# PULSE OF THE FASHION INDUSTRY

2018

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Global Fashion Agenda is a leadership forum on fashion sustainability. Anchored around the world's leading business event on sustainability in fashion, Copenhagen Fashion Summit, Global Fashion Agenda advances a year-round mission to mobilise the global fashion system to change the way we produce, market and consume fashion, for a world beyond next season. A non-profit initiative, Global Fashion Agenda collaborates with a group of Strategic Partners including Kering, H&M, Target, BESTSELLER, Li & Fung and Sustainable Apparel Coalition on setting a common agenda for focused industry efforts on sustainability in fashion.

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# INTRODUCTION

# GUIDANCE FOR A BETTER FASHION INDUSTRY

The fashion industry has a major opportunity to secure a prosperous future. The industry is facing a rapidly growing demand worldwide, and at the same time many companies are stepping up their work toward more environmentally and socially responsible practices. But this is not enough. To put fashion on a path to long-term prosperity financially, socially, and environmentally, much more must be done.

The Pulse of the fashion industry is still weak. The global Pulse Score, a health measure for the Fashion Industry, is 38 out of 100. In the past year, the Pulse Score improved by six points, from 32 to 38. The Pulse Survey, covering the perspectives of decision makers from all industry segments, confirms that sustainability is rising on the corporate agenda. Of the executives polled, 52% reported that sustainability targets acted as a guiding principle for nearly every strategic decision they made—an increase of 18 percentage points from last year. While encouraging, these results also speak to the need for still more movement toward increasingly responsible practices.

This year's progress came almost entirely from small and medium companies in the mid-price segment. Their average Pulse Score increased by 10 points. Given this segment accounts for half of the industry by revenue, progress here is particularly encouraging. However, other industry segments showed less progress in addressing their environmental and social footprints. The low-performing smaller companies in the entry-price segment remained significantly behind, making little to no progress since last year. The giant companies and luxury players still lead the way but finding solutions for the unresolved problems is becoming tougher and impact and returns are receding.

The goal of this year's Pulse Report is to share existing best practices and proven solutions, as a guide to the industry as a whole. In interviews, we have uncovered important actions industry players have taken, and identified the advanced players' success factors and lessons learned. What we found is that most companies' sustainability journeys follow a similar pattern, and that their environmental and social performance improves in phases. Together with frontrunners in the industry, we charted the trajectory from their first steps to implementing the most advanced practices. The result, what GFA and BCG call the Pulse Curve, provides a valuable guide for the entire industry. The majority of industry players can use it to assess and accelerate their own journey, deploying the frontrunners' learnings. The process is ongoing—as the industry leaders continue to experiment and advance, the rest of the industry continues to learn from them, moving the whole industry to better practices.

## THE ROADMAP TO SCALE

The Global Fashion Agenda and the Boston Consulting Group, together with key players from the fashion industry, have assessed existing high-impact and implementable solutions to develop the Roadmap to Scale. It describes tangible actions, best practices, and key success factors for nav-

igating the journey to a more responsible fashion industry. Companies can adapt these measures not only to improve their environmental and social performance, but also to raise their profitability. Even without considering the positive effects on brand building and risk management, there is a sound business case. By realizing the potential savings and efficiency increases described in the Roadmap to Scale, companies will see an uplift in their profitability by 1 to 2 percent.

The Roadmap to Scale first calls on companies to lay the organizational foundation: a dedicated team with a budget and strategic goals, and a mandate to gain tractability over supply chains. The mid-sized players that drove this year's improved Pulse Score did so largely by setting a strategy and creating traceability into their activities.

After laying this foundation, fashion players can focus on starting to make impactful improvements to core steps in the value chain—including material mix, working conditions, and efficient use of water, energy, and chemicals—to increase their environmental and social performance. Companies at this stage are gaining momentum, building their capabilities and first proofpoints while boosting the Pulse Score. This is where investments start to generate financial return.

More advanced players that have moved beyond focusing on those core initiatives continue to scale existing solutions in their supply chain, but at the same time they're investing in innovation programs that will set new best practices for the industry to follow.

However, frontrunners that have worked their way through all these stages along the Pulse Curve find identifying these innovations increasingly complex. At this stage, individual efforts have a diminishing effect and the impact is only incremental.

## CREATING SYSTEMIC CHANGE THROUGH COLLABORATION

Even under optimistic assumptions, the industry's existing solutions and business models will not deliver the impact needed to transform the industry. Fashion needs a deeper, more systemic change.

To rekindle momentum, the industry needs to innovate and to invest jointly to target the unsolved challenges in the value chain with new solutions. Fashion companies must join forces with suppliers, investors, regulators, NGOs, academia, and consumers to create an ecosystem that supports transformational innovation and disruptive business models. This is especially important for the most difficult steps in the value chain: raw materials and end-of-use. Companies cannot overcome these challenges alone.

The required fundamental changes will not be easy in such an asset-intensive industry. Many of these innovations will need significant investments and pre-competitive collaboration to become commercially viable. The most promising areas are: Sustainable Materials Mix, Closing the Loop, and Industry 4.0. In other areas of the value chain that currently see below-average scores, a stronger push is yet to come.

This report offers both the Roadmap to Scale and a glimpse into the future of the fashion industry. It sketches out potential new business models for how clothes could be made, distributed, and consumed. Changing consumer behaviors and rapidly evolving technology will shape and challenge the industry in unpredictable ways. Yet we are confident about the industry's future. Its leaders and their colleagues bring enormous creativity, energy, and passion to the business. Once bolstered by an industry-wide commitment to a vision of future possibilities, the industry can achieve long-term prosperity.

# CHAPTER ONE

# 2018 PULSE CHECK OF THE INDUSTRY

THE FASHION INDUSTRY'S PULSE SCORE INCREASED FROM 32 TO 38 IN THE PAST YEAR

Over the past year, the fashion industry's overall Pulse Score rose from 32 to 38 out of 100 possible points. While all progress is encouraging, the Pulse still remains weak across the majority of the industry. Most of this change has proven incremental, with large parts attributed to improvements by average-performing company segments. However, a broader application of existing solutions proves not to be enough to accelerate change going forward. There is still much room for improvement. Especially small to mid-sized companies in the entry-price segment have shown little progress over the past year.

This chapter delves into the industry's Pulse Score to understand where progress has been made and not. As in the 2017 report, GFA and BCG analyzed the detailed data from the Sustainable Apparel Coalition's (SAC) Higg Index*—the industry's assessment tool for environmental and social impact throughout the value chain. We complemented the data with a survey of industry executives (the Pulse Survey), and interviews with stakeholders across the value chain (see page 12). The analysis not only generated the overall Pulse Score for the industry, but also helped chart the typical trajectory of a company's sustainability efforts: the Pulse Curve. It displays the companies' development along the different phases. Evaluating the Pulse Curve, fashion companies can not only determine their individual position on the curve but gain insight into what can come next.

**PROGRESS IN THE MIDDLE**

There is still a considerable gap in sustainability performance that breaks down according to company size and market segments, with the large fashion players, luxury companies, and Sustainability Champions** remaining the industry's frontrunners. Still, mid-price companies have started to catch up (see exhibit 1 on page 13). As this segment comprises half of the industry by revenue, progress here is encouraging. The companies in the second-highest performance quartile jumped from 32 to 43, and those in the third quartile rose from 22 to 32. A few brands' Pulse Score even increased up to 31 points, demonstrating that rapid improvement is possible. Taking structured actions such as defining sustainability targets and increasing traceability within the supply chain were key actions contributing to this progress. Nearly all of this year's Pulse Score improvement came from these two quartiles, which last year were among the weak and average performers.

Those in the top and bottom quartiles, by contrast, saw slower change: the top performers went from 63 to 64 points. While amplifying and scaling their efforts, their realized results become more incremental, seemingly approaching a point where the impact of existing solutions lessens. The lowest performers advanced from 11 to 12 points, leaving their overall gap in sustainability performance unchanged.

* For more information, see www.appparelcoalition.org

** Sustainability Champions: Sustainability is part of their core strategy and decision-making framework. These typically smaller companies regard sustainability as a key differentiator in their strategy and align their actions, products, and communications behind it.

# TAKING THE PULSE OF THE FASHION INDUSTRY

## Why a Pulse Score?

The Pulse Score is a global and holistic baseline of the sustainability performance in the fashion sector. It is based on the Sustainable Apparel Coalition's proprietary Higg Index and extends its scope to extrapolate its findings to the entire industry. The Higg Index is the most extensive and representative existing transparency measurement tool of the industry. It covers the majority of large companies and was extended to gain a view on currently underrepresented small to medium-sized players.

Gaining full transparency on the sustainability level of the industry as a whole is important because it gives the industry a common understanding of what the most critical issues across the value chain and by impact areas are. Perhaps more important, it creates a foundation for the landscape for change, channeling investment and innovation into those areas that smart businesses will capture and benefit from.

As the Pulse report will be released annually, the Pulse Score further allows tracking the progress of the industry over time.

### About the Higg Index

The Higg Index, developed by the Sustainable Apparel Coalition, is a suite of self-assessment tools that empower brands, retailers, and facilities of all sizes, at every stage of their sustainability journey, to measure their impact on environmental and social dimensions and to identify areas for improvement.

The Higg Index has three modules: brand, facilities, and product. The brand module measures amongst others the degree of transparency, environmental/social impact tracking as well as fashion brands' collaboration with facilities. The facilities module focuses on environmental and social measures implemented by fashion-industry suppliers. The product module provides general frameworks to be utilized especially by brands in their design processes to optimize design and material choices with regard to sustainability.

## Methodology

The Pulse Score was developed based on:

**SAC Higg Index Brand Module** as underlying data set source, clustered into segments to detect patterns[1]

And complemented by:

1. **Expert interviews** going through Higg Index Brand Module questions to test patterns and validate and pressure testing answers live with sustainability managers
2. **Pulse Survey** answers to reconfirm sustainability patterns and performance to increase sample size and fair market representation further
3. **Expert sounding board** to validate and discuss results

To get a representative view of the entire market, results were analyzed by company size and price positioning, and reweighted according to the overall market structure based on revenue contribution.

1. The brand module is unverified, meaning in this context that it is based on a self-assessment and that it has not been audited or reviewed externally.

## The Pulse Score

The Pulse is a performance score, powered by the Higg Index, for measuring and tracking the sustainability of the global fashion industry on key environmental and social impact areas. By design it is impossible to achieve a score of 100 on sustainability, as this is intended to be aspirational.

Overall, the Pulse Score of the fashion industry is:

**38 / 100**

Measured on a scale from

**1 – 100**

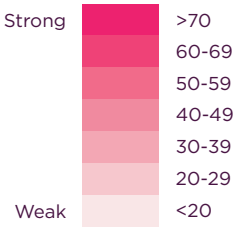
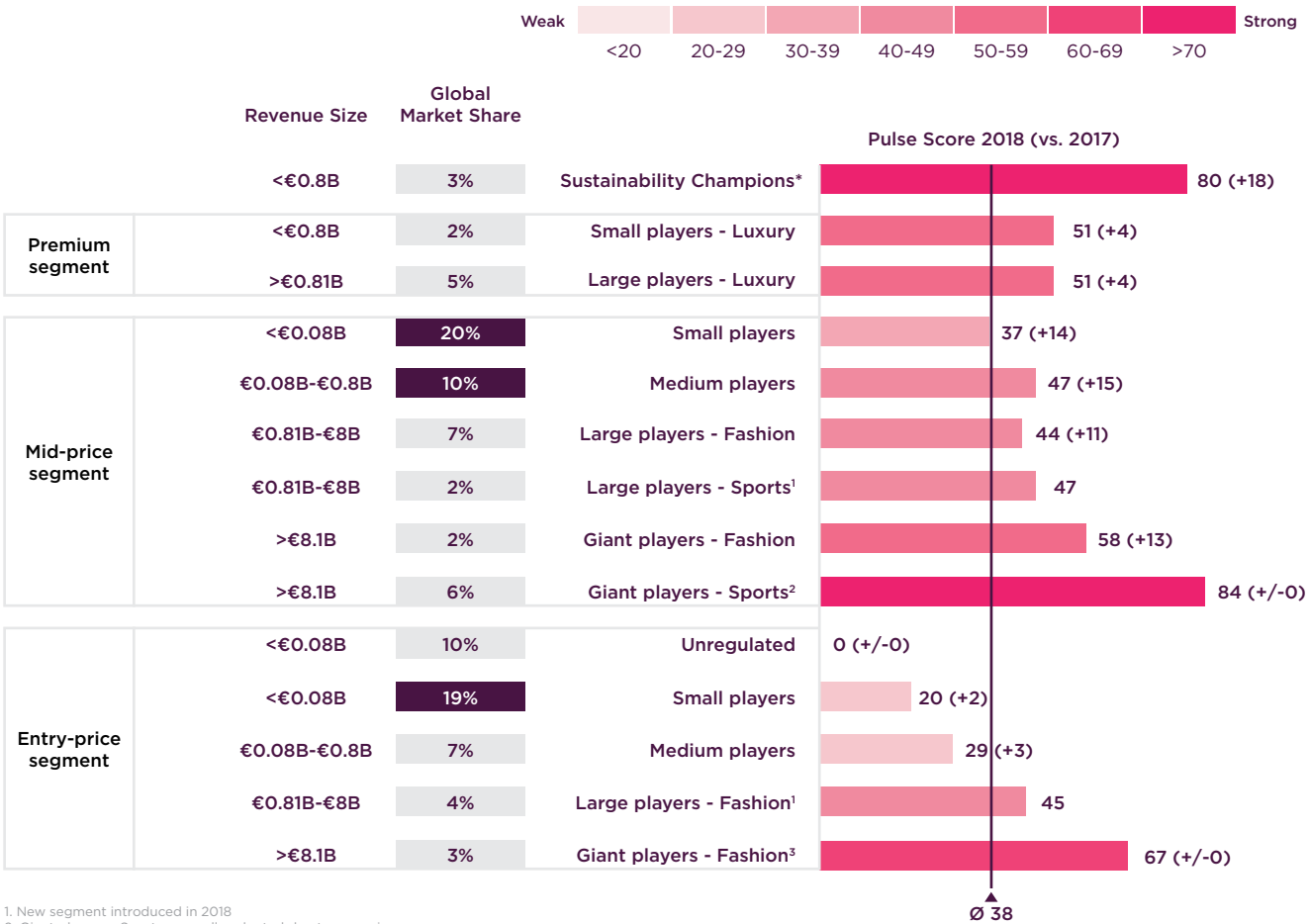


**Exhibit 1** **Pulse Scores by segments and sizes**
Biggest advancement by mid-price segment; size remains highly correlated with sustainability performance




1. New segment introduced in 2018
2. Giant players – Sports manually adapted due to errors in completing Higg Survey
3. Giant players – Entry-price fashion manually adapted due to different revenue thresholds compared to last year

*Note: Sustainability Champions: Sustainability is part of their core strategy and decision-making framework. These typically smaller companies regard sustainability as a key differentiator in their strategy and align their actions, products, and communications behind it

For the industry as a whole, environmental and social matters are becoming a priority for an increasing number of companies. While in 2017 only 56% of executives in the Pulse Survey had multiple sustainability-related targets, 66% have now reached this level. Even more encouraging, 52% reported that these targets acted as a guiding principle for nearly every strategic decision they made, an increase of 18 percentage points (see exhibit 2 on page 14).

Despite the strong advances of the mid-price companies, size continues to be a major determinant of performance in sustainability for the industry as a whole. The exception is the luxury segment, where small as well as large players are doing well. Frontrunners among the luxury players have anchored sustainability into their strategy and corporate identity.[1] Especially in the field of raw materials, luxury players have pushed for progress and have shown continual improvement.

As a group, the Sustainability Champions had the biggest Pulse Score gains at 18 points, from 62 to 80. Having sustainability at the core of their brand appeal and their mission, these companies address sustainability holistically including it both into their core strategy and decision-making framework. While these Sustainability Champions tend to be of smaller size, their accelerated efforts put them among the Pulse Score leaders.

The strong performance of sportswear giants mainly stems from two factors: the result of early controversy over working conditions at supplier factories and their heritage of delivering high-performance products.

# THE REALITY AS EXPERIENCED BY FASHION SUSTAINABILITY PROFESSIONALS

**About the Pulse Survey**

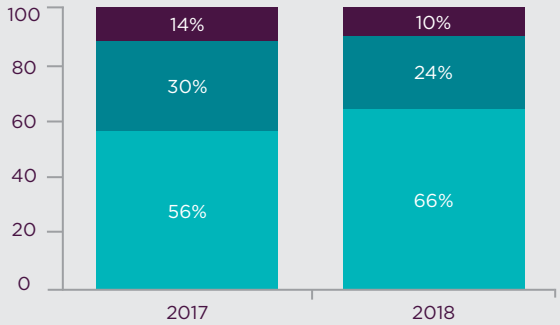
BCG and GFA polled over 90 senior managers responsible for sustainability issues across a range of fashion companies, from large international brands to small and medium-sized companies spanning various price segments and distribution models globally. The managers were asked about the integration of sustainability topics in their organization and their sustainability strategy as a whole, and queried about specific focus topics along impact areas and value chain steps. Additionally, their views were sought on which barriers prevent progress and which stakeholders should take responsibility.

The respondents were also invited to share their perspectives on the best ways to advance the industry's standing on sustainability.

**Exhibit 2**

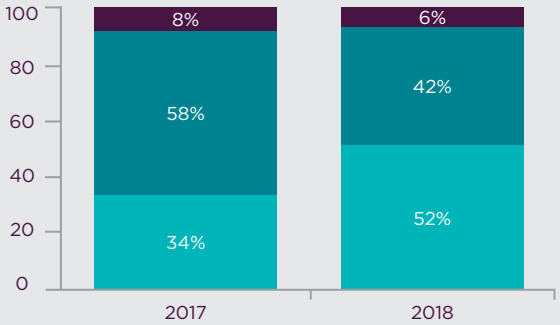
## Compared to last year more companies have started the groundwork by setting targets

**Are there sustainability-related company targets?**




- No, there are no sustainability-related company targets
- Yes, but only a few sustainability-related company targets exist
- Yes, multiple sustainability-related company targets exist (more than five)

**What role do these company targets play in the overall strategy?**

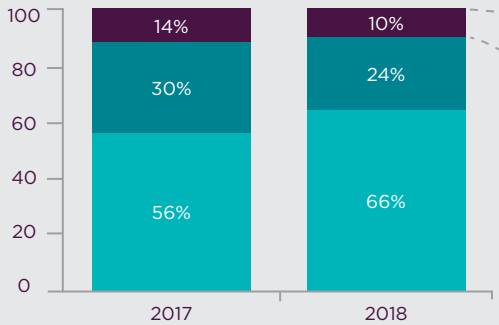



- Not yet an influencing part of company's strategy
- Are included in company's strategy but other factors guide decision making
- Drive company's strategy, acting as guiding principle for nearly every decision

**Exhibit 3**

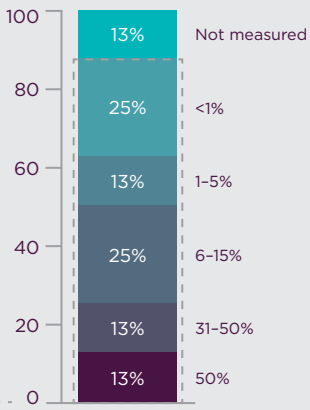
## Even those companies that do not have sustainability targets occasionally engage in the topic

**Are there sustainability-related company targets?**

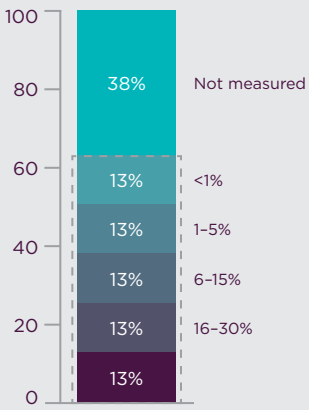



- No, there are no sustainability-related company targets
- Yes, but only a few sustainability-related company targets exist
- Yes, multiple sustainability-related company targets exist (more than five)

**Which share of your clothing and accessories is made of sustainable materials?[1]**




**Which share of your revenue is currently achieved with products explicitly marketed as sustainable?[1]**

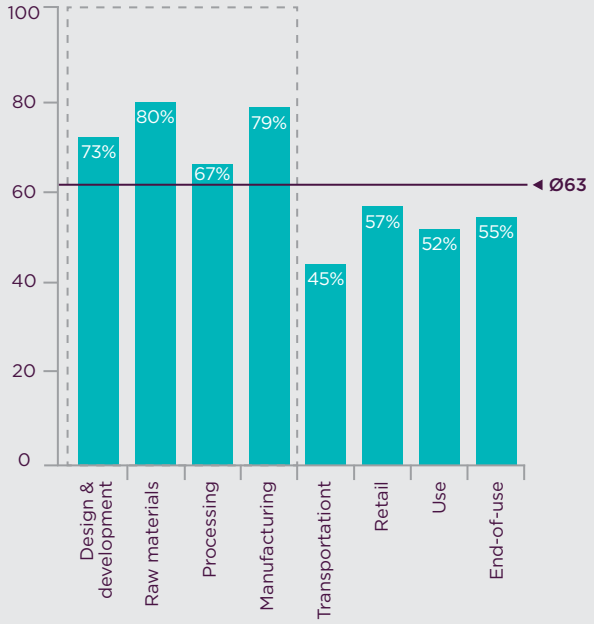



1. Subset of respondents who indicated not to have any sustainability-related targets in their organization

**Exhibit 4**

## Raw materials and manufacturing will remain high on the agenda and focus on end-of-use will increase

**Which areas of the value chain have you prioritized in the last year?**

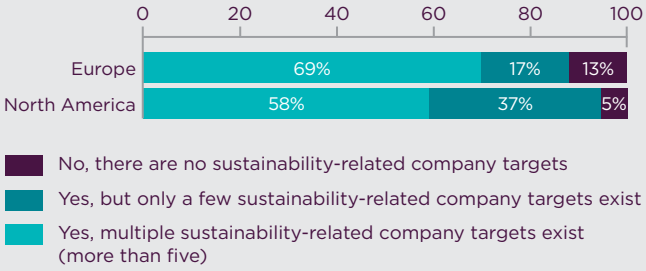



**What areas of the value chain will you prioritize in the next 1-2 years?**

**Exhibit 5**

## European companies are more advanced in formulating detailed sustainability targets for each impact area

**Are there sustainability-related company targets?**




**For which of the following impact areas are targets defined?**

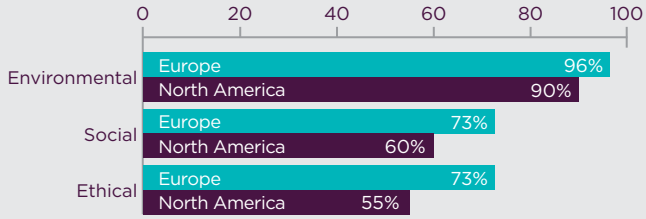
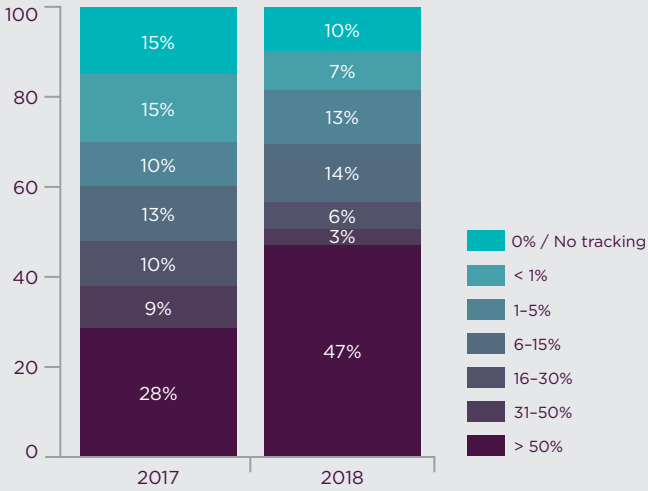



**Exhibit 6**

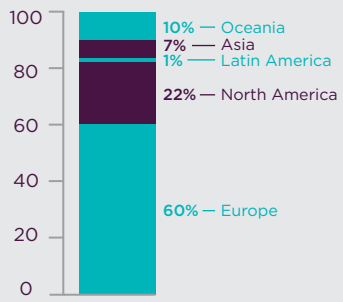
## Volume of sustainable materials has increased significantly in the last year

**Which share of your volume is made of preferred materials (e.g., organic, recycled, fair trade, BCI, Tencel®)?**

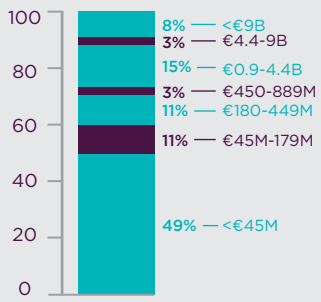



## Survey sample

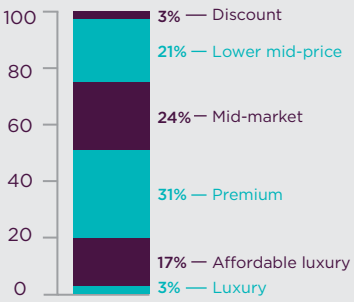
**Geography**




**Company size**




**Company price segment**




Source: Pulse Survey Analysis, n=90

**Exhibit 7** **Pulse Score by value chain steps**
The Pulse Score shows strong improvements in the beginning and end of the value chain

| | Design & development | Raw materials[1] | Processing[2] | Manufacturing[1] |
|---|---|---|---|---|
| **Normalized total** | 27 (+5) | 21 (+4) | 40 (+2) | 30 (+2) |
| Top quartile | 40 (+3) | 47 (+0) | 67 (+1) | 56 (+0) |
| 2nd quartile | 30 (+9) | 23 (+7) | 45 (+1) | 30 (+4) |
| 3rd quartile | 28 (+9) | 11 (+7) | 34 (+5) | 23 (+1) |
| Bottom quartile | 10 (+0) | 2 (+0) | 15 (+1) | 11 (+0) |
| **Spread btw. Top/Bottom** | 31 (+3) | 45 (+0) | 52 (+0) | 45 (+0) |

Sportswear consumers demand a continuously improving product,[2] so investing in innovative materials, advanced technology, and strong cooperation with the supply chain is essential to their business success. The traceability of their products, as well as a detailed understanding of the materials' components and their impact, has been part of the sportswear players' daily business for many years now. The strong connection between sports and nature as well as sports being a global force connecting athletes, consumers and producers, fuels their social and environmental efforts.

THE MOST-IMPROVED VALUE CHAIN STEPS ARE DESIGN AND DEVELOPMENT AND END-OF-USE

Not surprisingly, small players in the entry-price segment score the lowest. They often lack the resources and knowledge of companies with size and influence, and typically have little control and traceability over suppliers, as they are too small to gain leverage. Yet the successes of small mid-price players indicate that this segment can act differently.

## PERFORMANCE DIFFERENCE ALONG THE VALUE CHAIN

The overall increase of the Pulse Score is clearly reflected in the value chain: in almost all areas, except retail, the score increased over the last year (see exhibit 7). The strong development of companies in the middle quartiles has driven the advances in certain value chain steps, but has not changed the overall picture. Last year's most advanced steps (processing, manufacturing, and transportation) remain high with scores of 40, 30, and 43, respectively. But weaker steps, such as end-of-use and design and de-

| Transportation[1] | Retail[3] | Use | End-of-use |
|---|---|---|---|
| 43 (+2) | 28 (+0) | 25 (+2) | 17 (+8) |
| 67 (+0) | 33 (+0) | 31 (+7) | 29 (+8) |
| 52 (+5) | 35 (+0) | 25 (+0) | 22 (+13) |
| 37 (+3) | 30 (+1) | 31 (+2) | 14 (+10) |
| 17 (+0) | 14 (+0) | 14 (+0) | 2 (+0) |
| 50 (+0) | 19 (+0) | 16 (+7) | 27 (+8) |

| | |
|---|---|
| Strong | >70 |
| | 60-69 |
| | 50-59 |
| | 40-49 |
| | 30-39 |
| | 20-29 |
| Weak | <20 |

Note: Normalized – unverified data; Differences in sums can occur due to rounding; not all questions of Higg Index can be mapped to value chain steps

1. Top quartile score edited due to human error on behalf of accountability & based on findings from expert interviews & Pulse Survey
2. Bottom quartile score edited based on findings from expert interviews & Pulse Survey
3. Top 3 quartile scores edited based on findings from expert interviews & Pulse Survey
Source: BCG analysis; SAC Higg Index Brand Module, Jan 2018; Expert Interviews; 2018 Pulse Survey

velopment, saw the biggest gains this year and have narrowed the gap – a very encouraging turn of events. Design and development is a key function in the transition to a more sustainable footprint, as decisions here affect the entire value chain. Companies have progressed by making design and product development teams more aware of the environmental and social impact of their decisions. Fashion brands and retailers across all performance quartiles made some advances here (see page 18).

End-of-use increased its Pulse Score by eight points, the most across all value chain steps. Yet end-of-use remains the weakest step. While some encouraging activities have started to take off (see page 19), the massive transition needed for substantial progress will likely take several years, and will require standards defined jointly with regulators. The required solutions are not yet available for the industry as a whole.

In the raw materials stage, the second and third performance quartiles improved from a very low basis and drove the Pulse Score to 21. But next steps will be challenging, as few alternative and scalable "new" material solutions exist. The need for innovation and advanced solutions is urgent.

The Pulse Survey highlights the first four value chain steps as top current priorities among fashion executives (see pages 14-15). Going forward, end-of-use is rising on the agenda, possibly reflecting the executives' hopes that practical solutions will emerge soon. It is reassuring that the average future commitment to sustainability increased across the value chain, most rose in the mid-price segment.

# DESIGN & DEVELOPMENT

Two thirds of the sustainability impact happens at the raw materials stage

**Pulse Score 2018 (vs. 2017)**

26 (+5)

**Performance distribution 2018 (vs. 2017)**

| Bottom quartile | 3rd quartile | 2nd quartile | Top quartile |
|---|---|---|---|
| 10 (+/-0) | 28 (+9) | 30 (+9) | 40 (+3) |

A range of decisions and actions taken within the design and development stage determine a product's environmental and social performance. Most important is the selection of materials, which in turn affects not only the footprint within dyeing and processing but also end-of-use.

The Pulse Score within the design and development stage displays the second-largest improvement (+5 points) of all value chain steps with respect to 2017. Yet, the majority of the industry is only starting to focus on this stage. A main improvement driver was the segment of Sustainability Champions with score increases of more than 20 points. At 70 points, the segment scores highest across the industry, 24 points ahead of the giant sportswear players.

Key to the score uplift within design and development proved to be a shift in accountability toward the design and product development teams to incorporate sustainability targets into the final product. Further uplift was generated by the implementation of design standards facilitating better repair and care of the garment, so as to increase its longevity.

The industry's awareness of the strong need to improve in this value chain step is rising. Highlighted by the Pulse Survey results 2018, a growing share of executives assigned design and development highest priority within their sustainability efforts going forward.

It remains to be seen how progress in digitization will affect traditional design processes in the foreseeable future.

## ENCOURAGING MOVES

- Hugo Boss has decided to stop preparing physical samples for its 2018 pre-fall collections. Instead, all items will appear on large touchscreens presented in digital showrooms, thus eliminating the resources to produce samples and saving transport costs.[1]
- Inditex has committed to train 100% of their designers on circular design principles by 2020 as part of the 2020 Circular Fashion System Commitment.[2]
- Nike has developed an app in collaboration with the London College of Fashion that seeks to enable designers to create more sustainable products based on the environmental impact of their material choices. The app called MAKING provides a user-friendly tool which ranks materials by four environmental impact areas that are water, chemistry, energy and waste.[3]

1 Hugo Boss, (2017). LAUNCH OF HUGO DIGITAL SHOWROOM. [online] Available at: <www.group.hugoboss.com/en/news/27102017-launch-of-hugo-digital-showroom-13001051/> [Accessed 11 Apri 2018].

2 Global Fashion Agenda, (2018). 2020 CIRCULAR FASHION SYSTEM COMMITMENT. [online] Available at: <www.globalfashionagenda.com/logo/inditex> [Accessed 11 Apri 2018].

3 Nike, Inc., (2013). NIKE UNVEILS NEW APP TO HELP DESIGNERS INVENT BETTER. [online] Available at: <https://news.nike.com/news/nike-unveils-new-app-to-help-designers-invent-better> [Accessed 11 Apri 2018].

# END-OF-USE

Of all the value chain steps, end-of-use has seen the strongest Pulse Score improvement

**Pulse Score 2018 (vs. 2017)**

17 (+8)

**Performance distribution 2018 (vs. 2017)**

| Bottom quartile | 3rd quartile | 2nd quartile | Top quartile |
|---|---|---|---|
| 2 (+/-0) | 11 (+7) | 23 (+7) | 47 (+/-0) |

The end-of-use stage is the section of the value chain where industry collaboration as well as regulatory support is most needed. The required upfront investment to put the necessary infrastructure in place to effectively sort and recycle is simply too large to be managed by a single brand or retailer.

At 17 points, the overall Pulse Score of the end-of-use stage remains the lowest across the entire value chain. With an improvement of eight points compared to 2017, however, it also saw the largest improvement in the past year.

While most of the uplift was driven primarily by the average-performing company segments, the end-of-use stage also saw a significant score increase by the top-performing companies. With a more-than 25-point jump, the large luxury player segment displayed the strongest improvement. According to the Pulse Score results, the luxury segment's commitment to ambitious targets reducing the environmental impact of the produced product range has determined most of the improvement within this phase.

Similar to other stages along the value chain, the segment of Sustainability Champions proves strongest across the industry in end-of-use, displaying a score above 70. Big players in the premium segment achieve the second highest score at 41 points.

Despite their relatively small revenue size and a positioning often in niche markets, Sustainability Champions have already implemented many effective solutions increasing their performance in this stage. Initiatives such as clothing repair services and garment collection schemes all point in the right direction.

Promising innovations will drive the industry's performance in end-of-use going forward. These refer, for example, to the usage of the Internet of Things to facilitate recycling. Innovator Eon.ID, for example, implants RFID tags into the piece of clothing, providing information about employed materials and effective ways to recycle the respective garment.

In order to boost the industry's performance in the end-of-use stage, it is crucial to drive these promising first steps up to scale and foster an integration into the mass market.

## ENCOURAGING MOVES

- Eileen Fisher set up a garment collection scheme across its store network. In 2016, 170,000 garments were collected, equivalent to 2% of their yearly production. Once sorted and cleaned, the garments were returned to the shop floor. All sales revenue was donated to over 100 charity organizations.[1]
- Vaude established a garment collection scheme across its store network. All collected clothing is donated to FairWertung–a charity organization that pushes circularity by collecting old clothing at the end of the lifecycle. The charity sells all collected garments onwards to finance a wide range of social projects.[2]
- Nudie Jeans offers a repair service to their customers as an additional effort to make its products last longer. Through its Repair Shops, customers can bring back their damaged jeans for repair right at the shop instead of sending them in. This initiative has proven to be a great success, with additional Repair Shops opening regularly. In 2016 alone, 44.021 pairs of Nudie Jeans were repaired.[3]

1 Eileen Fisher, (n.d.). Eileen Fisher. [online] Available at: <www.eileenfisher.com> [Accessed 10 April 2018].

2 Vaude, (2017). Nachhaltigskeitsbericht 2016. [online] Available at: <http://nachhaltigkeitsbericht.vaude.com/gri/news/VAUDE-unterstuetzt-Fairwertung.php> [Accessed 11 April 2018].

3 Information provided by Nudie Jeans.

## ENVIRONMENTAL AND SOCIAL PULSE SCORES

In both impact areas the Pulse Score rose over the last year. The gap between the environmental and social Pulse Score is narrowing.

The environmental Pulse Score increased by 6 points to an average of 35 (see exhibit 8A). The same overall pattern can be identified: the frontrunners in the top performance quartile have intensified their efforts. They have remained at their leading positions, while the middle segment has caught up, narrowing the gap. Most of the improvement in this segment arose from enhancements in resource efficiency realized within the supply chain. Advanced environmental monitoring and assessment tools will enable companies to respond effectively to this need. Governments' rising environmental interest, as seen in the Paris Climate Accord of 2016 and elsewhere, has set the scene to pursue this uplift.

The social Pulse Score increased by 2 points to an average of 44 points. Middle quartile players have almost caught up to the top performers (see exhibit 8B). Many initial actions on corporate social responsibility started in this field decades ago. Hence, public and regulatory scrutiny on social issues has been comparatively high for a long period of time. Fashion companies thus tend to have more initiatives in place focusing on social than on environmental concerns.

# THE PULSE CURVE: *TRAJECTORY TOWARDS A HEALTHY PULSE*

To understand these disparate gains and provide guidance to less advanced companies, it is helpful to understand the typical journey of fashion companies. From interviews, we have learned what steps advanced players have taken over time, what their success factors are, and about the lessons they have learned along the way. Most companies' development follows a similar pattern reminiscent of a S-curve: the "Pulse Curve," outlined in exhibit 9. The Pulse Curve charts the trajectory of the industry's environmental and social advancement along phases.

At the beginning, the curve is almost flat. Entry-level companies displaying the lowest Pulse Score results cluster in this section. The curve rises along with increasing Pulse Score levels, once companies set strategies and targets and lay the foundation to increase their environmental and social performance. The next bigger uplift is observed as they implement collaborative initiatives as well as improvement measures in their value chains. As they work with suppliers to introduce efficient production techniques, improve working conditions, and adjust their sustainable materials mix, the curve continues to rise. However, at a certain point companies continuing to implement these existing solutions experience only incremental change. Further investment starts to pay off less, demanding more effort. The curve's incline slows down.

To unlock this next level, frontrunners and Sustainability Champions now need new solutions to boost their environmental and social performance. To get fashion where it needs to be in the future, fashion companies must collaborate with other stakeholders, driving systemic change through bold leadership. Frontrunners have started to proceed in

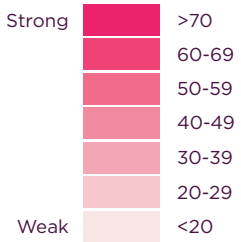



**Exhibit 8A** **Pulse Score by impact area**
The Pulse Score shows strong improvement in environmental scores especially in middle quartiles

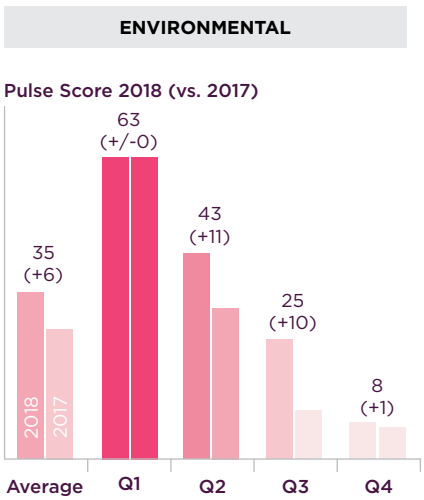
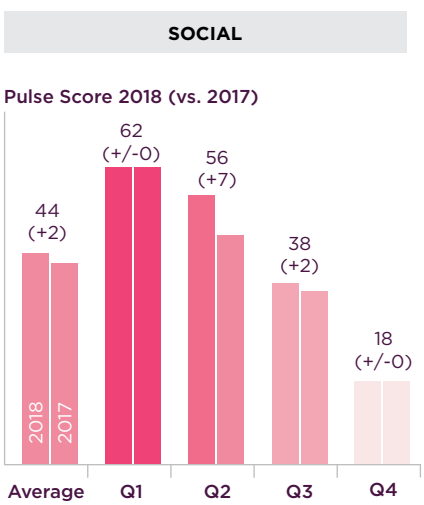



**Exhibit 8B** **Pulse Score by impact area**
The Pulse Score uplift in social areas is driven especially by quartiles two and three




Note: Scores derived by weighted scores per impact area; environmental weighted by proportion of €160bn opportunity, social weighted by proportion of Higg Index due to lack of monetary value of ethical practices

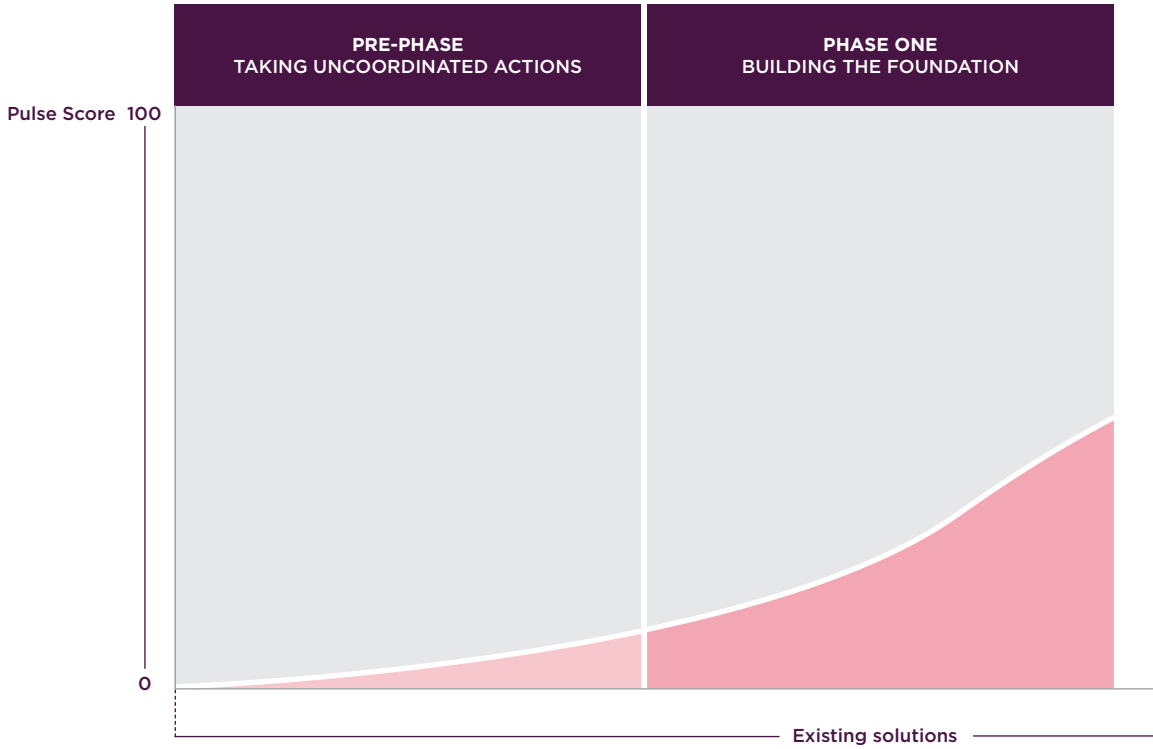
"The Pulse Curve reflects my observations from working with almost half of the industry. Once they laid the groundwork, we observed steady progress–first in setting strategy and targets and later in realizing tangible impact–as the focus is first on selected activities and then on expanding them to scale. Fully implementing existing solutions is not getting us far enough. We need new solutions to realize the full impact potential."
– Jason Kibbey, CEO, SAC

ENVIRONMENTAL AND SOCIAL PERFORMANCE IMPROVEMENT IS NOT LINEAR - IT COMES IN WAVES

this direction investing in new ideas and technologies. They have started to move into new solutions and kicked off a next curve to boost their sustainability performance. While returns in the beginning prove to be low, benefits might take off exponentially in the future. Chapter three will explore this topic further.

Companies can leverage the Pulse Curve to assess their current position and use it as a tool to understand where to go next. The next chapter will dive into the details, and offer a representative set of existing measures, initiatives, and best practices for the first three phases of the Pulse Curve journey. The Roadmap to Scale will serve as guidance, especially for the less advanced players, on how best to increase efforts and drive performance to a higher level.

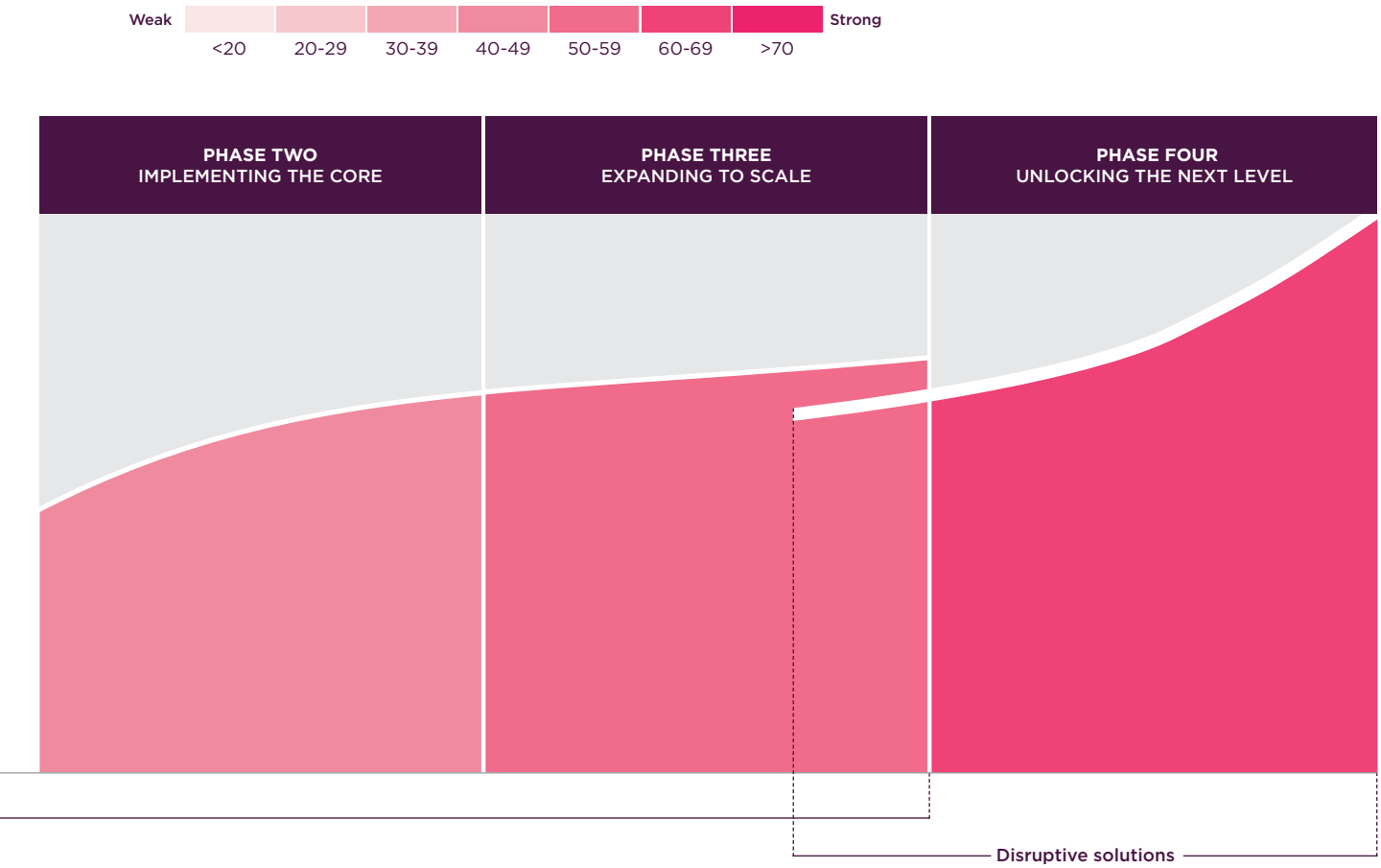
**Exhibit 9** **The Pulse Curve**
The Pulse Curve shows the trajectory toward a healthy pulse




**Pre-Phase: Taking Uncoordinated Actions**
Companies in the weakest performance tier show little progress. Lacking visibility over the environmental and social performance along the value chain, finding the right starting point proves to be a challenge. Most companies here have yet to commit fully to sustainability and lack a clear strategic direction and corresponding internal structure. Many, however, are engaging in initial, mostly uncoordinated and opportunistic actions: 80% have already sold products made from sustainable materials, and 60% have marketed some of their products as sustainable. Pulse Scores range roughly from 1 to 20 – mostly small to mid-sized companies in the entry-price segment are situated within this phase.

**Phase One: Building the Foundation**
Building the foundation usually starts with a formal commitment to sustainability. Companies in this phase start to build the enablers by empowering dedicated resources, setting targets, and directing efforts toward creating visibility into the supply chain. They have mustered the organizational will and resources to initiate first activities. Fashion companies in this phase have a clear view on their own performance, responsibilities, and overall footprint, while seeking knowledge from outside experts and associations. This foundation, despite lifting the individual Pulse Score, will prove crucial for later success as it facilitates all undertaken efforts. The Pulse Scores range from 20 to 40 points.

**Phase Two: Implementing the Core**
Targets, dedicated resources, a budget, and established traceability enable the industry to implement collaborative initiatives targeting core business processes and impact areas within their supply chain. Both environmental




as well as social issues are tackled. In parallel, improvements to the material mix are undertaken. All initiatives lead to proof points creating positive momentum in the organization, unlocking further resources. Fashion companies realize first positive environmental, social, and financial impact. The Pulse Score rises. Pulse Scores range from 40 to 60 points.

**Phase Three: Expanding to Scale**

Companies in this phase are amplifying their efforts, taking their initiatives to scale while reaching deep into their value chain. In close collaboration with their suppliers, they implement improvement measures and advanced solutions that increase profitability as well as environmental and social performance. Yet these initiatives start to reach their limits and attainable impact. Fundamental, path-breaking solutions are not broadly available. The majority of large sportswear and fashion players are operating in this phase. Their efforts to scale activities in their supply chain have led to only small incremental returns in Pulse Score improvements. Pulse Scores range from 60 to 80.

**Phase Four: Unlocking the Next Level**

Pulse Scores rarely rise above 80, given they largely depend on technological and business model innovations going far beyond what is currently in the pipeline and what individual companies can accomplish. The fashion industry needs to invest in transformational innovations and disruptive business models. Scaling these technologies will depend on leadership, a fit-to-purpose ecosystem and industry cooperation, including regulators and consumers. Only with a strong commitment can the industry point the Pulse Curve upward again. Pulse Scores in this phase range above 80.

# CHAPTER TWO

# SCALING UP EXISTING SOLUTIONS

While many companies have made progress, the fashion industry as a whole faces growing environmental and social pressures. As apparel consumption continues to rise, the urgency will only increase.

The industry has plenty of opportunity along the Pulse Curve. Many small and mid-sized companies in the entry-price segment have hardly begun formal efforts in sustainability, and can draw on successful examples from the more advanced fashion companies. Even most frontrunners can still intensify their efforts in a variety of ways. Beyond the upside of improving resource use, lowering pollution, and enhancing the lives of workers and their communities, these investments generally have a positive business case. Companies can raise their profitability while creating significant value for the world economy.

GFA and BCG, along with key players from the fashion industry, have developed a Roadmap to Scale. It offers concrete actions for every phase of the sustainability journey, as well as guidance in setting strategic priorities and implementing solutions. The roadmap is the first attempt by the industry for the industry to present a potential path for fashion brands and retailers regardless of size, price positioning or geography to raise environmental and social performance. As such it is a framework, suggestive rather than definitive, reflecting various lenses, opinions, experiences, and insights. Every brand or retailer will have to define their own pathway, drawing inspiration and guidance from the roadmap. Based on the first common CEO Agenda on sustainability (see page 26), the roadmap details high-impact areas that industry leaders consider to be urgent.

The Roadmap to Scale addresses companies at any point along the Pulse Curve offering potential next steps to advance further. Proceeding incrementally, it starts when companies make a decisive strategic commitment to sustainability. It covers the first task to build internal capabilities and set up key enablers; then carrying out immediate, high-impact activities across a range of areas and value chain steps; and finally driving those efforts to scale while initiating focused activities. The roadmap illustrates each of these three phases with examples of industry players of all sizes and segments.

Successful implementation of the roadmap will leave fashion companies with a well-grounded foundation, including an ambitious strategy and dedicated team, having embedded sustainability deep within the core of the business. Elevated performance across environmental and social impact areas along the value chain will be realized when driving successful high-impact initiatives up to scale. Full traceability fostering a closer partnership with the supply chain will drive results even further. Enhancing the individual footprint will not only generate a positive impact on brand building and risk management, but also elevate EBIT margins along the way.

# CEO AGENDA 2018

In March 2018, Global Fashion Agenda released the first-ever CEO Agenda for the fashion industry, which spells out seven crucial sustainability priorities. Developed in collaboration with leading fashion players such as Kering, H&M, Target, BESTSELLER, Li & Fung, and Sustainable Apparel Coalition, and building on the *Pulse of the Fashion Industry 2017* report, this historic first edition of the CEO Agenda offers a high-level guide for company executives on where to focus their sustainability efforts.

The complexity of sustainability has had fashion executives around the world call for guidance. The CEO Agenda 2018 is a response to this request. It is a guide to what every CEO in fashion needs to prioritize to future-proof their company—because sustainability is no longer a trend; it is a business imperative.

This is the first time in history that such key players from the industry have joined forces to discuss—and agree on—what to prioritize in order to improve the industry's environmental and social footprint.

**What´s on the agenda?**

The CEO Agenda 2018 provides a guideline on what to prioritize to become more sustainable by spelling out seven priorities that should be top of mind for any CEO in fashion.

## THREE CORE PRIORITIES FOR IMMEDIATE IMPLEMENTATION

| | |
|---|---|
| SUPPLY CHAIN TRACEABILITY | Trace tier-one and tier-two suppliers |
| EFFICIENT USE OF WATER, ENERGY, AND CHEMICALS | Implement water, energy, and chemicals efficiency programs in processing stages |
| RESPECTFUL AND SECURE WORK ENVIRONMENTS | Uphold standards for the respect of universal human rights for all people employed along the value chain |

## FOUR TRANSFORMATIONAL PRIORITIES FOR FUNDAMENTAL CHANGE

| | |
|---|---|
| SUSTAINABLE MATERIAL MIX | Reduce the negative effects of existing fibers and develop new, more sustainable fibers |
| CLOSED-LOOP FASHION SYSTEM | Design products and invent novel collection and recycling systems that enable the reuse and recycling of post-consumer textiles at scale |
| PROMOTION OF BETTER WAGE SYSTEMS | Collaborate with industry stakeholders to explore opportunities to develop and implement better wage systems |
| FOURTH INDUSTRIAL REVOLUTION | Embrace the opportunities in the digitization of the value chain and engage with other brands, manufacturers, and governments to prepare for disruptive impact and the transition of workforces |

# PHASE ONE
## *BUILDING THE FOUNDATION*

Getting started is a challenge that much of the industry has yet to overcome. Many companies still invest little and take mostly uncoordinated, opportunistic actions—if any at all. The Roadmap to Scale does not cover this pre-phase, when companies are still becoming aware of the possibilities for change, lacking a clear strategic direction and corresponding internal structure.

The roadmap begins with phase one, after fashion companies have formally committed to improving their environmental and social performance. Within this first phase, the roadmap lays out key enablers for success: a dedicated team, a clear strategy, frequent internal and external communications, and traceability across the supply chain. These enablers lay the groundwork for any implemented initiative along the roadmap and determine the brand's ability to scale sustainability efforts later on. The quality of the enablers will determine the duration of the individual phases, the ease of implementation of any activity, as well as the ultimate environmental, social and financial impact of the fashion company's roadmap. With progress along the curve, the enablers will grow in size. As efforts are pushed to scale, more members are added to the team, the strategy becomes more elaborate with bolder ambitions, and the visibility into the supply chain extends towards tier-three and tier-four suppliers.

**Building The Foundation**

Building the foundation depends on a formal commitment to sustainability. The aim is to build a strong groundwork based on dedicated employees, a strategy, and communication. Efforts to increase traceability result in improved visibility over performance, responsibilities, and overall footprint.

**Phase**

| | | | | |
|---|---|---|---|---|
| | 1 | | | |

### Enabler: Resources

Any impactful company-wide effort depends on the explicit support of senior management.[3] This is essential if sustainability is to become a core decision criterion. A past survey on key success factors identified top management support as the most significant variable in driving sustainability.[4] Not surprisingly, the CEOs of the industry's frontrunners have openly expressed their commitment to the topic. This top management support often depends on proof that these efforts bring not only environmental and social improvements but also financial payoffs — covered at the end of this chapter.

Most sustainability efforts start with a few enthusiastic and motivated employees who explore opportunities to improve the company's footprint. If enabled by the support of their top management, these efforts usually go a long way. For the first phase of the roadmap, few resources are required: a few highly dedicated individuals or small teams with a clear mandate.

The team's access to and integration into the business are essential. Large organizations tend to place their sustainability department close to the leadership, often with a direct reporting line. Smaller organizations with fewer available resources often link these teams to the sourcing department for a direct line into the supply chain. No matter the placement, the team's connection to the core of the business is crucial. It needs to become an integrated part of everyday business, rather than an insular, standalone team. A 2017 survey of 2,500 business professionals stressed that the robustness of teams, dedication, and availability of budget are key success factors for implementing environmental and social change initiatives.[5]

**Exhibit 10**

**Roadmap to Scale**

| | PRE PHASE | PHASE ONE BUILDING THE FOUNDATION | PHASE TWO IMPLEMENTING THE CORE | PHASE THREE EXPANDING TO SCALE | PHASE FOUR |
|---|---|---|---|---|---|
| Fourth Industrial Revolution | | | | | |
| Better Wage Systems | | | | Joining global platforms to promote better wage systems | |
| Closed-loop Fashion System | | | | Training designers, reducing pre- and post-consumer waste and engaging customers | |
| Sustainable Material Mix | | | Baselining and improving material mix starting with high volume and high impact materials | Increasing share of non-conventional materials and implementing sourcing guidelines | |
| Respectful and Secure Working Conditions | | | Implementing collaborative initiatives to enhance working conditions in main facilities | Expanding collaborative initiatives in supplier base and increasing worker engagement and skills | |
| Efficient Use of Water, Energy, Chemicals | | | Implementing collaborative resource efficiency programs in main facilities | Scaling efficiency programs across supply chain and investing in targeted, high-impact initiatives | |
| Enabler | | RESOURCES | Dedicated resources with management mandate growing into a full team embedded in organization | | |
| | | STRATEGY | Measurable targets leading to a full sustainability strategy closely tied to the corporate strategy | | |
| | | COMMUNICATION | Internal and external communication with stakeholders | | |
| | | TRACEABILITY | Increasing supply chain visibility starting with tier-one/tier-two, gradually extending to tier-three/tier-four | | |

**Exhibit 11**

**Outerknown's sustainability strategy**
Three year sustainability framework
2015-2018

## SUPPLY CHAIN EXCELLENCE

**QUALITY**
- Select suppliers based on core strengths
- Build clothes to last

**MATERIALS**
- Implement a preferred fiber strategy
- Build materials library
- Emphasize low-impact fabrics

**CHEMICAL MANAGEMENT**
- Define and implement chemical management program using MSRL and RSL as guidelines

**MILL CERTIFICATION**
- Identify non-certified partner mills
- Roll-out mill certification of Bluesign, Oeko-Tex, GOTS
- Reduce non-certified partner mills

**CHAIN OF CUSTODY**
- Define and implement chain of custody process

## SOCIAL ACCOUNTABILITY

**FAIR LABOR STANDARDS**
- Align with a credible social accountability organization
- Adopt best practices for supplier monitoring program
- Develop and implement sustainable remediation solutions
- Reduce audit fatigue by partnering with brands

**SOURCING FOR CHANGE**
- Create a master sourcing plan
- Develop and implement process for supplier education, selection and on-boarding
- Align with partners that share your goals

**STRENGTHEN IDENTITY**
- Publish 'Code of Conduct' and 'Supplemental Expectations'
- Innovate by putting people first

Source: Information provided by Outerknown

Over time, especially in later phases of the roadmap, teams will expand in size and ultimately establish functional nodes throughout the organization. Large, committed companies can have as much as 2 to 4 percent of core headquarter staff dedicated to sustainability–in some cases up to 200 team members.[6] Kering and other frontrunners have posted experts at the regional or brand level, while the H&M Group also positions them within every function to integrate the topic holistically into the company's business activities.[7] Some small brands, especially Sustainability Champions, have developed large teams relative to their overall headcount so as to align all their activities with their environmental and social vision.

### Enabler: Strategy

Setting strategies with short-term and long-term targets is the cornerstone of any major business endeavor, including sustainability. More than 60% of the industry has taken this important first step and set up sustainability targets and strategies so far.[8] Over the last year, especially mid-price players lifted their Pulse Scores substantially by doing so.

Targets not only set direction but also communicate the company's concrete commitments, externally as well as internally. The ideal target addresses high-impact steps in the value chain which fit the brand's priorities.

## LEAD BY INNOVATION

**MATERIALS AND CONSTRUCTION**
- Identify sources for the newest materials, washes and construction while meeting positive environmental goals

**EDUCATION**
- Educate our customers and colleagues with a focus on environmental change

**TRANSPARENCY**
- Publish supplier list and other partners in sustainability

**PARTNERSHIP**
- Align with industry partners to accelerate change

**OPEN SOURCE SHARING**
- Create a culture of innovation by making sources available to our friends and partners
- Enhance scaling possibilities via open source sharing

## PROTECT OUR RESOURCES

**PRODUCT END-USE MANAGEMENT**
- Partner with customers on "end of life" program
- Minimize our impact while manufacturing products that last the right amount of time

**IMPACT MEASUREMENT**
- Elevate our supply chain strategy through "environmental mapping"
- Set targets to reduce our impacts

**WHERE WE STAND**
- Create a formal statement about where we stand on sustainabilty, people and the environment, ocean health, and education initiatives
- Align with conservation groups that protect the planet
- Develop and use recycled materials from ocean trash

## BUILD COMMUNITY

**INDUSTRY COLLABORATION**
- Bring people together who share our mission and purpose
- Reach out and connect
- Participate in industry working groups
- Participate in Fair Labor Association Caucuses
- Enhance our visibility through collaboration

**INFLUENCING CHANGE**
- Share stories about the work that we're doing
- Join working groups I.E. Textile Exchange, Fair Labor Association, Outdoor Industry Sustainability Working Group

**GIVING BACK AND DONATIONS**
- Create an everyday approach for giving back to our community and responding to need
- Align with ocean health organizations

While the adoption of targets is very encouraging, fashion companies need to link these efforts with their overall business strategy, embedding sustainability into their core business. Indeed, Pulse Score frontrunners have managed to make their efforts complement the larger corporate strategy in running a profitable business.

A comprehensive sustainability strategy addresses both the social and environmental areas. It touches on topics such as resource efficiency and respectful working conditions, and makes sustainability part of the company's value proposition.[9] Outerknown, a menswear brand, focuses on supply chain excellence, social accountability, and the community. Clear targets for each of these areas helped turn the company into a Sustainability Champion over just a few years.

Short-term targets aim to create proof-points of success in order to seal ongoing organizational support. Top management is often driven by short-termism[10] due to the decreasing tenure of CEOs[11] and the need to deliver annual revenue targets. So companies need quick wins to gain momentum and secure future funding. But a short-term mindset is not enough to address large-scale challenges such as sustainability. Long-term targets are required to stay centered on strong, lasting impact.

Local, national, and international compliance standards provide a strong basis for the definition of these long-term targets. Major international standards for social issues include the UN Declaration of Human Rights and the International Labor Organization's Declaration on Fundamental

"In the Luxury sector what sets us apart is the influence we have in establishing the trends. Similarly, Luxury has a leadership role in sustainability but driving its uptake requires a collaborative approach, both inside and outside a company. An unwavering commitment from the CEO and managers is crucial to integrate sustainability into the business strategy of a company."
– Marie-Claire Daveu, CSO, Kering

Principles and Rights at Work. The OECD Guidelines for Multinational Enterprises offer principles and standards for responsible business conduct. Due diligence guidelines and targets for the garment and footwear sector complement this compliance standards. All of the above standards provide a baseline for supply chain due diligence, and serve companies by helping them define targets for human rights, labor, and environmental issues along their value chain.[12,13,14]

Targets based on these standards can often be challenging to put into practice due to geographically extended and fragmented supply chains and insufficient internal resources. Participating in multi-stakeholder initiatives, such as the Fair Labor Association or the Ethical Trading Initiative, can go a long way to assist. The Fair Labor Association, for example, undertakes independent assessments and monitors compliance to its code of conduct and relevant laws across the affiliated companies' supply chains. It records findings, flagging any compliance gaps and suggesting concrete solutions. The association closely tracks remediation and evaluates progress. Participating brands receive a full and detailed overview of their supply chain's performance. Risks can be spotted, compliance gaps uncovered, and solutions raising standards can be implemented.[15] Once compliant, member companies receive accreditations that can be leveraged for external communication.

**Enabler: Communication**

Internal communication unites the organization on sustainability. Companies need to share the top management's commitment, explain the strategy and targets, and set transparent expectations for the supply chain. Only if cascaded down through the entire organization can sustainability become an integral part of the company's core business, values, and, ultimately, DNA.

External stakeholders are increasingly interested in the ambitions, targets, and performance of the fashion industry. Yet some companies still put off communicating progress until achieving "perfect sustainability performance."[16] They fear accusations of 'greenwashing' as well as public dissatisfaction with their efforts. The industry needs a new paradigm where perfect is not the enemy of good.[17]

Diligent communication is essential for a range of stakeholders. Regulators are demanding more visibility and information, as reflected in the E.U's Non-financial Reporting Directive. Consumers wish to be well informed: 89% of 10,000 citizens polled across nine countries expect companies to report on sustainability.[18] Finally, investors seek companies that communicate openly about their efforts, as they see sustainability as a key part of a company's risk profile. In a recent poll of investment officers, 60% believed that good performance here reduces the overall risk.[19]

Guidance for external communication is readily available. International frameworks such as the Global Reporting Initiative (GRI) or the German Sustainability Code offer common reporting standards and enjoy wide adoption, as they can be adapted to each company's context while enabling comparisons across the industry.[20] Many fashion players across the industry refer to these standards in their regularly published sustainability reports.

Communicating progress on environmental and social issues to investors can be difficult, as CFOs and investor portfolio managers often lack insight into those efforts and results. By linking sustainability activities with the financial, investor, and auditing functions, companies can better

comply with requirements and satisfy stakeholders. Organizations such as the Sustainability Accounting Standards Board (US) support to establish this link so that investors can gain relevant financial information.[21]

**Enabler: Traceability**

With its multilayered and fragmented supply chain, often involving large geographical and cultural distances between the brand and production, the fashion industry has one of the most complex production networks.[22] Many brands and retailers lack visibility of where and how their products are produced.

Traceability in the supply chain is a prerequisite for companies to understand the social as well as the environmental impact of business practices and products. It enables brands to identify risks and challenges, as well as opportunities to increase operational efficiency, while building strong and trusting relationships with suppliers.[23]

Companies can start by mapping tier-one and tier-two suppliers, while frontrunners push further, extending to tier-three and tier-four. They need to identify the suppliers, understand their business practices, and estimate the environmental and social impact generated by everyday business. To gather this information and related insights, many companies refer to the Sustainable Apparel Coalition's Higg Index (the same one powering the Pulse Score). The Higg Index's standardized assessment framework, for brands, retailers, and manufacturers supports to generate visibility across the value chain.[24] It enables not only detailed comparisons across peers and factories, but also the identification of improvement areas across each player's value chain.

Recently, a growing number of companies are making their traceability efforts public, becoming more transparent. In 2017, a third of the 100 biggest global fashion brands made their tier-one supplier lists public—a jump from only 12% the year before.[25] Concerns on competitiveness in combination with a lack of attributed importance, had previously prevented many companies from publicizing this list. Now some dedicated players are doing more. Primark posted its tier-one suppliers on its website, including more than 1,000 factory locations along with the number of employees divided by gender.[26] C&A published its tier-one and tier-two suppliers, thereby fostering a closer relationship and increased trust, while gaining a direct channel for communication between brand and supplier.[27]

Calling upon the consumer to demand transparency of the produced garments, prominent consumer-facing campaigns increase public awareness. With initiatives such as #whomademyclothes by Fashion Revolution[28], the subject is gaining in importance and momentum.

Smaller, less complex supplier networks facilitate extensive tracing activities. Building close relationships with suppliers enabled Icebreaker, a merino wool outdoor brand from New Zealand, to publish a list that went all the way to tier-four, covering 100% of the sourced fabric and 90% of the fibers.[29] As transparency is a priority for the brand, the list includes the name and location of the supplier, the gender split of the workforce, the percentage of migrant workers, the length of cooperation with Icebreaker, and the date of the last audit.

**Exhibit 12**

## Establishing the key enablers

Icebreaker's commitment to traceability and transparency

**Motivation**

"Transparency and traceability are at the foundation of our business. It is a commitment to full and regular public disclosure of all policies, procedures, progress and real world impacts on workers, animals, communities and the environment. For Icebreaker, this means opening all our decisions up to scrutiny and assessment. Put simply, our 'inside' needs to be the same as our 'outside' and we accept responsibility for all of it."
- Greg Smith, CEO, Icebreaker

**Traceability activities**

- Supply chain traceability: full supply chain mapping (tier-one to tier-four)
- Transparency on policy, practices and structure: publication of *Transparency Report*

Source: Information provided by Icebreaker

**Description**

Icebreaker has completely eliminated agents and sources 100% of fabrics as well as 90% of fibers from direct suppliers. In 2017, the company published its list of all tier-one to tier-four suppliers, encompassing the entire value chain from wool fiber and yarn processing through to garment suppliers. The list also includes Icebreaker's contracted grower listing, containing 75 merino stations. As main success factor, Icebreaker names the long-term relationships to its suppliers (65% of Icebreaker's volume is still made by the same two suppliers Icebreaker started working with 13 years ago). The published supplier information contains supplier names, location, number of employees, workers' gender distribution, percentage of migrant workers, length of cooperation with Icebreaker, and the date of the last audit. Previous concerns about giving valuable information to competition were outweighed by the interest in traceability and transparency.

In 2017, Icebreaker published its first *Transparency Report* including detailed information on all employed supply chain policies, practices and codes of conduct. Within the report, the company incorporated an open discussion of best practices as well as key improvement areas within business, supply chain operations, transparency as well as social and environmental initiatives. All supplier audit results (100 % of all merino stations as well as fabric and garment suppliers have been audited) were disclosed in full. Icebreaker reemphasized its public commitment to transparency and continuous improvement.

**Key figures**

Publication of full supplier list:

- Total number of contracted growers: 75
- Total number of suppliers: 40
- Total number of factories: 59

Full disclosure of supply chain audit results:

- 100% of contracted merino stations
- 100% of fabric and garment suppliers

**Key outcomes**

- 100% directly-sourced fabric and garments
- Responsible purchasing practices to provide long-term forecasts and minimize human rights risks
- Chemical control and waste management policies required by all factories
- Full disclosure of supply chain audit results
- Public commitment to transparency and continuous improvement

"We expect transparency to become the norm in the near future, with more and more brands publishing or mapping their supplier list. Transparency is only the first step towards brands becoming responsible and accountable for their supply chain, but it encourages a culture of scrutiny and vigilance which will eventually lead to best practice."
– Orsola de Castro, Founder and Creative Director, Fashion Revolution

# PHASE TWO
## *IMPLEMENTING THE CORE*

Phase two is where environmental and social progress materializes. Around a third of the fashion industry by market share – especially small and medium mid-price companies as described in chapter one – have entered this phase. Benefitting from greater visibility generated over both their supply chain as well as their own sustainability performance, companies start to take specific actions targeting core business processes around their product/materials and within their supply chain.

Implementing collaborative existing programs and initiatives enables companies to make significant progress in a relatively short amount of time. Benefitting from key learnings, expertise, and best practices generated by frontrunners, companies in this phase enhance their performance in environmental as well as social areas, while generating proof-points supporting the business case for sustainability.

**Implementing The Core**

The previously laid foundation enables companies to carry out the core efficiency programs—which, in turn, bring environmental, social, and financial improvements. These programs generate proof-points to create positive momentum in the organization and unlock further resources.

**Phase**

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### SUSTAINABLE MATERIAL MIX — BASELINING AND IMPROVING MATERIAL MIX

For brands, the product is at the core: it differentiates the company with consumers and unifies the internal organization. As brands have control over their product, making changes to its design, composition or input materials can be done directly.

Improving the materials mix has become a priority for many fashion companies and their executives: 47% of 2018 Pulse Survey respondents, compared to 28% in 2017[30], estimated that more than half of the material volume consists of preferred fibers[31]. While some players exchange one material after another, others proceed product group by product group, working closely with suppliers to identify alternative options. Improvements in materials can have an immediate environmental and social impact without interfering directly in supply chain operations. By focusing on preferred rather than conventional fibers, Reformation, a US-based Sustainability Champion, was able to save 20% in $CO_2$ and 30% in water consumption while lowering waste creation by 20%.[32]

Last year's report provided insights into the impact of common material groups: animal fibers, cellulose-based fibers, and synthetic fibers. Estimates are inconsistent, as no standard method for calculations of either the environmental or social impact has been accepted in the industry.

**Animal fibers,** such as leather, wool, or silk, entail both ethical issues as well as significant environmental impact potential. As production processes can include force feeding, live-plucking and unethical slaughtering practices, brands are often confronted with an increasing number of customers demanding guarantees for animal welfare in the materials production process. Evaluating the environmental performance, animal fibers carry a large footprint especially due to their extensive use of land and the high release of methane, a strong greenhouse gas, during production. Nevertheless, these fibers are durable and have a lower footprint during the use stage of the value chain.[33,34]

**Cellulose-based or plant-based fibers,** such as cotton, viscose, lyocell, and bast, account for a third of all textile fibers. Cotton alone rep-

resents 90% of this group. These fibers have several advantages: they are renewable, biodegradable, lightweight, strong, and mechanically recyclable. On the downside, especially conventional cotton farming and processing consumes large amounts of water and chemicals.[35]

**Synthetic fibers,** such as polyester (over half of the total textile fiber production), nylon, and acrylic, require less water than cellulose fibers. They are more durable and require less agricultural land, but their production depends on oil feedstock and is energy-intensive.[36] In addition, these fibers are nonbiodegradable, and shed plastic microfibers during use.[37]

Every fiber thus carries its advantages and disadvantages. When selecting the materials mix, brands and retailers must set their own priorities and make a choice where to focus their attention first.

Visibility over the materials footprint is a prerequisite to improving the materials mix. The first step is to understand and analyze the current bill of materials (BOM). The BOM should include all material codes, describe where in the garment each material is used, and explain the yield (materials consumed per piece), vendor, and type of processing (such as dyeing or sponging).[38,39] Without these details, companies are operating in the dark.

"Before you can improve your environmental and social footprint, you have to understand your product and its components. Even as a small brand, that is a very easy starting point. That understanding is the foundation to prioritize actions such as starting to improve your material mix."
– Niels Eskildsen, CEO, Designers Remix

**Tools to derive the material baseline**

In order to take an informed decision when selecting or swapping materials, fashion companies refer to the use of a range of tools to estimate a fiber's environmental impact. The cradle-to-gate Higg Materials Sustainability Index (Higg MSI) is one available tool, used by most of the 200-plus members of the SAC, to evaluate a material's environmental footprint.[40] Assessing 80 base materials as well as their processing steps and blends, the Higg MSI score shows the materials' impact on global warming, water supplies, fossil fuels, chemical usage, and eutrophication. Companies can use the tool to make more informed decisions on their selected materials and adapt designs and sourcing plans accordingly. An additional product module, coming in 2019, will further enrich the analysis within the Higg MSI.[41]

Some brands and retailers have developed their own benchmarking to conduct customized materials-scoring or lifecycle assessments. While Reformation developed the RefScale tool, G-Star and the H&M Group use the Fibre Benchmark. Kering has built its own environmental P&L (EP&L). All of these methods aim to map a brand's raw materials mix to its impact on land usage, water and energy consumption, waste creation, and chemical usage.

With its EP&L, Kering identified the drivers of its footprint across different value chain steps, impact areas, and raw materials groups. One key finding estimated 72% of the total environmental footprint—equivalent to €618 million in monetary terms—to occur within raw materials. The company has set itself the ambition of reducing its EP&L footprint by 40% by 2025 in proportion to its total revenue growth.[42]

**Exhibit 13**

## Baselining the material impact
Reformation's life cycle assessment tool RefScale

### Motivation

Quantifying the resources used throughout a garment's life cycle, comparing it to industry standards and displaying the total amount of resources saved by purchasing clothing by Reformation

Quantifying the resources used throughout a garment's life cycle, comparing it to industry standards and displaying the total amount of resources saved by purchasing clothing by Reformation

### Key figures

- Share of collection covered: 100%
- Resulting reduction in CO2: 20%
- Resulting reduction in water: 30%
- Resulting reduction of waste: 20%

Source: Information provided by Reformation

### Description

RefScale was developed to inform design and sourcing teams of the environmental footprint of a garment. The tool is based on the life cycle assessment methodology. Thus, it relies on primary and secondary data of the environmental impact of fashion, covering the whole value chain from raw materials, to manufacturing, packaging, transit and garment care until end-of-use.

By using RefScale, the fashion brand Reformation is able to estimate the environmental footprint of its entire collection. Comparing the results to the environmental impact of similar products made from conventional materials, Reformation is able to calculate the positive delta generated by its product palette. RefScale currently covers water, CO2 emissions, and waste – the impact on chemicals is currently accounted for via certifications. The RefScale data is also made available in the online shop on the company's website, displaying the true cost of the product to the customer.

### Roadmap to RefScale

- Desk research and engagement of partners to draft initial assumptions
- Life cycle assessment with limited scope (e.g. secondary research)
- Refinement of assumptions based on primary supplier data and expansion of scope
- Annual update of data with new studies and primary data input

### Key benefits

- Data-driven decision-making
- Holistic view and 'hot spot' analysis of the supply chain
- Brand and impact transparency
- Integrated tool for design, reporting, and engagement

**Exhibit 14**

## Measuring the environmental impact across the value chain
Kering's EP&L

### Motivation

Identifying environmental impact of business activity across value chain and impact areas

Targeting of sustainability initiatives to impact areas and value chain steps yielding largest benefit

### Key figures

- Group-wide EP&L impact across supply chain tiers in 2016: €857 million
- Ambition for 2025: 40% reduction of environmental footprint

### Description

Kering´s EP&L was developed to measure and identify the group's environmental impact in monetary terms covering the value chain from raw material extraction to store. The monetization of the environmental footprint helps to translate sustainability opportunities into a business context and allows the comparison of impact areas, value chain steps, geographies and business units.

The methodology of the EP&L enables Kering to target sustainability initiatives effectively, track their environmental impact over time and reduce the business activities' negative environmental impact.

### Key results: Environmental footprint estimation

- Largest share of the environmental footprint (93%) is generated within the supply chain
- 72% of this impact lies purely in raw materials with main drivers being land usage, greenhouse gas emissions and water pollution
- Biggest impact area overall is greenhouse gas emissions generating 36% of the total environmental costs
- Own operations contribute only 7% to the environmental footprint

### EP&L Roadmap

- Identification of included parts of business in scope of EP&L
- Mapping of supply chain to identify involved suppliers, processes and activities
- Identification of data requirements and selection of data gathering approach
- Collection of environmental and non-environmental data from suppliers and brands
- Completion of gaps within primary data by knowledge available in scientific studies, from NGOs or external sources (e.g. life cycle assessment analyses)
- Determination of changes in environment and resulting costs on people
- Implementation of valuation mechanism to transform impact data into profit and loss analysis

Sources: Kering, (2017). Environmental Profit & Loss (EP&L) 2016 Group Results. [pdf] Available at: <http://www.kering.com/sites/default/files/kering_group_2016_epl_results.pdf> [Accessed 12 April 2018].
Kering, (2015). Kering Environmental Profit & Loss (EP&L) Methodology and2013 Group Results. [pdf] Available at: <http://www.kering.com/sites/default/files/document/kering_epl_methodology_and_2013_group_results_0.pdf> [Accessed 12 April 2018].
Kering, (2017). 2025 STRATEGY Crafting Tomorrow's Luxury. [online] Available at: <http://www.kering.com/en/sustainability/2025-strategy> Accessed 12 April 2018].

The better the industry estimates the effects of its materials choices on environmental and social issues, the more conscious and impactful its decisions in design, product development, and sourcing can be. Designers at Filippa K use the brand's Fibre Tool in their daily work to compare materials and set concrete goals for the final materials mix of the collection.[43] Peak Performance set up a fabric library so designers could choose from a variety of materials that meet the brand's targets for functionality as well as environmental impact.[44]

Many brands and retailers, such as Brooks, Kathmandu, and Toad & Co., use the Higg Index's Design & Development Module (Higg DDM) to score apparel and footwear products early in the design process. Design and development teams can thereby consider more environmentally friendly materials or construction techniques to lower the design's footprint.

In order to select which materials to replace, frontrunners within the industry take three variables into consideration:

- the material's share of the total materials volume employed
- the environmental footprint of the material
- the availability of commercially viable and scalable alternatives

**Transitioning away from conventional cotton**

Evaluating these three aspects, a large share of the industry has opted to look into transitioning away from conventional cotton. Using organic cotton instead of conventional, as calculated by the Textile Exchange's life-cycle assessment (LCA), could reduce energy costs by more than half and cut the contribution to global warming by 46%. It could also lower the acidification of land and water by two-thirds, soil erosion by a quarter, and blue water consumption almost entirely.[45]

"RefScale is an incredible design tool used on a day-to-day basis. It sets the goal posts for our design and product teams, and supports them to see in actual gallons of water or pounds of carbon, the tradeoffs between selecting certain materials or other product attributes. It takes the very abstract idea of embedded resource use in fashion, and makes it real. And it let's them be a part of making our products better."
– Yael Aflalo, Founder and CEO, Reformation

Dedicated companies have already achieved significant results over short periods of time, elevating their ambition level as they make progress along the phases of the roadmap. After having started with small shares of preferred cotton within their overall material mix, the H&M Group increased sustainable cotton usage by 30 percentage points, elevating its proportion up to 43% of its total cotton use, on the way to becoming the world's largest buyer of better cotton (BCI)[46] and the second largest of organic cotton.[47] Similarly, C&A has increased the share of more sustainable cotton within their range of materials to account for a total 53%.[48]

Preferred cotton* has grown significantly in usage as an increasing share of the industry progresses along the roadmap. The ten largest users by volume, after the H&M Group, are Ikea, C&A, Nike, adidas, Levi Strauss & Co., M&S, Tchibo, Jack & Jones and Woolworths.[49] Many smaller Sustainability Champions have replaced conventional cotton nearly entirely. Skunkfunk, a Spanish ethical fashion brand, moved from only 8% of organic cotton in 2010 to 92% in 2018, and aims to reach 100% by 2020,[50] while Nudie Jeans has rolled out organic cotton in its entire denim collection.[51] Pushing the ambition further, dozens of prominent brands and retail companies, such as Burberry, adidas, Timberland, ASOS, and Levi's, committed in 2017 to using 100% sustainable cotton by 2025.[52]

Many of these nonconventional materials, however, are not currently scalable to the extent needed. In 2017, preferred cotton made up only 15% of total global cotton production.[53] More investment and cooperation within the fashion industry and with the agriculture industry is needed to increase this share to a level where supply and demand correspond. A few initiatives to this end are already well under way, such as a partnership among Cotton Australia, the Australian government, and the Better Cotton Initiative (BCI). It aims to increase the supply of better cotton by providing environmental skill training to 200,000 farmers in Pakistan. BCI hopes to certify 30% of the world cotton production by 2020, raising the number of trained and licensed farmers to 5 million. [54]

"Our customers are increasingly interested in the origins of our materials. At ASOS we have focused on switching to sustainable cotton because cotton is our single most used fiber and because we can make the switch almost cost neutral."
– Tara Luckman, Senior Sustainability Manager, ASOS

**Replacing virgin polyester is gaining momentum**

As polyester is the most used material in textile production, a growing share of fashion companies has evaluated its replacement for more sustainable alternatives. Exchanging one metric ton of virgin polyester for recycled polyester can save 80% in toxins, around 60% in energy consumption, and up to 40% of CO2 emissions.[55] In 2016, Nike and North Face became the top two brands using recycled polyester by consumption, while Inditex and smaller brands such as Fjällräven, Outerknown, and Volcom have grown the fastest.[56] The H&M Group hopes to raise its consumption by partnering with Jeplan, a Japanese company, to dissolve polyester fiber into a pure resin usable for new polyester.[57] Meanwhile adidas, Eileen Fisher, Gap Inc., Lindex, and Target have pledged to use at least 25% recycled polyester by 2020.[58] Recycled polyester, however, is not a fully sustainable solution due to, for instance, its characteristic of shedding microfibers during the use stage of the value chain. Thus, while all of these efforts represent progress, the ultimate solution remains still to be found.

*Note: Preferred cotton (as defined by Textile Exchange) refers to Fair Trade Conventional, fair trade organic, organic, CMiA organic, CMiA conventional, BCI standard, Cotton Australia, ABRAPA, SCS Benchmark, Cleaner Cotton, REEL and e3. Source: Textile Exchange Preferred Fiber Materials Market Report 2017.

## EFFICIENT USE OF WATER, ENERGY AND CHEMICALS: IMPLEMENTING COLLABORATIVE PROGRAMS

Within the supply chain, the processing stage is the one where the combined environmental impact of water, energy, waste, and chemicals is largest.[59] Yet many fashion brands have not extended their efforts to include this stage. Finding the individual starting point to engage, and accumulating the required knowledge and expertise to begin, proves to be a challenge. In order to make progress and accumulate proof points, the roadmap outlines the implementation of existing collaborative initiatives in a fashion company's supply chain. Building on the experience, expertise and best practices from more advanced players within established platforms can prove especially beneficial for small to mid-sized firms.

Most of these efficiency programs require the support of the supplier as well as the brand. Once brands gain this support, these programs can strengthen ties and increase trust with suppliers. Both sides will enlarge their commitments to each other, while saving scarce resources.

One such collaborative initiative is the Clean by Design project, initiated by the Natural Resource Defense Council (NRDC), and implemented in the supply chains of players such as Target, Burberry, Gap, Kering, and Levi Strauss & Co.[60] This holistic efficiency program, rolled out in over 200 fabric mills of all ages and sizes in a variety of countries, focuses on ten best practices for saving energy and water, all of which are easy to implement, involve low initial investment, and yield relatively high financial returns, usually within a year. It has brought about annual savings of more than 7 million tons of water, as well as the equivalent of 90 thousand tons of coal. Across 56 of the factories that have completed the program within

"Clean by Design is the classic win-win initiative that companies say they are seeking, significantly reducing the environmental footprint while saving real money. We commonly see double-digit reductions in energy and water use, with average costs savings of €1,6 million over five years in each participating mill—not to mention that these savings are delivered with minimal up-front costs and payback periods typically less than a year."
– Linda Greer, Senior Scientist, NRDC

**Exhibit 15**

## Improving water and energy consumption in processing

NRDC´s Clean by Design program

**Motivation**

Increasing resource efficiency (energy, water, and soon chemicals) within the processing stage of the supply chain (especially textile dyeing and finishing at textile mills)

**Key figures**

- Investment (supplier): ~€3.000-4.500
- Investment (brand): ~€4.000-8.000 per facility
- Total savings: €18 million annual savings in operational cost (€30.000 annually/mill)
- ROI*: < 9 months

**Description**

Clean by Design, a partnership between the International Finance Corporation, the Sustainable Apparel Coalition and the Apparel Impact Institute, is a supply chain efficiency program developed by the Natural Resources Defense Council (NRDC) tackling water, energy and chemical consumption in textile mills. Since its establishment in 2007, the program has been rolled out to more than 200 mills of all ages and sizes globally.

The core of the program is based on ten best practices which are inexpensive, easily implementable and demonstrate a quick return on investment, usually within just one year. The ten practices include e.g. installing energy, water and steam meters as well as measurement software, reusing cooling and grey water, collecting and recovering condensate water, improving insulation, recovering heat from exhaust gas or optimizing compressed air. Further improvements in safety, comfort and health within the work environment have been realized.

With the launch of the Apparel Impact Institute (AII) in October 2017, Clean by Design was selected as a first project. The AII will focus on how to best support and roll-out the initiative globally.

**Activities**

- Brands recruit their suppliers to join
- Supplier completes baseline assessment including the Higg Facility Environmental Module
- Supplier participates in e-training and workshops on resource efficiency
- Expert visits supplier to review baseline and help to identify opportunities
- Supplier creates implementation plan
- Supplier undertakes improvements
- Expert visits to verify implementation of improvements
- Supplier submits final implementation report
- Completion of post-implementation Higg Index and verification of results
- Sharing of experiences among participants

**Key efficiency savings (2014-2017)**

- 7m tons of water per year (11% per mill)
- 90k tons coal per year (7% per mill)

Source: Information provided by NRDC; NRDC and SAC (2018), Clean by Design
* ROI = return on investment

the last three years, this reduction in consumption culminated in €18 million in yearly savings in operations' cost.[61] With the support of the recently launched Apparel Impact Institute (AII), the Clean by Design program aims to expand globally and achieve scale more quickly.

Kering, replicating the Clean by Design practices in its Italian fabric mills, realized annual savings of €39,000 per mill after two years. The program phased out fuel oil entirely, eliminated 7,850 tons of $CO_2$, and reduced greenhouse gas emissions by 12% per year.[62]

The SAVE program is another collaborative effort that—in contrast to fabric-mill-specific Clean by Design—covers a broad part of the supply chain, including tier-two as well as tier-one suppliers. Initiated by the public-private partnership among PUMA, the H&M Group, the DEG (KFW), and ASSIST, it focuses on reducing energy and water consumption as well as waste creation at apparel and footwear factories. Implemented measures include detecting and repairing compressed air leakages, replacing lights, better maintaining motors, and upgrading the servo motors on sewing machines. So far, the SAVE program has trained more than 500 employees at the involved suppliers. Its first year concluded with annual reductions of 44,500 tons of $CO_2$ emissions, 633,000 cubic meters of water, and 660 tons of waste—all of which led to €3.2 million in lower costs.[63]

**Exhibit 16**

## Improving resource efficiency in the supply chain

The public-private partnership SAVE

### Motivation

Increasing resource efficiency at production sites across footwear, apparel and accessory suppliers.

Reducing the consumption of water and energy as well as the creation of waste

### Key figures

- Total investment: €7.9 million
- Total savings: €3.3 million p.a.
- ROI*: 2.4 years

### Description

SAVE (Sustainable Action and Vision for a better Environment) was a public-private partnership by DEG (KFW), Puma and H&M in cooperation with the non-profit organization ASSIST. Established in 2013, the project aimed to create more environmentally-friendly production sites. The program focuses on raising energy efficiency and lowering the consumption of water and the creation of waste. 35 suppliers in Bangladesh, Cambodia, China and Indonesia participated in the program.

The majority of factories implemented predominantly short-term measures that could be realized without larger capital investments as well as energy saving measures which showed the largest direct financial benefits. The top five implemented measures included detecting and repairing compressed air leakages, replacing lights, improving the maintenance of motors, upgrading to servo motors on sewing machines and upgrading from traditional to low flow faucets.

The project was concluded in 2015 with the establishment of a best practice forum for all participating suppliers, a detailed documentation of the project in a case study book and the establishment of an e-learning system.

### Activities

- Project launch with suppliers' top management to ensure support
- Development of localized sustainability guidelines
- Supplier trainings on resource conservation
- On-site assessments by technical consultants to create environmental performance baseline
- Creation of supplier-specific improvement roadmap
- Twelve-month technical assistance by technical consultant
- Regular progress checks and corrective actions

### Key efficiency outcomes

- Energy savings: 62,000 MWh p.a.
- Water savings: ~ 633k $m^3$ p.a.
- Waste reduction: ~ 660 tons p.a.

Source: Puma, (2016). SAVE Project Final Report.
Available at: <http://puma-save.org/sub/wp-content/uploads/2016/final-report/SAVE_Final_Report.pdf> [Accessed 09 April 2018].
* ROI = return on investment

"At Burberry we are acutely aware of our responsibilities and the opportunities we have to drive positive change. We also believe that collaboration with both industry partners and peers is an important vehicle in enabling true, sustainable change. An example from our current responsibility strategy, Creating Tomorrow's Heritage, is our partnership with the NRDC to address key supply chain challenges faced by our industry and create a sustainable supply chain for the future."
- Pamela Batty, Vice President of Corporate Responsibility, Burberry

Replacing hazardous substances with less dangerous alternatives falls within the focus of other resource initiatives. Cotton farming, for example, consumes 4% of worldwide nitrogen fertilizers and phosphorous[64], 16% of all insecticides, and 7% of all herbicides[65]. These chemicals leach into groundwater and waterways and contaminate large areas of land, jeopardizing the health of workers and communities.[66] Studies estimate that two-thirds of China's rivers and lakes have been polluted by the 9 billion liters of contaminated water discharged from textile factories.[67] Prominent consumer-facing campaigns, such as 'Detox' by Greenpeace[68] have called for the responsible use of chemicals.

The combination of environmental degradation and human health risk has placed the use of chemicals under close scrutiny from several regulators, putting tight restrictions on usage and import in place. Legislation as seen in the EU (REACH)[69] and the US (TSCI)[70] illustrates two prominent examples of how the regulator enforces strict and legally binding restrictions on substance usage[71,72]. With time, more regulators will follow their example putting the industry under pressure to improve the usage of chemicals.[73]

**Minimizing the use of hazardous substances collaboratively**

In response, brands and retailers are implementing collaborative chemical management initiatives in their supply chains or embracing widely used certifications guaranteeing the elimination of harmful substances. GOTS, Bluesign, OEKO-TEX Standard 100 and other testing and certification systems set up frameworks and standards defining and regulating minimum environmental requirements for textile production employed to certify supplier factories. As third-party testing institutions audit these standards, many brands and retailers will rely on them when choosing their supplier base.[74,75,76]

Larger transformative initiatives include collaborations such as the ZDHC Foundation (Zero Discharge of Hazardous Chemicals) and its Roadmap to Zero Program. The ZDHC is an industry collaboration of currently 92 contributors (24 brands, 53 value chain affiliates, and 15 associates) within the sports, fashion, luxury, and outdoor industries. Signatories such as adidas, Burberry, C&A, Hugo Boss, New Balance, and Marks & Spencer are committed to implementing best practices in sustainable chemicals management to ensure safer working conditions and a lower environmental footprint. Implementing the ZDHC chemical management solutions, for example the Gateway Chemical Module—a global database of safer and more innovative chemistry to reduce hazardous chemical use—increases visibility and fosters the uptake of more sustainable chemistry across the industry.

So far, the Gateway has been rolled out to over 1,000 wet processing sites. Harmonizing individual chemical management programs and reducing the complexity within a brand's supply chain has led to 30–50% cost savings in wastewater testing, 20–40% reduced costs in chemical testing, and overall cost reductions of 30–40%.[77]

The benefits of these programs include a complete overview of chemicals used in production, detailed restricted substances lists (MRSL) defining maximum concentration limits, chemical guidance sheets, auditing, testing standards, and access to forefront industry expertise. Companies also gain a platform for sharing best practices with industry peers.[78]

"By joining the ZDHC and implementing our programs within their supply chains, brands benefit not only from a reduced environmental impact within their value chain, but also from reduced complexity in their supplying factories—saving 30–40% of costs purely by harmonizing individual chemical management systems."
– Frank Michel, Executive Director, ZDHC

### A CLOSE PARTNERSHIP WITH THE SUPPLIER IS KEY

All of these efficiency initiatives depend on the close collaboration and partnership between the brand or retailer and the manufacturer. The suppliers support is essential for driving the change and implementing the agreed-on measures. Brands and retailers are only capacity builders, enablers, and facilitators.

To embrace these initiatives, manufacturers need a positive business case, with visible benefits in their cost structure. Any required investment needs to remain at a reasonable level with a quick payback period. Many suppliers work with order contracts limited to one year, so payback periods beyond this timeframe are hard to sell. The uncertainty involved with order numbers for upcoming years often hinders suppliers' long-term commitment, especially in high-investment efficiency initiatives.

Some brands and retailers encourage suppliers' participation by giving them multi-year commitments or by recognizing their environmental performance in the supplier scorecard.

### RAISING ENERGY EFFICIENCY IN OWN OPERATIONS AND RETAIL NETWORKS

Besides driving efficiency programs in the supply chain, opportunities to improve the environmental footprint also exist in own operations. Most savings come from energy and water consumption, with practices such as changing from conventional to renewable energy sources, improving lighting and air-conditioning systems, and installing meters to measure energy or water consumption. Other best practices range from changes to the product packaging to using alternative means of transportation. Implementing these practices across headquarters, stores, and distribution centers can yield substantial savings.

ASOS, for example, updated the lighting in one of its UK warehouses, replacing all the light bulbs with low-carbon LED alternatives. The exchange of all 7,013 lights generated a reduction of 4.46m kWh per year, resulting in a 76% reduction in electricity consumption and a cut in annual carbon emissions of over 2.3 thousand tons.[79]

Hugo Boss analyzed their $CO_2$ emissions in logistics and transportation processes and adjusted routes and transport means accordingly. By switching to rail and short sea freight between Asia and Germany and via Europe's southern ports, the company reduced emissions by 95% versus conventional sea-air shipment[80]. VF, committing to zero waste at all distribution centers by 2020, has already achieved this ambition at 14 centers, saving €608,000 annually.[81]

## RESPECTFUL AND SECURE WORKING CONDITIONS: IMPLEMENTING COLLABORATIVE INITIATIVES

With more than 60 million workers, the fashion industry is one of the largest employers worldwide. Despite substantial recent improvements, working conditions still vary widely, especially across sourcing regions. Representing in particular the early steps of the fashion value chain, workers in those regions still face unsafe factories and harsh working conditions. Common issues include missing safety precautions, forced labor, verbal abuse, sexual harassment, long working hours or general non-compliance with international standards. Fashion can play a major role in driving large-

scale social change in this regard by improving conditions for workers and surrounding communities while safeguarding future productivity.

As with resource efficiency, brands can benefit most in this phase by joining collaborative initiatives already active in the field which can provide frameworks, standards, assessment methods, and training materials. These collaborative programs help to ensure compliance and offer measures to improve the working environment at participating factories. Besides safety and labor conditions, these initiatives address social topics such as financial inclusion, health, diversity, and gender equality.

To build on expertise and long years of experience, shared by these collaborative projects, is especially important when it comes to social measures. Addressing such complex issues in the supply chain requires not only visibility over its performance, but also well-grounded knowledge of international standards and insights into the local context.

**Collaborating to enhance working conditions in main facilities**

Suppliers as well as brands and retailers have much to gain from better working conditions. Higher health and safety standards at the factory will lower the number of accidents and their severity, thereby decreasing man-days lost and saving both labor and factory running costs. Training and coaching in a variety of areas, including business skills and health, can raise worker well-being, and efficiency, reducing overtime work.

The Better Work program, developed by the International Labour Organization (ILO) and the International Finance Corporation (IFC), focuses on enhancing working conditions. It offers factories both practical advice and financial help, supports national stakeholders in governing the labor market, and publicly discloses noncompliance—and demonstrates the business benefit of improved work environments to brands and retailers as well as suppliers. Working with more than 100 brands (including J.Crew, Target, Asics, Esprit, John Lewis, and Li & Fung) at 1,500 factories across seven regions with two million workers, Better Work is one of the largest and most international initiatives[82].

Introducing tools such as annual enterprise assessments, guided self-diagnoses, learning services, and worker management committees, Better Work has made factories more productive and profitable. At one Vietnamese factory, weekly working hours fell four hours, and worker productivity (especially of women) increased by 22%—which made Better Work factories up to 8% more profitable than their counterparts. Other programs reduced the gender pay gap as much as 17%, while reducing the incidence of abusive treatment by up to 18%.[83]

Health and safety initiatives within this phase aim to improve working conditions and raise the well-being and health levels of the workforce. In combination with reduced accident rates and a lowered number of man-days lost, overall productivity levels are expected to rise. Arvind, the Indian textile manufacturer, installed and implemented an array of safety features from comprehensive fire protection systems to work permit systems to personal protective equipment (such as safety shoes and masks) to weekly safety meets. Within two years, work injuries declined by 56%, resulting in a lowered accident frequency and severity rate of 55% and a reduction of man-days lost by 42%. The measures raised health, safety, and productivity levels of all manufacturing staff members. [84]

**Exhibit 17**

## Ensuring respectful and secure working conditions
The Better Work Program

**Motivation**

Improving labor standards and competitiveness in the global supply chain of the garment industry

**Key figures**

Included countries:
- 8 (Bangladesh, Cambodia, Egypt (pilot), Haiti, Indonesia, Jordan, Nicaragua and Vietnam)

Involved parties:
- >100 brands/retailers
- ~1,500 factories
- ~2 million workers

Factory benefits[1]:
- Profitability: +8%
- Revenue to cost ratio: +25%
- Productivity: +22%
- Working week: -4h

Community benefits[2]:
- Gender pay gap: -17%
- Sexual harassment concerns: -18%

**Description**

The Better Work Program is a collaboration of the International Labour Organisation (ILO) and International Finance Corporation (IFC) bringing together brands and retailers, factory owners, unions, workers and regulators. The main aim is improving working conditions and fostering the respect of worker rights within the garment industry while improving the profitability as well as competitiveness of the local industry.

Participating brands receive support to create transparency across their factories' performance. They can leverage the initiative's tools, frameworks and expertise to implement improvement mechanisms ensuring compliance with core ILO labor standards and national labor law across participating suppliers. In its work, the initiative emphasizes the role of worker-factory management cooperation, worker engagement and social dialogue.

The initiative's main focus areas include
- Advising factories on working condition improvements
- Publically disclosing non-compliance to display the business benefit of enhanced working conditions to both brands/retailers and suppliers
- Cooperating with brands and retailers to ensure long-lasting progress
- Collaborating with governments to improve labor laws

**Better Work activities at supplier site**

- Factory assessments for compliance with core ILO standards and national legislation using Better Work's Compliance Assessment Tool (CAT)
- Assistance in self-diagnosis of factories to identify issues and key priorities
- Assessment of improvement progress
- Establishment of worker-management committees enhancing workplace communication and cooperation
- Roll-out of training and coaching services
- Public listing of factories alongside their performance against a set of key criteria

**Better Work results at supplier site**

- Improved working conditions
- Enhanced adherence rate with ILO core labor standards and national legislation (incl. pay, contract, health & safety restrictions and working hours)
- Greater worker well-being
- Wide establishment of worker-management committees
- Higher factory productivity

1 Case study Vietnam
2 Average number across country programs

Sources:
Better Work, (n.d.). Better Work. [online] Available at: <https://betterwork.org> [Accessed 11 April 2018].
Better Work. (2016). Progress and potential: How Better Work is improving garment worker's lives and boostin factory competitiveness: A summary of an independent assessment of the Better Work programme. [pdf] Available at: <https://betterwork.org/dev/wp-content/uploads/2016/09/BW-Progress-and-Potential_Web-final.pdf> [Accessed 12 April 2018]
Better Work. (2016). Better Work Progress and Potential Vietnam. [pdf] Available at: <https://betterwork.org/dev/wp-content/uploads/2016/09/Vietnam-Country-Brief.pdf> [Accessed 16 April 2018]

"Target is a partner of the Better Work program that aims to promote well-being, working conditions and profitability in the global apparel sector. The emphasis of the Better Work program on engaging and activating workers to become change makers themselves is essential for creating a solid foundation for sustained increase in the well-being of workers. We know that in partnership with Better Work and other brands and retailers we can truly make a difference in the lives of millions of garment workers throughout the world."
– Amanda Nusz, Vice President, Product Quality & Responsible Sourcing, Target Corporation

"We see the HER Project as a true sustainable growth story. It is a business plan and an investment plan that works for people and business."
– Daniel Jae-Won Lee, Executive Director, Levi Strauss Foundation

**Promote female empowerment**

Several initiatives work directly on gender issues. As more than three-quarters of all fashion employees are female,[85] these issues offer a great deal of opportunity for companies - no matter their size – which aim to improve their performance in social issues.[86] Researchers have found that empowering women benefits not just the women themselves but also society at large. Promoting women's rights and well-being has resulted in lower household poverty, greater economic growth and efficiency, as well as higher productivity.[87]

The HER Project, launched by BSR (Business for Social Responsibility) in 2007, depicts one collaborative initiative targeting a wide range of topics within the field. Aiming to unlock the potential of women with workplace training and coaching programs over 12 to 18 months, participating fashion companies can benefit of the established infrastructure, build on accumulated expertise and key learnings while generating lasting impact over short periods of time. Measures at the individual factory include baselining health needs and undertaking impact assessments, training, and coaching events customized to the individual factory's strongest requirements.[88] After successful completion, the HER Project reduced turnover and worker absenteeism by more than half, and decreased worker attrition significantly. In an exemplary factory in Egypt, these lowered rates resulted in an ROI of 4:1 with rising overall factory productivity. Additionally, error rates dropped, with savings of about €8 per error.[89,90]

Over time, the HER Project expects greater gender equality, rising health levels, greater motivation and well-being, as well as ever-higher overall productivity.[91] With more than 60 participatory companies (e.g., BESTSELLER, VF Corporation, AB Lindex, Li & Fung), the program has already covered more than 700 factories reaching 800,000 women across more than 14 countries.

# PHASE THREE
## *EXPANDING TO SCALE*

Only around 10% of the industry (by market share) has reached this third phase. Having proceeded so far along the roadmap, fashion companies – mainly Sustainability Champions, giant sportswear players and other large companies in the entry-price and luxury segment—continue to intensify and amplify their efforts. Building on proof-points created in previous phases, these frontrunners have secured organizational backing as well as managerial support to reach this phase. Previously initiated activities are rolled out to scale, involving a larger share of their employed materials, penetrating an ever-growing portion of their supply chain and improving an increasing share of their own operations. They raise their social and environmental performance, pushing the ambition level even further: 'doing more and better' is the focus of this phase.

Most of the frontrunners work on expanding existing initiatives to more suppliers, while in parallel adding more programs dedicated to specific areas. These typically involve installing a new technology, implementing new approaches, pushing the ambition level further, and raising the impact in environmental as well as social issues. By diligently expanding successful programs across many factories, frontrunners avoid the problem of starting one pilot after another without realizing large-scale results.

Driving these initiatives to scale often requires enlarged investments, specific expert knowledge, or simply company size. Thus, in order to drive impact beyond previously achieved levels, companies undertake many of the activities within this phase in collaboration with peers or other players within the industry.

Similar to earlier phases, most activities are still undertaken within the three core categories of sustainable materials mix, efficient use of resources, and respectful and secure work environments. Frontrunners, however, do not only amplify their efforts within the existing fields but expand their engagement to include further activity fields, thus extending their efforts to a wider range of topics. Common extended topic areas within the industry are closing the loop and better wage systems. So far, however, these advances are only first steps, as no encompassing ultimate solution neither for the one nor the other has been found yet.

**Expanding To Scale**

The industry accelerates efforts, takes initiatives to scale, and integrates targeted programs deep into the value chain with tier-two suppliers and beyond. Implementing new technologies and process upgrades will raise profitability as well as environmental and social performance.

**Phase**

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### SUSTAINABLE MATERIAL MIX: INCREASING SHARE OF NON-CONVENTIONAL MATERIALS

Phase three incorporates intensified efforts to improve the sustainable materials mix. Companies that previously began to replace traditional fibers for more sustainable options now turn to maximize the share of preferred fibers within their BOM. The gradual replacement of lesser materials for better alternatives includes the definition of concrete material guidelines, specifying origin, production characteristics, and individual footprint to foster better design and sourcing decisions. Replacing conventional raw materials for alternative options generates products, entire product lines, or even whole collections of more sustainably sourced materials.

Advances within preferred fibers are transforming the economics of sustainability. As a growing number of companies seek alternatives for their collections' conventional inputs, preferred fibers become easier to source, at greater volume, and at a decreasing price gap to conventional

inputs. This, in turn, encourages more players to use these alternative materials in their collections, creating a new wave of improvements as well as enhanced environmental performance across the industry.

Other sustainable or preferred materials are already available.[92] Within manufactured fibers, companies can use synthetics such as recycled polyester and nylon, but also bio-based synthetics. Preferred manmade cellulosics include Lyocell and preferred viscose. For natural fibers the choices include organic cotton, preferred linen, or hemp, and animal fibers such as preferred wool or down, silk, or leather.[93]

**Crafting more sustainable products and collections**

A range of brands is adopting these fibers. The German brand Kunert, for example, introduced an exclusive pair of tights—Kunert Blue—using Econyl, a yarn made from 100% regenerated textile waste and old fishing nets.[94,95] Nau, after using 100% organic cotton and 100% recyclable polyester, became one of the first apparel brands in 2015 to introduce a collection with down recycled from post-consumer sources (down duvets and pillows). Offering the same high-quality characteristics as virgin down, it greatly reduces the environmental footprint.[96] Vaude, the German outdoor player, uses a wide range of bio-based, preferred natural fibers and recycled materials in its Green Shape Core Collection for summer 2018. Using recycled thermoplastics, preferred leather, as well as durable organic cotton, Vaude ensures the use of more than 90% preferred materials within its collection.[97]

More brands are setting targets defining the share of preferred fibers in their bills of materials. SELECTED (by BESTSELLER), for example, has committed to half of their Summer 2018 collection consisting of more sustainable materials[98], while the H&M Group aims to use only recycled or other sustainably sourced materials by 2030. These include Better Cotton, bio-based synthetics and plastics, responsibly sourced manmade cellulosic fibers, and responsibly sourced animal-based fibers such as wool and down.[99]

Some others have advanced further. G-star and C&A have produced cradle-to-cradle (C2C) gold-level certified products using 100% organic cotton. G-star developed its C2C denim jeans in collaboration with Dystar, Artistic Milliners, and Sai-Tex. The denim is dyed with a new indigo technology that uses 70% fewer chemicals, and washes with a novel technique that enables 98% of the water to be reused.[100] Similarly, C&A developed a C2C certified T-shirt that is fully compostable, made of 100% organic cotton, using only 100% nontoxic chemicals, and produced within high social and environmental standards[101]. The T-shirt is sold at a competitive price from €7, indicating a positive contribution margin.[102]

Besides proving to the industry that cost-competitive sustainable products are a reality, both brands openly share their concepts for others to follow suit and increase the uptake of the C2C production process within the industry. While G-Star made its fabric development process open source,[103] C&A's close partner Fashion for Good applied the learnings from the Cradle-to-Cradle gold Certified™ T-shirt to create a guide and self-assessment tool for suppliers.[104] This publicly available C2C Certified™ "How-To" Guide includes a detailed description for garment manufacturers of the production process.[105] Both brands have contributed to pre-competitive and industry-wide collaboration, all to enable further advances in sustainability.

### Setting the guardrails for sustainable sourcing

In order to control the footprint of the used fiber mix closely, detailed sourcing guidelines are required for manufacturing processes and raw materials. In 2018, Kering, for example, has published its detailed set of standards for 12 of its key materials, including leather, precious skins, fur, cashmere, wool, cotton, down, and cellulosic fabrics. Covering guidelines for both manufacturing and raw materials processes, the rules outline the company's expectations for origin, traceability, and required certifications of their employed materials. By defining these detailed standards for all employed materials, Kering is able to enhance and reduce its environmental and social footprint across their brands and all produced collections.[106]

## SCALING EFFICIENT USE OF WATER, ENERGY, AND CHEMICALS

To enhance resource efficiency, frontrunners are investing in new projects as well as driving previously initiated projects up to scale. They usually aim for high-impact projects in the supply chain, with deep-dive activities that save resources, implement new technologies, and install new machinery or equipment at suppliers' sites.

Energy efficiency is one of the biggest areas of concern, as electricity is one of the most costly input factors. Li & Fung, for example, installed web-based monitoring sensors at factories in India and China to collect real-time data on energy usage. The installed technology helped to identify the main drivers of energy consumption. While Li & Fung gained visibility into their supply chain's environmental footprint, the supplier managed to optimize its energy consumption. The resulting efficiency gains brought a return on the initial investment within only a few months, saving more than 3.100 kmH of energy per month. Having gathered this proof of concept, Li & Fung is launching a network-wide plug-and-play energy sensor package.[107]

With the highest levels of consumption in the earlier stages of the value chain, water is a crucial input factor, especially during the processing stage. Despite being often depicted as an undervalued resource, especially in Asian countries, water has moved up high on the priority list, as increasing supply chain visibility uncovers growing water scarcity in combination with overconsumption and dangerously high levels of pollution.

### Improving water consumption further up the supply chain

Common practice focuses on the dyeing processes at tier-two factories. Current solutions include pre-treating raw materials, optimizing dyeing efficiency, introducing more sustainable and efficient dyestuffs, upgrading dyeing technologies, and implementing closed-loop water systems. Water savings that reduce the water intake by 90%[108] to nearly 100%[109] can be realized with these technologies. As significant capital investments are required to upgrade facilities, industry collaborations are the norm within this field.

For example, bonprix partnered with DyeCoo Textile Systems, the Netherlands-based inventor of a waterless textile-dyeing machine.

The company entered a joint venture called CleanDye with different partners. The three companies set up a factory in Vietnam to install DyeCoo's waterless dyeing machines and bring them up to scale. As the only

**Exhibit 18**

## Defining sourcing guidelines

Kering's standards for raw materials and manufacturing processes

### Motivation

Creating 100% traceability of key raw materials and replacing conventional materials by more sustainable options

### Key figures

- Number of covered raw materials: 12 (hides and skins for leather, precious skins, fur, cashmere, wool, cotton, paper/wood, plastics, down, cellulosic fabrics, gold, diamonds)
- Additional raw materials to be covered by 2025: 5 (silk, synthetic fibers such as polyester and nylon, silver, brass, colored stones)

### Description

In 2018, Kering published a set of environmental and social standards for manufacturing processes and raw materials to be used by all of their suppliers and sub-contractors. The standards include guidelines on origin and traceability, required certifications, production process requirements, animal welfare practices and chemical usage.

For each key material, there are minimum requirements which need to be met immediately to become a Kering supplier. A second section defines additional conditions and best practices which a supplier should work towards in the future. Going forward, a vendor rating system will monitor and assess all suppliers' performance to the Kering Standards. The rating result will be made visible to all Kering brands for incentivization.

### Activities

- Tracing of raw material sources
- Development of sourcing guidelines
- Distribution of guidelines among suppliers and sub-contractors
- Establishment of monitoring and support systems
- Definition and implementation of additional standards

### Key results

- Establishment of minimum sustainability requirements across all materials
- Transparency across all materials used
- Intensified relationship with suppliers

Sources: Kering, (2018). Kering Standards. [pdf]
Available at: <http://www.kering.com/sites/default/files/kering_standards.pdf.> [Accessed [12 April 2018].

**Exhibit 19**

## Monitoring energy usage and raising resource efficiency

Li & Fung's energy sensors

### Motivation

Lowering energy usage at supplier site and increasing energy efficiency

Providing of real-time data on energy usage to identify key consumption drivers and supply chain's environmental footprint

### Key figures

- Investment cost: €900
- ROI*: < 1 year
- Cost savings/month: €500
- Energy savings/month: 3100 kwH

### Description

In 2017, Li & Fung piloted the use of wired and wireless sensors to monitor energy-intensive production equipment at two of its network suppliers. The aim was to understand key drivers of energy consumption within manufacturing operations, improve resource efficiency, and provide visibility into the supply chain's environmental footprint. The collected data revealed a range of opportunities to lower energy consumption without disrupting operations. These opportunities mainly involved behavioral changes with little to no financial investment.

Li & Fung provided support and technical knowledge, but the learning from the project remained with the factory management. Based on this experience, Li & Fung will launch a network-wide plug-and-play energy sensor package to drive energy efficiency within the supply chain, and automate the data collection. It will further explore similar approaches to monitor and conserve other resources such as water and waste.

### Activities

- Design and select plug-and-play starter kit
- Select suppliers for pilot program and secure supplier buy-in and budget
- Install plug-and-play solution in production lines
- Collect real-time data on energy usage
- Analyze data and extend to water and waste
- Potential roll-out across further factories in 2018

### Key takeaways

- Real-time monitoring allows to detect key consumption drivers and identify improvement opportunities
- Energy-saving opportunities involved behavioral changes with little to no financial investment
- Key argument to secure factory management buy-in was low initial investment and quick ROI

Source: Information provided by Li & Fung
* ROI = return on investment

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"CleanDye is a significant project within bonprix´s CR strategy. The new technology provides a sustainable alternative and is set to revolutionize the dyeing process." – Stefanie Sumfleth, Head of Corporate Responsibility & Quality Management, bonprix

retailer, bonprix is investing directly in the construction of this plant, offering the world's first waterless and process-chemical-free dyeing. DyeCoo uses recycled CO2 to dissolve and transport dyes into fibers, saving approximately 25 liters of water per T-shirt. The process consumes significantly less energy, reduces dyeing time, saves around 30% of dyestuff, and eliminates the need for added chemicals.[110] In Vietnam, the partners constructed a fully waterless and process-chemical-free dyeing factory bringing DyeCoo's machines up to scale. The first waterless products will be available within bonprix' collection in early 2019.[111]

Other cross-industry partnerships and multi-stakeholder initiatives focus on large-scale activities to reduce water consumption, increase awareness of pollution, and enhance water efficiency. One of the largest collaborations in this field is the WWF's Water Stewardship program. For the H&M Group, the effort generated an extensive baseline assessment of overall water usage, resulting in water training for 75,000 employees and better standards for water and chemical management at all 500 H&M Group wet process suppliers. Undertaking advised investments in water, climate, and energy improvements, suppliers reduced water cost by as much as 25% within two years. These initiatives demonstrate the power of collaboration: implementing technologies that require investments too large for a single player, so companies can raise the ambition level on resource efficiency.

## RESPECTFUL AND SECURE WORKING CONDITIONS: INCREASING WORKER ENGAGEMENT AND SKILLS

On social issues, frontrunners are deepening their engagement with suppliers and pushing progress on working conditions. Increasing the potential for higher future achievements, GAP even consolidated its supplier network by 25% in order to engage more closely with the remaining partners.[112] Undertaken measures are usually narrowly focused, in-depth, and customized to a specific group of workers entailing larger investment requirements or piloting new ideas. Skill-building and coaching programs focus most commonly on topics such as health and safety, financial inclusion, diversity, gender equality, or the empowerment of women.

By elevating workers' skill levels and well-being as well as their health and confidence levels, undertaken measures have proven to deliver promising results. Suppliers not only satisfy basic human rights and meet compliance standards, but realize reduced turnover rates and lowered absenteeism, elevated worker retention and rising motivation levels. Resulting into increased efficiency levels, these measures also elevate factory productivity.

Many initiatives are dedicated to involve the worker at the workplace. The Workforce Engagement Program by GAP Inc. and Verité, a US-based nonprofit organization specializing in fair labor, gives workers a voice in daily factory business. Workers gain a channel for anonymous feedback to share their thoughts on topics such as relationships with their supervisors, established grievance mechanisms, training, and development opportunities. GAP helps suppliers draw conclusions from the results, and supports the development of action plans on how best to invest in the workforce. In 2016, Gap reached more than 220,000 workers across 80 facilities through the program.[113] In addition to increasing workers' well-being, higher employee engagement in manufacturing companies has proven to reduce

**Exhibit 20**

## Increasing worker involvement
GAP's Workforce Engagement Program

**Motivation**

Raising the engagement level of workers in factories

Enhancing the level to which garment workers feel valued and engaged at work

**Key achievements**

- Since 2015, feedback surveys were completed in more than 81 facilities in Bangladesh, China, Guatemala, India and Vietnam. Additional eight facilities were reached with other partners in China, Sri Lanka and Vietnam
- By the end of 2016, more than 220,000 workers had participated in GAP's workforce engagement program

**Description**

GAP has partnered with the NGO Verité to raise the engagement level of garment workers within their work places. The program enables workers to provide anonymous feedback on key topics such as training and development opportunities, supervisor relationships, and grievance mechanisms. The information is collected through surveys, focus groups and one-on-one interviews, providing both quantitative and qualitative data to derive insights. Once the data is received, GAP supports its suppliers to analyze the findings and to create individual recommendations where and how best to invest in employees.

The retrieved results also impact training programs provided for facility managers enhancing the development of tools to increase workers' satisfaction, knowledge and overall well-being. An Engagement & Well-Being Toolkit is provided, including team-building activities and supervisory skill trainings.

**Activities**

- Provision of anonymous feedback opportunity for workers
- Analysis of feedback data to identify where best to invest in employees
- Launch of training programs for facility managers to increase workers' satisfaction, knowledge and overall well-being

**Key benefits**

- Facility managers listen to and act on workers' ideas and concerns
- Enabling workers to actively engage at their workplace has been proven to lead to above-average productivity, improve retention and lower absenteeism

Source: GAP Inc., (2016). Global Sustainability Report 2015-2016. Available at: <http://www.gapincsustainability.com/sites/default/files/Gap%20Inc.%202015%20-%2016%20Report.pdf> [Accessed 09 April 2018].

turnover by 70% and absenteeism by 40%, reducing overall labor costs.[114] Similarly, feeling engaged and valued at work was found to increase the probability of above-average worker productivity by more than a third, leading to elevated productivity levels that allow suppliers to gain a three-to-one return on their initial investment. [115]

At an average share of 68%, women represent the largest group within the garment workforce.[116] Identified as a key driver of business innovation, risk management, and rising productivity[117], the empowerment of women is depicted as a prerequisite to the eradication of poverty and sustainable growth.[118]

Many activities initiated within this phase of the roadmap emphasize women, their empowerment, and their independence. GAP's PACE (Personal Advancement and Career Enhancement) program was established in collaboration with the International Center for Research on Women (ICRW), the Swasti Health Resource Centre and CARE International. It provides classroom learning as well as interactive group sessions for women workers covering topics such as "communication, problem-solving and decision making, time and stress management, water sanitation and hygiene."[119] So far, the program has increased skill-sets, increased self-esteem and confidence, and accelerated productivity within the factories.[120] Further modules include topics on how women can advocate for themselves or find their voice. By 2016, the brand had reached 68,000 women in 12 countries, and aimed to expand PACE to 1 million women and girls by 2020.[121]

## CLOSED-LOOP FASHION SYSTEMS

The fashion industry's prevailing business model is linear, ranging from raw materials to production, use, and ultimately disposal. While the demand for clothing is projected to increase at 2% per year[122], the number of times clothes are actually worn has dropped by a third compared to the early 2000s.[123] Some studies estimate the average garment to be worn only ten times before disposal.[124] Most discarded items end up as waste, as very few are recycled. In total, three-quarters of all used material processed along the fashion value chain are lost in landfills—representing the equivalent of one garbage truck of textiles per second.[125] Less than 1% of all materials in clothes are recycled into new garments. Much of today's production is designed neither for longevity nor recycling, but rather for short life cycles to encourage consumers to buy anew.

The transformation of the fashion industry's business model from a linear to a circular system has risen far up on the agenda of the fashion industry. Involving the regulator as well as nongovernmental organizations, four activities can be observed across the industry:

- Training designers in durability, disassembly, and recycling
- Influencing consumer behavior to care and repair
- Investing in garment collection schemes to facilitate recycling
- Increasing the reuse of pre-consumer waste

### Training designers in durability, disassembly, and recycling

Designers have to take a product's full lifecycle into account. A growing number of brands have indeed started training their design teams around product durability, reuse, and recycling, so that circularity can become core to the design briefs. As part of Global Fashion Agenda's 2020 Circular Fashion System Commitment, 54 companies—including Inditex, ASOS, BESTSELLER, Hugo Boss, and Ganni—have set targets on circular design.[126] GFA also launched the Design for Longevity platform, with support from the C&A Foundation and the EU LIFE fund, as a catalog of ideas in order to break down the complex issues of design for longevity and circular strategies into easily digestible pieces.[127]

Puma, partnering with cradle-to-cradle co-founder Michael Braungart and the EPEA Institute, used a three-step process to design for circularity. The first step eliminated all materials that led to the buildup of harmful chemicals in later materials cycles. Then they accepted only materials that were either biodegradable or technically recyclable. Finally, for those technically recyclable materials, they avoided any with mixed fibers that were difficult to disassemble.[128]

### Influencing consumer behavior to care and repair

Consumers can strongly influence progress within sustainability via their purchasing decision and care for products. Educating consumers on how to improve the usage of a garment increases its durability and prolongs its lifetime, lowering its overall footprint. A study by WRAP found that extending a garment's life by just three months would lower the water, carbon, and waste footprint by 5–10%.[129] Labels informing about the included materials, their recyclability, instructions for disassembly, as well as providing instructions on how to wash, dry, and repair, would thus signify a first step in this direction.

However, these initiatives do not go deep enough. Labels reach only those consumers who actively search for the information. Some players increase efforts to reach a wider consumer base. In spring 2018, the H&M Group will launch its Take Care pilot, a project that will provide customers with guidance and inspiration as well as services and products to help refresh, repair, and remake their clothes.[130] Nudie Jeans offers repair services for customers' damaged jeans, while Patagonia provides its customers with an "Expedition Sewing Kit"[131] to repair their clothing if needed. Initiatives such as these are crucial not only to increase awareness and lower the environmental footprint, but also to involve the customer actively in the transformation of the fashion industry toward a circular model.

**Investing in garment collection schemes to facilitate recycling**

Only around 25% of clothing is currently collected globally at the end of its lifespan. However, this rate varies widely from country to country. While in Germany, nearly 75% of disposed garments are collected, the US or China only reach rates between 10 and 15%.[132]

Several frontrunners, such as Patagonia, Eileen Fisher, Nudie Jeans,[133] and Inditex, have set up individual garment collection schemes within their stores to push these numbers to a higher level. While at Eileen Fisher all collection and sorting is organized in-house,[134] the H&M Group has installed collection bins across its entire fleet of stores. In collaboration with its partner I:CO[135], the retailer has sold, resold, recycled, or downcycled (as cleaning cloths) more than 55,000 tons of garments.[136] Besides promoting circularity, the collection scheme is a valuable tool for engaging the H&M Group's customers.

While increasing collection rates within the own store network can drive significant change—GFA and BCG estimated a savings potential of more than €4 billion if collection rates were tripled by 2030[137]—an industry-wide end-of-use garment collection scheme would be needed to make major progress toward circularity. Collaborating with peers and regulators would allow companies to pool resources, benefit economies of scale, and ultimately facilitate the industry's progress.

By installing their collection bins in public spaces in addition to collecting garments within their store network, Inditex is already undertaking first steps in this direction. With support from local governments, the bins are available to everyone, not just Inditex customers. The company has committed to add 1,500 to 2,000 containers in public spaces within its home market of Spain and has pledged to improve sorting facilities.[138]

**Increasing the reuse of pre-consumer waste**

Pre-consumer waste—albeit a smaller opportunity than post-consumer—still offers a substantial opportunity. A quarter of the industry's resources are wasted as leftovers of fabric and garment production every year. Half of these involve yarn waste, while the rest includes greige fabrics, cut pieces, roll ends, and defective fabric pieces, as well as overproduced or rejected garments. Disposing of this waste is also costly in itself, especially for fabrics that have already been branded and therefore must be destroyed.[139]

Exacerbating this problem is the brands' practice of using thousands of different fabric specifications and combinations in their products. If product orders change, fabrics for one item cannot be easily applied to others. This complexity also hinders recycling of the waste materials. By

**Exhibit 21**

## Promoting fair living wages

Fair living wage management systems at H&M Group

**Motivation**

Safe and secure working conditions including fair wages for all its suppliers' employees.

Establishing a sustainable system of living wages not only within its own supply chain, but across the entire fashion industry.

**Achievements**

- Average wages in H&M group supplier factories are often well beyond minimum wages, with generally higher take home wages in those factories that have implemented the fair wage method
- Signed MoU[1] on responsible purchasing practices and for living wages between IndustriAll Global Union and 17 brands, including H&M Group (as part of ACT collaboration)

**Description**

The H&M Group developed a Fair Living Wage management system to help suppliers improve their wage practices, as for example better skill recognition and benefits for workers contributing to higher take home wages for workers. This goes hand in hand with working together with other brands, trade unions and governments to jointly increase legal minimum wages and move towards industry-wide collective bargaining through collaborations such as ACT.

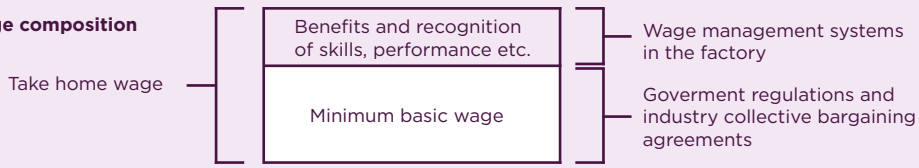
With the aim of establishing a system of living wages across the entire fashion industry, the H&M Group's key activities include:

- Collaboration with other brands to drive sustainable change towards fair wage management systems
- Engagement with governments to support the promotion of the required legal framework
- Collaboration with trade unions (as well as other industry players), for example through ACT, to achieve systematic change towards industry-wide collective bargaining
- Facilitation of democratic elections of effective employee representation at factories
- Implementation of fair wage method at its strategic suppliers

**Key figures**

- The H&M Group has implemented the Fair Wage Method and wage management systems in six countries: Indonesia, India, Turkey, China, Bangladesh and Cambodia.
- So far, a total of 227 factories, accounting for 40% of production volume have been affected. By 2018, H&M aims to raise this share to 50% of production volume
- H&M supported the establishment of democratically-elected worker representations in over 450 supplier factories representing 52% of production volume

**Wage composition**




Source: Information provided by H&M; H&M, (2017). The H&M Group Sustainability Report 2016. [pdf] Available at: <http://sustainability.hm.com/content/dam/hm/about/documents/en/CSR/2016%20Sustainability%20report/HM_group_SustainabilityReport_2016_FullReport_en.pdf> [Accessed 11 April 2018].

creating better visibility into fabric components, and simplifying the selection of materials, brands and retailers can reduce the waste generated.

One frontrunner in processing pre-consumer waste is the Sustainability Champion and Cambodian fashion brand Tonlé. In 2014, Tonlé kept 10,000 kg of materials from landfills and 70,000 kg of CO2 from entering the atmosphere. It also reduced pesticide consumption by 200 kg and water consumption by 200 million liters. Using discarded fabric before it goes to landfills, the brand reworks the material scraps into its own collection, reducing the average 40% of factory waste to a mere 2–3%.[140,141]

### BETTER WAGE SYSTEMS

As described in last year's report, too many fashion workers are still living in poverty. As the key global employer of around 60 million people across the value chain[142]—with over 60% of the production located in countries such as China, India, Bangladesh, Cambodia, Sri Lanka, Malaysia, and Indonesia[143]—the fashion industry is in an ideal position to influence these poverty levels. Unfortunately, in many of the main supply chain countries, min-

**Exhibit 22**

## Promoting Better Wage Systems

ACT (Action, Collaboration, Transformation)

**Motivation**

- Fostering industry-wide collaboration to ensure living wages for workers within the garment and textile industry
- Introducing industry-wide negotiation schemes on national level for both wages and wider employment conditions
- Establishing a connection between negotiated wages and purchasing practices of global brands and retailers

"Ensuring a level playing field puts an end to unfair competition based on poverty wages and rewards those enterprises that are efficient and innovative. Overcoming poverty wages will speed up the structural modernization of the sector."

– Dr. Frank Hoffer, Executive Director, ACT

**Description**

ACT (Action, Collaboration, Transformation) is the first global commitment between brands, retailers and the global union federation IndustriALL to ensure the implementation of living wages throughout the garment sector.

Living wages are defined as "the minimum income necessary for a worker to meet the basic needs of himself/herself and his/her family including some discretionary income. This should be earned during legal normal working hour limits."[1]

ACT actively supports negotiations between factory owners, workers and their representatives towards legally-binding and enforceable industry-wide collective bargaining agreements. It further encourages the introduction of fixed minimum wages underpinned by the necessary legal framework to ensure compliance throughout.

ACT brands commit to adopt purchasing practices (in e.g. strategic planning, development, sourcing, buying) that incorporate the payment of living wages. Countries with an industry-wide bargaining agreement displaying substantial progress towards living wages are defined as preferred sourcing destinations among members. Brands and retailers commit to incorporate wage increases in the labor cost component of their purchasing prices.

**Selected activities of participating brands and retailers**

- Conduct of due diligence of purchasing practices using ACT benchmarking tool
- Improvement of buying practices to meet ACT demands, align behaviors and establish linkage between worker wages and business practice
- Support industry-wide collective bargaining to achieve objective of setting living wages
- Support industry within production countries to upgrade manufacturing standards via skill development and capacity building

1. ACT, (n.d.).ACT. [online] Available at: <https://actonlivingwages.com> [Accessed 18 April 2018].

imum wages are less than half of what's required to meet basic needs,[144] with widespread noncompliance even with these low levels.[145] A large proportion of garment workers indeed fail to receive their entitled wages. The International Labour Organization finds that noncompliance with wage regulations can vary between a relatively low 6.6% for workers in Vietnam to a staggering number of 53.3% of workers in the Philippines.[146]

Many brands and retailers currently positioned within phase three of the roadmap engage in the wage discussion, building a stance on better wage systems. Having worked on compliance to minimum wages within previous phases of the roadmap, in phase three, frontrunners push the discussion forward. This engagement is much needed, although brands do not actively set the wages for their factory workers.

The H&M group promotes fair living wages across production countries by rolling out its fair living wage management system across its supply chain and facilitating democratic elections for employee representation. As of early 2018, the H&M group has implemented its fair wage management system at 227 factories, representing 40% of its production volume. In addition, H&M group seeks to achieve systemic change beyond it's own supplier factories together with ACT (see exhibit 22).[147,148]

Brands and retailers commonly focus on creating an honest dialog with suppliers and on supporting them in upgrading or introducing wage

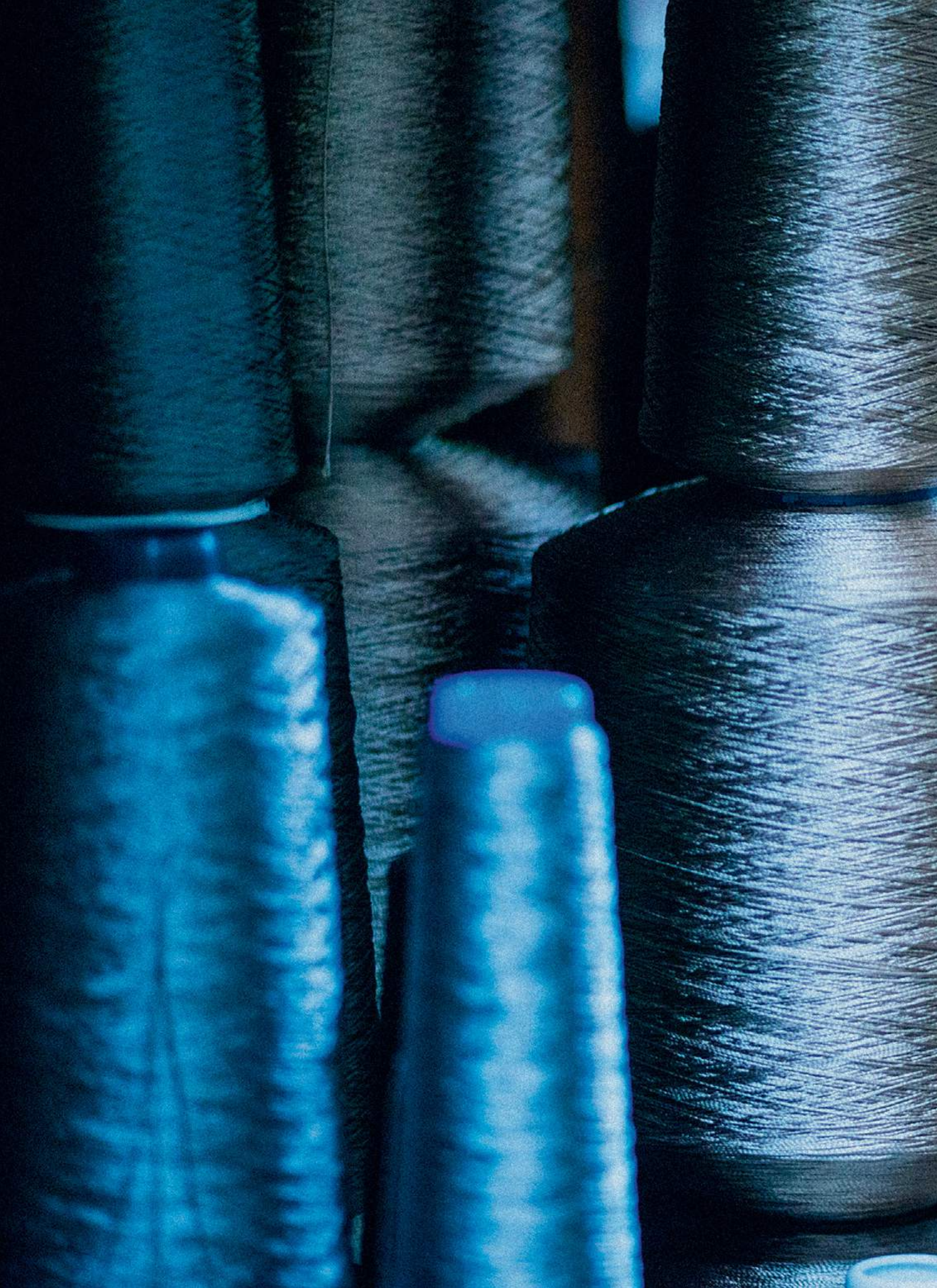
management systems. Monitoring progress and evaluating the true impact on the affected workers is essential to ensure real change. Most of these activities emphasize the brand as the 'developer' and 'capacity builder' rather than the 'auditor' implementing remediation measures.

**Collaborating to promote better wage systems**

Real change, however, can be achieved only by industry-wide collaboration. Brands and retailers, suppliers, employee representatives, local governments, as well as industry associations and nongovernment organizations, all need to get involved. By engaging in a dialog to promote systemic change, they can create one common approach and a common set of standards for wage mechanisms that could one day eradicate poverty in the garment sector.

Some early examples of collaboration exist already. ACT (Action, Collaboration, Transformation) is the first global framework bringing together all stakeholders—brands, retailers, manufacturers, and unions—to achieve living wages in the garment sector through industry-wide collective bargaining. ACT focuses on moving wage negotiations in key production countries toward legally binding, industry-wide collective bargaining agreements. It also helps manufacturers improve their own operations with efficient human resources and wage management systems. Members of ACT include brands and retailers such as adidas, ASOS, Inditex and Topshop.

"We became a founding member of ACT because we have always believed that we must work collaboratively to bring sustainable improvements to working conditions and living wages in the garment supply chain. By bringing brands together through the ACT platform, we can establish the mechanisms to support collective agreements between worker and management representatives. Only through this joint work can we reach this aim."
– Felix Poza, Director of Sustainability, Inditex



# THE BUSINESS CASE IS POSITIVE

Even without considering the positive impact on brand building and risk management, the business case for investing in sustainability is positive. Improving a fashion brand's environmental and social performance does not lower its profitability. In fact, if companies implement and scale the activities showcased in the roadmap, they can expect a positive EBIT margin uplift of 1-2 percentage points by 2030 (compared to the 2015 baseline). The case for sustainability is even stronger, once we compare the profitability uplift from implementing the roadmap to continuing business as usual in 2030. Comparing the decline in EBIT margin of 3-4 percentage points (business as usual) with the positive EBIT uplift of 1-2 percentage points (taking action), reveals the true value of sustainability – a potential uplift of up to 4-6 percentage points EBIT margin.

GFA and BCG have estimated the financial impact of implementing the main roadmap activities in resource efficiency, secure work environments, and sustainable materials for a sample fashion company. To ensure comparability in our calculations, we based all estimates on the assumptions in last year's report.[149] There, we estimated the financial impact of continuing business as usual with a projected increase of retail value of 2% annually.[150] We assumed labor costs rising by 4%,[151] parallel to accelerated water scarcity and growing energy prices at growth rates of at least 2.3%.[152] We concluded companies will face an EBIT margin decline of more than 3 percentage points by 2030 if they continued business as usual.[153] "If no action is taken, fashion brands will likely find themselves squeezed between falling average per-item prices, deeper discount levels, rising costs for labor outpacing the growth in retail value, and resource scarcity along the value chain. All of these factors increase the pressure on fashion brands."[154]

Taking this conservative scenario as a reference point, our projections show a positive business case. Investments in resource efficiency, secure work environments, and sustainable materials not only counteract the projected losses but increase profitability. The Roadmap to Scale can therefore be used as guidance to create value within organizations (see exhibit 10 on page 29).

GFA AND BCG PROJECT THAT THE BUSINESS CASE IS POSITIVE. BY 2030 FASHION BRANDS WILL BE ABLE TO SEE AN INCREASE IN EBIT MARGIN OF 1 TO 2 PERCENTAGE POINTS-IF THEY INVEST IN SUSTAINABILITY

**EFFORTS IN RESOURCE EFFICIENCY CONTRIBUTE TO A POSITIVE BUSINESS CASE**

Enhancing resource efficiency in water, energy, and chemicals has the potential to improve a fashion company's EBIT margin up to 2-3 percentage points by 2030, as compared to the 2015 baseline.

Both the fashion brands and the manufacturers benefit financially from lower input costs and prices. If resource prices continue to rise beyond the conservative price level currently assumed, the business case would even be more positive. All calculations are performed for investments in resource efficiency, targeting the consumption of energy, water, and chemicals as well as the creation of waste. In addition to these investments at the tier-one and tier-two suppliers within a company's supply chain, we have incorporated resource efficiency measures within the own store fleet.

Energy measures have a significant impact on the supplier's factory running costs, as the production and processing of yarn, fabrics, and ulti-

**Exhibit 23** **Exemplary P&L for a fashion brand implementing the Roadmap to Scale**
Adapting best practices from the industry adds 1-2 percentage points EBIT until 2030

Improvement potential within: Labor, Energy, Water, Waste, Chemicals

Exemplary P&L (M€)

| | | 2015 | 2030 Base case | 2030 Roadmap | CAGR[1] Roadmap |
|---|---|---|---|---|---|
| **Total revenues** | | **10,000** | **13,522** | **13,522** | **2.0%** |
| Cost of goods sold | Production cost – Labor cost [Supplier] | 1,144 | 2,019 | 1,937 | |
| | Production cost – Factory running cost | 256 | 341 | 312 | |
| | Production cost | **1,400** | **2,360** | **2,249** | 3.1% |
| | Material cost – Fabric cost | 2,059 | 2,542 | 2,320 | |
| | Material cost – Other material cost | 841 | 1,108 | 938 | |
| | Material cost | **2,900** | **3,649** | **3,258** | 0.3% |
| | Factory profit | 300 | 419 | 384 | |
| | Logistics & tariff cost | 400 | 559 | 512 | |
| **Gross profit** | | **5,000** | **6,535** | **7,119** | **2.7%** |
| Operating expenses | Selling, general and administrative expenses – Store occupancy cost | 1,280 | 1,736 | 1,700 | |
| | Selling, general and administrative expenses – Labor cost [Brand] | 1,178 | 1,823 | 1,824 | |
| | Selling, general and administrative expenses – G&A | 1,241 | 1,678 | 1,678 | |
| | Selling, general and administrative expenses | **3,700** | **5,238** | **5,203** | 2.2% |
| | Other operating expenses | 100 | 135 | 135 | |
| **EBIT** | | **1,200** 12% | **1,162** 8.6% | **1,781** 13.2% | |
| | | | **Business as usual** | **Roadmap** | |
| | Delta to 2015 | | **Δ = -3.4 ppts** | **Δ = +1.2 ppts** | |
| | Delta to business as usual | | | **Δ = +4.6 ppts** | |

1. Note that we do not assume the same growth rate for every year in the study, so the CAGR represents an indication of magnitude over 15 years
Note: Differences in sums can occur due to rounding
Source: BCG analysis

mately the assembly of the final garment require large amounts of energy. Energy also accounts for a considerable share of the store occupancy costs of retail stores, further downstream in the value chain. Between now and 2030, energy prices are going to rise with a CAGR of 2.3% in the base case scenario.[155] Measures offering energy savings are therefore attractive for brands and suppliers alike. Joint investments of brands and suppliers to improve processes, upgrade equipment, accelerate technology, enhance training, and improve infrastructure are typically amortized within one to two years.

Simultaneously, investment in energy-saving measures at retail stores such as replacing conventional light bulbs with LEDs, installing occupancy sensors and energy meters controlling consumption, and even upgrading heating and ventilation systems, are also paying off. Store occupancy costs make a considerable portion of the SG&A costs with energy, thus contributing a non-negligible share. Undertaking quick-to-implement alterations is therefore estimated to lead to more than 20% in energy cost savings within the store network directly impacting the brand's cost structure.

Key production steps, especially at tier-two suppliers, require large amounts of water, in particular so-called 'wet processes' such as dyeing

"Chemical management practices provide a strong business case and spur innovation. Both chemical testing as well as wastewater treatment tie resources at the supplier and at the brand. Ensuring conformance with our standardized MRSL list can save up to 50% of these total costs." – Frank Michel, Executive Director, ZDHC

and finishing. A 100% cotton T-Shirt, for example, requires approximately 120 liters of water in its fiber production alone.[156] A large proportion of this amount is used during the rinsing cycles of fibers which—depending on color—can be undertaken more than ten times. Using large amounts of water, some process steps can even require temperatures of above 100°C using significant shares of energy to heat the baths in the different rinsing stages (depending on the dyeing method).[157]

Water efficiency measures such as metering and leak detection, cooling water reuse, gray water or condensate water recovery, and innovative dyeing methods minimizing water intake all counteract the rising costs and can save up to 80% of water in individual production steps. Required investment in this field varies: waterless dyeing technology can cost as much as €1.6 million, but alterations in dyestuffs or upgrades to water processing are usually much more cost effective with a payback period of just a few months.

These investments will pay off even faster if, as predicted, governments react to current pollution levels and set regulations that raise prices and limit consumption (e.g., carbon tax). The business case behind water savings could be even larger if water optimization would eventually lead to investments in new technologies that further accelerated water efficiency. Pre-treatment steps in the dyeing process of cotton, for example, could reduce dyeing time by up to 60%, resulting in a significant drop in water consumption, as suggested by ColorZen.[158] Leading to a threefold increase of utilization, new technologies of this sort further impact the business case, improving the cost structure of the factory and the fashion brand.

Chemical usage is particularly high within upstream value chain steps, where it becomes a major cost-driver for the P&L. Handling, storing, and processing chemicals, in combination with wastewater and chemical testing, drives material costs for the brand and factory running costs at the supplier. The introduction of chemical management systems establishes a common baseline as well as the possibility of eliminating hazardous substances to comply with international standards. These systems can lead to savings of 30–50% in wastewater testing and reduced costs of 20–40% in chemical testing connected to chemical formulators. About 30–40% of cost reduction for the brand is generated by harmonizing the chemical management programs and reducing complexity in the brand's supply chain. These chemical management systems typically have a payoff period between 0.5 and 3 years, depending on the level of innovation, process applicability, and technology.[159]

### THE BUSINESS CASE FOR RESPECTFUL AND SECURE WORK ENVIRONMENTS IS POSITIVE

As fashion is a highly labor-intensive industry, labor costs make up around two-thirds of the production costs and are projected to rise 4–5% annually, outpacing the projected growth in retail value.[160] Improving work conditions, investing in skill building at suppliers, and promoting topics such as health, safety, financial inclusion, diversity, and gender equality can drive the EBIT margin up to 1-2 percentage points until 2030, as compared to the 2015 baseline.

Initiatives such as Better Work, described in this chapter, provide a solid baseline for our estimations: These initiatives have raised worker productivity as much as 22%, increasing factory profitability by up to 8%.[161]

Safety precautions such as fire protection systems, personal protection equipment or improvements to material storage, workstations, and machine safety entail, besides being a basic right, also an uplift to worker productivity[162]. Increasing safety levels at the workplace (expressed by fewer and less severe accidents and injuries) represents a strong lever for our estimated business case. We predict reductions based on proven numbers from the industry: safety precautions as well as general improvements to the work environment are assumed to result in 56% fewer injuries, 42% fewer man-days lost, and a lowered accident frequency and severity rate of 55%.[163]

Additional initiatives include skill trainings, which focus on health, nutrition, and financial inclusion, and topics such as the empowerment of women. Worker engagement programs, the establishment of communication platforms, and workers' councils are further activities.

After successful completion of these coaching programs, workers display greater well-being and engagement levels as well as greater health and nutrition standards. These factors all contribute to lower overtime rates, reduce the number of strikes and work injuries, and generate a drop in accident frequency and severity. As a result, worker turnover decreases by 30–50%[164] while lost man-days are cut in half.[165] Labor costs in factories are therefore expected to decrease, while productivity is estimated to rise.

Educating workers in nutrition and balanced diets, has been shown to lower fainting rates and absenteeism by up to 50%, reducing error rates by more than 20%. These reductions entail increasing worker retention and higher factory productivity as well as efficiency levels.[166] Effects would be even stronger if we were to factor in the positive impact on worker families and surrounding communities generated from raising worker awareness regarding health, nutrition, and hygiene.

In addition to the direct financial implications, increasing a brand's social performance entails important indirect benefits. Companies strengthen their supplier relationships, optimize business practices, enhance their protection against downside risk, and gain a positive halo effect within the impacted communities. Yet none of these variables has been factored into this rather conservative business case.

One last variable needs to be kept in mind when investing in working conditions and social issues within the supply chain. The prevention of accidents such as factory fires, building collapses, or comparable events serves as quasi-insurance against potential future financial losses, reputational damage, and supply chain interruption. A similar argument can be made for strikes, which often cause factories to close for extended periods of time. One garment manufacturer association in Cambodia estimated the cost of work stoppages to the local industry: €160 million in lost sales, €57 million in revenue over two months, an untold number of buyers threatening to sue or cancel contracts over lost production, and several consumers canceling their visits.[167] In order to keep the above business case at a rather conservative level, this effect is not included in the estimates.

## RISING INPUT PRICES MAKE THE CASE FOR AN INVESTMENT IN PREFERRED MATERIALS

The materials mix drives the largest portion to a fashion brand's environmental footprint—determining two-thirds of a brand's impact in water, energy, and land, as well as its air emissions and waste.[168] For a typical brand, materials account for over half of its total cost of goods sold (COGS), consisting of cost of fabrics, accessories, print and embroidery, as well as packaging and hang tags.

Even though preferred materials are more expensive than conventional ones, we estimate that switching over will increase EBIT by as much as 0-1 percentage points by 2030, as compared to the 2015 baseline. The upfront investment of replacing materials will take some time to recoup (we estimate five to ten years to positive ROI), thus increasing materials cost in the short term. We can safely assume, however, that raw materials prices of conventional materials will increase in line with their underlying input factors (especially energy, water, and labor). With the shrinking price gap, overall materials costs will fall over time and turn the business case positive by 2030.

For the two most commonly used materials—conventional cotton and polyester—prices are projected to rise in line with the cost of their most significant input factors: water and oil. Despite conventional cotton prices estimated to remain rather stable at a projected real annual growth of 1%, we assume this figure to be higher given rising water scarcity and more active involvement of regulators.[169] Similar assumptions are taken for the conventional polyester prices, which demonstrate a close correlation with oil prices. Despite projections of an annual increase between 2.3% and 3.5%, we assume the price of conventional polyester to increase more dramatically once regulators become more engaged, limiting energy consumption, implementing carbon taxes, or restricting the oil supply.[170] While replacing cotton with its organic alternative, for example, can save up to 90% of fresh water and 62% of energy, substituting polyester with its recyclable counterpart offers up to a 90% reduction of toxic substances, a 60% reduction of energy usage, and up to a 40% of reduced emissions.[171,172]

As seen in phase three of the roadmap, companies are expanding to scale, amplifying and intensifying their sustainability efforts. Additional activities to close the loop or establish better wage systems are being undertaken, contributing to the business case. However, as most activities within these fields have not been widely adopted within the industry, only proofs-of-concept and individual pilot examples exist. We have therefore refrained from incorporating these dynamics into the business case calculation. Closed-loop and better wage systems are likely to play a more prominent role in the future.

# CHAPTER THREE

# *MOVING INTO DISRUPTIVE SOLUTIONS*

**Unlocking The Full Potential**

Only with systemic change can the industry unlock its full potential. Frontrunners are experiencing the limitation of existing solutions. Only with transformational innovations and disruptive business models can the industry move forward to the future. But scaling the new technologies will depend on leadership and cooperation across the industry, including regulators and consumers.

**Phase**

| | | | | |
|---|---|---|---|---|
| | | | | 4 |

While the existing solutions outlined in the last chapter will do much to improve the industry, they will not accomplish the environmental and social changes needed for a sustainable future. The fashion industry requires a collective effort to go beyond what is available and possible today. No individual commitments or actions can drive this transformation. To achieve lasting impact at scale, the industry needs systemic change through leadership, innovation, and collaboration. A number of promising, disruptive innovations are emerging to move the industry—but success will depend on a strong ecosystem rooted in the efforts of regulators, consumers, nongovernmental organizations, and other stakeholders.

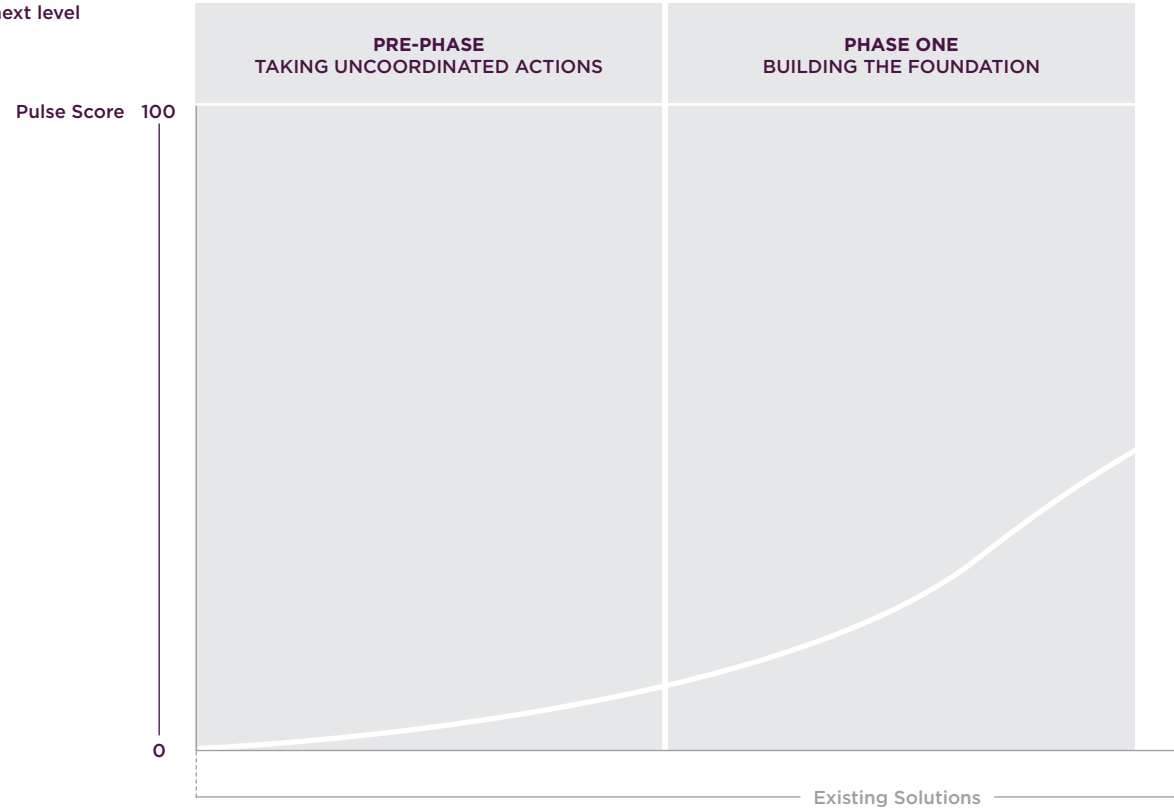
## UNLOCKING THE FUTURE REQUIRES INNOVATION AND COLLABORATION

As described in chapter one, the industry's frontrunners are experiencing diminishing impact and return from driving existing solutions to full scale. The Pulse Curve, representing the implementation of current practices, is flattening out. Fashion companies in phase three find themselves at the end of the first Pulse Curve lacking new solutions to further boost efficiency, new raw materials options or an infrastructure to address industrywide topics such as recycling. To unlock the next level of environmental and social progress, investment into new solutions and business models are needed. It's unclear how long it will take for these new solutions to become available and commercially viable. Until then frontrunners will split their investments between scaling proven solutions and fueling the pipeline of disruptive solutions, before they fully level up to a new development trajectory—the next Pulse Curve— toward a better fashion industry (see exhibit 24 on pages 74-75).

Innovation and collaboration will therefore play a key role in this new trajectory. Major solutions to reduce the industry's environmental and social impact are now emerging, but few are commercially viable. To enable widespread adoption, leading companies must nurture these solutions beyond the proof-of-concept stage. That requires coordinated efforts of bold leadership across the industry and at individual facilities.

We don't know what disruption in the industry will look like, or where it will lead. Once it starts, we expect that change will disseminate in an exponential rather than a linear way. We expect the emerging solutions will eventually transform the industry, raising overall performance and creating enormous value for fashion companies and the industry as a whole. Digital technologies will help to drive this transformation, while disrupting existing business models in fashion just as they have in other industries.

**Exhibit 24** Unlocking the next level




This chapter focuses on select innovation areas that are on the radar of sustainability frontrunners and multi-stakeholder initiatives, and prioritized by leading fashion players. It examines how fashion companies, investors, regulators, and consumers can collectively create an ecosystem where these innovations can thrive and scale. We close with a vision for a better fashion industry and the disruptive changes this might bring.

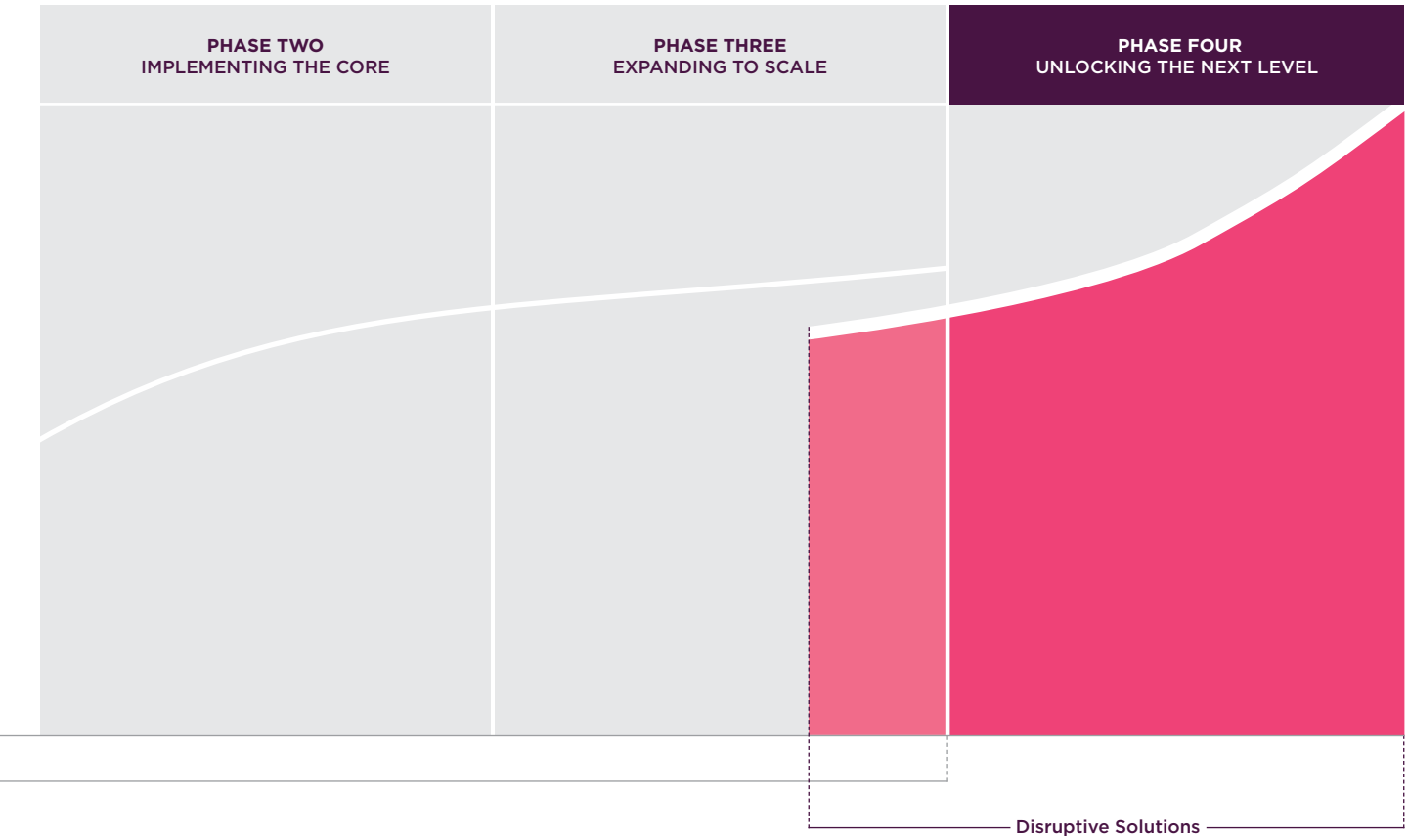
## WHAT'S TRENDING ON THE INNOVATION AGENDA?

We observe innovation in all segments of the value chain across all impact areas. Innovations range from ideas to market-ready solutions, though most will need some time before they are market-ready and commercially viable. At the moment, based on observations of the priorities of frontrunners, leading innovation platforms, and the CEO Agenda, certain topics are high on the innovation agenda of the industry:

**Sustainable materials mix:** innovating in new materials and existing materials to reduce the environmental footprint

**Closing the loop:** minimizing resource consumption by facilitating re-entry into the value chain

**Industry 4.0:** leveraging the constantly increasing capabilities of automation and ubiquitous technology




"Connecting breakthrough innovators with large corporations can create a highly impactful change in the system. This cannot happen in a bubble. Together with our partners, we are building an open innovation and collaboration culture, which is a key step toward a circular fashion system."
– Katrin Ley, Managing Director, Fashion for Good

The CEO Agenda, set by leading fashion industry players, emphasizes these priorities as key transformational topics for the industry's future.[173] The 2018 H&M Global Change Award winners also have a strong focus on sustainable materials, such as the biotextile companies Agraloop, Algalife, and MycoTEX.[174] Other innovations are focusing on closing the loop as well.

Together with its partnering brands, Fashion for Good (FFG) identifies, accelerates, and scales the most innovative and impactful solutions. FFG's innovation overview showcases the key technologies on the industry's current watchlist (see exhibit 25 on pages 76-77). Three-quarters of the innovations accepted into one of FFG's programs come from the aforementioned three areas.[175]

The industry requires innovation in other important areas as well, such as wage systems. But solutions here are still in their early stages and require a multi-stakeholder approach. Defining and implementing systemic changes will take longer, with no immediate transformational innovation on the horizon.

**Exhibit 25**

**Good fashion innovation overview**
Source: Fashion for Good

Disruptiveness

| RAW MATERIALS | PROCESSING |
|---|---|
| **Bio-mimicry:** Modifying bacteria to produce e.g. spider silk, hagfish fibers using plant-based feedstock | **Microbial dye / fixing:** Using bacteria to make and affix pigment to fabrics |
| **Bio-based plastics:** Creating polymers like PET / PLA from e.g. agri-waste, sugar by-products | **Supercritical fluid:** Dyeing polyester with pressurized, closed-loop CO2 and no water |
| **Algae, seaweed, chitin:** Regenerating cellulose from low-impact ocean feedstock | **Plasma, ultrasonic:** Applying performance finishes without heat or water |
| **Wood, leaf and bast fibers:** Using naturally occurring cellulose fibers of low-footprint plants | **Enzymes:** Using biotech to replace chemicals for finishing and laundering |
| **Regenerative agriculture:** Applying farming improvements to increase yield, decrease footprint | **Nanotech:** Imparting performance to fabric permanently at nano-scale |
| | **Pre-treatment:** Improving attraction between dye and fabric to increase efficiency |
| | **Digital printing, laser:** Saving labor, chemicals and water in e.g. denim finishing |

**Cross-supply chain innovations**

**Transparency:** Solutions that enable disclosure of accurate, credible information in a manner that is accessible to all and enables comparisons

**Traceability:** Solutions that enable the capability to trace products, parts and materials

**Worker Empowerment:** Solutions that enable fair and just working conditions for garment workers

Innovators develop myriad exciting new materials and technologies across the fashion supply chain. These range from incremental improvements in resource efficiency to radical re-thinking of business models. Together, these innovations will not only decrease the footprint of fashion production and distribution, but also change how we buy and use clothes. Screening hundreds of innovators globally, Fashion for Good has mapped the most groundbreaking technologies in the above innovation landscape.

Disruptive innovations can only grow from the lab to industrial scale if brands, retailers, manufacturers, and start-ups work together. The Fashion for Good Innovation Platform brings together and supports these players in a pre-competitive collaboration space.

| MANUFACTURING | RETAILS & USE | END-OF-USE |
|---|---|---|
| **Additive manufacturing:** Solutions in which garments are created using 3 dimensional data, applying materials layer for layer | **Circular business models:** Models providing fashion as a service (e.g. leasing) | **Chemical recycling:** Chemical process where fibres are chemically separated and recovered |
| **Automation (e.g. sewing):** Automating the activities in the garment production process from fabric to finished garment | **Customization solutions (create your own garment):** Solutions that enable mass customization of garments (from design to pattern) | **Re-sale platforms / new business models:** Business models that allow garments a second life (e.g. white label second hand platforms) |
| **Garment construction reconfiguration:** Solutions in which a garment is constructed using new joining techniques | **Visualization solutions (e.g. virtual fitting):** Solutions that use digital techniques to offer an alternative fitting experience (e.g. augmented reality) | **Automated sorting:** Use of different technologies to automate the process of sorting textiles based on their composition |
| **Zero Waste Manufacturing:** Solutions to eliminate, re-process or re-use pre-consumer fabric waste | **Garment sustainability rating solutions:** Solutions that enable insights into the environmental & social impact of products | **Mechanical recycling:** Mechanical process to unravelling discarded textile into fibers |
| **Made to measure (e.g. bodyscans):** Solutions that enable mass customization of garments (from pattern to finished garment) | **Microfiber solutions:** Solutions that capture microfiber at the washing phase or that avoid the shedding in the first place | |

**Supply Chain Redesign:** Solutions that enable the creation of (local) micro factories

**Zero Carbon Manufacturing:** Solutions that enable production sites to eliminate, recapture, or re-use their carbon emissions

**Warehousing, Transport & Packaging:** Solutions that reduce the environmental impact of the distribution network

Corporate partners co-define Fashion for Good's innovation agenda. They define focus areas, participate in the selection of new innovators and provide expertise and mentorship to circular fashion start-ups. In return, they gain specialized scouting and screening support as well as preferential access, scaling and implementation support for market-ready innovations. Together, they are championing the relevant, replicable and scalable innovations that will accelerate the transition to a sustaining fashion industry.[176]

Note: Spinning, knitting & weaving are not listed as separates steps in the value chain. Although they are typically considered as separate steps, innovations in these areas are included in the other steps.
**Leather innovations (e.g. bio-engineering, preservation and tanning improvements) are not included in this overview.**

Reducing the effects of existing materials and developing new sustainable materials must be a fashion priority. More research and visibility into the complex materials footprint is needed to further target innovation efforts. Advances in lowering the impact of cotton and recycled polyester are not enough, as they still put a strain on the environment.

Scalable solutions, however, are difficult to come by. To develop new materials, innovation easily gets very complex as adjacent industries, such as agriculture and chemicals, must often be considered. New fibers from virgin crops might interfere with feedstock usage and land-use of other industries, or cause deforestation—especially of rainforests crucial to the global environmental balance.[177]

Not surprisingly, many industry leaders are relying on further innovation in manmade fibers. Yet producing these fibers requires more advanced technologies and skills than cultivating natural fibers. Most of the countries that produce natural fibers lack the means to generate artificial substitutes.[178] Artificial fibers can also have some challenges of their own—many come from petroleum and leave microfibers in the ocean.

Besides taking the potential negative (second-order) effects into consideration, the industry has to come together to solve the largest challenge: scaling. Supplying the large global demand of fashion brands and interacting with complex sourcing processes can slow down innovation or become a showstopper.

**ENCOURAGING MOVES**

- In the luxury segment, Salvatore Ferragamo recently announced that it will be the first brand to use the fabrics made from Orange Fiber, an Italian innovator that has specialized in creating a cellulose yarn from the byproducts of citrus juice, which serves as the basis for a sustainable alternative to silk.[179]
- Milan-based Vegea specializes in creating leather that is made entirely from grapes skin, stalks, and seeds. The startup won the 2017 H&M Global Change Award and also received funding from EU's Horizon 2020.[180]
- Algiknit is developing textiles based on a biopolymer made from kelp and other seaweeds. This feedstock has the advantage of being highly renewable (growing ten times as fast as bamboo) and can absorb nutrients transported into the ocean through sewer or agricultural runoffs. Producing products to shape, minimizes waste.[181]
- Nano Textile provides an alternative to the chemicals used to bind finishes to fabrics, using a technology that embeds finishes directly into fabric using a process called Cavitation. The process can be used with other products too, such as antibacterial and anti-odor finishes, or water repellency. The technology protects people from exposure to the usual binding chemicals, and the environment by reducing the use of hazardous chemicals.[182]
- Provenance Biofabrics programs collagen molecules to self-assemble, creating a true leather equivalent. In addition to being efficient, this bioengineered leather does not involve harming animals.[183]

**BIOSYNTHETIC FIBERS**

Numerous small innovators are developing biosynthetic fibers wholly or partly based on other renewable feedstock, such as agricultural waste. These solutions require no wood, encourage no deforestation, and require no additional acreage. Circular Systems' technology, the Agraloop Bio-Refinery, turns food crops waste into biofibers that supplement existing cellulose-based fibers, and estimates that the readily accessible waste from five crops (pineapple, banana, flax, hemp, and cane) has the potential to create enough fiber to exceed the current global fiber demand.[184]

**BIOMIMICRY FIBERS**

A more recent area for innovation is combining nature and technology, mirroring biological structures and processes. These biomimicry fibers are predicted to outperform conventional fibers in durability, strengths, and sustainability. While very promising, many of them still require several years to reach mass-market maturity. "Spider Silk" is an example of a new fiber with impressive elasticity, durability, and softness. The artificial silk production mirrors the biological process that spiders use to create their fibers. During the manufacturing process, genetic material from spiders is inserted into yeast to form proteins that can be spun into fibers. The resources required for the production are still relatively high and scalability is a hurdle yet to be taken.[185] Stella McCartney, for example, has partnered with California-based innovator Bolt Threads to design a dress made from Spider Silk. [186]

**BAST FIBERS**

Innovators are also looking into other natural fibers such as bast fibers (among them hemp, flex, nettle, and jute). These fibers can yield significant benefits, as they have a smaller environmental footprint than conventional plant-based fibers. For example, compared to cotton, hemp uses less than a third of water needed for the production of cotton and yields 220% more fiber on the same surface acreage.[187,188] So far, bast fiber quality is comparatively low, and finishing technologies are still not widespread. This is starting to change, however, and the industry has begun to use more hemp in their products. Several large players, such as Armani and Burberry, have already successfully incorporated hemp into some of their products.[189]

StexFibers and other innovators are developing techniques to soften hemp fibers to give them a haptic similar to cotton.[190] They hope to have industrial-level solutions ready by 2019. China, the world's largest producer of hemp, has also invested heavily in improving hemp solutions.[191]

**PLASTICS**

Projections estimate between 1.8 and 5 million tons of microplastics annually to end up in the environment. By 2050, this number is expected to increase to more than 22 million tons - more plastics than fish would then be in the ocean (by weight).[192] Microfiber waste threatens not just the ocean but also drinking water. According to research by The Guardian, 83% of tap water samples from a dozen nations across the world were contaminated with plastic fibers.[193] The case is clear: innovation in plastics alternatives, as well as all-around reduction and better recycling of plastics, needs to be supported and scaled as quickly as possible.

Biobased-plastics could reduce plastic pollution, but current solutions rely on polymers made from feedstock that currently serve other industries. Mango Materials and QMilk are innovating to create biodegradable PLA. Mango Materials has discovered a natural alternative to petroleum-based plastics. It uses methane, a waste biogas, to produce a biopolymer that is economically competitive with conventional plastics.[194] NatureWorks has developed Ingeo, an innovative range of polylactic acid (PLA) biopolymers, generated from the stored carbon dioxide in plants (e.g. corn or sugar cane). These biopolymers can be used, once turned into pellets, much like conventional plastics and turned into performance materials.[195] Virent and Far Eastern New Century produce BioFormPX paraxylene, a precursor to PET, used to produce the world's first 100%plant-based polyester shirt.[196]

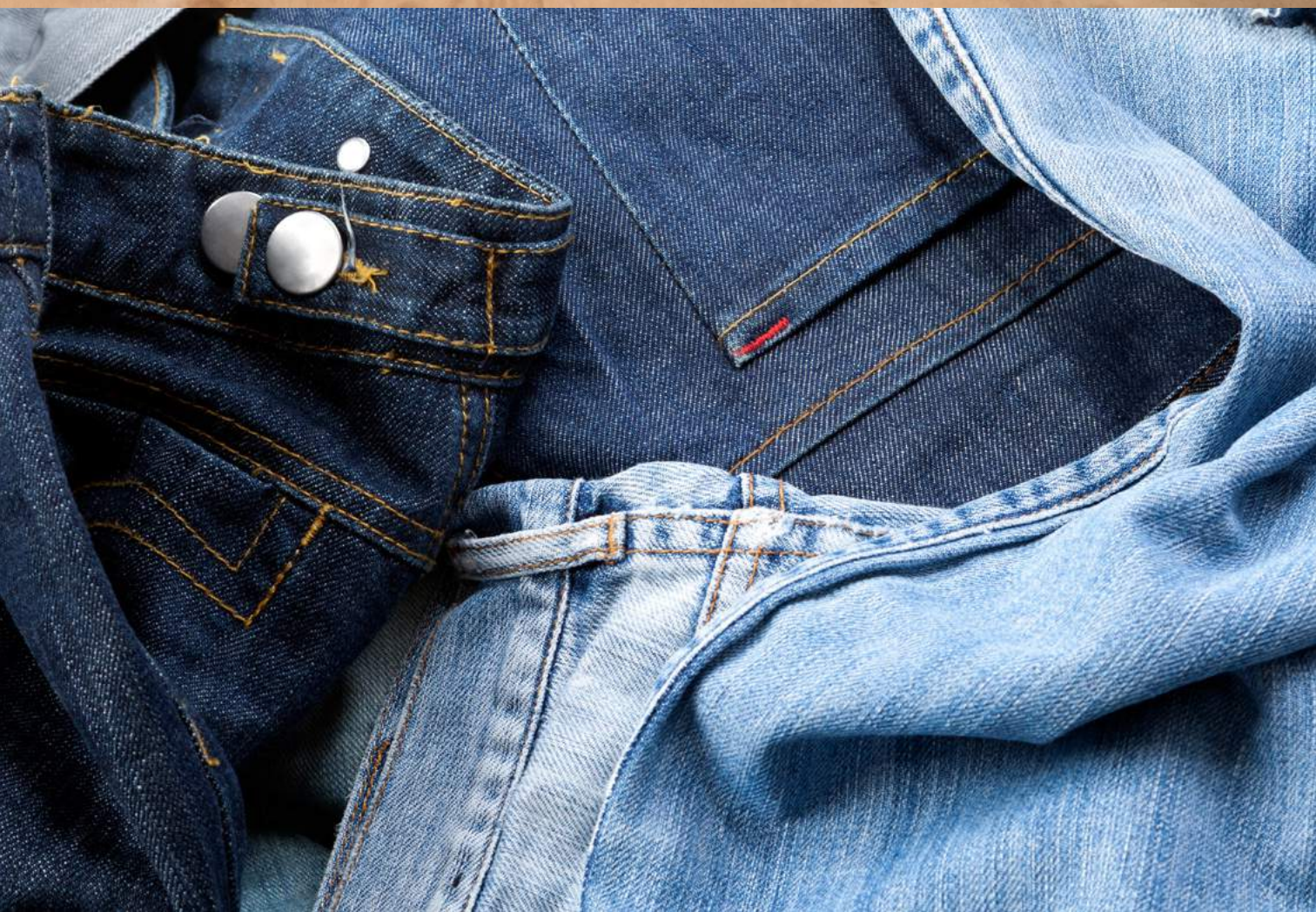
The industry's current linear business model is an obvious contributor to stress on nature.[197] Moving the industry toward a circular economy can yield tremendous environmental benefits for the fashion industry while mitigating the effects of greater demand for garments due to a rising world population. With finite land, water, and energy resources, the industry needs to reduce its waste considerably.

As demonstrated by its low Pulse Score of 17, much work remains to be done in the End-of-Use phase. Encouraging signs are that the Pulse Score increased by 8 points last year, and several large brands have moved toward circularity. As of 2018, around 100 companies, representing 12% of the global fashion market, signed the 2020 Circular Fashion System Commitment.[198] The agreement has four action points: design new strategies for recycling, increase the collection of used garments, increase the reselling of used garments, and increase the volume of garments made from recycled post-consumer textile fiber.

Realizing the importance not only for the environment but also for businesses, the brands are taking the first steps to provide the required infrastructure for End-of-Use. Some brands have already made progress by setting up individual garment collection schemes. These brands alone would have only a limited impact; but if others follow, the impact would multiply. The collected garments must be properly recycled so that they don't end up in traditional disposal facilities or incinerators. Therefore, it is essential to invest in the steps after collection and develop solutions to support recycling or reselling.

**ENCOURAGING MOVES**

- Re:newcell produces new, high-quality textile fibers comparable to virgin fibers by dissolving cotton and other natural fibers from both pre- and post-consumer waste to create a biodegradable raw materials pulp. The new fibers can then be worked back into the textile production cycle to close the loop.[199]
- The Infinite Fiber Company invented a process technology that enables companies to transform textile waste with a sufficiently large cotton proportion into new textile fibers. The resulting fibers have a quality similar to viscose and save 20,000 liters of water per kilogram compared to cotton. In 2016, the company already produced more than 50,000 kilograms of natural fiber.[200]
- Danish brand Vigga's circular business model is renting maternity clothes as well as kidswear through a subscription concept with customers saving time, money, and resources. The idea behind the concept is to share and circulate high-quality products for a reasonable price where clothes are simply replaced after they get too small.[201]
- Reverse Resources enables fashion brands and garment manufacturers to address pre-consumer waste for industrial upcycling. The software-as-a-service (SaaS) platform lets fabric and garment factories map and measure leftover fabrics and scraps, making them traceable throughout their lifecycles.[202]



"Inditex believes in and commits to developing a sustainable model that adds social and environmental value in every step. Our goal is to close the loop and move toward a circular economy—developing a complete and efficient life cycle for our products, in which nothing goes to waste, and where we are able to protect and improve the environment. This is imperative for us."
– Felix Poza, Sustainability Director, Inditex

**FIBER SORTING**

Efficient fiber-sorting technology is essential for creating a tipping point in a closed-loop industry. Only if garments are sorted correctly can they be directed into the correct recycling channel.[203] Optical sorting technologies, as developed by the Textiles4Textiles Initiative (funded by the European Commission), are progressing and will enable textiles to cycle multiple times through the supply chain. The initiative's machine sorts fibers based on their composition and color through near-infrared technology. The Fibersort project is now refining this technology and could transform the sorting process once it is scalable. Both solutions have existed for a number of years, and require further support from the industry to gain momentum.

Technologies such as RFID can also support the correct identification of fabrics, and several innovators are working here. One success is Eon.ID, a winner of the 2017 Global Change Award. Its Content Thread uses RFID to store the relevant information for the automatic sorting of a garment. The company is gaining momentum and has already produced millions of content threads in 2018.

**RECYCLING**

Existing recycling methods (especially for fiber-to-fiber recycling) are still limited. If fibers are separated and downcycled, it only postpones disposal into landfills.[204,205] Yet there are several promising technologies on the verge of development (see Encouraging Moves).

Most clothes consist of a combination of blended fibers. One such example is polycotton, a combination of typically 35% polyester and 65% cotton.[206] Separating mixed fibers during the recycling process is often a challenge.[207] WornAgain hopes to overcome this obstacle and provide a technology to separate fibers, dyes, and other contaminants from the fabric.[208]

The Regenerator uses an environmentally friendly chemical process to separate fabrics' blends into fully usable textile fibers, and H&M Group is exploring its potential. [209] Prolonging the life cycle of garments is also an essential enabler and requires consumer engagement.[210]

The industry is working on closing the loop and minimizing waste, which also are priorities for an increasing number of regulators.[211] The EU Commission already developed a Circular Economy Package in 2015 as part of the Investment Plan for Europe. By doing so, the EU Commission made clear that it sees the transition toward a circular economy as one of the key levers to create sustainable jobs and economic growth in 2020. This package will receive more than €6 billion in funding from the European Structural & Investment Funds, as well as from the Horizon 2020 Program.[212] China, the world's largest producer of textile waste with 53% global share, aims to generate 4.5 million tons of recycled textiles by 2020.[213] The EU's European Clothing Action Plan, with €3.6 million in funds through 2019, aims to prevent about 90 tons of garments from ending up in landfills or incinerators per year.[214] In addition, DEMETO was officially launched in 2017. The EU is working to partner with players from the fashion industry and other industries, nongovernmental organizations, and innovators to enable and scale chemical recycling.[215] Together with advancing technologies, collaborative initiatives involving the fashion industry and other industries as well as the regulator are a very encouraging step toward creating recycling systems that ultimately should cater to fiber-to-fiber recycling and close the loop in the fashion industry.

Digitization is going on all around us, but we have yet to see much effect on the fashion industry. While we don't know when and how these changes will occur, we can be certain that they will transform the industry. Digitization is likely to affect every step in the value chain, especially in the supply chain. By 2020, robots will probably carry out 25% of all manufacturing.[216]

This transformation is also likely to trigger the industry's environmental and social performance, as digitization makes the value chain leaner and more efficient in its use of resources.[217] Companies benefit from higher productivity, greater speed to market (with fewer markdowns in retail), and better communication and connectivity across the entire value chain from creation to retail and end-of-use.

According to Li & Fung, "The application of digital technologies has the potential to reduce the time it takes to move an item through the supply chain by 48% [...] That means digitalization could cut up to 19 weeks off the process."[218]

Automated and enhanced manufacturing processes, along with full end-to-end traceability, are just some of the digital applications. Developing these technologies, and increasing their capabilities, autonomy, and connectivity, will be transformational. Just as the technologies of Industry 4.0 have led to completely new business models in other industries, so too might they disrupt fashion as we know it. If the industry joins forces and supports the digital innovators, these technologies will gain traction and begin to scale up.

**ENCOURAGING MOVES**

- ICad3D+ has developed a software connecting 3D design and 2D pattern environment. Offering a virtual alternative to the traditional footwear design and pattern engineering process, speeds up the sampling process and reduces the required input materials and other resources.[219]
- Scalable Garment Technologies Inc.'s robotic knitting machine makes custom seamless knit garments, enabling the digitization of the entire production process and the ability to offer on-demand responsiveness to consumers while also reducing waste.[220]
- Primo1D offers solutions for embedding electronics in textiles using the E-Thread™ yarn, which contains RFID threads. This not only allows for better traceability of products and facilitation of inventory management, but also is an effective mechanism against counterfeiting.[221]
- Collaborating with Siemens, adidas is further evolving its Speedfactory, creating a "digital twin". This fully digitized simulation will allow for testing and optimizing the entire production process up front, leading to more efficient resource utilization and greater transparency.[222]

"Technology has always been a driver of change in the fashion industry. In the future we expect big opportunities in terms of how technologies like the Internet of Things and automation can transform the industry's sustainability performance."
– Spencer Fung, CEO, Li & Fung

**AUTOMATION**

Most garment manufacturing still goes on in countries with a high proportion of manual labor,[223] but robotics may change this dramatically. With Grabit's electro-adhesion-based robotic grippers, Nike can now manufacture its shoe uppers in as little as 50 seconds, 20 times faster than a human. At that rate the investment payback is two years.[224] So-called sew bots, ultra-light robots focusing on sewing garments, are emerging for garments. SoftWear Automation's Sewbot uses computerized vision to watch and analyze the moving fabric automatically.[225] Combining these innovations with technologies like laser cutting will allow more precise manufacturing, further eliminating waste.[226]

Most of these solutions, however, are not ready for scale. Several technical hurdles must be overcome, such as handling soft fabric pieces without applying toxic stiffening chemicals.

If the industrial revolutions in the past serves as any precedent the increase in automation stands to benefit the industry in several ways: productivity will rise, and workers who currently have repetitive and potentially dangerous tasks will over time move into safer and more sophisticated jobs requiring a highly skilled workforce. But as with all change, the way it will play out and the impact is uncertain. This time the pace of technological change is unprecedented, and it's not yet clear how quickly the work in the garment industry will change and how fast production countries with a low-skilled workforce can adapt. Klaus Schwab, WEF Founder and Executive Chairman, notes that "today's transformations represent not merely a prolongation of the Third Industrial Revolution but rather the arrival of a Fourth and distinct one."[227] In production countries such as Bangladesh, the garment industry is one of the biggest employers, so the need for transitional solutions is clear. This is precisely why the fashion industry, governments and NGOs need to work together now to engage in contingency planning and the training and up-skilling of workers. [228]

Besides robotics, additive manufacturing—also known as 3D printing—is emerging. This technology is not only revolutionizing fashion production in the traditional supply chain, but also enabling manufacturing at the Point of Sale or at home. According to Li & Fung, "A 3D printer is a machine that can produce physical items from digital design files. 3D printing could potentially eliminate all the stages in manufacturing. However, the technology is still limited by the range of materials that can be used, so 3D printing is currently confined to the design/sampling stage of the supply chain."[229] Sportswear players such as adidas are collaborating and investing in startups such as Carbon with the purpose of manufacturing innovative products like the FutureCraft 4D Shoes and taking the production to the retail stores.[230] Meanwhile, Reebok uses 3D drawing in its Liquid Factory in Massachusetts to design shoe components in 3D layers using a proprietary liquid material.[231]

3D printing in combination with innovative design software, for instance from ICad3D+, brings speed and efficiency to the sampling process while saving energy and further eliminating CO2 emissions and waste through reduced sample production and transportation.[232] In the production processes, the technology can have an even greater impact. TamiCare invented Cosyflex, blending liquid polymers with a small amount of textile fibers to create tailor-made fabrics, reducing the raw materials footprint to the minimum.[233]

Moving to the Point of Sale, 3D printing enables instant customization of products. The Girl and the Machine's on-demand 3D knitter allows customers to change the shape, color, and measurements of their desired garments—a process that greatly reduces water consumption and waste.[234] Ministry of Supply's garments are likewise made according to the customers' measurements in-store, but are also extremely durable due to being seamless.[235] This technique still takes about 90 minutes,[236] so it is not ready for widespread use.

**SENSORS AND INTERNET OF THINGS**

Chapter Two described how digital sensors have improved efficiency and workplace safety, but these sensors combined with the Internet of Things (IoT) will appear beyond factories and warehouses. Avery Dennison, a global player in apparel and footwear labeling, is partnering with Smart Products Platform pioneer EVRYTHNG to provide 10 billion apparel and footwear products with unique digital identities and data profiles in the cloud over the next few years.[237]

These technologies enable garments to provide relevant instructions when reaching end-of-life, including how to enable upcycling for second use, or the location of the nearest recycling center.

**ADDING A BLOCKCHAIN**

While IOT, RFID, and Near Frequency Communication are powerful tools by themselves, when combined with distributed ledger systems such as blockchain, they enable faster trade transaction and traceability. Companies would then be able to create end-to-end digital histories for all items in their inventories, and operate complex processes almost automatically in real time thanks to Smart Contracts triggered by specific events in the supply chain. Blockchain technologies assign each product a unique digital ID or token that enables the tracking of materials or garments through the supply chain. Saving all data on a decentralized, distributed ledger makes the information throughout this process incorruptible.[238,239]

Blockchain startup Provenance, for example, has cooperated with London-based designer Martine Jarlgaard to track raw materials along the value chain from wool farms to spinning mills to finished garment; customers can even trace movement on a map.[240] H&M Group has recently announced that blockchain is a key tool for improving traceability.[241] Combined with innovation further upstream, such as technologies that use DNA in plant-based materials to geolocate its origin, it will contribute to full end-to-end value chain traceability.

## BOUNDARIES FOR INNOVATIONS

Innovation is the key to unlocking opportunities that can transform today's fashion industry. Compared to other industries, fewer startups are dedicating their efforts to fashion and sustainability. No "unicorns"[242] or other breakthroughs have entered the market yet.[243]

The industry's fragmented value chain is offering opportunities for innovation. From asset-heavy business-to-business ideas for transforming the supply chain to virtual business-to-consumer ideas for transforming retail to new fashion brands, these emerging innovations have much to contribute. But from an environmental and social impact perspective, the main opportunity is in the supply chain and raw materials. New technologies must navigate complex, global supply chain networks—a difficult environment for change:

- **Innovation requires deep expertise:** Supply chain innovations require advanced chemical or engineering skills. Most fashion brands do not have these capabilities in-house, and the number of innovators with that background is limited.
- **Innovation requires time:** Unlike a virtual innovation that can be scaled quickly, fixed-assets innovation requires long R&D and capital expenditure cycles.
- **Proving the concept requires industry support and funding:** Asset-intensive innovations have to be tested in facilities resembling the actual production. So innovators depend on either the cooperation of suppliers to proof their concept or the support of investors. Neither is easy to come by, even when suppliers directly benefit. Suppliers fear that testing of innovations will disrupt their regular operations, while investors are unlikely to invest in testing facilities prior to a successful proof-of-concept.

## ONLY A STRONG INNOVATION ECOSYSTEM WILL TURN THESE OPPORTUNITIES INTO REALITY

Accordingly, fashion's stakeholders must join in providing a favorable ecosystem for incubating and scaling new ideas. "Startups go where the money is—and historically, that's been Silicon Valley".[244] Besides funding, innovators in this industry have requirements like access to supplier facilities for piloting innovations as well as laboratories, testing facilities, and academia. Even more than quickly scaling B2C businesses, asset-intensive innovators require a strong network of support: extensive mentorship, patient capital, and close collaboration throughout the fashion value chain.

The major brands must be a strong anchor stone in the ecosystem. They coach startups, establish corporate venture capital (CVC) funds, and build in-house capabilities such as research and innovation labs. Brands offer access to their supply chain network and piloting opportunities, and support fundraising and the scaling of promising ideas through letters of intent.

Some brands have already launched similar initiatives: Topshop has a wearable tech program,[245] Neiman Marcus[246] has set up an innovation "lab," H&M Foundation has its Global Change Award,[247] and just this year Asics set up a tech lab in Barcelona.[248] LVMH has inaugurated La Maison des Startups, which will host dozens of firms identified mainly through the LVMH Innovation Award. [249]

**Exhibit 26 Selected Innovation Platforms**

**Fashion for Good**
A global innovation platform, offering both accelerating as well as scaling programs for sustainable fashion startups. An additional investment fund is currently under development. Fashion for Good currently has locations in Amsterdam and Silicon Valley. It was founded by the C&A Foundation, and is supported by Plug and Play[251].

**Future Tech Lab**
An innovation hybrid that brings together fashion and science, with a threefold approach: (1) investing in startups specializing in smart textiles and biotech; (2) incubating new and experimental ideas from research institutions; and (3) offering agency services in order to connect fashion industry with engineers and scientists experienced in materials science. It currently consists of 12 locations in three continents.[252]

**Fashion Technology Accelerator**
A global platform for entrepreneurs in fashion technology. The accelerator has specialized in providing resources to post-revenue startups for further growth, and currently has offices in Silicon Valley, Milan, and Seoul.[253]

**The Mills**
An incubator supporting startups at the intersection of fashion, textiles, and technology by making the concept of 'wearable technology' focus on the fashion and textile industry. Its overarching aim is to promote fashion and textile vitality through techstyle and the power of science and technology.[254]

**New York Fashion Tech Lab**
A community-driven, relationship-building, collaboration and business development platform. The nonprofit program was co-founded by Springboard Enterprises and key fashion retailers to support women-led companies that have developed innovations at the intersection of fashion, retail, and technology.[255]

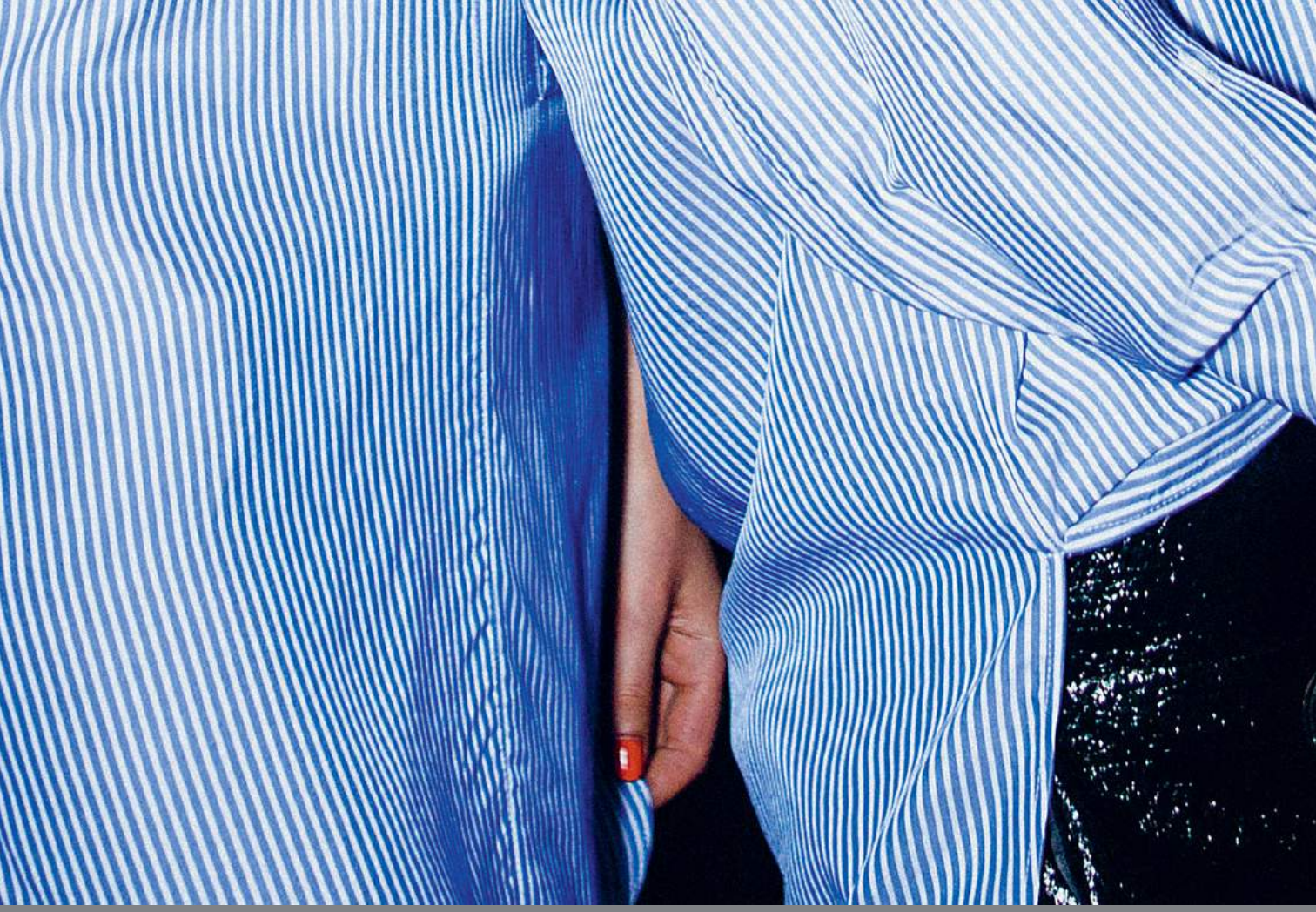
**Lafayette Plug and Play**
A three-month, equity-free accelerator program for innovative startups in retail. It claims to drive startups' growth equal to what they would otherwise achieve in a year. This is achieved by introducing them to a global network of industry executives, venture capitalists, and expert mentors.[256] After completing the Galeries Lafayette Program, startups have access to the Plug and Play Brand & Retail Vertical in Silicon Valley to enter the US market.

**Brooklyn Fashion + Design Accelerator**
A New York-based accelerator that provides on-site business mentorship, conventional and digital manufacturing resources, showroom space, and retail sites to emerging companies with a focus on sustainability in fashion. It also offers more than €1.6 million in initial funding provided by the Pratt Institute.[257]

So far, few disruptive innovations have made it to market, because scaling up to commercial viability requires stronger industry collaboration and support. The CEO Agenda, which aims to unify the industry behind common priorities, is a step in the right direction. Next steps need to include jointly working with innovators, collectively investing, and sharing best practices. When it comes to innovation, however, that is easier said than done. So long as brands regard innovations in these areas as competitive advantage, true collaboration is unlikely. A mind-shift toward pre-competitive behavior is required to achieve systemic change, especially for innovations that concern everyone, such as recycling.

Multi-stakeholder initiatives can facilitate this collaboration and also encourage the convergence of technologies where appropriate. These platforms also provide an attractive platform for smaller brands, offering access to innovation and bespoke support to innovators while sharing the responsibilities with many brand participants (see exhibit 26).

Besides access to innovation platforms and industry collaboration, funding is often a key factor preventing the industry from strongly pursuing innovation. Several fashion brands are establishing venture teams separate from their business. Recently, some new models, especially in multi-brand holdings, have started to take shape. LVMH set up a Carbon fund, where funds are collected from all brands to finance carbon/emission reduction programs.[250]



"The big challenges facing the world can only be tackled by working together. This is a prerequisite for making the fashion industry part of the solution rather than part of the problem. Our collaborative mindset has, for example, helped us when setting the ambitious goal to become climate positive by 2040. This means we'll go beyond minimizing the negative consequences of our business to create a positive impact on the planet. But no matter if the challenges are about recycling innovation, new sustainable materials or working conditions for the people making our clothes, our collaboration with others is key to make lasting change."
– Karl-Johan Persson, CEO, H&M Group

Overall investments into fashion innovation have significantly increased in the past year[258]—a trend we expect to continue. New investment vehicles need to be introduced to support the innovators on their journey to scaling as well as to support and de-risk piloting for the suppliers. As of today, it is still difficult for innovators that require large amounts of capital to prove their asset-intensive ideas to investors. Funds specializing in fashion sustainability understand the different terms, timelines, and requirements to actively invest in the space—but most of these funds lack the scale to lead the financing of asset-intensive innovations by themselves.

Circularity Capital is a specialist private equity firm investing in European growth small and medium-sized enterprises (SMEs) in the circular economy.[259] It seeks ventures requiring between €1.2 million and €5.8 million investments.[260] Specialized venture funds such as Safer Made, which invests in technologies that remove or reduce harmful chemicals in products and manufacturing, are emerging and being backed by the industry.[261] Target made an investment in Safer Made in the beginning of 2017.[262]

To scale and implement innovation, the fashion industry needs to come together and work with investors and regulators to jointly provide the required financial resources. Brands can de-risk investments into innovations by giving commitments or letters of intent, and collaboratively investing alongside with investors and other entities (such as regulators).

## REGULATORS MUST PLAY AN ACTIVE ROLE

Governments can also actively support promising innovations, especially game-changing solutions such as closing the loop by providing funding or supporting regulations. Taking a stake in an innovation, or displaying a commitment to a certain technology or solution, reassures potential investors in the private sector. Horizon 2020 is an €80 billion program for research and innovation within the EU. It runs from 2014 to 2020, and has already yielded several encouraging developments. More than 60% of its investments have involved sustainability, and 24% went to SMEs with a revenue of less than €50 million.

Besides funding, the regulator can amplify the industry's efforts with incentives and tax discounts. These supportive elements can contribute to a favorable innovation ecosystem.

Global regulators and policymakers have recently put more focus on environmental and social issues in the fashion industry. China has launched a "war on pollution" with much stronger penalties for violators. Plastics have received special attention: France and Italy have banned the production and use of plastic bags, while India's capital New Delhi and Costa Rica have banned all single-use plastics. China is banning all plastic imports starting this year. Given that China had formerly been the world's largest importer of plastic waste, this is likely to have a significant effect on how the fashion industry uses and discards this material. Other countries will need to find new solutions to their waste disposal issues.

Yet enforcing such laws remains a significant challenge, especially in fashion's fragmented global supply chain. The lack of transparency often limits regulators to general legislation, such as carbon taxes on fossil fuels that tackle many industries at once.

This could change significantly with the rise of the technologies described above. The technologies in combination with blockchain could greatly improve transparency by providing information on the environmental and social footprint of each step in the value chain. Regulators could analyze this information on a company level to monitor the supply chain due diligence of individual brands and retailers. Spotting violations and irresponsible behavior would be much easier, and enforcement would be strongly improved. Regulators could establish maximum environmental footprints for individual companies. Any excess usage of water, energy, or chemicals beyond this limit could then be sanctioned by higher taxes or fines.

**DISRUPTIVE BUSINESS MODELS CHANGING THE FASHION INDUSTRY ALTOGETHER**

The future of fashion might look dramatically different from today. Innovation may fully disrupt how clothes are made and consumed.[263] Global trends and forces will shape consumer behaviors—and the role of brands and retailers—in unpredictable ways.

To help the fashion industry grasp potential developments, GFA and BCG have investigated disruptive patterns in other industries and have interviewed thought leaders in scenario planning and digital transformation. Based on these findings, we present three scenarios of disruptive business models. These scenarios are not predictions, but rather a visionary look into the future—with a call for conversations on how companies might prepare and safeguard the future. The fashion industry has to be vigilant about recognizing early on the trends that will challenge their business models, and plan effective responses that will lead to continued growth.

"When we consider the future impact of the huge raft of economic and societal trends that are currently impacting the global apparel system, it is important to remember that different trends impact different parts of a system in different ways, and that trends don't act in isolation. That means, on the one hand, that predicting the future of apparel is incredibly difficult. but on the other hand, if we can understand the way in which trends impact the different parts of the fashion system, as well as how these trends interact, then we can begin to harness all this change and dynamism and perhaps create the apparel system we want—a sustainable one."
– Sally Uren, CEO, Forum for the Future

# IMAGINE A WORLD OF INSTANT FASHION

The consumer spots an outfit on Pinterest or while walking down the street, snaps a picture, and "tries it on" in front of the digital mirror—flipping through various optional backgrounds, checking if it would also look good on a beach or mountain top. With the chatbot, ordering the outfit is easy and quick—the connected camera has already recorded the exact sizes. A few hours later, a drone delivers the fitted made-to-measure outfit, which was 3D printed at a nearby retail store. Unfortunately, the weather changes. Luckily, the smart wardrobe is on top of it and identifies the matching coat to complement the latest clothing addition. Ordering is swift—and "printing" the missing accessories to go with the coat works effortlessly from home.

See-now, buy-now consumption patterns are dominant in this scenario of Instant Fashion. According to Avery Baker, Chief Brand Officer at Tommy Hilfiger, the industry is already all about "...delivering on the instant gratification that consumers are really seeking" [264] and "...closing that gap between the visibility of a fashion show and the moment of purchase."[265] The disruptive business model envisioned above goes a step further, turning our everyday life into an all-day fashion show. Inspiration can be found anywhere, anytime, and realization is only a click away. This increasing connectivity generates a direct engagement between the consumer and retailers and brands, with the underlying technologies transforming the supply into a demand chain.

First advances toward this envisioned futuristic scenario can be found in other industries. Many have already experienced a radical shortening of their supply chain, resulting in a much more convenient delivery of goods and services to the consumer. In the media industry, Netflix disrupted the prevailing business model by enabling its customers to directly stream video content at home or on their mobile devices instead of buying or renting a DVD. The company is constantly learning about the streaming preferences of its users, collecting data on their viewers' consumption of millions of hours of video each day. This knowledge is turned into improved customized recommendations for movies and TV shows.

Translating this disruptive business model into a fashion context would have significant implications for the fashion industry. Most products would be mass-customized unique items, which would be 3D printed close to the consumer, either in nearby retail stores or directly at the consumers' homes. The industry would consequently see a tremendous shift of production closer to the consumer. Supported by deep learning algorithms analyzing the previous outfit choices of consumers, brands and retailers would design collections closer to their customers' personal tastes and styles. Finally, the combination of extremely shortened lead times and greater analytical capabilities of design algorithms would enable the industry to offer an even wider and more frequently updated assortment. These algorithms would independently design entire pieces of clothing to be delivered instantly to the consumer's home.

This disruptive alteration to the prevailing business model would greatly affect the fashion industry's environmental and social footprint. The underlying radical made-to-order approach would result in garments produced only after they have been sold—which would sharply reduce overall production, waste creation, and resource consumption. As the garment's production would be located in close proximity to the final custom-

ers via automated 3D printing, transport costs as well as connected CO2 emissions would drop, further lowering the impact on the environment.

In addition, 3D printing further offers the option of using more sustainable input materials requiring less water, energy, and hazardous substances.[266] As the consumer or the brand itself can directly control input factors at the printer, it would be easier to produce sustainably. The industry would have to mitigate the potentially negative effect for the millions of workers currently employed along the supply chain. Brands and retailers would need to enable a smooth transition for the millions of workers currently employed in the garment-producing countries that would suffer from the reshoring of production. The faster trend and assortment lifecycles would add to the need for a functioning circular economy to limit the resulting waste creation.

How far along is the technology that would unlock this scenario? GFA and BCG did a reality check and found that all technologies required for an "Instant Fashion" model are either already available or under development. The customer journey described above begins with the customer seeing an outfit that they like. Goxip, the "shoppable Instagram," is part of the Mills Accelerator. It allows customers to find and shop fashion items from any picture using AI image recognition.[267] The same holds true for virtual reality mirrors. Not long after acquiring 3D scanning startup Body Labs in 2015, Amazon applied for a "blended reality system" for an AR mirror to facilitate trying clothes on at home. Moreover, its Amazon Echo Looks can analyze uploaded pictures to provide style advice.[268] Nike recently acquired Invertex, which creates mobile applications that can analyze the human body in three dimensions and give customers greater confidence in buying.[269]

The industry is also advancing in the field of algorithms to analyze and predict consumer trends. Google and Zalando have teamed up on Project Muze, training a neural network to understand colors, textures, style preferences, and other aesthetic preferences.[270] Bold Metrics' Apparel Insights helps brands to obtain the body measurements of their shoppers based on their previous purchases to provide better recommendations concerning sizing and fit.[271]

Amazon is also making progress in the production and delivery of mass-customized fashion. In late 2017, the company secured a patent for an on-demand apparel manufacturing system that would manufacture clothes only after ordering.[272] Moreover, in 2016 Amazon UK managed its first product delivery by drone.[273]

# IMAGINE A WORLD WHERE FASHION IS A SERVICE

In this scenario, a universal wardrobe belongs to everyone and choices are unlimited. Customers turn into consumers, stepping away from ownership by tapping into a global pool of sharing clothes. With limited funds, styling options become endless. The smart home assistant can select the daily outfit—perfectly aligned to the weather, fashion, mood, style, and fit. Delivering right on time and picking up after wearing is automatic.

Access to clothes, as opposed to owning them, is the main disruptor in the Fashion as a Service scenario. The power here moves to the technology provider that manages the global wardrobe. The second key player within the business model would be the rental provider who delivers and picks up the clothes, though this job could also be done by the player that manages the wardrobe—especially with last-mile costs falling.

As opposed to Instant Fashion, clothes in this scenario could be manufactured anywhere, so sustainable processes would still need to be ensured across all global production sites. But the overall "active wardrobe" would be significantly smaller on a global scale and so would its footprint.

To demonstrate the disruption potential of this business model: If global fashion consumption were reduced by 25 percent, it would result in 20 billion fewer clothes per year.[274] Thus, Fashion as a Service would greatly reduce the current overproduction and overconsumption, contributing to a more efficient usage of resources. Moreover, the rental provider could also take care of clothes at the end of their lifecycle, and would therefore ensure an adequate and consequently more effective recycling process. This would further limit the environmental footprint of the industry.

Consumers that would still prefer to permanently buy their clothes from the universal wardrobe could still benefit from the increased transparency and traceability enabled through technologies such as blockchain. Since all brands, retailers, and suppliers would be incorporated into the wardrobe system, each consumer would know exactly where, by whom, and under which conditions their garments have been manufactured. The newly created transparency would also prevent counterfeiting and theft, benefiting both industry players and customers. The last and probably more long-term benefit is in optimizing inventory across brands and thus minimizing overproduction.

Maximizing the use of existing assets with sharing technologies has already disrupted other industries, such as accommodations and transportation. Both AirBnB and Uber have enabled their users to share underutilized assets, namely apartments and cars, respectively, to improve efficiency, community, and sustainability.[275]

Similar to Instant Fashion, virtually all components of this disruptive business model are already in place or in the experimentation phase. The most significant player is without a doubt Rent the Runway. Founded in 2009, the company rents out designer clothes from more than 500 brands to its subscribers. Rent the Runway's success has resulted in more than 6 million subscribers and revenues of more than €80 million.[276] Other players, such as the UK company Chic by Choice, which has focused on designer fashion for women across Europe, have followed this successful example.[277] In China, where sharing economy platforms are particularly successful, the startup YCloset secured a €40 million funding round in late 2017.[278] For roughly €65 per month, customers can rent as many clothes as

they like, with the clothes offered on the platform having an average retail price of about €190.[279] But consumer habits are still a big obstacle.

The companies mentioned above focus on compiling a stock of clothes that they subsequently rent out to customers. Other business models include UK-based Rentez-Vous' peer-to-peer sharing platforms[280] and Travel Vendi, also honored at the 2016 Global Change Awards, which has customers renting clothes through vending machines.[281] Tchibo rents out baby as well as maternity clothing. As these garments feature some of the shortest usage periods, renting them out and making them reusable extends their lifecycle by a multiple, reducing their environmental footprint.[282]

# IMAGINE A WORLD WITH SMART FASHION

Consumers are driven by ultimate real-time personalization. Style is design—and design has to adapt immediately to the surroundings, mood, or situation. The consumer owns a few pieces of clothing made of smart fibers catering to the constant need for change by altering their color and their texture in real-time. Beyond the wearer, the garments are able to process and send information, thereby extending the ubiquity of technology further into fashion.

Flexibility and personalization are the ultimate drivers of the fashion industry in this disruptive business model—with the design at its core. Consumers who wear the smart fibers could fully personalize their clothes within seconds with self-created designs through their smartphone. The fibers would also recognize outside conditions such as rain or wind and adapt their texture accordingly. In this world, the power lies with the design and technology providers. Fashion brands and retailers would focus on creating designs electronically that customers could download and try on instantly.

As for the environmental or social implications of this business model, the footprint of the industry would be strongly reduced, as very few items would have to be produced in order to meet the demand. Especially when considering that the average person has up to 100 pieces of clothing in their wardrobe, limiting this amount to only a few underlines the potential that this business model would have in tackling overproduction.[283]

The smart fibers could also track data such as the blood pressure or blood sugar levels of their wearers, and therefore could initiate actions in case any of these health parameters reach a critical level. Smart fibers would thereby promote health and safety as well.

The Smart Fashion business model has the potential to disrupt the entire industry because it bundles many existing functions and activities into one highly customizable platform. It is thus similar to disruptive innovations such as the iPhone, which forever changed the mobile phone industry. Not only did it merge a music player, a phone, and an internet browser into one device, but it also gave its users countless opportunities to personalize its use with the App Store. Similarly, the Chinese software company Tencent has created a digital ecosystem for its users through its messaging app WeChat. Users can send text messages, but also play games, pay bills, or access bank services, depending on how they decide to use the app. The Chinese government is now integrating WeChat into the country's electronic ID system.[284] Likewise, Smart Fashion would not only be highly customizable, but would also enable their wearers to perform numerous other activities.

When reality-checking this scenario, it is clear that it is the furthest from the present. But many of its technologies already exist. For the 2018 Winter Olympics in Pyeongchang, Ralph Lauren equipped Team USA with parkas with self-heating systems to keep wearers warm for up to 11 hours, and controlled them with an app.[285] Thus the clothes can adapt to outside weather conditions. Clothes measuring bodily functions already exist in the sportswear market, as with Polar's training shirt that measures heartbeat, position, and current speed.[286] This data can give athletes and coaches much more insight into performance. Several prominent sports teams have already implemented the shirts in their day-to-day training.[287]

Likewise, Google has developed a technology called Jacquard, described as the first digital platform for smart clothing at full scale.[288] Jacquard employs threads with embedded electronics, enabling standard digital activities such as getting directions or playing another song on the connected smartphone. The technology was first used in collaboration with Levi's, where it was successfully implemented in a denim jacket.[289] As for real-time personalization of fashion, the crowd-funded startup Shiftwear has shown a promising first step by including an LCD-display in the heels of sneakers, which can show different themes and colors that can be controlled via a smartphone.[290] The next step will be to enable color-changing fibers. MIT researchers have recently taken a first step in this direction by creating a system called ColorFab, which allows users to change the color of 3D-printed objects even after they have been printed. This is done by using "photochromic inks" that change their color when they are exposed to certain wavelengths of UV light.[291]

# FOR A WORLD BEYOND NEXT SEASON

This report aims to inspire the fashion industry to move toward a better future. Recognizing the need for change in last year's report was an important step. But now, ambitious actions to improve the industry's social and environmental performance are needed.

What we see in this report is that change is achievable. The Roadmap to Scale of existing solutions gives fashion companies the tools they need to raise their environmental and social performance. It offers proven best practices, solutions, and the business case for taking action. We are confident that companies, using this roadmap as guidance, can increase their Pulse Score and gain a stronger position in the industry.

Yet the roadmap can only take us so far. Fashion companies must also come together to develop, support, and implement new emerging solutions that will transform the industry to the level required for long-term prosperity—financially, socially, and environmentally. Innovations and disruptive scenarios we detail in this report have the potential to substantially improve the industry's overall performance.

BCG and GFA hope the fashion industry will follow the call for future collaboration and innovation. Only a joint effort will push many of these disruptive innovations to reach the necessary scale. Even in the best circumstances, this will take joint investments and efforts spanning several years.

More broadly, we hope this report advances the conversation about sustainability, innovation and collaboration triggered by last year's edition. The urgency, and the potential for value creation, are as great as ever. We are confident that the creativity and commitment of the fashion industry's leaders can create a prosperous outlook for years to come.

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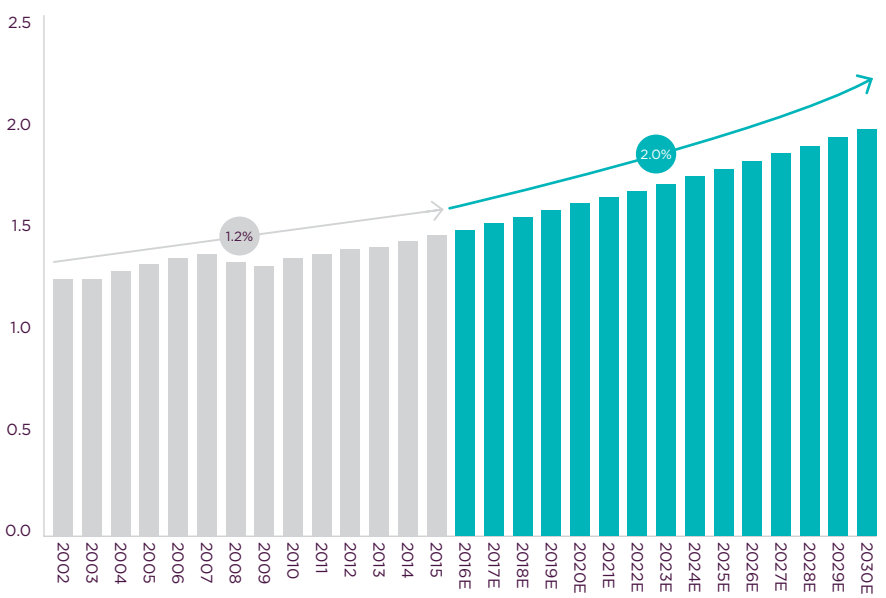
# APPENDIX

# FORECASTING THE P&L OF AN EXEMPLARY FASHION BRAND

The profitability of the Roadmap to Scale is calculated using a projection of the profit-and-loss statement of an exemplary fashion brand. We estimate the P&L for a base case scenario assuming no sustainability efforts at all and a roadmap scenario assuming the implementation of Roadmap to Scale activities within materials, resource efficiency and respectful working conditions. We refer to the base case scenario as business as usual. The roadmap scenario will highlight the uplift potential unlocked if committing to sustainability today and scaling efforts until 2030.

We align our assumptions closely with those employed in this report's first edition of 2017. Hence, for both cases, we start our projections in 2015 and assume total revenues of the exemplary brand to grow at the same rate as the retail value of the total apparel and footwear market (estimated growth rate of 2.0% per year between 2015 and 2030[1] (see exhibit A1).

**Exhibit A1** **Projection of the retail market**




**CAGR 2016-2030**

1.2% Continuation of historical growth

2.0% BCG triangulation

- Well performing lead markets including the US and China as well as growing emerging markets such as India, are driving retail value growth
- Quality focus coupled with 'slow fashion' trend could decelerate price decline by item (in marginal terms)

1. Apparel and footwear market shown using historic constant 2016 prices. forecast constant 2016 prices and historic fixed 2016 exchange rates. forecast fixed 2016 exchange rates
Source: Euromonitor; Economist Intelligence Unit; Mintel; World Bank; Pulse Report 2017 (GFA and BCG); BCG Analysis

Exhibit A2 provides a detailed overview of the results for the business as usual projection, including margin assumptions and the magnitude of the individual line items, as well as the CAGRs for the entire period.

**Exhibit A2** **Projected Profit-and-Loss of an exemplary fashion brand – Business as usual**

Sources of rising costs: Labor, Energy, Water

| | | Exemplary P&L (M€) 2015 | | 2030 | | Projected CAGR[1] |
|---|---|---|---|---|---|---|
| **Total Revenues** | | **10,000** | 100% | **13,522** | 100% | **2.0%** |
| Cost of goods sold | Production cost – Labor cost [Supplier] | 1,144 | | 2,019 | | |
| | Production cost – Factory running cost | 256 | | 341 | | |
| | Production cost | **1,400** | | **2,360** | | 3.5% |
| | Material cost – Fabric cost | 2,059 | | 2,542 | | |
| | Material cost – Other material cost | 841 | | 1,108 | | |
| | Material cost | **2,900** | | **3,649** | | 1.5% |
| | Factory profit | 300 | | 419 | | |
| | Logistics & tariff cost | 400 | | 559 | | |
| **Gross Profit** | | **5,000** | 50% | **6,535** | 48% | **1.8%** |
| Operating expenses | Selling, General and Administrative Expenses – Store Occupancy cost | 1,280 | | 1,736 | | |
| | Selling, General and Administrative Expenses – Labor cost [Brand] | 1,178 | | 1,823 | | |
| | Selling, General and Administrative Expenses – G&A | 1,241 | | 1,678 | | |
| | Selling, General and Administrative Expenses | **3,700** | | **5,238** | | 2.3% |
| | Other Operating Expenses | 100 | | 135 | | 2.0% |
| **EBIT** | | **1,200** | 12% | **1,162** | 8.6% | |
| | | EBIT at risk | | **Δ = -3.4 ppts** | | |

1. Note that we do not assume the same growth rate for every year in the study, so the CAGR represents an indication of magnitude over 15 years
Note: Differences in sums can occur due to rounding
Source: Pulse Report 2017 (GFA and BCG); BCG analysis

In contrast to the business as usual projection which assume no sustainability efforts, exhibits A3 to A8 provide explanations and projections of the potential impact of adding a range of activities within resource efficiency, respectful working conditions and materials. While exhibits A3, A5 and A7 explain detailed assumptions, lever implications and saving potentials, exhibits A4, A6 and A8 display the respective P&L, as well as the CAGRs for the entire period.

**Exhibit A3** Adding sustainability activities – Resource efficiency P&L implications

Improvement potential within: Energy, Water, Waste, Chemicals

| | | Exemplary P&L (M€) 2015 | 2030 | 2030 Efficiency | CAGR[1] |
|---|---|---|---|---|---|
| **Total revenues** | | **10,000** | **13,522** | **13,522** | **2.0%** |
| Cost of goods sold | Production cost – Labor cost [Supplier] | 1,144 | 2,019 | 2,019 | |
| | Production cost – Factory running cost | 256 | 341 | 322 | |
| | Production cost | **1,400** | **2,360** | **2,341** | 3.4% |
| | Material cost – Fabric cost | 2,059 | 2,542 | 2,424 | |
| | Material cost – Other material cost | 841 | 1,108 | 980 | |
| | Material cost | **2,900** | **3,649** | **3,404** | 0.7% |
| | Factory profit | 300 | 419 | 401 | |
| | Logistics & tariff cost | 400 | 559 | 534 | |
| **Gross profit** | | **5,000** | **6,535** | **6,843** | **2.4%** |
| Operating expenses | Selling, general and administrative expenses – Store occupancy cost | 1,280 | 1,736 | 1,700 | |
| | Selling, general and administrative expenses – Labor cost [Brand] | 1,178 | 1,823 | 1,824 | |
| | Selling, general and administrative expenses – G&A | 1,241 | 1,678 | 1,678 | |
| | Selling, general and administrative expenses | **3,700** | **5,238** | **5,203** | 2.2% |
| | Other operating expenses | 100 | 135 | 135 | |
| **EBIT** | | **1,200** 12% | **1,162** 8.6% | **1,505** 11.1% | |
| | | | Delta to business as usual | **Δ = +2.5 ppts** | |

1. Note that we do not assume the same growth rate for every year in the study, so the CAGR represents an indication of magnitude over 15 years
Note: Differences in sums can occur due to rounding
Source: BCG analysis

**Exhibit A4** Adding sustainability activities – Resource efficiency

**BUSINESS CASE: Efficiency in water, energy, waste and chemicals**

Resource efficiency measures
- At strategic suppliers saving energy, water, chemical intake and reducing waste
- Within own retail stores focusing on energy consumption

| Δ EBIT-margin vs 2030 business as usual | | |
|---|---|---|
| | Upper margin | **+2.5 ppts** |
| | Lower margin[3] | **+1.6 ppts** |

**Underlying drivers:**

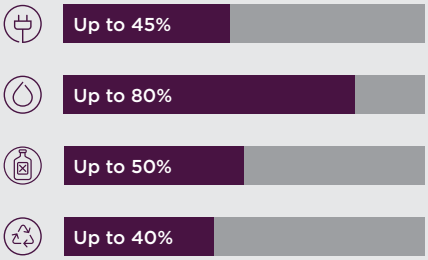
**Energy**
- Energy price increase until 2030 (non-renewables) between 2.3% - 3.5% CAGR[4]

**Water**
- Rising water prices (assuming future water tax)

**Chemicals**
- Growing restrictions on usage of hazardous substances
- Rising waste water and chemical testing costs due to increasing environmental standards

| | |
|---|---|
| **Production** | • Investment into resource efficiency to improve energy consumption and waste creation at tier-one strategic suppliers<br>• Roll-out over time: Gradual roll-out to 100%, additional narrow-focused projects up to 30% of strategic suppliers (over a total of 8 years)<br>• Investments: Enrolment fee in existing collaborative initiatives in addition to a variable fee per participating factory (ROI up to 12 months); Narrow-focused programs involve larger investments from brand as upgrading technical equipment in factories is required (ROI within 2-3 years)<br>• Exemplary measures (existing initiatives): Maintenance on exhaust fans and motors, air conditioning upgrades, introduction of recycling and garbage collection<br>• Exemplary measures (narrow-focused projects): Upgrades to sewing machines (motor upgrades), introduction of energy measurement systems |
| **Materials** | • Investment into resource efficiency to reduce water, energy, chemical usage and lower waste creation at tier-two strategic suppliers<br>• Roll-out over time: Gradual roll-out to 100%, additional narrow-focused projects up to 30% of strategic suppliers (over a total of 8 years)<br>• Investments: Enrolment fee in existing collaborative initiatives in addition to a variable fee per participating factory (ROI up to 12 months); Narrow-focused programs involve larger investments from brand as upgrading technical equipment in factories is required (ROI within 3-4 years)<br>• Exemplary measures (existing initiatives): Optimization of metering and leak detection, cooling water reuse, improvement of boiler efficiency, improvement of insulation, optimization of compressed air, introduction of restricted substances lists<br>• Exemplary measures (narrow-focused projects): Introduction of real-time energy monitoring sensors, closed-loop water systems, upgrades to dyeing technologies, chemical management systems |
| **SG&A** | • Investment into energy efficiency in retail store network to lower store occupancy costs (operation expenses related to electricity)<br>• Roll-out over time: Starting with 20% of stores following gradual roll-out to reach 100% of stores (over 8 years)<br>• Investment: Cost per sqm of store space to implement upgrade measures<br>• Exemplary measures: Upgrade lighting in retail stores (e.g. switch to LED bulbs), installation of occupancy sensors and energy meters, upgrading heating and ventilation systems, switch to renewable energy provider |

**Overall environmental savings 2030[1]**




**Overall financial savings 2030[2]**

| | |
|---|---|
| Production cost | 0.5% - 0.8% |
| Material cost | 3% - 6% |
| SG&A | 0.3% - 0.6% |

1. Assumptions based on Clean by design and SAVE project

2. Comparison to 2030 business as usual

3. Lower margin assumes roll-out to only 50% of total strategic suppliers/stores and only 75% of max. potential environmental savings

4. Oxford Economics (2017), U.S. Energy Information Administration (2017)

Source: BCG Analysis

**Exhibit A5** Adding sustainability activities – Respectful and secure working conditions P&L implications

Improvement potential within
Labor

| | | Exemplary P&L (M€) 2015 | 2030 | 2030 Labor cond. | CAGR[1] |
|---|---|---|---|---|---|
| **Total revenues** | | **10,000** | **13,522** | **13,522** | **2.0%** |
| Cost of goods sold | Production cost – Labor cost [Supplier] | 1,144 | 2,019 | 1,937 | |
| | Production cost – Factory running cost | 256 | 341 | 332 | |
| | Production cost | **1,400** | **2,360** | **2,269** | 3.2% |
| | Material cost – Fabric cost | 2,059 | 2,542 | 2,547 | |
| | Material cost – Other material cost | 841 | 1,108 | 1,029 | |
| | Material cost | **2,900** | **3,649** | **3,576** | 1.0% |
| | Factory profit | 300 | 419 | 408 | |
| | Logistics & tariff cost | 400 | 559 | 544 | |
| **Gross profit** | | **5,000** | **6,535** | **6,726** | **2.3%** |
| Operating expenses | Selling, general and administrative expenses – Store occupancy cost | 1,280 | 1,736 | 1,736 | |
| | Selling, general and administrative expenses – Labor cost [Brand] | 1,178 | 1,823 | 1.824 | |
| | Selling, general and administrative expenses – G&A | 1,241 | 1,678 | 1,678 | |
| | Selling, general and administrative expenses | **3,700** | **5,238** | **5,238** | 2.3% |
| | Other operating expenses | 100 | 135 | 135 | |
| **EBIT** | | **1,200** 12% | **1,162** 8.6% | **1,353** 10% | |
| | | | Delta to business as usual | **Δ = +1.4 ppts** | |

1. Note that we do not assume the same growth rate for every year in the study, so the CAGR represents an indication of magnitude over 15 years
Note: Differences in sums can occur due to rounding
Source: BCG analysis

**Exhibit A6** Adding sustainability activities – Respectful and secure work environments

**BUSINESS CASE:** Respectful and Secure Working Conditions

Initiatives at strategic suppliers
- Improving work conditions and health and safety standards
- Emphasizing diversity, gender equality, discrimination, empowerment of women and financial inclusion

| Δ EBIT-margin vs 2030 business as usual | | |
|---|---|---|
| | Upper margin | **+1.4 ppts** |
| | Lower margin[5] | **+0.7 ppts** |

**Underlying drivers:**

**Health & Safety**
Increase of labor costs due to
- High number of work injuries, accident frequency rate, accident severity rate
- Large amount of man days lost
- Lowered workers' well-being levels

**Working Conditions**
Increase of labor costs due to
- Low retention rate of workers
- High turnover rates
- High number of strikes
- Lack of worker incentive schemes

**Production & Materials**

- Investment in health and safety as well as working conditions at strategic suppliers to raise worker well-being, lower accident rates, man days lost and increase retention of workers and individual motivation as well as productivity
- Roll-out over time: Gradual roll-out to 100%, narrow-focused projects up to 30% of strategic suppliers (over a total of 8 years)
- Investments: Enrolment fee in existing collaborative initiatives in addition to a variable fee per participating factory; Narrow-focused programs involve larger investments from brand (training programs are more customized, general upgrade of safety equipment might be required); ROI between 1-4 years (depending on intensity of training and size of initiatives)
- Exemplary measures (both existing as well as narrow-focused projects): Training and skill-building programs; Health, nutrition and financial inclusion programs; Installation of health and safety measures; Worker engagement initiatives
- Potential factory productivity increase of more than 20%[2]
  - Installation of health and safety features reduces number of work injuries (accident frequency rate), lowers accident severity rate, reduces the amount of man days lost
  - Improvement of working conditions enhances workers' well-being and health levels, increases retention rate at work, lowers the number of strikes and increases motivation
  - Establishment of worker incentive schemes foster motivation, eagerness to learn and lowers error rate

**Overall labor implications 2030[1]**

| | |
|---|---|
| Turnover rate | -30 to -50%[3] |
| Work injuries | –56%[1] |
| Man days lost | -50%[3] |
| Accident frequency rate | -55%[1] |
| Accident severity rate | -55%[1] |
| Absenteeism | -50%[4] |

**Overall financial savings 2030[2]**

| | |
|---|---|
| Production cost | 2% - 4% |
| Material cost | 1% - 2% |

1. Assumptions based on case study by Arvind (2017)

2. Assumptions based on Better Work Program

3. Nike Sustainability Report 2014/15

4. Assumptions based on HER project

5. Lower margin assumes roll-out to only 50% of total strategic factories and only 75% of max. potential savings in labor cost

Source: BCG Analysis

**Exhibit A7** Adding sustainability activities – Materials P&L implications

Improvement potential within: Energy, Water, Chemicals

| | | | Exemplary P&L (M€) 2015 | 2030 | 2030 Materials | CAGR[1] |
|---|---|---|---|---|---|---|
| **Total revenues** | | | **10,000** | **13,522** | **13,522** | **2.0%** |
| Cost of goods sold | Production cost | Labor cost [Supplier] | 1,144 | 2,019 | 2,019 | |
| | | Factory running cost | 256 | 341 | 341 | |
| | | | **1,400** | **2,360** | **2,360** | 3.5% |
| | Material cost | Fabric cost | 2,059 | 2,542 | 2,551 | |
| | | Other material cost | 841 | 1,108 | 1,031 | |
| | | | **2,900** | **3,649** | **3,582** | 1.1% |
| | Factory profit | | 300 | 419 | 415 | |
| | Logistics & tariff cost | | 400 | 559 | 553 | |
| **Gross profit** | | | **5,000** | **6,535** | **6,613** | **2.1%** |
| Operating expenses | Selling, general and administrative expenses | Store occupancy cost | 1,280 | 1,736 | 1,736 | |
| | | Labor cost [Brand] | 1,178 | 1,823 | 1.824 | |
| | | G&A | 1,241 | 1,678 | 1,678 | |
| | | | **3,700** | **5,238** | **5,238** | 2.3% |
| | Other operating expenses | | 100 | 135 | 135 | |
| **EBIT** | | | **1,200** 12% | **1,162** 8.6% | **1,239** 9.2% | |

Delta to business as usual **Δ = +0.6 ppts**

1. Note that we do not assume the same growth rate for every year in the study, so the CAGR represents an indication of magnitude over 15 years
Note: Differences in sums can occur due to rounding
Source: BCG analysis

**Exhibit A8** Adding sustainability activities – Materials

**BUSINESS CASE:** Sustainable Material Mix

Transition to a more sustainable material mix (initial focus on cotton and polyester with subsequent replacement of further conventional materials)

| Δ EBIT-margin vs 2030 business as usual | | |
|---|---|---|
| | Upper margin | **+0.6 ppts** |
| | Lower margin | **+0.2 ppts** |

**Underlying drivers:**

**Resource prices**

- Rising costs of raw materials (e.g. especially water and energy)
- Growing restrictions on usage of hazardous substances

**Materials**

- Investment in preferred materials reducing the amount of water, energy and chemicals used within their production process, lowering the environmental footprint of the brand
- Roll-out over time: Starting with largest two materials, cotton and polyester, gradual replacement of further materials for alternative fibers lowering the environmental footprint of the brand
- Investments: Current price upcharge for preferred materials increases material cost over the short term. Assuming higher input prices for, in particular, energy and water, price upcharge expected to decline over time. Over the long term, preferred fibers are assumed to be of similar or even lower price than conventional materials. ROI assumed to be around 5-10 years
- Exemplary measures: Component analysis of entire collection, followed by subsequent replacement of conventional material for preferred options (e.g. replacement of conventional cotton for organic cotton, replacement of polyester by recyclable polyester)

**Overall environmental savings 2030**

- Up to 60%[2]
- Up to 90%[2]
- Up to 90%[1]

**Overall financial savings 2030[1]**

| | |
|---|---|
| Material cost | 1-2% |

1. Textile Exchange Quick Guide to Organic Cotton (2017)

Source: BCG Analysis

All calculations and projections included in this business case are based on assumptions taken from a range of reputable sources as well as BCG triangulations. Exhibit A9 describes the list of data sources employed to calculate all growth projections. We display the sources by cost bucket and line item. Any item not included in the below table is assumed to grow proportional to total revenues.

Exhibit A10 displays the list of additional sources used to estimate the financial effect of implementing activities taken from the Roadmap to Scale. The model is based on the assumption that the exemplary fashion brand invests in three different categories of sustainability initiatives: resource efficiency, safe and secure working conditions and sustainable materials.

**Exhibit A9** Sources contributing to the estimation and forecast of the exemplary P&L – Base case

| P&L topic | Source | Description | Comment on application |
|---|---|---|---|
| Company Data | CapitalIQ | Financials for selected sample companies | Major P&L line items and margins averaged across sample |
| Cost of Goods Sold | ILO (2017) | Cost breakdown for jeans produced in China, Bangladesh and Cambodia as well as poloshirt and technical t-shirt | Average across all cases with equal weights |
| | BCG | BCG estimates for the overall COGS breakdown across countries for an apparel company | |
| Production Cost | Oxford Economics (2017) | Forecast: Real earnings (relative to CPI) for China, India, Turkey, Indonesia and Malaysia | Earnings are not specific to the textile industry. Assumption that the growth rate for earnings in the textile industry mirrors the growth across industries in the given country. Earnings are weighted by the number of garment workers in the given country |
| | Clean Clothes Campaign (2014) | Number of garment workers for China, India, Turkey, Indonesia and Malaysia | |
| Material Cost | World Bank (2017) | Forecast (real values): Cotton A Index | Used without changes |
| | | Forecast (real values): Aluminum, iron, copper, zinc | Averaged with Oxford economics forecast. Input factor for metals proxy for accessories |
| | Oxford Economics (2017) | Forecast (nominal values): Aluminum, iron, copper, zinc | Averaged with World bank forecast. Input factor for metals proxy for accessories. Deflated by MUV index used by World Bank |
| | | Forecast: Oil prices (real values) | Key input factor for polyester proxy. Oil prices are assumed to drive 50% of polyester price |
| | | Forecast: World energy prices (nominal values) | Deflated by MUV index used by World Bank. The energy mix is estimated to be 50% coal, 25% oil and 25% gas |
| | World Bank (2017) | MUV inflation index: Unit value index of manufacture exports in US dollar terms for fifteen countries | The average MUV inflation index over the period 2015-2030 is used to adjust forecasted growth for inflation |
| Selling, General and Administrative Expenses | Oxford Economics (2017) | Forecast: Real earnings (relative to CPI) for UK, France, Germany, US, Japan, S. Korea, China, Brazil, Argentina | Earnings are not specific to the textile industry. Assumption that the growth rate for earnings in retail sales mirrors the growth across industries in the given country. Earnings are weighted by the population in the given country |
| | UN (2015) | Population by country for UK, France, Germany, US, Japan, S. Korea, China, Brazil, Argentina | |

Note: Assumptions based on Pulse Report 2017 (GFA and BCG)

**Exhibit A10** Sources contributing to the estimation and forecast of the exemplary P&L – Roadmap to Scale

| Roadmap items | Source | Description | Comment on application |
|---|---|---|---|
| Resource efficiency | NRDC and SAC (2018) | Percentage of water and energy reduction potential by factory | Averaged with SAVE numbers. Input factor for water and energy savings per tier-two factory |
| | SAVE (2016) | Percentage of water, energy and waste reduction potential by factory | Averaged with NRDC and SAC numbers for water and energy at tier-two. Used without change for waste. Input factor for water, energy and waste savings per tier-one and tier-two factory. |
| | ZDHC (2018) | Percentage of cost reduction in chemicals | Input factor for cost reduction potential in chemicals of introducing chemical management systems and ensuring adherence with MRSL |
| | USAID (2014) | Energy efficiency savings per energy source and measure | Averaged with Li & Fung numbers. Input factor for energy efficiency savings, incl. ROIs for narrow focused-projects |
| | Li & Fung (2018) | Energy saving potential in technology upgrades | Averaged with USAID numbers. Input factor for energy efficiency savings for narrow-focused projects |
| | ColorZen (n.d.) | Percentage of water saving potential | Averaged with Bonprix. Input factor for water reduction in narrow-focused projects undertaken at tier-two factories |
| | Bonprix (2017) | Percentage of water saving potential | Averaged with ColorZen. Input factor for water reduction in narrow-focused projects undertaken at tier-two factories |
| | Oxford Economics (2017) | Forecast: World energy prices (nominal values) | Input factor for energy cost reduction in retail network. Deflated by MUV index used by World Bank. The energy mix is estimated to be 50% coal, 25% oil and 25% gas |
| Safe and secure work environments | Better Work (2016) | Potential factory productivity and profitability increase | Input factor for productivity increase at participating factory |
| | Arvind (2016) | Potential impact on injury rate, man days lost, accident frequency rate, accident severity rate | Input factor for efficiency increase and labor cost reduction at participating factory |
| | Nike (2015) | Potential impact on turnover rates | Input factor for efficiency increase and labor cost decrease |
| | BSR (n.d.) | Potential impact on absenteeism rate, fainting rate, error rates, worker retention rates, factory efficiency rate | Input factor for efficiency increase and labor cost decrease |
| | Clean Clothes Campaign (2014) | Number of garment workers for China, India, Turkey, Indonesia and Malaysia | Forecasted growth rates are weighted by the number of garment workers in the given country |
| Sustainable material mix | World Bank (2017) | Commodity prices: cotton | Input factor for estimation of future conventional cotton price |
| | Textile Exchange (2017) | Price gap between organic and conventional cotton | Input factor to estimate price gap between organic and conventional cotton going forward |
| | EDIPTEX (2007), Clean Clothes Campaign (2014), O'Rouke, ILO (2017), WRAP (2012), Levi Strauss and Co (2015), Velden et. al. (2014), Cotton in-corporated (2012), Skog and Landskap (2014) | Estimation of the price increase of water as reference for conventional cotton price increase based on: Average weight of a t-shirt, water usage in production of 1 kg of cotton, average cost of materials in a t-shirt, assuming a t-shirt to weigh 250g | BCG triangulation of the average cost of materials in a cotton t-shirt with potential cotton price increase. Reference for price differential between organic and conventional |
| | PUMA (2011) | Cost to society of water | Used in estimation of water price increase. Pricing the negative externality of water based on the cost to society as measured by PUMA in the company's E-P&L. Input factor used to estimate conventional cotton price going forward |
| | Oxford Economics (2017) | Forecast: Oil prices (real values) | Input factor for polyester proxy. Oil prices are assumed to drive 50% of polyester price |
| | Textile Exchange (2017) | Estimated savings potential in reduction of water, energy, GHG, chemicals when switching to preferred fibers | Input factor to estimate price gap between organic and conventional cot-ton going forward (averaged with Textile exchange numbers); Input factor to estimate price gap between recycled and virgin polyester |

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