM DEFINE ITSELF, AND WILL THAT DEFINITION STILL BE RELEVANT IN THE NEXT FIVE TO TEN YEARS? THE ANSWER TO THAT QUESTION DETERMINES THE STAYING POWER OF BOTH YOUR BRAND AND YOUR DPC EFFORT.

deployment, but they do not measure benefit. This is why a team that digitizes 95 percent of its line but does not impact the calendar or profitability may deliver less value than a team that digitizes 20 percent and improves early sell-in enough to increase profitability by one or two percent. The latter team likely had a far greater impact on the business.

In 2026, I expect this shift toward practical value to continue as companies move past AI hype and focus on integrating AI capabilities alongside traditional DPC. We will see DPC programs connect more directly to integration, orchestration, and automation efforts as brands look to increase efficiency, speed up decision making, and strengthen data integrity. Most importantly, I expect brands to treat organizational change management as a foundational part of their DPC program, with a stronger focus on human-centered approaches to usability. A truly human-centered approach is the single most important lever to ensure adoption

What's the most useful question that companies can ask themselves, right now, to better understand what they want to accomplish next with 3D - whether that's driven by their own ambitions, or by changes in the market?

The most useful question a company can ask is: **How does your company or program define itself, and will that definition still be relevant in the next five to ten years?** The answer to that question determines the staying power of both your brand and your DPC effort.

3D is a powerful solution to many of today's problems, but so were T-squares and slide rules seventy-five years ago. Many people may not remember these tools, but they were essential to product creation at the time. If you defined yourself as a draftsman, you never would have adopted computer technology. If

you defined yourself as a product designer, you always would have been looking for better ways to work faster and with higher quality.

This goes back to the Guy Kawasaki example. How do creators want to define themselves? Are they 3D designers, or are they product visualizers? The difference matters.

The same is true for brands. Do you define yourself as an apparel company, or as an icon of style? As a footwear company, or in service to athletes? The first definition limits you. The second opens nearly endless possibilities for how a company approaches its consumers and how technology can support those goals.

Technology will continue to evolve. We have already seen the shift from 2D CAD to 3D applications, from days long render times to real time visuals. AI now adds a new set of capabilities, but none of these tools are mutually exclusive. They are simply points along a curve of continuous evolution.

My suggestion is to understand how you want to define your company and your creators, then embrace whatever combination of technologies moves you forward, keeps you relevant in the market, and gives your teams the confidence and joy to do their best work.

SHIMA SEIKI is a computerised flat knitting machine manufacturer and solution provider driving digital transformation in the fashion industry with its APEXFiz® design software.

We provide comprehensive solutions that support the entire knit production process, from planning and design to digital sampling and all the way to production.

APEXFiz® supports digital libraries of yarns and knit patterns, enabling super-realistic knit simulations using actual yarns. For those struggling with their quality of knit simulations in other 3D software, APEXFiz® provides an effective solution.

Suppliers can also use APEXFiz® for simulations based on production data to ensure smooth communication with brands and achieve seamless integration with the manufacturing process.

The following is a typical workflow using APEXFiz® in flat knitting.

1. Yarn manufacturers design yarns in APEXFiz® and upload them to yarnbank® digital yarn website.
2. Brands research and download digital yarns, then use APEXFiz® for design and creation of realistic digital samples.
3. Digital samples are shared with suppliers who use them to create production data. More accurate digital samples based on production data can also be created for final brand approval.
4. Actual sampling.

Beyond knits, SHIMA SEIKI's solutions also support design and simulation for other textiles such as weaves and embroidery. Results can be integrated with other 3D tools for flexible operation.

When creating digital fabrics, not only fabric images but also texture maps are automatically generated and can be exported to other 3D software via U3M. This enables significant improvement in the quality of 3D digital products.

HEADLINE CUSTOMERS

YARN MANUFACTURERS

BRANDS, RETAILERS,
TRADING COMPANIES

KNITWEAR
MANUFACTURERS (FLAT
KNITTING, CIRCULAR
KNITTING, HOSIERY)

WOVEN FABRIC MANUFACTURERS

EMBROIDERY
MANUFACTURERS

TOWEL MANUFACTURERS

INTERIOR & HOME TEXTILES

SCHOOLS & RESEARCH
INSTITUTIONS

TECHNOLOGY PARTNERSHIPS

LONATI

Italian sock knitting machine manufacturer. SHIMA SEIKI's APEXFiz® enables sock design and 3D simulation, ensuring interoperability with Lonati Orion CAD software and Lonati sock knitting machines, thereby digitising the sock production supply chain.

FRONTIER / SEDDI

AI-powered fashion tech companies generate data on physical properties for digital fabrics created on APEXFiz®.

YARN MANUFACTURERS WORLDWIDE

yarnbank® is a digital yarn sourcing web service operated by SHIMA SEIKI, providing a platform where yarn information can be searched, viewed and downloaded online. This service is supported by yarn manufacturers worldwide. They digitise their yarns and provide them to users free of charge for use in DPC.

*Partner company names are listed in [yarnbank®](#).

PRICING MODEL

Use of APEXFiz® is on an annual subscription basis. The types of software are as follows.

1. Design-Standard: For image processing such as photo-retouching, creating colourways, print design, embroidery simulation, etc.
2. Design-Knit: For design and simulation of knitwear and knitted accessories such as caps and socks, as well as design for circular knit fabrics.
3. Design-Weave: For design and simulation of woven fabrics and towels.
4. Design-Sox: Specialized for design and 3D simulation of socks, and includes 3D simulation functions as standard.
5. Design Pro: Top-tier software including all of the above.

3D simulation capability is available as an option for all other software besides 4) Design-Sox above.

Furthermore, each software comes in the following two types:

- **A) User Licence:** Licence granted to each individual user.
- **B) Floating Licence:** Licence that can be shared among multiple users, including simultaneous usage.

Volume discounts are available for contracts exceeding a specified number of licences.

An Academic Plan is available for educational institutions.

WHAT ROLE DO YOU SEE YOURSELF PLAYING IN THE 'DIGITAL PRODUCT CREATION' JOURNEY?

SHIMA SEIKI has consistently proposed digital solutions for supply chains under the keywords 'SMART/SPEEDY/SUSTAINABLE.'

It is widely recognised that DPC enables the reduction of physical samples, significantly cutting waste and CO2 emissions. This not only reduces costs but also substantially shortens product development lead times and accelerates decision-making.

Shortened lead times allow product planning to be timed closer to the actual sales period. This enables the market to be assessed as thoroughly as possible, facilitating the development of products with higher demand. Our solution enables digital samples to generate production-ready data simultaneously, going beyond merely providing realistic imagery.

Furthermore, for knitwear, we offer WHOLEGARMENT® seam-free 3D knitting technology. This reduces material waste while eliminating the sewing process, ultimately minimising production lead times.

Combined with DPC on APEXFiz®, this brings transformative change to the future of apparel production.

CONTACT

SHIMA SEIKI

Ready, Set, Garment!

GO! Directly from DPC to Garment Production

APEX F i Z[®]
Make Fashion Sparkle





MR. MITSUHIRO SHIMA, PRESIDENT, SHIMA SEIKI

For a while now the broad shape and scope of 3D and DPC strategies have been generally accepted, but now companies are asking some fundamental questions about how far those initiatives should stretch. Some see a clear opportunity to take them further. Others potentially see arguments for either ringfencing them where they stand, or possibly even scaling them back. Technology footprints will always morph over time, but this feels like a deviation from the standard. What's your perspective, as a company with a very unique vantage point on digital product creation?

There certainly was a period when the fashion industry rapidly accelerated efforts to digitalise workflows in design and prototyping under the banner of digital transformation. Thanks to these efforts, DPC gained attention, and numerous 3D software and related services emerged. As the main objectives of DPC include improving development speed, reducing costs, and promoting sustainability, we believe that this evolution should not stop here but must be further advanced.

The objective is the proliferation of DPC throughout the industry so that its usage becomes the norm. To realize it, we must make the effort to convince the industry that this technology is worth adopting, by making it possible for users to reap the benefits promised by it. Although trends to embrace sustainability and tackle waste have encouraged

investment in DPC and with measurable results, there have also been cases where outcomes have fallen short of expectations, especially in the real-life producibility of digital products. I suspect this has been a major factor preventing DPC from catching on. Therefore, the use of DPC must not be limited to within the digital realm, rather it must facilitate smoother integration with real-world production processes. By doing so, the full potential of DPC can be unlocked, leading to further improvements in cost-effectiveness. To that end, establishing an operational framework that seamlessly combines both digital and physical aspects will be key.

This is where we come in as manufacturer of production machinery. Our mission is to provide a direct link from DPC to manufacturing. Moreover, this is not just about accurately conveying design intentions digitally from studio to factory; suppliers can also take advantage of DPC. We are already seeing this trend among our machine customers, who as suppliers are making proposals leveraging their own expertise in knitting and materials, allowing both sides to accelerate product development and co-create new products through two-way communication based on digital products. We will continue to advance these solutions further to promote automation and labour-savings from product development through prototyping and on to production, thereby contributing to digitalisation and sustainability throughout the entire supply chain.



Most 3D / DPC companies began life selling software, and have spent the majority of their time in the market further developing and refining that software. Some of them have subsequently launched hardware of their own - primarily in material testing - but most are still software-first. SHIMA SEIKI is different in this respect, since the company was founded in 1960s as a manufacturer of textile machinery before getting into DPC solutions. What was the motivation behind that move?

The fashion industry has long operated on a model of mass production, over-stocking and discarding of unsold inventory. This approach generates significant waste and proves unprofitable as a business model. Consequently, product prices have become inflated, creating a vicious cycle where products do not sell at proper prices because consumers wait for bargain sales. Furthermore, the environmental impact is enormous.

One solution we proposed 30 years ago called the Total Fashion System, a design-centric knit production system that used fabric simulations called "virtual samples" to replace actual sample-making. This was back in the day when keywords such as "sustainability" and "SDGs" did not exist yet, so the proposal was purely for the sake of efficiency and eliminating waste from the planning, design and evaluation process in knitwear production. In hindsight, it may well have taken none other than a machine manufacturer that knew first-hand about current problematic areas to arrive at such a solution. As such, SHIMA SEIKI's Total Fashion System is arguably the first application of commercial DPC in fashion. At around the same time we reduced waste and enhanced efficiency from the production process as well, with the advent of the WHOLEGARMENT® knitting process which could produce a garment in its entirety in three dimensions. From this development arose the need for 3D virtual sampling. In this way, our motivating factor for DPC technology came about by recognising the inherent problems of the fashion industry from the perspective of a machine manufacturer and resolving to improve the industry at

the earliest stage. We have been driven by a strong conviction to utilise digital sampling technology ever since, to transform the fashion business into a sustainable model and have worked tirelessly towards this goal for the past 30 years.

One of the key questions that shapes digital product creation strategies is how closely the output of 3D design, simulation, and visualisation tools captures the producible reality of the garment. What's your perspective on the importance of this link between physical and digital? And how do you think your perspective on this has influenced the way you build DPC solutions compared to software-first companies?

It is precisely because we are a textile machinery manufacturer with comprehensive expertise in knitting that we can develop dedicated design and simulation functions tailored to the characteristics of knits. A major strength lies in the fact that our digital samples do not merely serve as realistic visualisations, but also seamlessly connect to subsequent production processes. Therefore, our perspective on the link between physical and digital is that of extreme importance.

As a machine manufacturer we examined the entire supply chain, and concluded that if you take the lowest common denominator of a knitted garment—the knitted loop and the yarn—and make that realistic, then the entire simulation of the garment becomes as realistic as it gets. That is why our fabric simulations are based on actual production data for forming knitted loops and begin with the scanning of actual yarn. Furthermore we provide a web service dedicated to digitising yarn by yarn manufacturers from around the world and letting our customers use them in their simulations free of charge. When the garments based on those simulations are physically produced using the actual yarns, they will end up matching the simulations precisely. When comparing realism among fabric simulations, the fact that we use real yarns is almost like cheating, isn't it (laugh)?

There's no question that specialisation leads to depth of functionality, and SHIMA SEIKI's history in building machinery for flat knitting certainly fits that brief, but does it also create any limitations? Is your focus purely on digital solutions for knitted textiles, or do you cater to other product types and market segments as well?

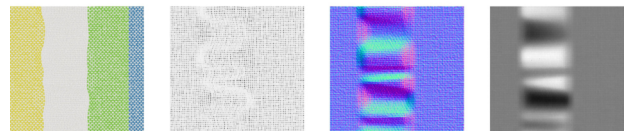
As a matter of fact, fabric design simulation on APEXFiz® covers a wide range of textile applications besides flat knitting, including circular knits, woven fabrics, embroidery, and even pile or towel fabrics. For those areas where we lack production machinery, we collaborate with partner companies in those fields to ensure seamless transition to manufacturing. We also facilitate data exchange with other companies by supporting common formats. As with our knit simulations, our fabric simulations of other types of textiles are also very realistic, and many users opt to utilise APEXFiz® alongside other 3D software.

What's your perspective on the impact that AI is having on 3D platforms (and on design software for fashion and textiles in general)? Do you see an opportunity to bridge some of the benefits of AI and the grounding required to ensure that every stakeholder is working towards the creation of products that are actually producible?

It is true that advances in generative AI have enabled instantaneous idea generation and concept design, alongside the ability to produce vast quantities of variations. The role of 2D and 3D design and simulation software is undoubtedly changing.

However, creating designs that precisely match the envisioned concept remains challenging for current AI capabilities. Even when generating images that appear realistic, whether that item is producible is an issue, not to mention they often lack the essential information required for production. Achieving a seamless workflow through to production remains challenging for AI on its own.

Moving forward, a hybrid approach combining generative AI for efficient idea generation, design software for concrete design creation, and integration with production will be required. We aim to contribute to digital transformation of the fashion industry by providing solutions aligned with this evolving trend.



What's the most useful question that companies can ask themselves, right now, to better understand what they want to accomplish next with 3D - whether that's driven by their own ambitions, or by changes in the market?

Although the use of 3D, DPC and generative AI ought to be improving communication between brands and suppliers, that does not necessarily seem to be the case. Therefore, I would like current DPC software users to ask themselves, "To what degree can digital samples be realised as final products?" Even if many excellent digital samples are created, that is not the goal. If those samples cannot be produced, those efforts are wasted. Moreover, there is a tendency to create an increasingly large number of digital samples simply because they are digital, but that can create an additional burden of having to choose from among so many of them.

As I mentioned in my answer to the first question, we must remind ourselves of our goals in terms of how fashion can benefit from DPC: How much lead time can be reduced across the entire supply chain and how much inventory risk can be minimised.

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The YKK Group is currently engaged in business in approximately 70 countries/regions around the world. The global business is carried out with YKK Group companies of each region playing a leading role and making the most of their respective regional characteristics.

YKK started receiving requests from buyers for 3D data in 2019. Since then, YKK has provided 3D files in different formats such as OBJ and FBX for Sliders, Snaps & Buttons and Plastic Hardware. These data files allow designers to easily incorporate different YKK 3D product models into their digital product creations and freely move and visualize them in a photo-realistic 3D setting in real time.

In 2023, YKK announced the launch of the “Digitalization Booth” on our YKK Digital Showroom website. There, you can try out the “YKK Trim Creator”, an online zipper configurator which is a valuable digital tool that enables users to visualize and customize trims in real time. It also promptly generates corresponding YKK item codes, and the zipper information can be effortlessly shared via URL.

These digital capabilities enhance the efficiency of the garment design and adoption process, while minimizing the need for physical samples and decreasing costs and carbon footprints by cutting back on waste and shipping.

TECHNOLOGY PARTNERSHIPS INCLUDE:

BROWZWEAR
CLO VIRTUAL FASHION

COLORO
OPTITEX

STYLE3D
VNTANA

WHAT ROLE DO YOU SEE YOURSELF PLAYING IN THE “DIGITAL PRODUCT CREATION” JOURNEY?

Digital Product Creation will continue to play an important role in the coming year as the wave of digitalization is an inevitable trend in the fashion and apparel industry. This trend extends beyond garments to include trims and accessories.

Brands continue to reduce physical sample waste and accelerating their time-to-market by using 3D product design and virtual sampling, including trims such as zippers, buttons and buckles. The availability of colors, textures, and scale representation early in the 3D design process helps to minimize costly revisions and improve the accurate visualization of virtual prototyping.

With sustainability remaining a key driver in aligning with circular fashion goals and the development of more AI-driven tools to support design ideation, virtual prototyping of digital trims can reduce material waste and shorten the development cycle.

Virtual and digital showrooms, immersive and interactive visual boards or mood boards are becoming standard “phygital” (physical & digital) experiences that showcase trim usage on garments for a complete product view in the market, both in wholesale and B2B buying.

CONTACT

YKKTM
Little Parts. Big Difference. >>>



YKK DIGITAL SHOWROOM[®]

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Experience our story.TM



INTERVIEW WITH
TAKAYUKI KATO,
VICE PRESIDENT,
GLOBAL MARKETING
GROUP,
BUSINESS STRATEGY
DIVISION,
YKK

For a while now the broad shape and scope of 3D and DPC strategies have been generally accepted, but now companies are asking some fundamental questions about how far those initiatives should stretch. Some see a clear opportunity to take them further. Others potentially see arguments for either ringfencing them where they stand, or possibly even scaling them back. Technology footprints will always morph over time, but this feels like a deviation from the standard. What's your perspective as a company with a central role in the 3D ecosystem?

At YKK, we view 3D and Digital Product Creation (DPC) as integral components to the future of fashion and manufacturing. While some companies debate whether to scale back or ringfence these initiatives, we believe the opportunity lies in expanding them thoughtfully. This approach is rooted in our CYCLE OF GOODNESS® philosophy: *"No one prospers without rendering benefit to others"*. By advancing 3D and DPC, we create value not only for YKK but for brands, technology partners, and ultimately consumers.

The industry is moving toward a more connected, digital-first workflow and trims are an integral part of that ecosystem. YKK's role is to ensure trims and fastening solutions are seamlessly integrated into that workflow. Rather than seeing this as a deviation, we see it as an evolution—one that enhances collaboration with technology partners and brands, speeds up development, and aligns with YKK's sustainability goals. The focus should be on aligning technology with business values and customer needs, not on chasing every new technology or capability.

Broadly speaking, what does digitalisation mean to you? Obviously offering 3D representations of your trims is the most visible piece of it, but there's almost certainly a wider transformation at work. How has your business changed as brand customers' expectations, tools, and workflows have evolved to become more digital over time?

Digitalisation for YKK goes far beyond offering 3D representations of trims. It's about rethinking the way we connect and collaborate with customers and partners, and how we deliver value while reinforcing our core fastening business. As brands adopt digital workflows into their design and development processes, we've evolved from being a physical component supplier to a digital collaborator.

Through our Digital as a Service approach, we provide tools and platforms such as YKK Digital Showroom, YKK Trim Creator, and virtual presentations, enabling brand and designers to design, customize and visualize trims instantly. This shift also involves integrating with 3D fashion design software to ensure our digital assets are accessible, accurate and ready for virtual prototyping and sampling processes.

Importantly, YKK will continue to innovate, integrate new technologies and refining processes to meet the changing needs of brands, customers, and consumers. Digitalisation is not a one-time shift for YKK, it is an ongoing journey that strengthens our ability to deliver at greater speed and more sustainably, based on our CYCLE OF GOODNESS® philosophy.

What role do you see YKK playing in the digital product creation ecosystem today, and how do you expect that role, and your partnerships with both brands and 3D technology providers, to evolve over the next few years?

Today, YKK serves as a bridge between brands and technology providers, ensuring that trims are not an afterthought but a core part of digital design. We offer high-quality, interoperable 3D assets of our fastening products and partner with leading 3D fashion design software companies to make our digital assets accessible and accurate.

The Global Marketing Group (GMG) has been instrumental in driving this role by leading the charge in digital collaborations and customer engagements. Looking ahead, we expect our role to deepen through expanded partnerships, enhanced interoperability, real-time customization, and sustainability-driven data sharing.

We also look forward to integration with emerging technologies such as AI-driven insights and other design aspects such as digital color matching into our processes. Our goal is to help brands achieve speed, improve design flexibility, and meet environmental targets—all while maintaining the quality and reliability that YKK is known for.

A key promise of DPC has always been to streamline product creation and to shorten the distance between idea and reality. When it comes to trims, there's a very real possibility to take a lengthy, iterative process and to make it faster and more flexible by transposing it to 3D. How does this manifest in your YKK Digital Showroom and online trim creator/configurator?

One of the greatest advantages of Digital Product Creation is its ability to compress timelines and reduce complexity. The YKK Digital Showroom and online YKK Trim Creator are practical expressions of our DPC strategy and exemplify how 3D accelerates product development.

Traditionally, trim selection involved multiple physical samples, back-and-forth communications and long lead times. Now, brands and designers can explore our entire catalog virtually, easily access and customize finishes, and visualize trims in context—all before a single physical sample is produced. This not only shortens timelines but also empowers creative freedom, enabling brands to iterate quickly, efficiently and confidently.

Another DPC promise was to move the needle on sustainability - not just by reducing the number of iterative samples required to get a product approved, but to optimise the entire lifecycle. How has 3D / DPC become part of YKK's overall sustainability strategy?

Sustainability is a core pillar of YKK's corporate philosophy, and 3D/DPC plays a critical role in advancing that commitment. By reducing the need for physical samples, we cut down on material waste and carbon emissions associated with shipping prototypes. Beyond sampling, digital workflows also allow for better forecasting, inventory management and minimizing overproduction. Besides reducing physical samples, the impact goes much deeper and optimizes the entire product lifecycle from design to production.



“ONE OF THE GREATEST ADVANTAGES OF DPC IS THE ABILITY TO COMPRESS TIMELINES AND REDUCE COMPLEXITIES.”



These efforts align with our commitment as ONE YKK to contribute to a sustainable society. Every innovation, from eco-friendly materials and processes to digital solutions, helps us progress toward YKK's Sustainability Vision 2050 while supporting brands in achieving their own sustainability goals. Through collaboration across YKK's global teams and partners, we ensure that technology and sustainability move forward hand in hand, creating value for all our stakeholders.

What's the most useful question that companies can ask themselves, right now, to better understand what they want to accomplish next with 3D - whether that's driven by their own ambitions, or by changes in the market?

The most useful question is: *"What tangible value do we want to unlock through 3D—speed, sustainability, creativity, or all of the above?"*

Understanding this helps companies prioritize investments and partnerships. 3D is not just a tool; it's a strategic enabler. Whether the goal is reducing time-to-market, meeting environmental targets, enhancing design flexibility or unlocking new digital experiences for consumers, the clarity on desired business outcomes ensures that digital initiatives deliver measurable impact. It is about aligning digital initiatives with business goals and market realities. Each ambition requires different levels of investment, integration and cultural change.





THE DPC OUTLOOK: BASELINE, BULL, AND BEAR

AN INSIDER'S VIEW OF WHERE DIGITAL PRODUCT CREATION STANDS TODAY, WHAT OPPORTUNITIES LIE AHEAD OF IT, AND WHERE THE SECTOR IS COULD BE CHALLENGED IN THE COMING YEAR.



BY BEN HANSON,
EDITOR-IN-CHIEF,
THE INTERLINE

For three years, The Interline as a corporate entity has analysed the market for 3D and digital product creation in fashion. And although that analysis has yielded useful results, and has given us a consistent reference frame, the datapoints it generated have also trended a little bit towards sameness over time; there are only so many ways to say that DPC has approached the point of ubiquity, but that there's still runway left to accomplish its eventual goal.

While the finer details of that picture changed year over year, the big strokes look the same when you examine them from a common vantage point each time you look. And in normal circumstances, not much will change in a given twelve-month period.

The 2025/26 year, though, is set to be anything but normal. And you don't have to be a trained market analyst to see that threats could be looming, and short-window opportunities could be right ahead, and that the nature of those elements lends itself better to a different type of analysis and speculation.

Because those more subjective elements are what tend to disappear through the cracks of market analysis that focuses primarily on sales figures and adoption rates. Or, to put it another way, objective benchmarking of a software sector tends to leave a lot of the nuance on the table, and at what feels like a potential transitional point for DPC (and a lot of other software categories) thanks to the rapid roll-out of AI, nuance matters more than ever.

For those reasons, this year's analysis has a more personal slant. Two personal slants, in fact!

The data available to us - both provided as part of this report, and gleaned from our own investigations and off-the-record conversations - is still factored into the thinking behind these pages, but it's also combined with more subjective criteria and sentiment-based indicators that don't necessarily have the same degree of confidence that raw figures do, even if they do more accurately reflect the way the industry "feels".

So, rather than our typical analysis, these final few pages of The DPC Report 2026 will serve as a test case for a new format: one where a representative from The Interline factors in that blend of objective and subjective criteria and puts on three different hats in sequence.

Wearing the first, they use the information available to us to put together a "baseline," where we paint as objective a picture as we can of the current state of, in this case, digital product creation, and ask whether that state has changed since our last baseline.

With the second hat on, they attempt to make the best possible "bull case" (an English language idiom for optimism in markets) for the technology and its near-term and further-out outlook, cataloguing the biggest opportunities in front of it.

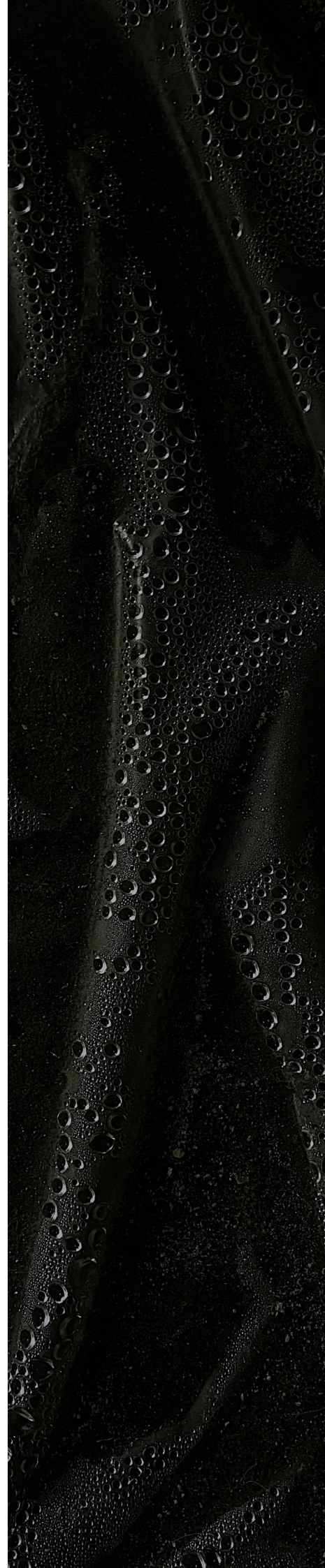
Wearing the final hat, they try to do the opposite: make a bear case for the technology segment, and list the challenges that companies catering to the space (and the users of their solutions) could face.

Critically: neither bull nor bear are predictions. To be clear about that up-front: our calculated expectation is that the market for digital product creation will remain relatively static, with a steady influx of new contracts, new solutions, and new users, but also a slow outlet valve for companies that have not found the right fit for the technology or the process, including some large ongoing contracts that we know have been or are being phased out.

Instead, these different perspectives should be viewed as a writer with expertise in a particular market painting a picture of what they see as the best potential outcomes for it, as well as the things that could potentially go wrong.

Since, as I've written in all of these DPC Reports over the last four years, 3D has been one of my key interests for my entire career, I have the opportunity to document the baseline and make the two opposite cases this year.

Our hope is that this format captures the "vibe" of the software market at hand, rather than simply presenting data and extrapolating and inferring from it.



THE BASELINE

You only need to look at the pages of this report, or the 2025 Fashion & Technology report we partnered with Fashion By Informa on, to see that 3D is everywhere.

Essentially all of the world's biggest brands and retailers have pioneered, then worked to scale, digital product creation strategies. And while the focuses of those strategies change company-by-company (some with an emphasis on content creation, others on virtual prototyping and 3D pattern development, and so on) adoption, on the whole, is widespread.

This is also increasingly true of the small-to-medium enterprise market, where a significant share of companies have, at the very least, trialled 3D. And, over time, the ease of deployment and the low barriers to entry to 3D tools - at least in pure cost of acquisition terms - has made the same opportunity to trial the benefits of 3D available to smaller and smaller businesses. The same is also true, albeit to a slightly lesser extent, for suppliers and upstream partners.

It's also important to realise that, while 3D has a surprisingly long history in apparel and footwear, the vast majority of DPC initiatives are what we would class as "first wave," i.e. they are their companies' first major attempt to transform their operations. This is unlike, for example, PLM, ERP, and other big enterprise products, where some household name brands are on their second, or third "rip and replace," swapping a legacy platform for a newer alternative.

As evidenced by the vendor profiles set out in the pages just before these, the DPC software and service ecosystem is also large and, for many years, has been continually expanding - even if some investment that would have flowed into new 3D tools, add-ons, and platforms has been redirected towards AI this year.

From accurate representations of materials, trims, and components, to digital asset management platforms, new approaches to simulation, and, of course, core 3D design, pattern development, and visualisation tools, there is, today, a mature and viable solution for essentially anything a company, a designer, or a team might want to accomplish, at almost any stage of the product journey.

And across those different stages, those mature solutions have also become well-integrated thanks to

partnerships and, in some cases, vendor consolidation. Broadly speaking, assets created in one leading 3D platform are compatible with the rest of the extended ecosystem of tools, even if some re-engineering or re-simulation is occasionally required.

As I wrote in my introduction to this report, though, that extended ecosystem has not, so far, resulted in the establishment of universal standards. While a typical 3D product journey is more streamlined, in the hand-offs between one platform and another, than ever, there is no single target profile for material capture, digital fitting, fabric simulation, and so on.


Finally, we can't talk about the baseline for the 3D market in fashion without acknowledging the changing userbase. As clear as it is that many, many companies have been able to obtain a return from their investment in DPC, and new companies are following in their footsteps it's also apparent that other companies have - this year in particular - scaled back their 3D teams and initiatives, even if those stories are yet to become public.

This creates a complicated picture of how many "3D users" there actually are, but market data (combined with insider knowledge) tells us that, while some large brands have certainly cut their spending on 3D by eliminating seats and licenses, mid-market brands and ongoing scaling-up of 3D teams at other multinationals have more than likely filled that gap.

From that point of view, the 3D market for fashion remains, we suspect, static in its overall size - not growing, on aggregate, but not contracting at this stage either, even if high-profile brands are making headlines by adjusting the size, shape, or scope of their DPC strategies.

Taking that as our axiom, we still believe the DPC market to be approximately the same monetary size as it was in 2024 (between \$50 to \$105 million in software licensing only) and the userbase bracket of between 75,000 and 150,000 also remains, in our educated estimate, accurate.

But I now want to make the case for why those figures might change: first on an upwards trajectory, and second in the opposite direction.



THERE IS, TODAY, A MATURE AND VIABLE SOLUTION FOR ESSENTIALLY ANYTHING A COMPANY, A DESIGNER, OR A TEAM MIGHT WANT TO ACCOMPLISH, AT ALMOST ANY STAGE OF THE PRODUCT JOURNEY.

THE BULL CASE

It's relatively easy to paint a positive case for the near-term future of DPC. On our hands we have a pool of experienced users meeting mature technology vendors, we see a steadily-developing technology (even if core simulation and visualisation are approaching the point of diminishing returns), a deepening ecosystem, and general industry alignment around the idea that 3D is still a transformative force in product design and development.

With my bull hat on, then, what opportunities does that create? In the best possible scenario, what are the key attributes of the fashion DPC segment that could set it up for success in the coming year?

The first of these I wrote about in my introduction to this report: the distinction between 3D as an engine for simulation, and AI as a tool for ideation and visualisation. It's no secret that these two technologies are clashing as often as they are complementing one another, but as I set out in the introduction, I see a very clear line between representation and simulation.

For every role in the fashion product journey, the ability to work with a 3D asset and to use it to make a fully trustworthy, accountable, and reversible decision, confident in the fact that the visual representation responds to producible reality, will remain 3D's edge over probabilistic tools with destructive pipelines.

In the best possible version of the near-term-future market for digital product creation, the extended userbase quickly develops even more trust in 3D representations, and everyone who contributes to the product journey is able to decide something, with full confidence, without ever seeing a physical sample.

This has been the vision for a long time, and critics would argue that the fact it still hasn't been realised suggests that it won't be, but I'd counter that assessment by pointing out that the sector is making steady progress towards 3D assets encompassing more of the product journey and product definition over time. Whether that trajectory will hit a wall... is the other hat-wearer's case to make.

This ability to virtualise more and more decision-making through accurate simulation can create a persistent differentiator for 3D that no other technology can attempt to replicate. And the existence of a vibrant content ecosystem, where the world's leading fabric, trim, and component suppliers are aligned on the value of providing digital versions of their products, underlines the fact that progressively more of each product is a logical target for that kind of virtualisation. That snowball could carry on picking up pace in 2026 and onwards.



3D also, by and large, has continued to retain committed, passionate community of direct users, which is a rare commodity in enterprise software, as well as a steadily expanding pool of beneficiaries - people who receive and act on the outputs of 3D workflows, but who don't have the requisite skills (or who cannot make a clear business case) to become 3D users themselves. Outside of core creative tools in other industries, very few commercial technology categories can rely on having dedicated champions for direct usage as well as the potential to reach a widening cohort of recipients and beneficiaries as the efficiency, output, and utility of those core users expands. Inside advocacy, driven by real results and by tools that people enjoy using, is a powerful force for driving deeper adoption and transformation across different teams.

That talent and user pipeline is also growing as a result of steady onboarding of suppliers (which we believe is still a net positive in 2025, in spite of the scaling-back of some 3D initiatives) and thanks to the continued presence of 3D and hybrid courses in formal education. And at the same time, there are more - and vastly more capable and experienced - 3D agencies and studios working on behalf of both major brands and smaller organisations, which are likely, over time, to either scale themselves or become catalysts for further upskilling and hiring-in of internal talent, as well as continuing to raise the bar for visual output.

And since so much of the 3D toolchain for apparel, footwear, and accessories incorporates not just fashion-specific tools but cross-industry engines, platforms, and environments, the DPC ecosystem in fashion can simultaneously benefit from sector-agnostic advances to technology, keeping it at or near the forefront of 3D working in general, as well as contributing more in the way of fashion and textile-focused functionality and processes to tools and standards that have extremely broad buy-in and support.

Finally, while it's certainly not news that there is tension between AI and 3D (see the bear case below) it also should surprise nobody that the most meaningful things that companies want to accomplish with AI rely on having a concrete grounding in the technical attributes of a product that 3D is uniquely equipped to provide. And from that perspective alone, the future of 3D, in its central role as an increasingly-complete digital representation of a real product should be assured thanks to ongoing demand that's actually being driven by the technology that people are positioning as being at-odds with it.

THE BEAR CASE

The biggest threat to essentially all software markets is the same: the encroachment of AI in a way that compresses and normalises all software, and that blurs the distinctions between different solutions and platforms to the point that they all but vanish.

This is, clearly, not a problem that's unique to digital product creation. We can already observe it happening in 2D image manipulation, for example, where native models like Nano Banana will do much of the work that casual audiences would have done in Affinity or Photoshop, or where MCP integrations between ChatGPT and those tools will allow AI to call the tools on the user's behalf and then return the results.

In that context, what are the future prospects for those tools as discrete pieces of software, instead of as extensions to an monolithic chatbox that seems to be essentially devouring the demarcation lines between different software? Not great, I'd argue. And I'd make the same argument for a range of other solutions that we think of as being fundamentally standalone today, from non-linear video editing to digital audio workstations. Whether those solutions continue to exist as graphical user applications rather than remote services remains to be seen.

But there's an extra sting in the tail for DPC, that puts it potentially earlier in the firing line than other software segments.

In last year's market analysis we wrote that "there is, as we see it, no reason to assume that DPC as a technology segment is faring any worse than other technology category during this unpredictable period". We were, then, talking about the economic environment rather than the frontiers of AI, but with my bear hat on I'd be inclined to say that current circumstances are perhaps more hostile to some use cases for DPC than they are for other categories of fashion technology.

If you've read the rest of this report prior to arriving at this analysis, you'll have come away with the impression that there's a tremendous amount of value in digital product creation when it's properly calibrated for the capabilities of the technology, and for the needs of users who are empowered by it.

IN THE BEST POSSIBLE VERSION OF THE NEAR-TERM-FUTURE MARKET FOR DIGITAL PRODUCT CREATION, THE EXTENDED USERBASE QUICKLY DEVELOPS EVEN MORE TRUST IN 3D REPRESENTATIONS.

Where that value perhaps looks a little shakier now is in a key use case for 3D: shortening the distance between a concept and a visual representation that other people can look at. To put it as bluntly as possible, generative image models offer a much shorter distance here, and if a brand's 3D strategy has been driven by that early-stage visualisation and range planning use case, then there would be a viable argument for deploying AI instead, to achieve roughly comparable outcomes at a lower speed and cost, even if sacrifices in accuracy and consistency are mandatory.

At the other end of the funnel - polished, consumer and partner-facing visual content - companies may also feel like they face a binary choice between expensive, labour-intensive-but-accurate 3D renders, and turnkey, cheap AI content. The week this report released, an executive from one of Zalando's in-house technology startups captured something fundamental: for large enough retailers, the biggest bottleneck is "high-quality storytelling". And rather than pointing 3D at this challenge, the vision instead is build out an AI pipeline capable of throughput on a scale that even the best-resourced 3D departments could not compete with.

The reality will be more nuanced, with 3D being, as I've said, the best foundation for AI, but there will be companies that, at least in the short term, pursue AI projects at both ends of the funnel, leaving 3D as a specialist discipline in the middle.

Not that there is anything wrong with being a specialist discipline of course! But being consigned to that status would work against the bull case I've set out above for a growing userbase and talent pool, and it would potentially lead, over time, to more 3D and DPC work being contracted out to a selection of agencies and partners who could eventually take ownership of what should be a combined in-house / partner function.

In that scenario, larger enterprises would effectively be "ringfencing" 3D in the middle of the product journey, and its relevance (and ongoing investment) to both dedicated fashion audiences and cross-industry tool developers could wither as a result.

Another key concern is that the "north star" for digital product creation remains far enough away that users and sponsors begin to see it as unreachable. As The Interline has said for several years, the eventual vision has to be that a 3D asset can serve as a complete representation of a real product, and the reality remains that, today, 3D is not capturing full product definitions or technical specifications. And for its status to remain secure, it has to continue making tangible progress towards that aim.



IF A BRAND'S 3D STRATEGY HAS BEEN DRIVEN BY THAT EARLY-STAGE VISUALISATION AND RANGE PLANNING USE CASE, THEN THERE WOULD BE A VIABLE ARGUMENT FOR DEPLOYING AI INSTEAD.



THE BALANCE

None of this, I'll remind you, is guaranteed or even highly likely. But just as I've painted what I believe are the best possible outcomes for 3D and digital product creation in fashion, it's important to also make the case for the alternatives.

Crucially, both brands and technology vendors have a window of opportunity to maximise the odds of the positive outcomes, and minimise the likelihood of the negative ones, by working together to ensure that 3D and DPC tools fit clear industry briefs, deliver value in measurable areas, and continue to add momentum to the promise of a digital twin being realised in a meaningful timeframe.

This report was written at what very much feels like a moment of significant change and evolution for DPC, and both objective criteria and more subjective analysis backs that feeling up. My personal opinion is that the bull case is more likely than the alternative, but it's also something that the industry will need to actively work towards, rather than being passively guaranteed.

THE BEAUTY PERSPECTIVE

Finally, what about beauty? With this being the first year we've had a beauty cover for this report, it's been interesting for our team to see just how many of the foundational principles of digital product creation can transfer over from fashion to beauty.

The answer is: many of the essentials are common between the two sectors. Both need to find ways to accurately represent the visual and physical characteristics of complex materials, model their interactions with digital humans, and use these to improve the way they create products and test use cases during development.

Cosmetics, however, are both more engineered and more tightly-regulated products, which, at least in theory, could advance the cause of digital twins in that sector more quickly.

In practice, the baseline for DPC in cosmetics, beauty, and skincare is currently set very low, but that sector has the potential to benefit from advances made in fashion and elsewhere to close the gap in the near future.

For the time being, though, producing a DPC userbase and monetary size for that segment would not be a useful exercise.

The Interline would like to extend our thanks to every technology and service provider who took part in this year's DPC Report, to all our editorial contributors, our two fantastic designers, and the creative and technical support professionals at technology companies - as well as our long-time sponsors at Fashion by Informa, the team behind SOURCING at MAGIC and other milestone industry events.

We hope you found value in this publication, and we encourage you to bookmark The Interline for more coverage of digital product creation throughout 2026.

If you are a technology company creating DPC-ecosystem tools, or a brand, retailer, or supplier using them, and you'd like to be featured by The Interline in the future (either as part of a deep-dive report or more generally), please [contact us](#).





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