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EQUITY DERIVATIVES INSIGHT

TECH STYLE

THE FUTURE OF FASHION

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MOST INNOVATIVE INVESTMENT BANK FOR EQUITY DERIVATIVES

Contents

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"What you wear is how you present yourself to the world, especially today, when human contacts are so quick. Fashion is instant language."

- Miuccia Prada

1 – NEED FOR SPEED

Millennial consumption patterns generally exhibit a clear need for immediate reward and speed. This presents a major challenge for most retail businesses and for the fashion industry in particular. Indeed, Since WW2, fashion had officially been broken up into seasons: spring/summer lines debuted on runways in early fall, and autumn/winter lines debuted in February. The nature of the staggered timeline was to give brands ample time to shift their manufacturing process to produce inventory based on likely demand.

In the realm of "Fast Fashion" however, products are expected to go directly from the catwalk to the shelves. Brands such as Zara, H&M, Top Shop and Forever 21 are leaders in this space and have been able to consistently outpace competitors thanks to rapid design teams and efficient supply chain management. Fast fashion brands may issue as many as 52 weekly "micro-seasons" per year. Topshop, for example, introduces 400 styles per week on its website.
This requires highly responsive production processes:

- **Smarter Product Designs**
- **Higher degrees of Manufacturing Automation**
- **Optimised Inventory Management and Fulfilment**
- **Close geographic proximity to the customer**

Social media platforms also help propagate new trends with 'see now buy now' online purchasing features.

SMARTER PRODUCT DESIGNS

Even with an army of creative and talented designers, it can be challenging to come up with original product lines on a regular basis. This is why Data Scientists have been exploring the possibility of generating AI-sourced designs for some time.

As explained by Evridiki Papahristou, a fashion engineer with a research focus in the effective integration of 3D virtual prototype in the apparel industry, **Google** (through Project Muze) first trained a neural network to understand colours, textures, style preferences and other aesthetic parameters derived from Google's Fashion Trends Report as well as design and trend data sourced by Zalando. Then, the project used an algorithm to create designs based on users' interests and alignment with the style preferences recognized by the network.

Similarly, **Amazon** Lab 126 developed an algorithm that is capable of learning about a particular fashion style using images. Using a Generative Adversarial Network, the algorithm can generate unique images in similar styles from scratch. A GAN consists of two deep neural networks working simultaneously to gain insights from raw visual data from a vast array of social media and online sources. By examining the properties of particular aesthetic using visual examples, it can apply that style to any existing item of clothing.

Researchers from UC San Diego and **Adobe** have outlined a way for AI to learn an individual's style and create customised computer-generated images of new items that fit that style. The system goes beyond recommending items from an existing inventory and can be used to suggest styles and aid the design of new products.

Stitch Fix is an interesting success story. Launched in 2011 by Katrina Lake, the company went public at the end of last year and now has a 2.6bn USD market cap, employing 5800 people, of which 3400 stylists and 75 data scientists. In May 2018, active clients on the platform hit 2.7 million, increasing 30% year on year. Again, the company uses smart algorithms alongside the input of human fashion experts to recommend items fitting the personality and preferences of each individual client.

Of course, more established High Street brands have also been doing their homework: **Tommy Hilfinger** teamed up with **IBM** and the Fashion Institute of Technology on a project called "Reimagine Retail", using AI to predict which items are going to be in style in the coming months, showing the importance of prediction in the day to day management of business operations.

Whether such invasion of the catwalk by computers will really benefit creativity is a different debate. But in an era where millennials are happy to follow computer-generated influencers like **Miquela Sousa** (http://www.instagram.com/lilmiquela/), what will matter most is how technology can be used to meet the needs of the younger generations of consumers.

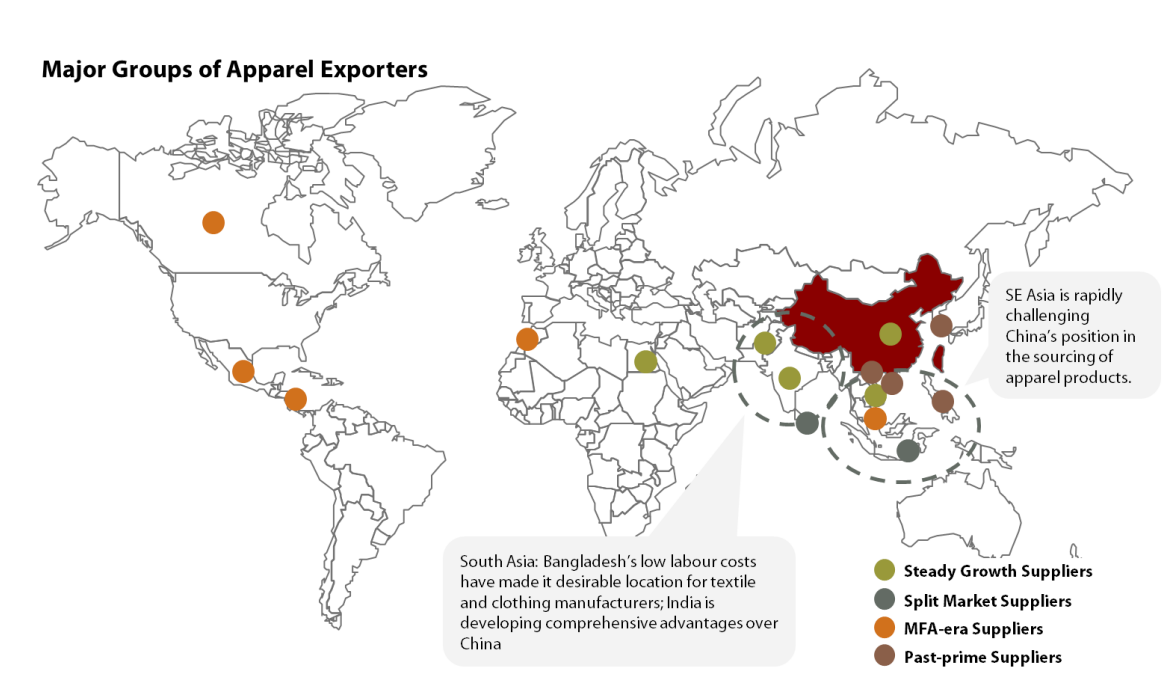
HIGHER DEGREES OF MANUFACTURING AUTOMATION

Behind the websites and digital apps, it's the entire textile manufacturing industry that needs to adapt. The emergence of Smart Factories powered by robotics, the Internet of Things and smart automation, utilizing cyber systems to monitor and track production, is a clear illustration of the recent evolutions. Whereas the traditional textile supply chain system consisted of several often disjointed processes ranging from marketing, product development, manufacturing and distribution, Technology suddenly allows increasing the communication between these segments and facilitating a faster more reliable product delivery.

For example, product design needs to be tested in reality through physical samples and sending garment samples for strike offs between buyers and manufacturers is a long and cumbersome process. However, developments in VR/AR may now be used to determine the viability of designs through virtual 3D models, subsequently saving costs and reducing manufacturing lead times.

Production processes are going to become highly automated, as the level of precision and accuracy is far superior to human processing. We expect to see the high wage cost nations venturing increasingly into robotics, impacting the sourcing landscape which is currently in favour of EM production. Intelligent factories are likely to gather momentum, the developments in IoT and cloud computing will allow machines to provide a plethora of data which can be analysed through AI and big data analytics. Operations will be in real time and downtime costs can be significantly reduced, management will become increasingly decentralized and the need for labour will be reduced.

In the near term, we are unlikely to see complete automation takeover humans due to technological constraints and CAPEX costs. Sewing systems are still struggling with higher automation, as the fabrics are soft and elastic, but soft robotics and 'Sewbots' are likely to make substantial strides in the coming years. These will be equipped with arms, micromanipulators and vacuum grippers that can accurately guide a cloth through a sewing machine. Companies such as SoftWear Automation are championing this effort. Within the shoe manufacturing industry, robotics have already been used to lower costs and reliance on labour (the upper component of shoes can easily be fused onto the sole by robotic arms). The use of 3D printers can also increase productivity and reduce lead time. It has been cited to reduce fabric wastage by 35%. The technology is still in its infancy, yet it is very promising to note that a garment can be fully produced through printing.



Source: China Sourcing Blog

OPTIMISED INVENTORY MANAGEMENT AND FULFILMENT

Mastering the logistical aspect of the supply chain will also be crucial. Brands are deploying an increased amount of sensors, scanners and cloud based software to track and measure inventory flow. The new business models require speed to market and the back end fulfilment needs adequate technological investment and support. Many firms such as Amazon, Zalando and Zara are heavily invested in fulfilment centres. These are now highly automated and very large sites, typically in rural areas close to large cities. These developments have facilitated the online fashion retail model, and subsequently led to bricks and mortar retail shifting function from essentially a storage site to an area for customer experiences.

We are likely to see a large rise in Radio Frequency Identification Technology (RFID), as these tags are battery free smart stickers that are useful in digital cataloguing. These stickers can be read from some distance preventing the need to manually log items as with barcodes. Macy's is working to get 100% of their stores shifted towards the RFID technology, in order to reduce inventory management costs and better control replenishment cycles. Kroger is utilizing digital price tags in around 200 stores. They aim to have tractability with smartphones facilitating communication between shoppers' lists and the store's inventory. Luxury brands such as Moncler/Ferragamo are also using RFID to reduce counterfeiting and theft as the journey of the inventory can be intricately tracked. Aside from inventory management, the RFID technology can be used in order to enable bespoke multimedia content for shoppers: Burberry buyers can scan the labels through the Burberry app and see various ways to wear and combine purchases. Socially conscious buyers can trace where apparel was manufactured and can acquire additional information on the production process and environmental/social impact. **Zebra Technologies** is heavily involved in this market, developing sensors, lasers, RFID scanners and other real time location equipment which facilitate the development of the effective fashion and textile distribution channels.

Similarly, Blockchain is often touted as transformative through the supply chain: we expect its implementation to be critical in the future. Giving each garment a unique ID or token stored on a decentralized distributed ledger will allow companies to create digital histories of all items in their inventories. This will inject transparency into the manufacturing and distribution process and may be of particular interest for fashion buyers who want to gauge product sustainability. Blockchain can also facilitate fully automated robotic distribution channels, where AI and machine learning can lead to the effective delivery of apparel without the intervention of humans. A few start-ups in the space are **VeChain** and **Provenance**.

Fulfilment business models employed by Amazon have ensured the speed to market of goods has rapidly gathered momentum. Investments in technology which facilitates higher degrees of automation and efficiency in fulfilment will drive competitive advantage for retail and apparel firms. We expect firms which place an emphasis on upstream manufacturing, and forward integration into an extensive distribution and fulfilment business model will reap benefits. Zara has managed to get a leading position in the fast fashion segment.

CLOSE GEOGRAPHIC PROXIMITY TO THE CUSTOMER

Geographically the sourcing dynamics of textiles will change in the near future, as supply chains shorten and the role of automation and robotics shifts emphasis to production near key markets. Historically production was spread across various corners of the world, with China and South East Asia being vital production hubs for the US and European market. However these low cost countries lack the necessary speed to market to cater for the emerging consumer trends. We are likely to see a shift from this production to production near or in Europe and the US. As robotics gains momentum, the high cost scarce labour force will not limit efficient production closer to the end consumer. As emerging economies gain wealth and disposable income, we may see localized production in these regions to cater for the domestic market. This geographic shift will be profound and widespread to traditional value chains.

2 – SUSTAINABILITY

Some of the evils of fast fashion include low quality, low cost manufacturing that engage factories with poor working conditions and utilize potentially hazardous materials. Large amounts of textile waste are also a reality, with polyester microfibers contributing to high levels of plastic waste in our oceans. The US Environmental Protection Agency claims 12.8m tonnes of clothing is sent to landfills annually. The sustainability element of the textile supply chain is vital in terms of the sourcing trends of tomorrow. Indeed, if the new generations of fashion consumers require immediate satisfaction and speed, they are growing more socially conscious at the same time. As political pressure is mounting, research in new material and fibres, recycling and traceability will be key to remaining relevant in the eye of the end client.

NEW TECHNIQUES AND NEW MATERIAL

Conventional cotton and polyester are the most typical fibres in garment composition and these contribute immensely to environmental pollution. Cotton despite being a natural fibre requires a large amount of water, and pesticides used in the process contaminate local food chains (global cotton crop land represents 2.4% of global crop land yet it accounts for 24% of global pesticide sales). Cotton growing techniques and water usage can be improved through programs such as BCI (Better Cotton Initiative) and CMIA (Cotton Made in Africa). Through biotechnology and genetic modifications, cotton can be made to be disease resistant and have higher yields per hectare.
Less polluting fibres like Hemp will require less water and can grow relatively quickly but will need rapid acceptance from end consumers. Innovative non-conventional material like bioengineered leather or citrus juice and grape fibres could also see growth in the near future.

The below table outlines the least impactful fibres (Class A) against the most environmentally impactful ones (Class E):

Environmental effects of some textile fibers

Class-A	Class-B	Class-C	Class-D	Class-E
Recycled Cotton	Tencel®	Conventional Hemp	Virgin polyester	Conventional Cotton
Recycled Nylon	Organic Cotton	Ramie	Polyacrylic	Virgin Nylon
Recycled Polyester	In Conversion Cotton	PLA	Modal®	Rayon
Organic Hemp		Conventional Flax		Bamboo Viscose
Organic Flax				Wool
				Generic Viscose

Source: Pamuk and Illeez, Sustainability in Apparel Production Supply Chain, ISAS 2018

WASTE RECYCLING AND CIRCULAR FASHION

Within the manmade fibre space, polyester can be created from recycled plastics in order to reduce pollution. Polyester is made from crude oil and contributes to plastic accumulation in the oceans. Decomposition is arduous and slow. We expect recycled fibres to become more mainstream. Companies such as Lenzing AG are examining fibres that utilize consumer waste and have a less detrimental impact for the economy, such as the RefibraTM fibre.

Circular fashion business models are becoming popular with brands such as VF and PVH, where they attempt to extend the life cycle of garments and encourage recycling and waste utilization. There is substantial wastage throughout the supply chain, which can be better managed and encompassed into garments.

Recycled fibres are approaching the same quality as virgin fibres, and would help improve overall sustainability at the industry level.

SUSTAINABILITY AND PROFITABILITY

Interestingly, sustainability efforts needn't happen at the expense of profitability. By focusing on the 3 P's (Profit, People and the Planet), this approach can be beneficial for all stakeholders.

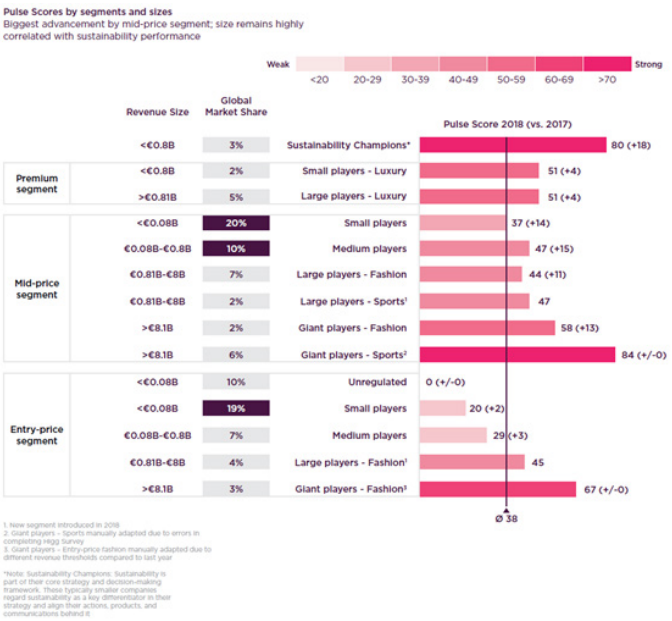
The benefits of circular business models and recycling waste are immense:

- **Reducing cost of purchasing materials.**
- **Minimizing costs of disposal and treatments.**
- **Minimizing environmental impacts by reducing use of new raw materials and producing products from earlier ones.**
- **Textile recycling requires less energy than any other type of recycling.**

Sustainability brings a lot of commercial advantages aside from averting losses associated with systemic failures. We have seen the impact of such failures on names where poor working conditions have led to erosion of brand value and customer boycotts (the 2013 Rana Plaza building collapse in Bangladesh impacted Primark's and Benetton's performance).

Historically, sustainability had been relegated to a 'good to have' as opposed to a 'must have' status, and had mainly been implemented by a few niche luxury players. However, substantial progress has been made recently in the mid-price segment, showing the path for entry price segment companies as well.

The trend is likely to intensify: research by the BCG shows that a scalable approach to sustainability leads to a 1% to 2% EBIT margin improvement along with higher productivity and superior brand image over the medium term.



Source: Global Fashion Agenda, BCG

3 – EXPERIENCE

A more sustainable and socially responsible fashion will increasingly sell online to meet the immediacy needs of the younger generations. But despite the ongoing e-commerce transformation, brands will have to keep investing in their equity by offering a much more immersive commercial experience. Malls will have to adapt as the use of showrooms and pop-up stores becomes more frequent. Retail won't disappear altogether but will have to propose a new experience, filled with Technology and the latest apps, VR/AR in order to connect with customers. Marketing will have to turn towards mass-customisation of items.

MALLS AND STORES 2.0

Physical storage space in malls has been made unnecessary by automated inventory management programs and sales through the internet. But we expect retail space to shift towards an entertainment and store experience purpose as opposed to its inventory depot conventional function.

The shift towards pop up stores and kiosks is likely to remain a prevalent trend as these constitute a good way to engage consumer interest with a lower cost base. Areas with high footfall can increase the D2C (Direct to Consumer) experience without substantially increasing the overhead burden on new young brands. There is also a notion of exclusivity, which plays to the millennial consumer preferences. Finally, D2C reduces the risk of overstocking, as the end consumer is not a middle man and the data gathered is strictly demand driven. We therefore expect small pop up short leases to become increasingly common for retail space, as an extension to a brand's online strategy. In 2012, Bonobos (recently acquired by Walmart) opened the first Guideshop, where customers can experience products in-person instead of just through a screen. The Guideshops function as an uncrowded service hub where customers make appointments, return any past purchases, try on new items, and complete purchases, which then get shipped directly to their homes. Brands like Everlane have also been active in that space, putting social media and online marketing strategies at the core of their business model, but using a small number of outlets to allow for a customised one-to-one shopping experience.

VR, AR AND OTHER TRICKS

Stores will need to act as a medium to build a more interactive connection with consumers. Along with improved instore activities, we see technology such as VR and AR helping improve the general shopping experience. We see VR/AR aiding in the E-commerce process as customers can see the product in a 3D image, along with creating an instore and at home experience associated with the brand. VR fashion shows are already being streamed by Victoria's Secret and Tommy Hilfiger along with other labels.

The dressing room fitting can also be addressed with AR technologies as users can use their phones and AR to gauge the fitting of certain garments (GAP's dressing room app addresses this and the Converse Sampler app allows the user to see different shoe styles on their foot). Instore AR compatible magic mirrors can be used to simulate wearing apparel.

Chatbots utilizing AI can provide channels for marketing and improving customer interaction with the brand: companies such as Louis Vuitton and other luxury brands have used them in order to create a personal shopping experience tailored to each individual. Nike uses AI to provide tailored training regimes and encourage adherence to training programs while products are placed in each proposed scenario and the brand is associated with positive progress.

MASS CUSTOMISATION AND TECH WEAR

To a large extent, the ability for fashion houses to mass-customise garments will help reinforcing customer's experience and attachment to the brand. Several famous names of the high-price segment have already started toying with ways to personalise items. Ralph Lauren, Lacoste, Tommy Hilfiger, Burberry, Gucci or Louis Vuitton will let you add embroidered initials, change elements of colour or design…10 to 20% of the product may typically be personalised. Full customisation isn't generally wanted by customers, who are happy to adhere to the general values of the brand they are buying into. Technology and close factory proximity are making it possible to create and deliver personalised items in a very short period of time, while remaining profitable. Indeed, according to a Deloitte survey in June 2015, one in three consumers were interested in personalised products, with 71 per cent of those prepared to pay a premium for such embellishments. Moreover, focusing on the fashion sector, 25% of those asked were prepared to pay a 20% premium, while 9% were even happy to fork out an extra 50% for customisation.

Finally, the emergence of Tech Wear gives another opportunity to associate a brand with progress and innovation whilst increasing revenues. From embedded electronics allowing a jacket to emit light at night or a pair of shoes to heat up in winter, to stain or smell resistant fabrics, or Personal Health data collection accessories, the possibilities are endless. As designs quickly improve, and cost becomes affordable, acceptance is growing too, and manufacturers like Adidas have been keen to associate themselves with images of Robots assembling almost futuristic trainer shoes as a way to appeal to the Tech Savvy consumers.

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