PixelPool™ | Dtail

Navigating the 3D Revolution in the Fashion Industry.

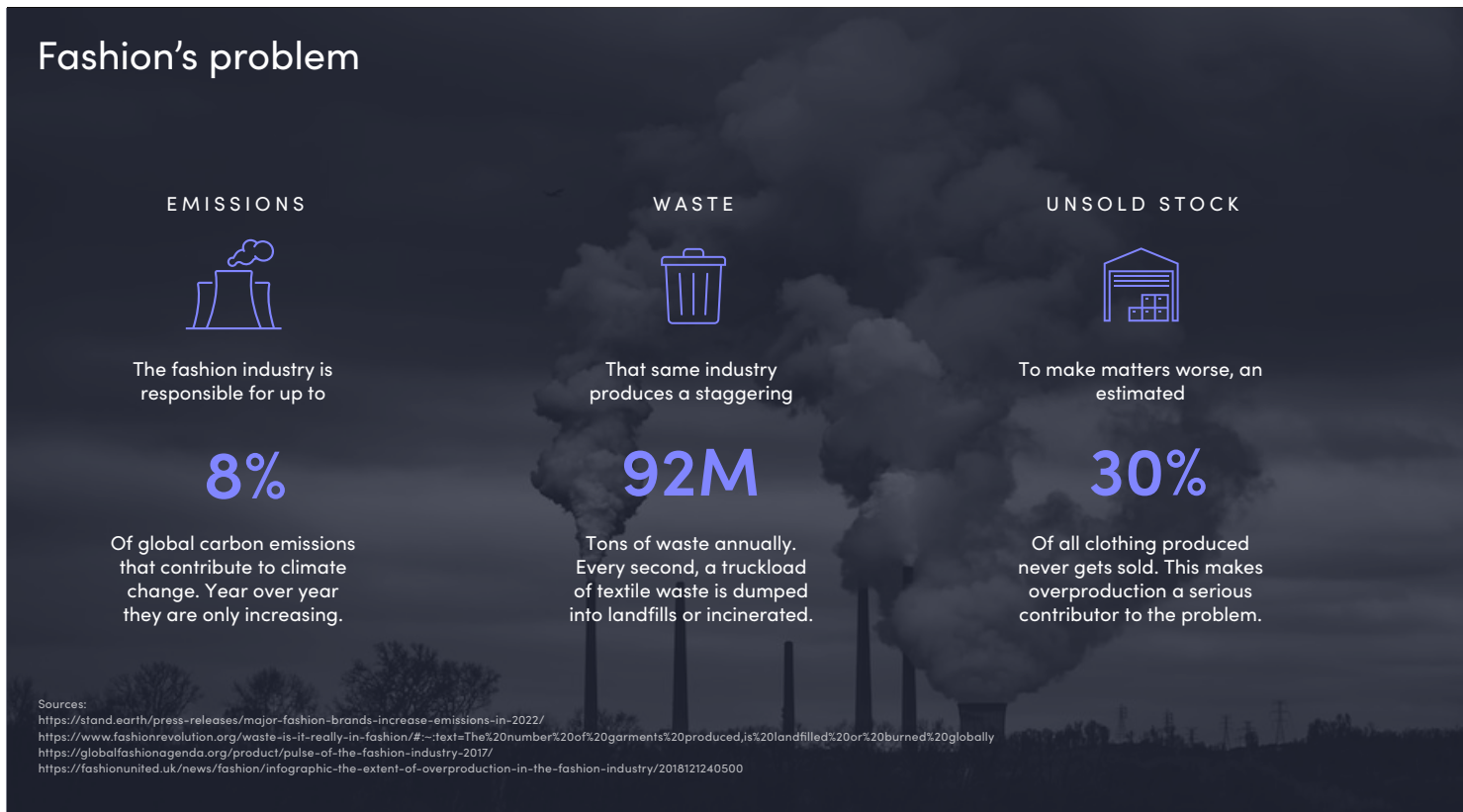# TABLE OF CONTENT

CHAPTER 1: 3D AS A SOLUTION

In recent times, the fashion industry has come under intense scrutiny due to its subpar ethical and environmental sustainability standards. According to Bowcott, Chantal Pharand, and Lee (2022) the fashion industry stands as one of the largest contributors to environmental pollution and resource depletion on a global scale.

Fashion's problem

EMISSIONS

The fashion industry is responsible for up to

8%

Of global carbon emissions that contribute to climate change. Year over year they are only increasing.

WASTE

That same industry produces a staggering

92M

Tons of waste annually. Every second, a truckload of textile waste is dumped into landfills or incinerated.

UNSOLD STOCK

To make matters worse, an estimated

30%

Of all clothing produced never gets sold. This makes overproduction a serious contributor to the problem.

Sources:
https://stand.earth/press-releases/major-fashion-brands-increase-emissions-in-2022/
https://www.fashionrevolution.org/waste-is-it-really-in-fashion/#:~:text=The%20number%20of%20garments%20produced,is%20landfilled%20or%20burned%20globally
https://globalfashionagenda.org/product/pulse-of-the-fashion-industry-2017/
https://fashionunited.uk/news/fashion/infographic-the-extent-of-overproduction-in-the-fashion-industry/2018121240500

Addressing the Industry impact

In a world in which more thoughtful consumer choices are advocated, the industry paradoxically embraces ultra-fast fashion, characterized by more frequent and rapid seasons. Simultaneously, there is a parallel effort to elevate sustainability standards across the board in response to consumer demand and impending legislations.

The Virtual world is enticing brands to rethink showrooms, samples and even garments. This presents a significant opportunity for early adopters in the industry. As explained by (Hackl, 2021), technological progress is continually gaining momentum, and companies that don't

make substantial investments in digital product development now will find themselves falling behind.

By switching to 3D technology, it is possible to significantly reduce resource depletion, water and air pollution, waste, as well as the carbon footprint of brands within the industry. Additionally, digital fashion can support brands in decreasing the time-to-market of new collections. Specifically, a study conducted by PixelPool and Halfday estimated that the switch to digital can reduce the carbon footprint of producing a sample from 1500 kg to 15 kg, as well as decreasing lead times from 21-28 to 1-3 days.
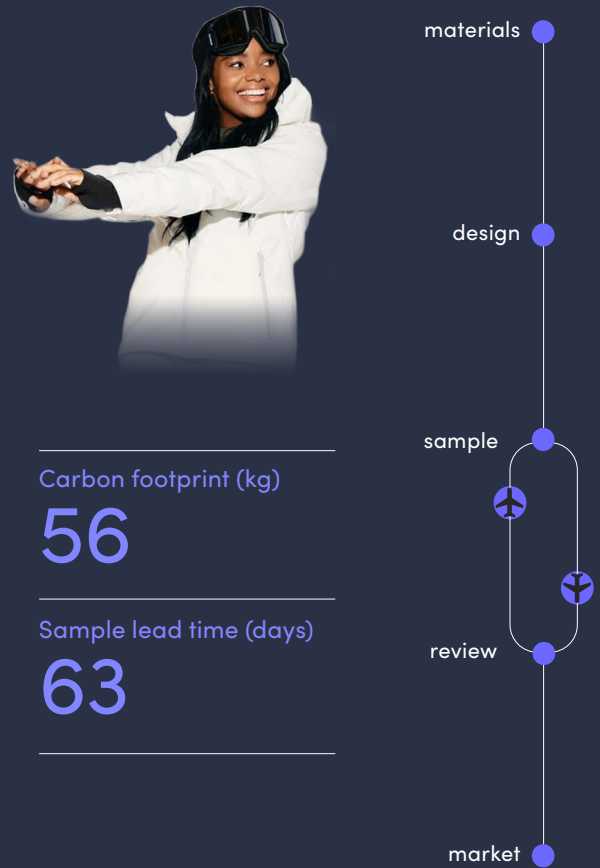
Within this white paper, we delve into the realm of 3D technologies, with a specific focus on several key facets. Firstly, we examine the diverse stages of 3D adoption within organizations. Secondly, we tackle the hurdles that brands commonly encounter during the digitalization journey, including issues related to coverage, pipeline, and roll-out. Additionally, we put a spotlight on the role of change management, as one of the major challenges of digitalization. Finally, to illustrate the real-world application of these insights, we present a compelling example of how one of our clients successfully embarked on their digitalization endeavours.

Halfday Women's Ski Jacket

virtual samples

materials

design

sample

review

market

Carbon footprint (kg)

7

Sample lead time (days)

14

physical samples

materials

design

sample

review

market

Carbon footprint (kg)

56

Sample lead time (days)

63

Final Sample with a total of 3 iteration rounds

Resource depletion
Fashion depletes limited natural resources – it consumes 79 billion cubic metres of water, and uses 31 billion litres of crude oil, enough to fill 12,402 Olympic pools.

Carbon footprint
Each year the fashion industry releases 4% of greenhouse gas emissions in producing and transporting the garments. Besides, the total emissions of the travel associated with the ready-to-wear wholesale buying process is: 241,000 tCO2e; enough energy to light up Times Square for 58 years or the Eiffel Tower for 3,060 years.
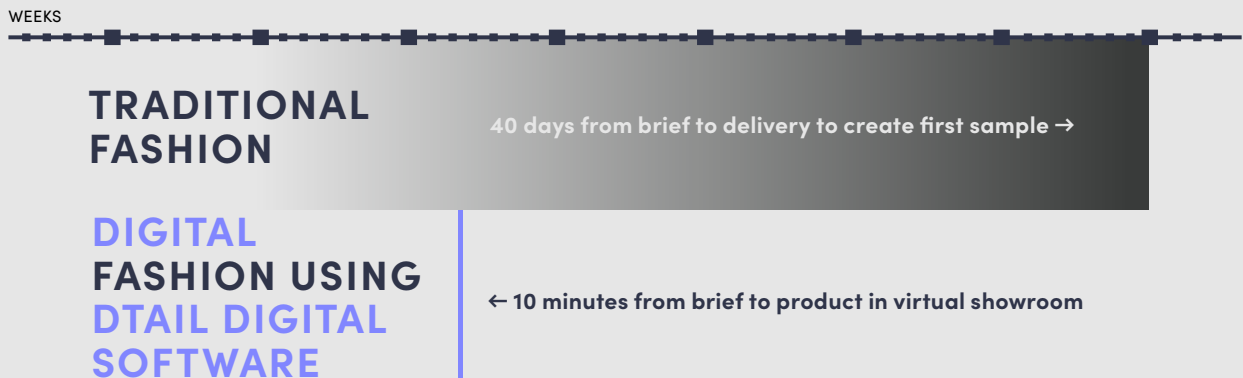
Faster to Market: what does it really mean?

The term faster to market is very popular nowadays and it refers to the ability of a company or product to be developed, produced, and introduced to the market more quickly than competitors. It is a strategic advantage that allows a company to capitalize on new opportunities, respond to changing market conditions, and meet consumer demands more promptly.

As illustrated in the graph below, the creation of product samples can extend up to 40 days. Furthermore, based on our in-depth case study involving our client, SAE-A, it's evident that clients frequently request to evaluate three to four styles, each in a variety of colors, occasionally extending to eight or nine different hues. The physical production of this array of options not only consumes several weeks but also results in manufacturing waste and product drops during adoption.

With the adoption of digital product creation and the use of PixelPool's digital workflow platform Dtail, SAE-A has effectively streamlined this process, making it more efficient and environmentally responsible. Specifically, within 10 minutes it was able to fully create a digital sample. Within only 10 days, it was able to deliver a full collection to Carhartt.

WEEKS

TRADITIONAL FASHION
40 days from brief to delivery to create first sample →

DIGITAL FASHION USING DTAIL DIGITAL SOFTWARE
← 10 minutes from brief to product in virtual showroom

Denzel Lee, SAE-A Design 3 Team
"Compared to physical samples, we reduced 4 weeks amount of work into just 10 days."

⌖ SAE-A

Samples: Their Impact With The Physical Process

Physical samples are costly to make. They cost anywhere from 1.5 to 2 times the production cost. Moreover, for a selling season, multiple pieces of the same garmet is produced for exposure in each of a brand's showroom across the world and additional samples are produced just for marketing needs. For a particular garment then, it is never just one sample that is produced. Add to this the time needed to produce samples which can take up to six weeks and you start to better understand why many brands have looked to digital to relieve their sample costs and improve their speed to market. With one

digital sample, you can cover your sales and marketing needs and also shorten your time to market based on their production timing. After a selling season, physical samples either end up in samples sales or end up as waste. Brands may archive one sample for their records, but over time this impacts their bottom line due to mounting storage costs. Multiple digital samples can be stored in the cloud or on servers at lower costs and can also be accessed more easily than they could from an archive.

Physical process

SAMPLES

Most fashion brands rely on physical samples, needing as much as

5 rounds

of samples in their design, planning and merchandising process.

COSTLY

For the industry as a whole, an estimated

$5-8B

is spent on physical sampling each year.

SLOW

Not only are physical samples costly, they can take up to

6 weeks

to be produced and shipped, lengthening a brand's 'time-to-market'.

Sources:
https://3dinsider.optitex.com/3d-saves-time-money/?ref=blog.dhakai.com

Advancing Brands: Navigating the 3D Maturity Scale

Clients can generally be categorized into different personas based on their level of 3D maturity. Here's an overview of the 3D Maturity Scale, featuring four distinct tiers that represent brands at different stages of 3D adoption. From "The Slackers" struggling to initiate 3D efforts to "The Frontrunners" confidently leading the charge, each tier offers unique insights into the progression of businesses in the 3D landscape.

The Frontrunners

3

These early adopters have already rolled out a consistent, repeatable workflow to multiple departments, countries, or product teams, depending on their structure. They are actively collaborating with partners as key stakeholders and contributors to 3D tool roadmaps. In at least one critical business domain, they confidently employ 3D for decision-making, both internally and with business partners and consumers. Driven by their strong belief in a future centered around 3D technology they take on an active role in sharing insights and best practices to drive the industry forward.

- Rolled out a consistent, repeatable workflow to multiple business areas.
- A key stakeholder / contributor to 3D tool roadmaps and are actively collaborating with partners.
- Confident using 3D for decision making in at least one key business area and towards some business partners and/or consumers.

The Believers

2

These intermediate-tier users of 3D tools have them active in multiple areas of their business operations and are pro-actively committed to enhancing their 3D workflows. They have already achieved some level of success with a proof-of-concept for a significant business segment, securing support from key stakeholders. Furthermore, they have dedicated resources earmarked for expanding their 3D capabilities. Within these organizations, individuals engaged in this effort swiftly become advocates, bridging the gap between 3D technology and business objectives. Their enthusiasm extends to exploring how 3D integration can benefit various other areas of the business. This intermediate tier represents a stage where 3D tools have become integral to the brand's operations, and the focus is on refining workflows and establishing scalable processes.

- Key users of 3D tool in multiple areas of the business who are pro-actively improving 3D workflow.
- Structural resource allocation towards a 3D workflow.
- Successful POC for a key business area.

The Newbies

1

Businesses falling in this category have taken initial steps towards adopting 3D technology. They have made progress by selecting a suitable 3D tool, securing the necessary budget, and initiating training for key staff. However, they have not fully integrated 3D into their internal decision-making processes nor shared it with business partners or consumers. This lack of full integration limits the potential impact of transitioning to a 3D solution. A pivotal step to move beyond this stage is to stimulate interest and enthusiasm for 3D within the organization. This could involve temporarily outsourcing production to an external vendor and conceiving a creative, unique project that effectively demonstrates the capabilities of 3D technology to the entire organization, with the aim of attracting more individuals, including decision-makers, to join the initiative.

- Found a suitable 3D tool, secured budget and have begun training key staff.
- Not yet confident to use 3D for internal decision making or towards business partners or consumers.

The Slackers

0

Brands in this category are currently not actively embracing 3D workflows in their operations. Consequently, these brands have yet to fully adopt 3D design tools or utilize 3D production services. Their approach tends to face challenges during the initial phase, with 3D initiatives sometimes viewed as additional tasks. In general, these brands may have a limited understanding of the potential benefits of 3D tools and may struggle to identify a suitable starting point within the 3D realm. As a result, these brands have not yet allocated significant internal resources to develop a 3D workflow.

- No adoption of 3D design tools nor are they using 3D production services.
- No structural resource allocation towards a 3D workflow.
- Any 3D research is done on top of existing workload.

Design
Curate
Present

Dtail™

Preparing For Digital Transformation: Challenges

In the realm of 3D technology adoption, brands across various stages face distinct challenges in terms of coverage, pipeline development, and the rollout of digital processes. The sections below expand on the each of the challenges.

Coverage

Many brands among the "Slackers" and "Newbies" find themselves in the early stages of 3D sample adoption often face the challenge of 3D coverage, which refers to the ability to generate a sufficient volume of 3D content that spans across the majority of a brand's product line, enabling them to fully capitalize on the advantages of 3D technology. For these brands, coverage is often sporadic across various product groups or departments, and depending on their progress in the creative process, they may not yet be in a position to fully harness the benefits of a 3D workflow.

To expand their initial coverage, brands can consider outsourcing to specialized external vendors with expertise in 3D production. These vendors can assist in creating a reusable library of 3D content and address other technical requirements that may surpass the capabilities of the brand's internal team. It's important to note that this outsourcing approach can gradually lead certain brands toward enhancing their in-house capabilities over time.

Alternatively, expanding coverage can involve exploring technologies like 3D scanning, particularly suited for non-apparel products like footwear and accessories. Although relying on physical samples for representation has its limitations when compared to the advantages of a full 3D workflow, it can serve as a viable means for brands looking to broaden their coverage. However, it's worth noting that 3D scanning entails substantial manual effort and demands specialized expertise. Notably, this technology

is rapidly advancing and is even making its way into the consumer market; for example, the latest iPhones feature LIDAR scanners, which produce impressive results.

Moreover, the role of libraries is pivotal in enabling brands to enhance their coverage, with a paramount focus on quality. The goal is to optimize efficiency by reusing high-quality geometries through the creation of streamlined template files. These templates can serve as foundational components for generating various color variations and other product iterations. Although this endeavor requires a significant commitment, maintaining a standardized library season after season can significantly expedite scaling efforts.

To further bolster coverage, it's essential to explore the 3D capabilities of suppliers. Suppliers are rapidly evolving their expertise in this domain, presenting opportunities for collaborative efforts to maximize the utilization of 3D platforms and showcase product assortments and other capabilities. Brands can either work with suppliers that provide 3D samples or mandate existing suppliers to include 3D samples as part of their standard business practices, thus increasing their access to a greater quantity of 3D products in the short term.

Pipeline

Brands falling within the categories of "Newbies" and "Believers" encounter common challenges related to their pipeline. This pertains to their ability to ensure that the produced 3D content is not only abundant but also genuinely valuable, delivering the desired outcomes.

The challenges ahead extend beyond mere volume and coverage, delving into the realm of the pipeline itself. The primary focus is to ensure that 3D assets are created in ways that maximize their value across all intended use cases. For most brands, this entails importing these assets into third party platforms that support internal processes, using them for e-commerce or metaverse-type applications which may require specific skills that are not always readily available within internal teams.

When embarking on the journey to establish a 3D workflow, one of the most crucial decisions lies in assembling a dedicated team tasked with developing and defining standards and workflows. These choices are heavily influenced by existing processes and preferences. Ideally this task should be assigned to a specialist or team that has detailed knowledge of the brand's business and its goals, in-depth knowledge of 3D technology, and the know-how of how to design a production process as well as manage a team.

While many brands have exceptional talents capable of producing beautiful assets, the challenge often lies in scaling this level of quality for an entire collection, given constraints on time and resources. Consequently, it is strongly encouraged to prioritize and focus on consistency and repeatability in the production process, ensuring that every team member can consistently deliver reliable, high-quality outputs. Following this, it's advisable to focus on gradual and iterative improvements. In case some challenges are experienced, it is important to note that there are always vendors and software suppliers who can assist in filling specific gaps within their teams.

When crafting their workflow, brands should strive for minimal deviation from industry-standard file formats. It is advisable to prioritize open formats over proprietary ones, aligning with the original vision of software creators. This approach facilitates seamless integration with other platforms over time. Additionally, careful consideration should be given to the structure of the library.

Integrations with a 3D platform, with a preference for API-first solutions, are only as effective as the quality of the content processed through them. In this updated process, the reliance on manual labor is significantly reduced, allowing a more substantial volume of content to flow through in less time. It's crucial to bear in mind, however, that the success of these integrations' hinges on a dedicated commitment to maintaining organized, properly named, and tagged content.

Roll-out

Lastly, "Frontrunners," having achieved a certain level of coverage and established a functional pipeline, shift their focus to the roll out of their digital processes. Successfully engaging with the rest of their organization becomes a key priority. It's necessary to ensure that these processes

permeate to other parts of their organization. There are some factors which can impede the rate of the rollout and they are broken down below.

The adoption of 3D introduces additional hardware requirements that the existing workforce may not be adequately equipped for. 3D production and visualisation necessitate more processing power than standard office applications. Therefore, it's essential to ensure that teams have the necessary hardware to support these requirements. It is advised to prioritize hardware to the most dependent groups – those who are producing 3D content on a day-to-day basis. Exploring alternatives like remote access and streaming to provide access to a wider group should also be considered.

Investments are essential to yield results, but obtaining results is equally crucial to justify further investments. The continuous expansion of the 3D workflow across the organization often necessitates additional investments in terms of human resources and time allocation. Although prioritizing these investments may precede the realization of immediate results, it constitutes a pivotal step towards achieving success in this context. For brands that are relatively new to 3D technology, defining clear objectives and key results can be challenging. The key lies in gaining momentum and inspiring progress; pilot groups can be instrumental in shaping OKRs (Objectives and Key Results) and securing necessary resources.

IT and security requirements can potentially impede progress if not addressed early on. Topics to be considered are existing internal policies, confidential product and user information, cloud technology as well as potential disaster recovery. It is important to seek support and maybe approach other businesses who have navigated the same challenge to find out what best practice solutions already exist.

Digital transformation

3D

3D is a proven technology, embraced by many leading brands.

50%

Of samples can reliably be saved during the design process – using today's solutions.

EARLY

We are still early in the adoption curve, and that as much as

95%

of ROI is left untapped – there are no solutions that use digital samples to their full potential.

POTENTIAL

The total market for digital sample solutions in fashion is expected to grow to

$4.8B

in 2031, at a compound annual growth rate of 26.4%

Sources:
https://www.forbes.com/sites/forbestechcouncil/2023/03/28/web3-and-web-20-a-paradigm-shift-for-digital-fashion-business-models/

Change Management

The combination of navigating these challenges as well as adopting new digital platforms that allow brands to get the most out of their digital product libraries are difficult hurdles to clear indeed. However, we find that more often than not, the most significant obstacle is change management itself. Understanding the challenges and game planning on how to manoeuvre through them involves calculated efforts. The emotional elements involved in change management however will inevitably present more roadblocks than hurdles in the 3D journey. It is important to always remember however that roadblocks are temporary, and you do get past them.
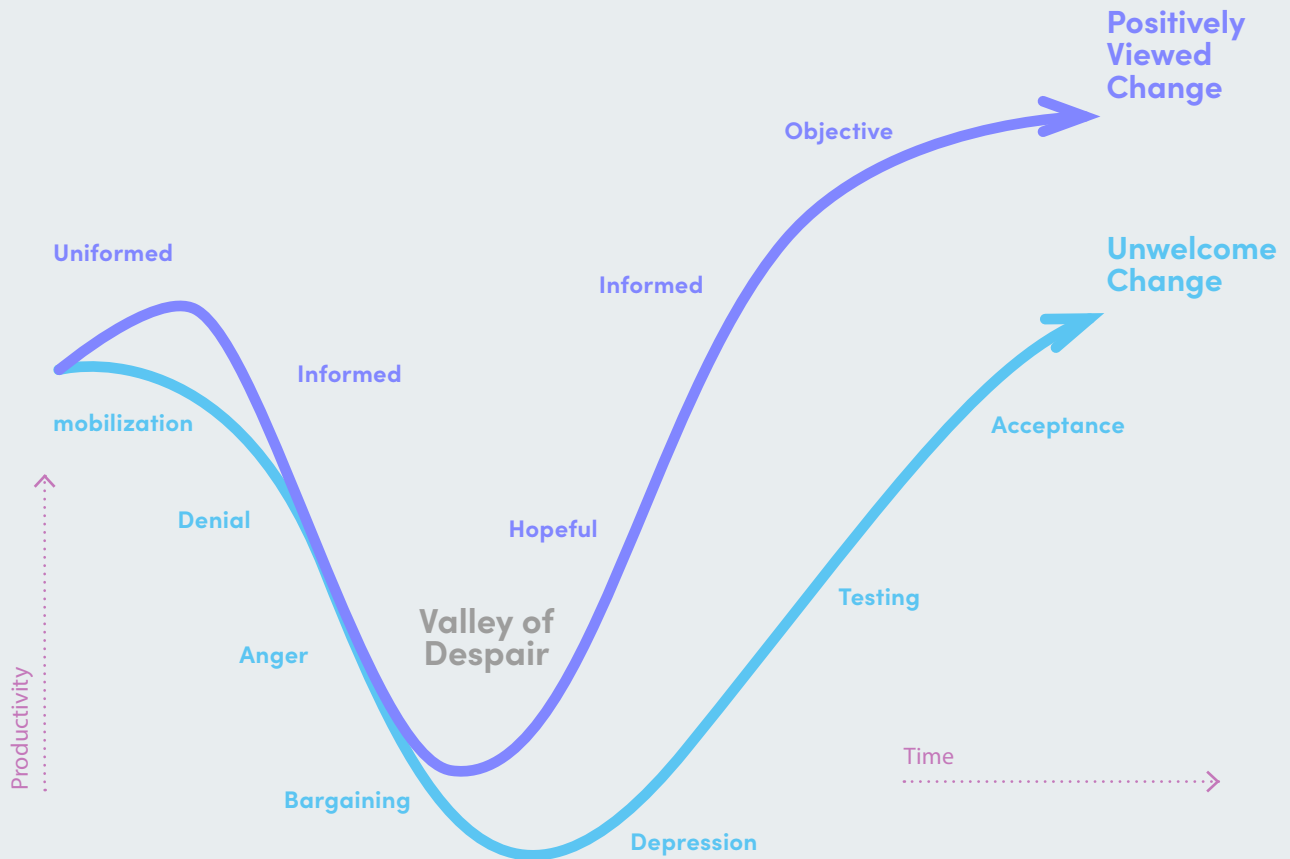
Firstly, digital maturity entails ensuring that 80% or more of your collection is available in 3D format. Secondly, a seamless workflow must be established to facilitate the smooth exchange of product data and 3D assets across platforms. Thirdly, successful integration into the value chain, with multiple business areas seeing a return on investment, is essential and can be achieved through the implementation of 3D solutions. Lastly, effective change management is crucial, particularly during the challenging "valley of despair" phase, as it plays a pivotal role in surmounting initial obstacles and ultimately reaching digital maturity.

What does Digital Maturity look like?

- **80% or more of collection available in 3D**
- **seamless workflow established to facilitate smooth exchange of product data and 3D assets across platforms**
- **successful integration into the value chain, with multiple business areas seeing a ROI**
- **effective change management**

Emotional cycles of change

Uniformed

mobilization

Informed

Denial

Productivity

Anger

Valley of Despair

Bargaining

Hopeful

Informed

Depression

Testing

Objective

Positively Viewed Change

Unwelcome Change

Acceptance

Time

NextForge
Advancing the business improvement process[sm]

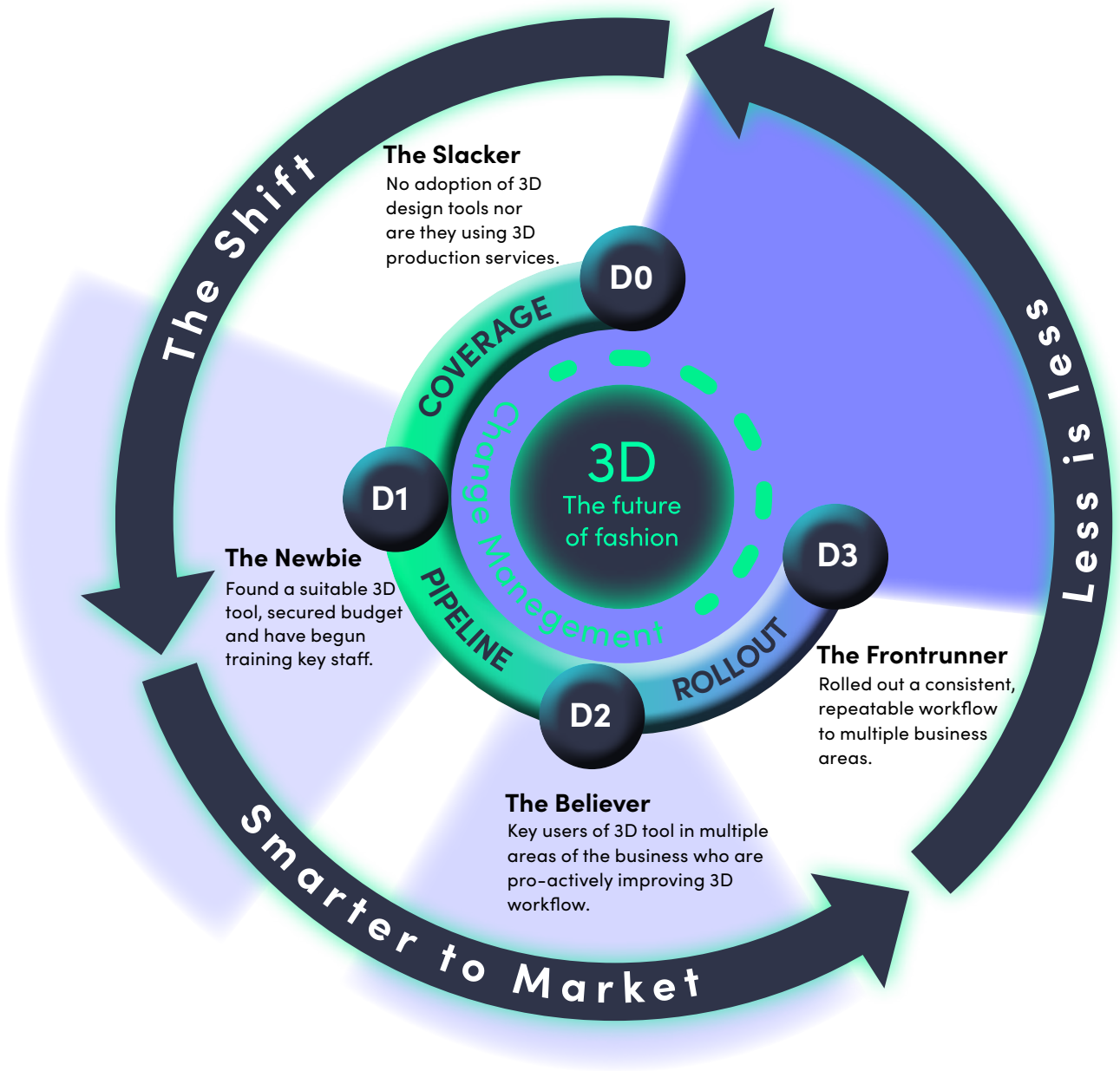Sources: Various including Elisabeth Kübler-Ross & http://jamesgoulding.com

As theorized by Kelley and Conner's (1979) study on emotional cycle of change, there are five stages that encompass change: uninformed optimism, informed pessimism, hopeful realism, informed optimism, and completion. The chart above, as explained by (Reeder, 2020) compares together the involuntary change model of Kübler-Ross with the voluntary change model of (Kelley & Conner, 1979).

Notably, as the chart showcases, the lowest area in the curve lying in between informed pessimism and hopeful realism corresponds to the "valley of despair". This situation is a consequence of the emotional challenges associated with change management. Often, companies in this situation pause their 3D journey for a time that can last as little as a season or as much as 2–3 years. Having a dedicated digital team who understands the challenges to achieving

3D maturity as well as the cycles involved in change management allows brands to navigate around this roadblock. The "valley of despair" is an inevitable phase in the change process. While it might not be directly felt within one's immediate team, it will be present in another part of the organization who will need to embrace change to allow the company to move forward. Anticipating this roadblock and making stakeholders aware of it will be the most effective defence against it. Additionally, by relying on a support network of people at other fashion brands or at industry conferences such as PI Apparel that can help deal with these challenges, brands can successfully, achieve them and move to the last phases, culminating with achieving digital maturity.

Digital Transformation
Scaling 3D Maturity and Navigating Challenges

The Shift

Less is less

Smarter to Market

The Slacker
No adoption of 3D design tools nor are they using 3D production services.

D0

COVERAGE

3D
The future of fashion

Change Management

D1

The Newbie
Found a suitable 3D tool, secured budget and have begun training key staff.

PIPELINE

ROLLOUT

D3

The Frontrunner
Rolled out a consistent, repeatable workflow to multiple business areas.

D2

The Believer
Key users of 3D tool in multiple areas of the business who are pro-actively improving 3D workflow.
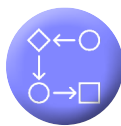

COVERAGE

Producing enough volume of 3D content to cover most of your product lines to let you take full advantage of 3D.

PIPELINE

The ability to ensure that you are producing 3D assets in ways that enable you to extract the maximum value out of your efforts, addressing all end use cases.

ROLLOUT

Ensuring these processes permeate to other parts of your organization at pace... change management, addressing IT security and hardware needs.

CHAPTER 2: PIXELPOOL & DTAIL DIGITAL SOFTWARE FOR THE FUTURE OF FASHION

3D technology is a key element in the future of the fashion industry. As leaders in digital solutions in this area of business, we draw upon our vast experience with top apparel brands and an extensive 3D apparel library to help clients save time, money, and resources across their communications, sales, and production processes.

We have a team of over 150 3D fashion specialists, artists, and developers operating across the globe. Our comprehensive range of services includes digital product and 3D environment creation complemented by the innovative 3D software tool, Dtail. As we are uniquely positioned to understand the various levels of 3D maturity as well as the challenges commonly encountered in each stage, we developed the Dtail platform to address those challenges and help usher brands through their 3D maturity levels. Dtail allows you to bring your digital and marketing tools together in one place for an immersive and interactive experience that embraces a digital workflow and provides efficiencies in the pivotal first four stages of the fashion go to market workflow: Plan, Design, Prepare and Sell.

In crafting our platform, we carefully considered the challenges that brands face at every stage of digital adoption. Additionally, through the participation in numerous pilots, trials, and the establishment of long-term partnerships with market leaders like Levi's, Nike, and H&M we have been able to continuously refine our platform features over time. Our aim is to ensure that our platform remains a forward-looking visual solution capable of addressing all the challenges associated with achieving digital maturity and maintain alignment with our core principles of empowering a culture shift in the industry that fosters better efficiency and better sustainability practices.

Better sustainability practices
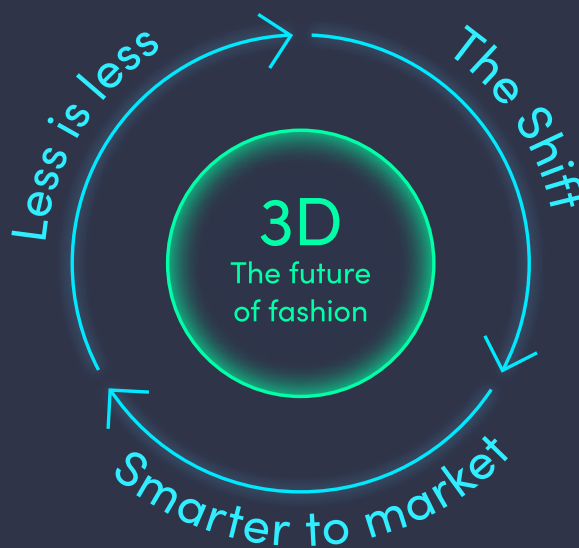
Empower a culture shift through forward visual solutions

Less is less

The Shift

3D
The future of fashion

Smarter to market

Adoption of a digital workflow

MAXIMIZE VALUE

Dtail maximizes the value of 3D by letting multiple links in the value chain benefit from digital samples.

DESIGN

PLANNING

B2B SALES

KPI'S

Dtail helps brands unlock key benefits, primarily measured by:

✓ >50% REDUCTION IN PHYSICAL SAMPLES

✓ >50% SHORTER TIME-TO-MARKET

✓ +20% B2B SALES

✓ -20% UNSOLD STOCK

SOLUTIONS

Dtail offers a state of the art, secure platform of interconnected products:

CATALOG
Store and manage 3D samples

PRINT DESIGNER
Rapidly design without specials software

CANVAS
Total control over your assortrments

SPACES
The most impactful way to present

How can Dtail help facing the challenges associated with digital transformation?

Addressing Coverage Issues with Dtail

Dtail effectively addresses the Coverage challenge with its Catalog, Designer, and Garment Library. Dtail Catalog is a cloud-based application which serves as a centralized repository, in which brands can store all their 3D assets. By seamlessly combining the capabilities of the Designer and the comprehensive Garment Library, which offers an array of standard product silhouettes with pre-made simulations, Dtail enables the swift customization of 3D garments. This means that brands can personalize their 3D products, incorporating colors, prints, and graphics, all within a matter of minutes, thus eliminating the need for extensive expertise in dedicated 3D software. Additionally, skilled designers can design 3D garments leveraging their extensive design experience while utilizing existing skills in design, photoshop and illustrator as well as the simple drag and drop functionality of any computer. Dtail's

Garment Library is equipped with body, fold, and hanging simulations for every style. Once a body simulation is crafted, the corresponding product map seamlessly transfers to fold and hanging simulations. The significance of this streamlined process becomes evident when considering that what would typically demand 16-20 hours to produce (body, hanging, and fold simulation) could now be accomplished in as little as 10 to 30 minutes. From a coverage standpoint, this represents a substantial paradigm shift, allowing for increased productivity in less time. Moreover, it empowers individuals within an organization with varying levels of 3D software proficiency to contribute effectively, making Dtail a game-changer in the realm of 3D product creation.

Addressing Pipeline Issues with Dtail

Dtail effectively addresses the Pipeline challenge through its API-first design and versatile platform architecture. The platform's API-first design ensures seamless integration with various systems, including PLM, DAM, ERP, and order intake systems. This API-centric approach enables Dtail to adapt to existing IT

infrastructure, allowing users to populate the platform effortlessly with their current systems. This not only saves time but also enhances organizational efficiency.

Dtail's capacity to accept multiple formats for content upload adds to its versatility. Users can seamlessly upload 3D content in a variety of formats, including GLB and OBJ, while sketches and inspirational imagery find support in png, jpg, and pdf formats. For videos, the platform accommodates the mp4 format. It distinguishes between optimized and unoptimized assets, with GLB files serving as the "one source of truth". Dtail's approach simplifies the user experience by handling optimizations on the platform side, converting unoptimized GLB files into "platform ready" assets. Dtail's ability to distinguish between optimized and unoptimized assets is critical as optimized assets are suitable for scaling in virtual spaces, while unoptimized assets find their application in product detail pages. The platform takes care of optimizations, converting unoptimized GLB files into virtual space ready assets, including merging multiple meshes into one, consolidating multiple materials into a single material, and baking textures into a single, square texture. Dtail's commitment to handling optimizations on the platform side simplifies the user experience, making it more accessible and efficient for brands.

Leveraging PixelPool's extensive 25 years of experience in digital creation services, we can provide clients with expert advice on optimal pipeline solutions tailored to their specific requirements. The synergy between access to Dtail and our wealth of experience proves to be a significant advantage in surmounting the pipeline challenge.

Addressing Rollout Issues with Dtail

Dtail effectively tackles the Rollout challenge as a cloud-based platform supporting a comprehensive 3D collaboration workflow within fashion organizations. This platform facilitates the storage of 3D assets, data, and marketing content, providing seamless access to all elements within virtual environments.

By fostering a fully integrated 3D collaboration workflow, Dtail empowers different teams within fashion organizations to collaborate efficiently. This cloud-based approach ensures accessibility and ease of use, allowing fashion brands

GLB Format – why do we call them the one source of truth.

Embracing digital transformation can seem daunting, especially when dealing with the considerable size of individual 3D products. However, the GLB file format, encapsulating 3D scenes, models, lighting, materials, node hierarchy, and animations, presents multiple advantages. It eliminates the need to upload separate images and meshes, ensuring small file sizes and fast load times. The compressed nature of GLB retains accessibility for various programs' downstream, making it ideal for applications such as Virtual Reality (VR), Augmented Reality (AR), games, and web applications.

30 day snapshot 3D Maturity Level of Dtail Customer types

Most of our customers operate as both retailers and wholesalers and leverage 3D technology for both internal purposes but also see a lot of value in wholesale presentations. Finally, some of the frontrunners operate vertically, meaning they own the whole or most of the value chain- making it easier, and more rewarding to integrate 3D technology throughout.

Our customer base split by maturity levels and brand segmentation

Our clients

Clients we work with have differing needs based on where they land with regards to their digital maturity and individual product offering.

Case study SAE-A →

Dtail
Unleash the Full Potential of 3D

IMMERSIVE • COLLABORATIVE • CONTENT RICH • SECURE • ORGANIZED

Welcome to Dtail, your gateway to the future of fashion design. Our revolutionary platform seamlessly integrates with industry-standard 3D tools like CLO and Browzwear, unlocking the untapped value of 3D design. Elevate your creations by uploading custom 3D content into fully customizable showrooms, redefining interaction for designers and customers alike.

Notably, Dtail leads fashion's 3D revolution with an API-first approach, integrating seamlessly not only with 3D tools but also with data-focused platforms like PLM and ERP systems. Future-proof your brand with Dtail—where innovation meets creativity, design meets immersion, and preparation meets progress.

Experience the versatility of Dtail as multiple roles benefit from presenting 3D content in a virtual environment. Designers conduct design reviews, merchandisers balance assortments, and salespeople seamlessly present and sell-in collections to their accounts, fostering collaboration across the entire fashion ecosystem.

Catalog

Create	Plan	Analyze
& Store	& Organize	& Filter
Products	Collcetions	Data

While Dtail prioritizes accessible, user-friendly features, it also supports advanced users aspiring to build realistic retail environments. Though achieving this level of detail requires effort, Dtail ensures users with the right content can bring their vision to life.

Virtual Showrooms

Visualise	Merch	Sell
& Customise	& Update	& Present
Digital Showrooms	Digital Showrooms	To Clients

CHAPTER 3: SUSTAINABILITY

As the fashion industry is characterized by brief production cycle, brands necessitate the capacity and flexibility to swiftly adapt collections in accordance with demand trends and the latest runway presentations (Xiao & Jin, 2011).

As a consequence of this demand for agility, the fashion industry's production processes have given rise to detrimental environmental and socio-economic consequences. The industry is characterised by overproduction of apparel (Pucker, 2022). As per insights from fashion sustainability consultant Hasmik Matevosyan (2016), 30% of clothing production goes unsold, an additional 30% necessitates substantial discounts, and 15% of materials are left unused at the factory due to production errors and cutting inefficiencies. Approximately 73% of discarded clothing is subsequently incinerated or deposited in landfills. The industry annually generates a staggering 92 million tons of waste (UN Helps Fashion Industry Shift to Low Carbon,

2017). Moreover, it contributes approximately 4% of global greenhouse gas emissions (Berg, Lee, Magnus, & Granskog, 2020). Over 70 percent of these emissions stem from manufacturing processes, while the remaining portion originates from retail, logistics, and product utilization (such as washing and drying) (Berg, Lee, Magnus, & Granskog, 2020).

In 2020, the textile industry ranked as the third-largest contributor to water degradation and land use (European Environment Agency, 2022). During that period, an average of nine cubic meters of water, 400 square meters of land, and 391 kilograms (kg) of raw materials were required to supply clothing and footwear to each citizen of the EU. (European Environment Agency, 2023)

According to McFall Johnsen (2020) to achieve lower price points and quicker production times, companies make use of lower quality products from non-renewable sources, like polyester,

Fashion's problem

EMISSIONS

The fashion industry is responsible for up to

8%

Of global carbon emissions that contribute to climate change. Year over year they are only increasing.

WASTE

That same industry produces a staggering

92M

Tons of waste annually. Every second, a truckload of textile waste is dumped into landfills or incinerated.

UNSOLD STOCK

To make matters worse, an estimated

30%

Of all clothing produced never gets sold. This makes overproduction a serious contributor to the problem.

Sources:
https://stand.earth/press-releases/major-fashion-brands-increase-emissions-in-2022/
https://www.fashionrevolution.org/waste-is-is-it-really-in-fashion/#:~:text=The%20number%20of%20garments%20produced,is%20landfilled%20or%20burned%20globally
https://globalfashionagenda.org/product/pulse-of-the-fashion-industry-2017/
https://fashionunited.uk/news/fashion/infographic-the-extent-of-overproduction-in-the-fashion-industry/2018121240500

which is found in around 60% of garments. This has a negative impact on the environment, as washing clothes releases around 500,000 tons of microfibers in the ocean each year, significantly contributing to pollution. Overall, the industry contributes to 20% of worldwide polluted wastewater (UN Helps Fashion Industry Shift to Low Carbon, 2017). A major cause of the fashion industry's water pollution can be attributed to the textile dyeing process, whereby its leftovers are discarded into ditches, streams, or rivers (European Parliament, 2023). This has a detrimental impact on the well-being of the local inhabitants, wildlife, and ecosystems in the vicinity of these factories (European Parliament, 2023).

Additionally, as articulated by the European Environment Agency (2023), textile manufacturing processes involve the utilization of a significant quantity and assortment of chemicals. In this regard, approximately 3,500 different substances find application in textile production. Notably, among these, 750 have been designated as posing risks to human health, while 440 have been identified as

having adverse effects on the environment. This intricate network of chemical use has far-reaching consequences, with an estimated 20% of worldwide water pollution stemming from the dyeing and finishing of textile products, thereby impacting the well-being of laborers and local communities. Moreover, during the laundering of textile items, the release of chemicals and microplastics into domestic wastewater is a pressing concern. Research suggests that nearly half a million tons of plastic microfibers are discharged into the oceans each year due to the washing of plastic-based textiles. However, as Greenpeace reports, companies are actively working on reducing the toxicity levels of the chemicals used within the industry. Specifically, the companies which signed the Detox commitment in 2011, were able to make a significant and positive change in the course of 7 years.

Lastly, the industry faces severe criticism for another prevailing practice: the outsourcing of segments of the manufacturing process to factories in emerging markets, chosen for their lower production costs (Dickson &

CHEMICAL VILLAINS the 11 priority hazardous chemical groups	Examples of uses /functions	Examples of hazards to environment and human health and relevant regulation
1. Alkylphenols/alkylphenol ethoxylates (APs/APEs), including nonylphenols/ nonylphenolethoxylates (NPs/NPEs)	Detergents and auxiliaries	APs: toxic to aquatic life, persistence, bioaccumulation,
2. Phthalates	Softeners in plastic coatings	Some phthalates are classed as reprotoxic, others are known for other types of toxicity. Under EU REACH legislation many phthalates are listed as Substance of Very High Concern. 13
3. Brominated and chlorinated flame retardants (BFRs, CFRs)	Fire retardant textiles	Many are persistent and bioaccumulative. Some PBDEs are endocrine disruptors and are banned under EU law.
4. Azo dyes with cleavable carcinogenic amines	Dyes and colourants	Release chemicals known as aromatic amines, which are carcinogenic for these azo dyes. Banned by the EU in textiles that come into contact with human skin.
5. Organotin compounds	Antibacterial and anti-mould agents;	Some organotins are persistent, bioaccumulative, and can affect immune and reproductive systems. Consumer products containing more than 0.1% of some organotin compounds are banned in the EU.
6. Per- and polyfluorinated chemicals (PFCs)	Water-, oil-, stain- resistant coatings	Many PFCs are persistent and bioaccumulative. Some can affect the liver or act as endocrine disruptors, altering levels of growth and reproductive hormones.
7. Chlorobenzenes	Carriers	Persistent, some are bioaccumulative, commonly affect the liver, thyroid and central nervous system; HCB is an endocrine disruptor.
8. Chlorinated solvents	Carriers/solvents	Effects vary from chemical to chemical: potential health effects include central nervous system, reproductive, liver, and kidney toxicity, and carcinogenicity.14 Regulations include a severe restriction on the use of TCE in the EU in both products and fabric cleaning
9. Chlorophenols	Antibacterial and anti-mould agents	PCP (penta chlorophenol) is highly toxic to humans and can affect many organs in the body. It is highly toxic to aquatic organisms. The EU banned production of PCP-containing products in 1991.
10. Short chain chlorinated paraffins	Flame retardant & finishing agent	Highly toxic to aquatic organisms, persistent, bioaccumulative. Their use has been restricted in some applications in the EU since 2004.
11. Heavy metals: cadmium, lead, mercury and chromium (VI).	Dyes and colourants; additives in some plastic coatings	Some can bioaccumulate in the body over time and are highly toxic, with irreversible effects including damage to the nervous system (lead and mercury) or the kidneys (cadmium). Cadmium is also known to cause cancer.

Warren, 2020). These factories, often referred to as "sweatshops," are typically marked by the employment of child labor, harsh working conditions, excessively long working hours, meager wages, and limited labor rights and protection (Roozen, Raedts, & Meijburg, 2021). Nevertheless, in the current years, companies have been making progress in regard to the matter, either by moving the production process in other countries or by adhering to industry standards.

While the current situation in the fashion industry calls for immediate change, it is important to mention that more and more companies are actively seeking to eliminate their negative environmental and socioeconomic effects. One of the avenues they pursue for this transformation is the modernization of their supply chains including going to a digital flow, where possible.
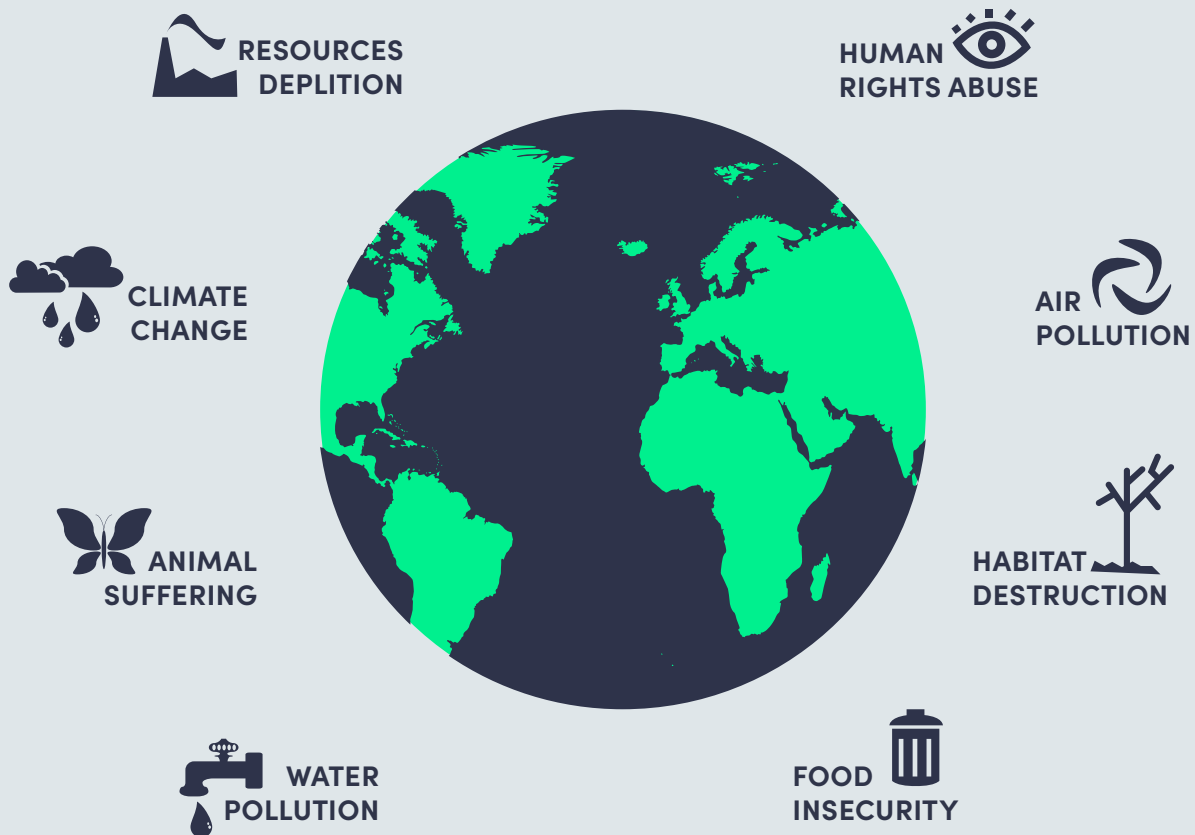
What is CO2?

Carbon dioxide, or CO2, is a colorless gas with a faint odor and sour taste. It's a minor component of Earth's atmosphere (about 3 in 10,000 parts) formed during combustion, fermentation, and respiration. CO2 acts as a significant greenhouse gas, contributing to global warming by trapping radiant energy and creating the greenhouse effect.

How does CO2 impact the environment?

As explained by Fecht (2021) Carbon dioxide (CO2) affects the environment by acting as a greenhouse gas, similar to a thermal blanket. When sunlight reaches the Earth's surface, it absorbs energy and releases it as infrared heat waves. Most gases in the atmosphere, like oxygen and nitrogen, do not interfere with these heat waves and allow them to escape into space. However, greenhouse gases like CO2 work differently. They absorb and re-emit infrared energy, creating the greenhouse effect. This means that some of the heat is trapped in the atmosphere, leading to higher temperatures on Earth and influencing the environment.

NEGATIVE IMPACT OF THE FASHION INDUSTRY

RESOURCES DEPLITION

HUMAN RIGHTS ABUSE

CLIMATE CHANGE

AIR POLLUTION

ANIMAL SUFFERING

HABITAT DESTRUCTION

WATER POLLUTION

FOOD INSECURITY

CONCLUSION

We know that the fashion industry faces increasing scrutiny for its environmental and ethical impact. In this white paper we have pulled together much of the literature in the market on this subject. Swift production cycles and low prices, core features of the industry, contribute to environmental degradation and social issues. Overproduction, material waste, greenhouse gas emissions, and resource consumption plague the sector. These challenges necessitate a shift toward sustainability where digitalization, specifically 3D technology, emerges as a solution. "Going digital" enables brands to create, visualize, and market their products more efficiently, but by adopting a 3D workflow, brands can also reduce waste, emissions, and resource consumption and thus contribute to their sustainability goal. All this while accelerating their time-to-market and making wiser and more informed production decisions.

Recently, however, there has been a pushback towards physical sampling due to the potential heavy lift of adopting a digital workflow. Many who are familiar with 3D transformation attributed this regression to the speed in which 3D was adopted during the covid epidemic without proper mentorship programs. Some brands hit significant roadblocks which highlight the need for a more gradual transition and phased approach to 3D transformation. In this white paper, we both magnify the process of 3D technology adoption within organizations and provide some mentorship by outlining a 3D Maturity Scale to demonstrate what progression looks like in the transformation process. We also outline how each stage offers challenges and recommend solutions for overcoming those challenges. We highlight how change management is a critical aspect in adopting a 3D workflow as it can derail even the most well thought out plans if it is not taken seriously and addressed early.

The fashion industry's journey toward sustainability, efficiency, and innovation is linked with its embrace of 3D technologies. As change sweeps through every facet of this dynamic sector, we stand ready to support brands in surmounting obstacles, achieving digital maturity, and embracing a future where fashion is not only forward-looking but also environmentally and ethically responsible. Together, we have the power to reshape the fashion industry into a more sustainable and innovative force for the years to come. We can only get there, however, by sharing our experiences of learning from the hiccups we encounter along the way and adopting best practices going forward.

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