Fashion's New Ecosystem:

THE FUTURE OF 3D, DPC AND VIRTUAL TRY-ON

Executive Report Presented by Alvanon

alvanon

3D TECH Festival 2022

THE WORLD'S BIGGEST FESTIVAL OF 3D, APPAREL, AND FASHION

Foreword

Three years of 3D Tech Fest!!! I never thought that Alvanon would be curating a virtual festival three-years into the pandemic, but when we surveyed our clients and our community, the overwhelming request was a deep need for team-wide training based on a technical foundation that also enabled an exploration of ideas. This presented a conundrum - how do you curate the world's biggest festival of 3D, apparel and fashion with something for everyone? You enlist your friends and partners!!

At Alvanon, we provide one crucial piece of the puzzle that impacts the entire demand and supply chain; we believe that the 3D journey starts by developing virtual bodies to build your garments on. We call these "fit standards", and they allow you to build consistent, well fitting garments in an industrial setting. This means that we are a tiny part of a much, much larger whole. Therefore, we must be collaborative, not only with our clients–brands, designers, trading houses and manufacturers, but with our technology partners–PLM, 3D design, merchandise assortments. These collaborations allow us a unique viewpoint into a complex ecosystem.

We are deeply concerned. We are worried that our industry will waste a good crisis. We know that in the next few years, retailers and brands must make less product, sell for higher prices, make better inventory choices and make healthier bottom lines. But we have not yet seen the investment that is required in the digital realm that will allow for solid foundations to be built for the future.

There are three key areas that need to be addressed within individual organizations:

1. **More transparency throughout the organisation and its supply bases**
2. **More training in substantial technical talent - in 3D, merchandising and supply chain**
3. **More investment in process transformation**

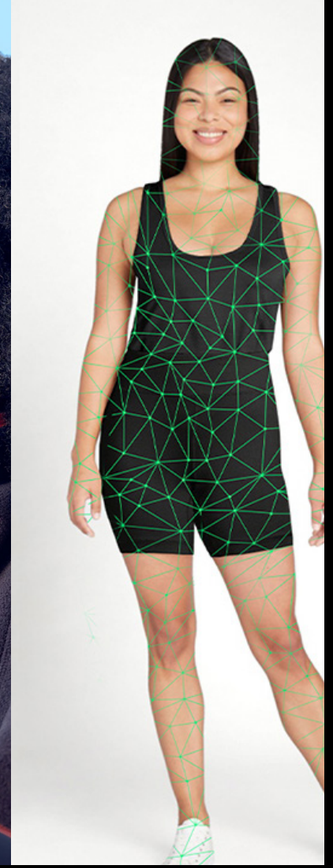
Worrying is useless. Action is everything. For our small part, we hope that by allowing full access to our digital roadmap; by asking our clients, friends and partners to be transparent about their processes; by enlisting academic friends to talk about good business and authentic needs; and by doing it all for free and online, we can provide some guidance into what will be a very turbulent few years.

3D Tech Fest is a passion project. It can only be useful if you take it into your teams, thoroughly discuss, and transform that into action. You will get more questions than answers from these sessions and this executive report. We hope that these conversations trigger you to action.

With hope,

Janice Wang CEO, Alvanon



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INTRODUCTION

The fashion industry is facing a new set of challenges, as consumer appetite for discretionary spending is declining, the cost of goods is going up, and the requirement for being sustainable has never been greater.

All of this comes at a time when the nascent NFT (and digital wearable) industry is coming under increased scrutiny as cryptocurrency values plunge.

Brands are in a situation where they need to really look at their product strategies to make sure they have the right products, at the right price, at the right time and in the right quantities.

The industry needs to build long-term strategies that effectively create ecosystems around their product creation and development strategies in order to both operate successfully and sustainably in the real world, while also preparing for the next stage of the digital revolution.

In the opening talk, Alvanon's Chief Operations Officer, Jason Wang emphasized where these developments stand at the moment. "We are not building digital clothing only for the metaverse or gaming right now, we are at the stage where revenue is still generated from selling real clothing in real life. The reason why building production ready digital garments is a fundamental step, is that it allows you to utilize your digital garments in different stages of the product life cycle. The key to a successful digital product strategy is to build assets once, then leverage that many times." Therefore, he said: "it's critical that your digital product development is done with a production ready mindset from the very beginning. In the last three years, we have seen a lot of our clients take this approach to build their digital pipeline."

DIGITAL GARMENT = PHYSICAL GARMENT

> "The question for our industry is whether we can produce and sell less, yet be more profitable? And while we are doing that, can we actually be more sustainable and responsible to our planet by producing less waste? The answer to all those questions should be yes. And it starts with placing an emphasis on devising mid to long term plans that aim to solve operational inefficiencies."
>
> **– JASON WANG**

ALGORITHMIC RETAIL - DEMAND PREDICTION

The fashion sector has been working to leverage big data to help make better decisions, and businesses are moving into the next phase of demand forecasting to bring in more data sources to create a more holistic view of demand.

Kris Ferreira, Assistant Professor, Harvard Business School described where the strengths of decision support systems lie.

She said that in aggregate, we are finding that with more and more data going into them, AI algorithms outperform humans' forecasting abilities. But she is calling for companies to think more in terms of AI-facilitated decision making rather than seeing AI as competition.

The gap in success between the two ways of forecasting comes down to the space between public versus private information. Private information in this case is information that the algorithm does not have access to. The example that Ferreira described was that the buyer might know that the Gen Z aesthetic is starting to gather interest. She has seen that on blogs, that Millennial Pink is over, and Gen Z green is going to be popular.

This knowledge means that she's able to "spot that the algorithm's forecast is going to be way inflated compared to actual demand, which means that she is able to make the better forecast of the two."

Companies are increasingly feeding that public information into the algorithms to allow them to make even more stronger predictions.

Many current algorithms use POS data to predict what will sell in the future, which Chris Chung, President of 7thonline, describes as "the cube", encompassing three dimensions of product, location and time.

He said that times have changed and that social media like Twitter, TikTok, Instagram, Facebook and Pinterest have become major influencers on purchasing behavior.

"We realized that we can no longer simply rely on the cube to predict the propensity of a product to sell, so we needed to add a fourth dimension, which we call media. But what media really is, at the end of the day, is the ability to analyze customer behavior. We needed more than point of sale data. We needed the ability to analyze customer behavior and bring this data in to detect, identify and prioritize what has the highest propensity to sell based on emerging trends," said Chung.

He described the results for 7thonline's client, Patagonia, with Chung saying that 7thonline's forecast was 30% more accurate than Patagonia's internal forecast and 80% more consistent over time. This all translated to an increase of $320,000 over four weeks.

The company forecasts sales down to the item level of style, color, size, store, and day, with the company concurrently utilizing four industry and scenario-specific algorithms to power its machine learning and AI. It is able to adapt its models to work for companies using both shorter, two-week production life-cycles to longer nine-month or more.

As part of this strategy, Patagonia uses this information in a way that is very transparent with its suppliers and internal teams, which allows it to communicate this kind of information, allowing it to continue to improve its sustainability credentials by reducing wastage and ensuring efficiency.

Personalization tools are also being used to ensure that people discover the best product for their specific circumstances.

Jelle Stienstra, Digital Strategy Director at PTTRNS.ai said that the company has trained algorithms that really understand consumer desires, exploring how the technology has been applied to eyewear brand retailers. Using computer vision, the technology looks at skin tone, the shape of the face, brow and jawline. It's also trained the algorithms to understand the qualities of frames in terms of shape, thickness, and contrast.

"We have labeled over 40,000 face/frame combinations, saying this is not working, this is aesthetically pleasing, harmonic, playful, delicate, and so-on," said Stienstra.

Retailers using this technology have seen conversion increase from 1.5% to 6%.

Meet Kami – The First Virtual Influencer With Down Syndrome

RESPONSIBLE RETAIL

Beyond doing the right thing and making sure clothing is available to everyone, producing product for people with disabilities is a huge market opportunity. Coresight Research, Senior Analyst Erin Schmidt says that in a survey the firm conducted in July this year, 48% of the respondents who have a disability or care for someone with a disability said they faced challenges finding apparel to meet their needs. Coresight Research expects that spending on adaptive apparel is forecast to reach US$1.3bn in 2022, but that the total addressable market is worth approximately US$67.3bn, which is fifty times the current estimated spending.

Working with the people who you are representing was really important for speakers, and ensuring they're represented through participation in the development of products that are being designed to serve them, particularly as digital technologies evolve in a way that might mean that people feel excluded.

Cameron Wilson, Founder and CEO of The Diigitals, described how their business, which creates digital influencers, created Kami, its first influencer with Down Syndrome.

This was important because there are a lot of issues when it comes to diversity and inclusion in digital spaces. "You can be anything or anyone, but what we found is that you can't create a character with Down Syndrome, and for those people, they couldn't see themselves represented in these spaces, and that feels like erasure and that you're not welcome in games like The Sims or Fortnite," said Wilson.

"Creating characters like Kami challenge the many layers of digital interfaces that currently lack inclusivity. We need to address some of the glaring problems in this space and build the online world we want for the future. And that's something that I really, really believe in doing from the ground up, having diversity and inclusion from the get go."

Click below to read **Research Highlights: Adaptive Apparel in the US** now.

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But in doing so, they have seen challenges when people from outside traditionally marginalized communities, appropriates from those groups rather than collaborates with them. For instance, AI powered digital rapper FN Meka was signed to Capitol Records in August 2022, having generated nine million followers on Tiktok. The fanfare around the signing was brief, as after FN Meka (a Black character), the non-Black creators were called out for using the digital creator as a vehicle to perpetuate offensive racial stereotypes. FN Meka was subsequently dropped from the label.

Wilson said that they wanted to emphasize the difference between this and the digital creators their company develops, saying that the Kami character was built as part of an ongoing relationship with Down Syndrome International (DSi). “When it came to Kami, I knew I needed to remove myself as much as possible from her creation and come up with a method that allowed her to almost come to me. That’s why we used 100 different images of women with Down Syndrome and combined them to create a base for Kami.”

Similarly this is an approach also undertaken by Craig Crawford, Founder of Differently Enabled, a new laboratory of designers, engineers, technicians and data scientists, that works to address the one billion people living with disabilities by creating clothing that is bespoke to fit the needs of the individual. Crawford describes the business as a “co-creation platform for individuals to be enabled differently”.

He, like Wilson, emphasized the challenges that the technical revolution is having when it comes to representing differently abled bodies in digital spaces, describing how the 3D designers have to adapt when creating products. Part of the longer-term business model is based on AI-led pattern development, but the issue with most technology today is that it assumes symmetry and for 3D human design tools, there are assumptions on how a human body will appear, which does not always hold true when a person has some kind of physical disability.

“Our basic fashion tech is flawed. It’s really exciting that Microsoft is doing this incredible stuff that says if you’re behind a tree, machine learning and artificial intelligence can fill you in. But can it? It assumes that we are symmetrical. Well, actually, we’re really not. But for pattern making purposes, and for fashion purposes, we’ve made this assumption. There are a billion people out there who are completely excluded, because the assumption from the base tack is that we’re symmetrical,” emphasized Crawford.

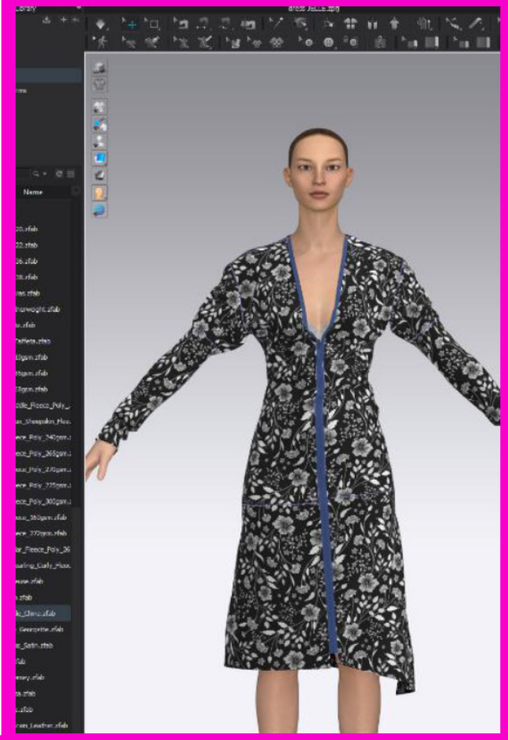
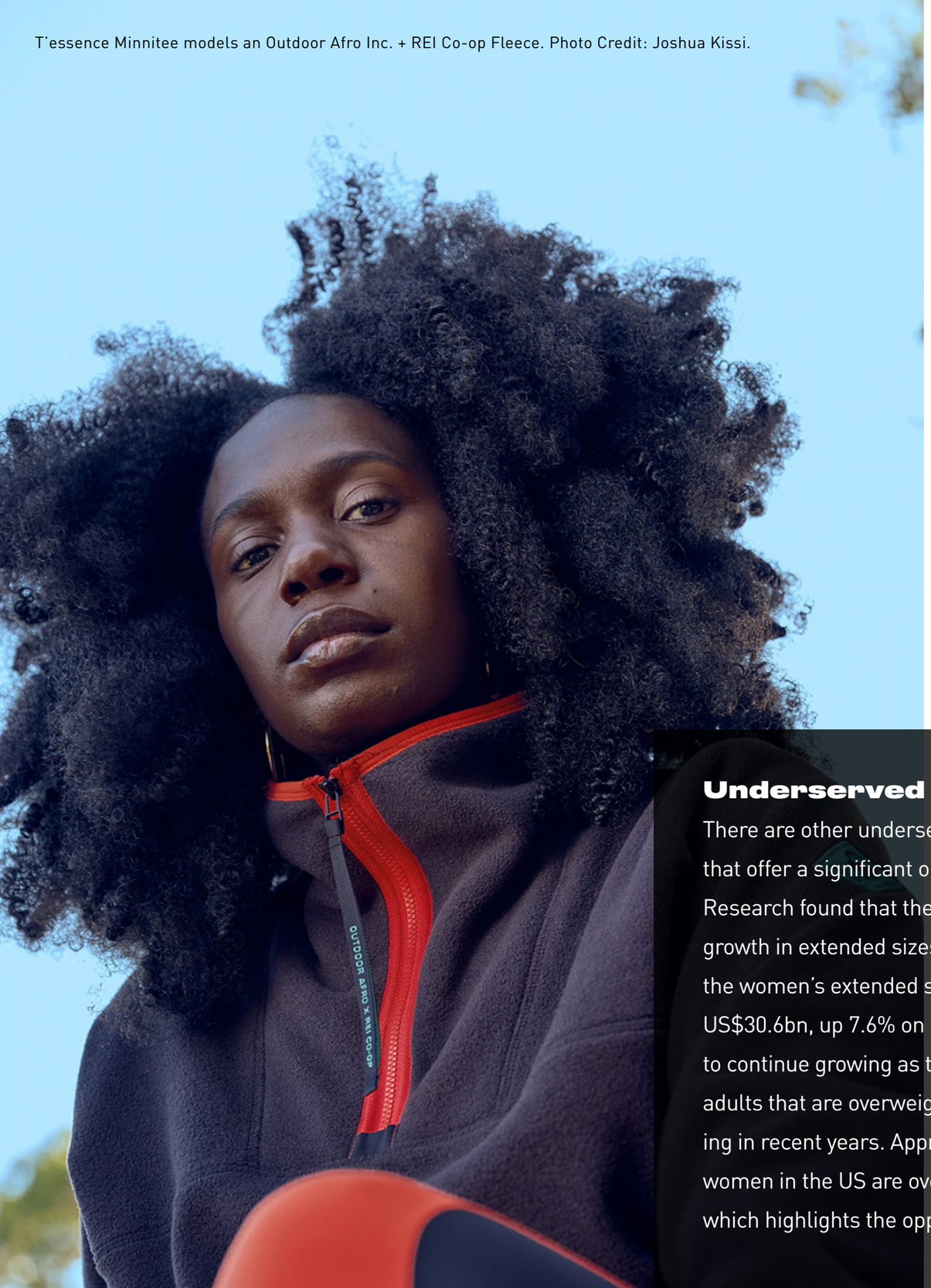


Image: Craig Crawford



T'essence Minnitee models an Outdoor Afro Inc. + REI Co-op Fleece. Photo Credit: Joshua Kissi.

Underserved Customers

There are other underserved customers that offer a significant opportunity. Coresight Research found that there is tremendous growth in extended sizes, estimating that the women's extended size market is worth US$30.6bn, up 7.6% on 2021. It's also likely to continue growing as the proportion of US adults that are overweight has been increasing in recent years. Approximately 69% of women in the US are overweight or obese, which highlights the opportunity for brands.

Alvanon has worked to ensure that its sizing standards reflect different populations around the world, but until now, its work hasn't really been used to service a specific group of people within one market. But recently REI partnered with Outdoor Afro, a US not-for-profit that encourages black people to enjoy the outdoors, on a range of clothing to service their community.

"When I surveyed Outdoor Afro participants," she said, "gear and equipment was one of the top challenges they faced—and still do today."

The outdoor industry's fit, style and functionality in fashion just didn't quite align with Black bodies or experiences in nature—including hers, Outdoor Afro founder Rue Mapp said.

The collaboration considers the range of Black body shapes that the clothes will fit and respecting the culture's interpretations of nature. It also means exploring a broader range of fit modeling, bold, celebratory colors, and materials that work with textured hairstyles.

"At the front of the collaboration you and your team at Alvanon provided us with a BIPOC study helping us understand how body shape varies by ethnicity and where we might need to fill some gaps. Armed with actual data and recommendations we were able to set a Outdoor Afro specific fit & size offer strategy, hire representative models and learn many things along the way," said Katharine Fuller - Director Of Product Development -Softgoods at REI

Speaking about the Alvanon portion of the collaboration, Emily Robertson-Hood, Senior Consultant from Alvanon said that the project was a great example of a brand that we were able to take a look through filtering for ethnicity, age groups and filtering through regions of the world or the country where they live in. "That takes a lot of subjectivity out of the fit room, when you have actual data to fall back on, that's a great thing. Then when you add health and demographic trend data into the mix and the human body really comes into clear focus," she emphasized.

INTEGRATING WHAT'S NEXT IN DIGITIZATION

Speakers discussed the gap between where they want to be when it comes to digital product creation (DPC) and where they are now.

Ben Hanson, Editor in Chief of The Interline explained that "We believe that digital assets are in historically high demand, but also currently in relatively low supply."

What he means by this, is that there's currently a mismatch between what the fashion industry wants as its output from digital product creation, and what it currently has as its inputs to digital product creation. So if we take it as read that DPC is fundamental to the future of fashion, it's very deeply ingrained in the way that the industry approaches the creation of physical products.

"The future of fashion is tightly wrapped up with the industry's ability to create digital assets, and to foster and support digital-native ways of working," said Hanson. "That's true for both traditional physical business models, where DPC is critical to streamlining processes, supercharging efficiency, improving sustainability, and replacing physical assets at as many decision-making junctures as possible. It's also true for the new all-digital business models that fashion is currently so keen on pursuing; the industry won't be able to start selling digital goods in any meaningful volume without building real digital asset creation pipelines. Wherever you look in the fashion value chain, there's a compelling use case for a genuine digital twin of a garment, shoe, or accessory."

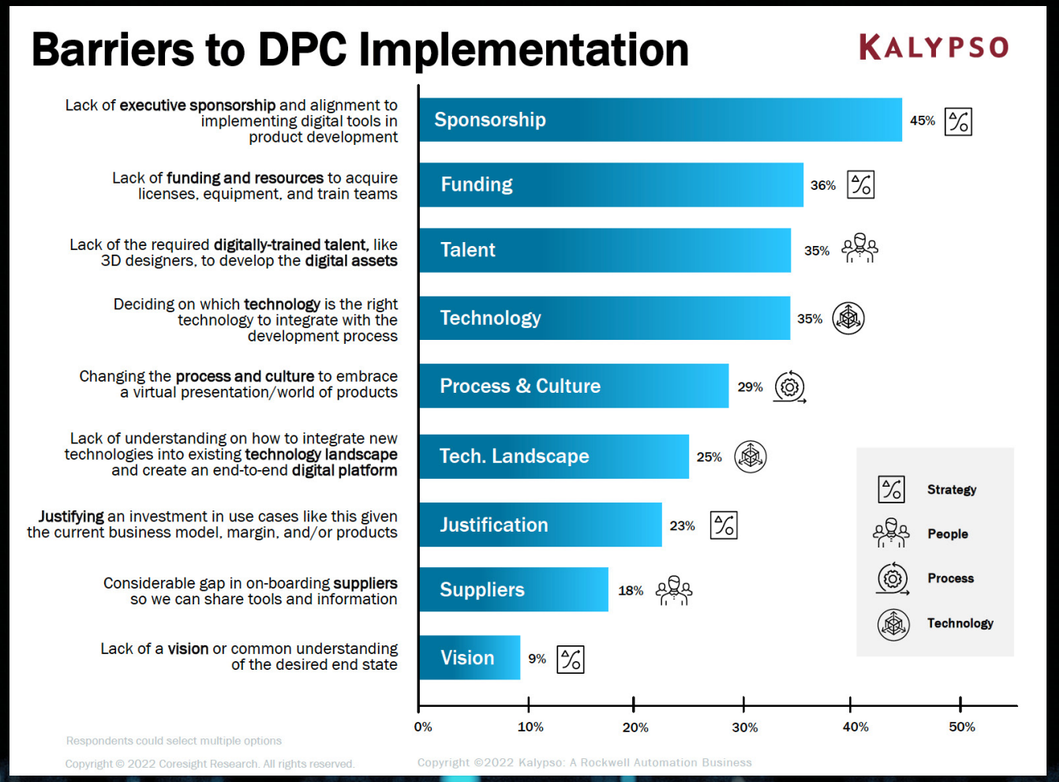
And where are brands investing at the moment? In a session hosted by Kalypso, Manager Alison Coddaire, and Director Will Yester described how the sector is in its teenage years. In the management consultancy's most recent piece of research, it found that brands have committed to this digitization trajectory, but are still some years away from achieving those aims.

Yester emphasized that we are now focused on the building blocks of the future of the industry. "Maturity will look like building out that thread of connected, efficient, collaborative information," he said.

Funding and sponsorship are the biggest barriers to scaled adoption at the moment, which Yester explained is about driving to alignment between functional leaders in a company who want to leverage those connective capabilities.

There is no single overarching barrier to DPC adoption; rather, several smaller issues. A Coresight Research survey for Kalypso asked which barriers, if any, have hindered DPC adoption or implementation plans. There is a broad range of perceived barriers, with the highest four barriers related to lack of executive sponsorship, funding, technology support and talent. However, there is no single category with a majority of respondents.

The largest barriers (each in the 35%–45% range) relate to a lack of underlying sponsorship/support



One brand that has completely changed the way that it operates in order to meet these new DPC expectations is Gap Inc. The scale of the strategy is not to be underestimated, as it has been rolled out across all of the US$16bn business' brands and vendors, including Old Navy, Gap, Banana Republic and Athleta, but also 120 vendors, across 25 countries and 400 mills.

Its shift towards digital design strategies has meant that it has created a circular, collaborative workflow that gives visibility to everyone in the product development lifecycle much sooner.

Bernard Grenier, Director of Digital Product Creation at Gap Inc. said the business is moving away from a physical sample workflow that relies entirely on one action happening before another one can happen, in a linear fashion. "It's a workflow that's filled with duplicative effort. There's no way around it, you've got to wait for that physical sample, you've got to wait for the evaluation of the physical sample, you've got to pass that information back to the vendor, and it comes back to the brand," he said.

The new process the business has worked towards requires a collaborative digital workflow with one source of truth. Now, there's a new partnership that's built with a collaborative workflow. The business is bringing in visibility early on in the pipeline, to the marketing team, to the photography team, to web teams, and most importantly, to customers, which means that they can feedback from the consumer sooner.

Rozh Roux, Senior Director Technical Design, DPC, PI & Footwear at Gap Inc, emphasized the value of this shift, saying that until now the business has been working in a very siloed way, which leads to limited levels of collaboration, and when it comes to working with vendors, the business pushes information out to them. "It doesn't create dynamic partnerships, and it is a one-way workflow," she said.

"So if we think about how do we really collaborate with them and bring them into our environment and really become part of our workflow, one has to really think about what a village would look like, and how the interaction between the different departments and the different vendors becomes integral to that work flow, and it becomes really interconnected."

Discussing the benefits of this way of working, the Gap Inc. team said it's not about immediate cost savings (although these exist) but about ensuring sustainability. That by working in more collaborative and less siloed ways, it means that the business can test products in the market sooner which means that it can get feedback from the customer sooner, leading to less product that is wasted.

"Ultimately we should really be looking at this entire end-to-end process much more holistically. And not just from an initial upfront savings to the cost of developing a product, but a more, global aspect of what this means to the entire garment industry and what we put back into our end to end process," emphasized Roux.

WORKSTREAMS

NEW

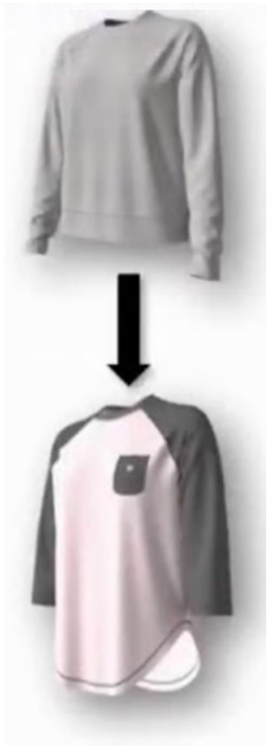
Library does not offer similar silhouette and vendor partnership is required for pattern making, followed by submission via designated board on the collaborative platform.

MODIFY

A similar silhouette is downloaded from library and minor adjustments that do not affect fit, are made to the style.

CARRY OVER

Style is downloaded from collaborative Platform for color fill, prints, print placement & print scaling.



Gap Inc.

Photo: Dani Loftus

DEFINING YOUR ROLE IN THE DIGITAL LANDSCAPE

Brands need to decide what role they want to play when it comes to the digital/physical divide. In her session, Dani Loftus, Founder & CEO DRAUP described the three ways brands can consider the role that they will play in these new ecosystems.

In Real Life (IRL): Refers to fashion and digital companies working to build things in real life and in digital worlds, for instance Nike and Rtfkt partnering to create clothes for digital avatars that are replicated as physical goods.

On Real Life (ORL): Are digital products worn on real people, for instance brands like Dress X that create digital clothing that is placed over a real human form.

Unreal Life (URL): Digital fashion that's created directly for an avatar.

Loftus delineates the way we engage online in two ways, curated digital identities, which is how we portray ourselves on social media like Instagram. "We're taking snippets of our physical lives, we're curating them, and then we're putting them online onto these digital platforms to show who we are," she said. The second, more emergent mode of social representation online is that which is digitally created identities, which doesn't rely on our real lives at all. "So instead of selecting moments and curating them, you are creating yourself, the way that you look, how you self express, and the moments that you engage with digitally from the bottom up. And this category right now, is mostly pervasive through gaming," Loftus emphasized.

ACCELERATING VIRTUAL TRY-ON

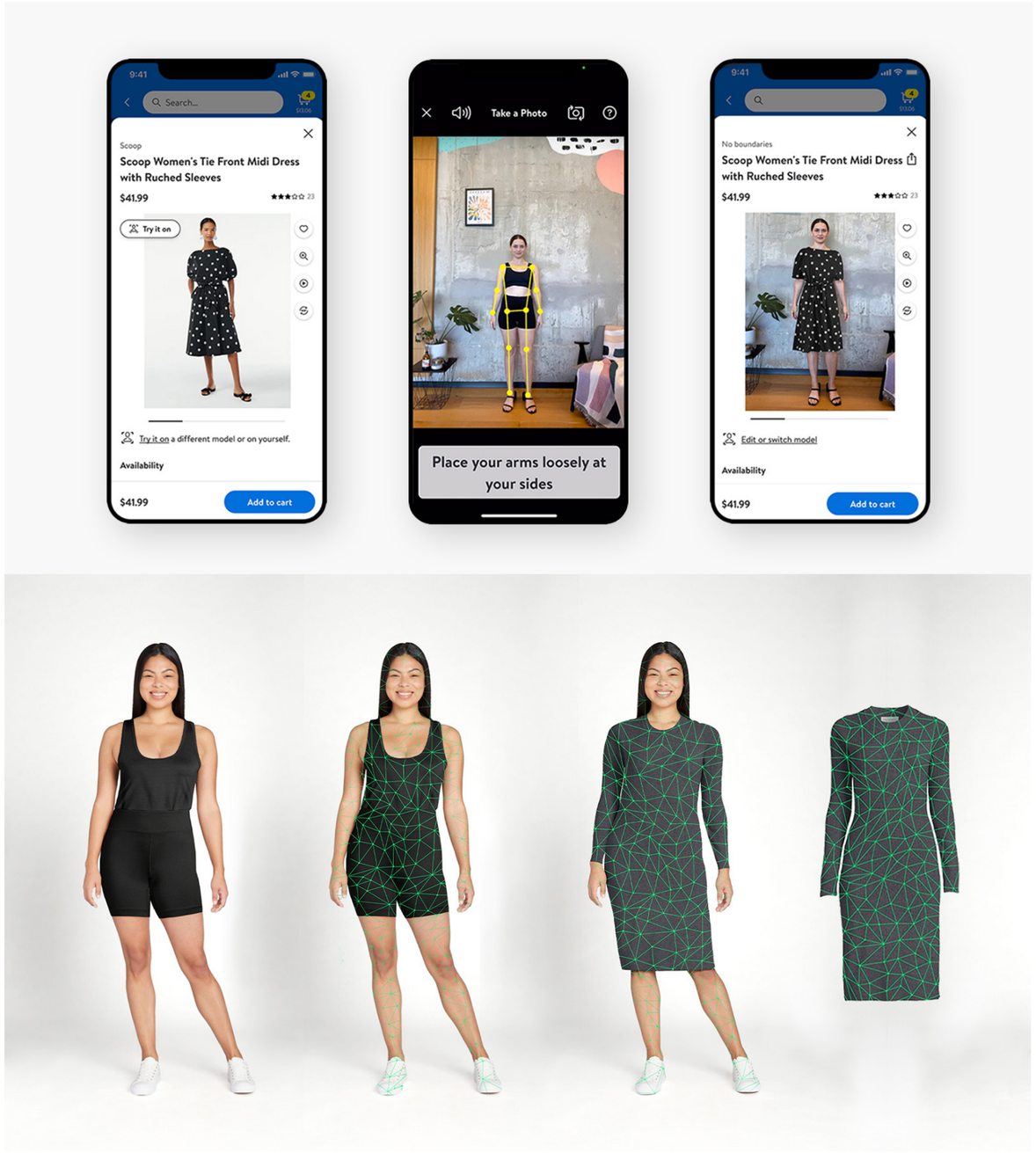


Photo: Walmart

In an interview with Robin Lewis, Founder and CEO, The Robin Report, Denise Incandela, EVP, Apparel Division and Private Brands, Walmart US revealed the latest innovation it is launching with its virtual try-on experience for online shoppers.

After purchasing Zeekit last year, the business has been working to finesse and develop the algorithms and machine learning models, powered by Walmart Global Technology. In the first implementation, called Choose My Model, the customer selects a model that looks like them to show the clothing. The virtual try-on experience has now evolved to allow the customer to upload a photo of themselves and see what clothing looks like on them. It's called Be Your Own Model and the customer can choose either option across nearly 300,000 items on Walmart.com.

While the tool doesn't suggest which size yet, Incandela said that there was huge use for the try-on tool as it really helps people to understand where the sleeve or hem would fall on their body, but beyond this thinking about the gamification of shopping.

"We all know how much people love seeing themselves in social media. And so it widens up the lens of the gamification part of shopping, which I don't think exists. And of course, adding social media sharing is on our roadmap. Which will mean that now I can show my mother or my friends my seven different outfits," Incandela said, emphasizing other key moments where people might find it useful, for instance when trying to figure out what to buy for their children.

But ultimately, what she emphasized is the iterative nature of these kinds of developments. "Is it perfect today? No, but is it a step in the right direction? I think it's really intriguing. And what I would also say is, normally, I've always advocated for being a fast follower versus a first mover because the first mover has a lot of cost and pain and investment. But in this case, the machine learning is so intense and so difficult that there are some interesting...first mover advantages, which we got excited about."

Alvanon is working to create a more holistic solution when it comes to virtual try-on apps. Jason Wang said there is an opportunity to integrate more elements when it comes to figuring out which product is right for a specific consumer.

Wang and the Alvanon team are currently working to bridge the gap between the current product offerings which either help customers understand whether they like a style, color and other features of a garment versus solutions that address how an item will fit.

“Consumers are first drawn to the style and the look of the garment, while sizing and fit is the last decision they make before they make a purchase,” Jason Wang said.

But being able to achieve this, requires businesses to have done a lot of that integration work around DPC, which will mean that they have a library of authentic digital garments. But technology for predicting and building consumer digital avatars will need to be more accurate and much simpler to use in order for mass adoption. Finally, and probably most importantly, the industry will need to have enough computing power and faster algorithms to perform real time simulations of digital garments on the consumer avatars. If all three of these conditions are met, a true virtual dressing room can be achieved, Wang explains.

As Alvanon has spent the last 20 years gathering a lot of body data from around the world, developing both its own size standards for different markets around the world, including North America, Europe and China. “All of this data, as well as all of the body data that we have gathered through different scanning projects is being used to drive our alpha non-party Alvanon Body Engine,” said Wang.

Brands will be able to use the tool to feed in their proprietary fit standards and use those to accurately predict and recommend the correct fit and size to the consumer.

“The use of consumer facing fit technology allows you to have a feedback loop about the sizing and body information of your consumer. This data is analyzed and could be immediately applied as recommendations to improve or better your current fit standards.”

CONCLUSION

While the operating landscape is set to remain challenging in the months and years to come, brands that invest now in partnering with their supply chains to create holistic ecosystems that prepare themselves for the future will be the ones that are able to succeed in the future.

Rather than thinking from season to season, it will require them to think more broadly both about the challenges that need to be solved now, but also the opportunities that will open up in the future.

As Jason Wang emphasized: “We have a saying in Chinese, that where there’s danger, there’s opportunity. I’d like to think that we as an industry are resilient and flexible enough to get out of this predicament.”

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About Alvanon

Alvanon is a fashion technology company, focused on enabling companies to generate and leverage their authentic 3D digital assets across multiple platforms and applications. It has developed a unique and innovative body data-driven approach, with a consumer-scanning element, to solving the challenges of sizing and fit inherent in the apparel industry.

Since 2001, it has dedicated itself to body shape data research and has gathered more than 1.5 million body scans in 30+ countries, most recently, in China, Colombia, Costa Rica and the US. Combined with its deep apparel knowledge, this has allowed Alvanon to develop thousands of fit standards for hundreds of brands globally.

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