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Threads and Tech: From Runway Sass to Smart Class – Pierre Bourdieu's Concept of Capital Revisited*

Abstract

This paper delves into the convergence of fashion and technology, commonly referred to as "fashtech", through the analytical framework of Pierre Bourdieu's concept of capital. As the fashion industry embraces technological advancements – from smart textiles and wearable devices to digital platforms and artificial intelligence – the traditional forms of capital outlined by Bourdieu (economic, cultural, social, and symbolic) undergo significant transformation and redefinition. By revisiting Bourdieu's theories, the study examines how fashtech not only reshapes the distribution and accumulation of these capitals but also creates new avenues for their enhancement and expression. For instance, technological innovations enhance cultural capital by enabling innovative design and creative expression, while digital networking platforms expand social capital through enhanced connectivity and influencer ecosystems. Additionally, the integration of technology elevates symbolic capital by redefining brand prestige and consumer identity in a digitally-driven marketplace. Furthermore, the study considers the role of intellectual property (IP), highlighting how IP introduces complexities that are not entirely encompassed by Bourdieu's traditional framework of capital. This analysis highlights the intricate ways in which fashtech influences and is influenced by the various

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forms of capital, offering a comprehensive understanding of power dynamics and status within the modern fashion landscape. Ultimately, the paper contributes to both fashion studies and sociological theory by demonstrating the enduring relevance of Bourdieu's concepts in interpreting the ongoing evolution of the fashion industry in the digital age.

KEYWORDS: IP, Intellectual Capital, Pierre Bourdieu, fashtech, fashion law, fashion tech

1 Introduction

Last decade, any time we would mention fashion and technology as closely related, we would receive startled looks and people ask how it is even possible for these two concepts to become intertwined. And so, in trying to codify the meaning of fashion technology, we arrive at a number of concepts that reveal some fundamental truths, such as that fashion is as old as technology (1), that fashion flourishes only when enabled by technology (2) and, finally and most interestingly, that fashion technology and fashion tech are not quite the same (3). In the introduction, the authors will highlight the scientific attempts to define these terms, as these are often omitted from the argument.[1] This paper sets out to break the new ground of the technological developments in fashion, whether already well established or fledgling initiatives coming soon, along with their social and legal consequences or threats. Many articles detail the importance of introducing social and technological change to fashion, however, these are mainly Internet-derived sources lacking a methodological and systematic approach.

In addition, recent research into theory and empirics emphasizes the importance of Fashion Tech. One cannot deny that Fashion Tech comes with both benefits and hazards.

1 Nirupama Pundir, *Fashion technology: Today and tomorrow* (Mittal Publications, 2007); Pooja Khurana, *Introduction to fashion technology* (Firewall Media, 2007); *Advanced fashion technology and operations management*, ed. Alessandra Vecchi (IGI Global, 2017); Elsayed Ahmed Elnashar, "Philosophy of the Construction Elements of Fashion Elements of Fashion" *Trends in Textile Engineering & Fashion Technology*, 4 (2018); Sabine Seymour, *Fashionable technology: The intersection of design, fashion, science, and technology* (New York: Springer, 2008).

2 Looking Back, Moving Forward

In 2010, *Levi Strauss & Co.* took a bold leap into the future by collaborating with the Forum for the Future initiative, "Action for a ainable World." The result was a set of four dynamic scenarios that dared to paint the fashion industry's path forward in a world grappling with climate change, technological advancement, and evolving consumer values.[2] What seemed like whimsical conjectures at the time now appear more prescient than ever, blurring the lines between speculative fiction and plausible reality.

2.1. Slow is Beautiful – The Age of Deliberate Luxury

Imagine a world where time slows down, and quality reigns supreme. In this low-carbon utopia, buying less is fashionable, and sustainability is the new status symbol. Garments are crafted from organic, natural fibers, emphasizing durability and craftsmanship over disposability. Health-conscious consumers gravitate toward "smart clothes" that monitor well-being, blending style with science.[3]

Handcrafted, vintage, and second-hand apparel is no longer a niche choice but a mainstream statement of eco-conscious sophistication. Digital tracking, through SustainGrade labels and tags, offers unprecedented transparency, revealing every thread's journey from field to fabric. Boutique stores and online platforms replace sprawling fast-fashion outlets, as consumers seek meaning and traceability in their purchases.

2.2. Community Couture – DIY Chic in an Age of Scarcity

In a world shaken by climate upheaval and resource scarcity, self-reliance becomes the new black. Here, do-it-yourself (DIY) fashion is not just a trend but a necessity, taught in schools alongside reading and arithmetic. Rising raw material costs turn new clothing into a luxury, while second-hand markets thrive.

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2 Fiona Bennie, Ivana Gazibara, Vicky Murray, "Fashion Futures 2025: Global scenarios for a sustainable fashion industry" *Forum for the Future* (London, 2010).

3 Nabil Bouazizi, "Green technology in textile industries" *Journal of Textile Science & Fashion Technology*, 8.2 (2021): 1-6; Sarah Scaturro, "Eco-tech fashion: Rationalizing technology in sustainable fashion" *Fashion theory*, 12.4 (2008): 469-488.

Tailors and seamstresses are back in demand, transforming pre-owned pieces into personalized couture. Certified synthetics and virgin materials are reserved for those who can afford them. Traditional retail stores resemble fortified vaults, while black markets and clothing libraries fill the gap for those seeking affordable options.[4] This is fashion redefined by necessity, ingenuity, and community.

2.3. Techno-Chic – Where Science Meets Style

In the techno-chic future, the world is flush with wealth and high-tech wonders. Fabrics are not just materials but marvels of innovation, woven from nano-tech, bio-tech, and sustainable fibers that biodegrade on command. Programmable clothes allow styles to change at the push of a button, making fashion faster, smarter, and surprisingly eco-friendly.[5]

Shopping becomes a virtual affair, thanks to 3D body scanners and interactive mirrors that let consumers to "try on" outfits without ever stepping into a dressing room.[6] Nanotech coatings reduce the need for laundering, keeping clothes fresh and functional for longer. This is fashion at its most futuristic form – fast, customizable, and effortlessly sustainable.

2.4. Patchwork Planet – A Tapestry of Localized Trends

Fragmentation shapes the world of the *Patchwork Planet*, where cultural and regional blocks dictate fashion tastes and practices. Supply chains are dramatically shortened, with fabrics produced and sourced locally to

4 Francesca Bonetti, Patsy Perry, Lee Quinn, "The digital revolution in fashion retailing: examining managerial processes and challenges in the adoption of consumer-facing in-store technology" *20th Annual Conference for the International Foundation of Fashion Technology Institutes*, (2018).

5 K. Srinivasan, et al. "Nanotechnology trends in fashion and textile engineering" *Current Trends in Fashion Technology & Textile Engineering*, 2.3 (2018): 56-59; Chang-Kyu Park, Sung-Min Kim, "Digital convergence in IT and fashion: i-fashion" *Fashion information and technology*, 5 (2008): 54-63.

6 Danmei Sun, Agita Valtasa, "3D printing in modern fashion industry" *Journal of Textile Science and Fashion Technology*, 2.2 (2019); Gill, Sophie, Vazquez, "Enabling"; Arribas, Veronica, José A. Alfaro, "3D technology in fashion: from concept to consumer" *Journal of Fashion Marketing and Management: An International Journal*, 22.2 (2018): 240-251.

reduce environmental impact. Local craftsmanship and cultural heritage influence design, creating distinctive, regional aesthetics.

Online shopping dominates, with personalization options allowing consumers to tailor their clothes digitally before they are even produced. Nanotechnology still plays a role, enhancing fabrics' functionality and longevity. This scenario presents a world where global connectivity coexists with hyper-local identity, stitching together tradition and technology.

When these visions were sketched out in 2010, they might have seemed like ambitious leaps into the unknown. Yet, here we are, inching closer to 2025, and the threads of these scenarios are already weaving into the fabric of our reality. The rise of sustainable fashion, the resurgence of DIY culture, the promise of tech-infused apparel, and the emphasis on local production reflect a world that is adapting, innovating, and rethinking its relationship with fashion.

The question remains: Will consumers fully embrace these futures? If the trajectory holds, the line between science fiction and fashion reality will only continue to blur. And perhaps, just perhaps, those bold statements of the past will transform into the intelligent innovations of tomorrow.

3 Technology

Tailoring has been known to humankind since the Palaeolithic era, or since about 30,000 BC. Of course, the discipline did not originate at that time fully formed, and it took many iterations to produce zips, collars, lapels or even buttons or woven fabric. Therefore, it is no exaggeration to say that the fashion industry could not flourish without technological progress.[7] The Industrial Revolution should be one of the most celebrated watersheds in the history of fashion. The period between 1760 and 1840 witnessed a fierce drive for innovation (including in textiles and garments), moneymaking sweatshops and numerous patent applications securing the intellectual property (IP) interests of business-savvy men. As a full account of inventions in the textile industry is not feasible in this format,

7 Elnashar, Elsayed Ahmed, "A unified fashion technology in trends of textile engineering science 7000Bc in Egypt" *Trends in Textile Engineering and Fashion Technology*, 2.1 (2018): 1-3.

it suffices to say that J. Hargreaves (1764 – Spinning Jenny), Crompton (1779 – Spinning Mule) and Arkwright (1764 – Water Frame) have been described as a "texture triumvirate". This technology was much desired by countries competing in the industrialisation race, which included France and especially the United States. From the cultural and social perspectives, it should be observed that this period of time proved pivotal in popularising fashion and appearance. Never before had "beauty" been simultaneously so adored and so easy to access. If we take the legal perspective, it can be noted that this watershed contributed greatly to a better understanding of the importance of technological improvements, business methods for selling and policies on intellectual property rights. One of the best examples of this transformation was I.M. Singer & Company, which, by 1890, made nearly 90% of the world's sewing machine sales. In the 1970s and 80s, it introduced the world's first electronic and computer-controlled machines, and recently, in 2017, it launched the world's first Sewing Assistant App for sewing help on the go. Singer's success can be attributed to an aggressive trade-in policy and openness to business and technological innovations, including licensing fees, advertising leaflets, long-term relations instead of spot transactions, a free trial system, salesman training on protocols of comportment and dress, etc. In the contemporary world, the above-mentioned simple business strategies are not enough.

Fashion technology should be understood from at least three perspectives. The first views fashion from the broad perspective of technical improvements that developed across the ages, allowing fashion to proliferate. Fashion technology in this sense encompasses sewing techniques, textiles, accessories (including zippers, press-studs etc.) and supply chain. In this sense, fashion and technology overlap and are intertwined, since the former cannot exist without the latter. The second, narrower approach, considers the period of the industrial revolution, that became the corner stone of mass fashion and triggered the use of mass production in the garment segment. Finally, the third relates to the newest developments allowing the fashion industry to market products better and sell them faster and more globally.[8] However, "fashion technology" is most often interpreted based on the first perspective, leading to the coining of the specific term "Fashion Tech" for the third approach.

8 Teddy Seyed, "Technology Meets Fashion: Exploring Wearables, Fashion Tech and Haute Tech Couture" *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems*. 2019.

3.1. Fashion Tech – Digital Tech, Physical Tech, Bio Tech

Fashion Tech receives a lot of publicity in popular (that is, not scholarly) literature and is often defined as a merging of fashion, design and technology.[9] It is, therefore, somewhat confusing because, as mentioned above, fashion and technology have been fused since time immemorial. However, if, in this definition, the term "technology" were to be replaced with "new technology" it would make more sense. Fashion Tech is also defined as any significant digital development in or for fashion.[10] It embraces the newest technical achievements used in business, such as social media, digital and mobile media, e-commerce, augmented reality, wearable technology[11] and 3D printing. Innovative fashion brands capitalise on fitting technology,[12] virtual fitting rooms, and AI-enhanced virtual shopping apps, assisting consumers to tailor and select their preferred size and appearance for apparel. Recently, "fashion tech" was used as a buzzword to additionally encompass innovative technologies used throughout the supply chain.

Fashion Tech has just recently been earmarked as worthy of scientific investigation. It addresses three areas, each of which is divided into three smaller groups of scientific research:

1. digital tech
   a. wearables
   b. circular consumption models
   c. connected supply chain

9 Simeon Gill, Monika Januszkiewicz, Maryam Ahmed, "Digital fashion technology: A review of online fit and sizing" *Digital Manufacturing Technology for Sustainable Anthropometric Apparel* (2022): 135-163; Eun-young Song, Ho-sun Lim, "Perceptions and trends of digital fashion technology-A big data analysis" *Fashion & Textile Research Journal*, 23.3 (2021): 380-389.

10 X.H. Kamilova, X.M. Yunusxodjaeva, Z. Sobirova, "Interaction of fashion industry and information technology. digital and phygital new fashion technology" *Spectrum Journal of Innovation, Reforms and Development*, 3 (2022): 95-98.

11 Sibel Deren Guler, Madeline Gannon, Kate Sicchio, *Crafting wearables: Blending technology with fashion* (New York: Apress, 2016).

12 Sophie Miell, Simeon Gill, Delia Vazquez, "Enabling the digital fashion consumer through fit and sizing technology" *Journal of Global Fashion Marketing*, 9.1 (2018): 9-23.

2. physical tech
   a. 3D solutions
   b. nanomaterials
   c. robotics

3. biological tech
   a. bio-based materials
   b. renewable energy and bioenergy
   c. biomimicry

One of the first to coalesce high fashion and new technology was Diane von Furstenberg, who, in 2013, presented a fashion collection with models wearing Google Glass. Starting with 2015, the H&M Foundation, together with Accenture and KTH Royal Institute of Technology, established Global Change Awards, which were informally labelled Fashion Nobel Prizes. The range of winning projects reveals the substantial amount and level of sophistication of research undertaken for the sake of sustainability in fashion. The advancement of the studies can be exemplified by these innovations, which were awarded prizes between 2016 and 2020:

1. digital tech
   - Tracing Threads (2020): blockchain technology to track and verify the use of sustainable fibres, including sustainable viscose and recycled polyester; each material batch is certified with a twin fibercoin, a digital token that can be linked to a fingerprint, ensuring a unique digital identity for the material that is sustainably produced;
   - The Loop Scoop (2019): a digital system which specifies how each garment choice including material, cut and production affect the planet; the specifications are saved into a digital identity, called a circularity.ID, that can be scanned by consumers to access information about the reuse, updating and recycling of clothes;[13]
   - Scrap Mapper (2016): an online platform where textile remnants from fabric and garment production are mapped, traced and traded;

13 Alessandra Vecchi, "The circular fashion framework-the implementation of the circular economy by the fashion industry" *Current Trends in Fashion Technology & Textile Engineering*, 6.2 (2020): 31-35.

2. physical tech
   - Zero-Waste Tailoring (2020): 3D printed garments can be produced without wasting any resources and can be reused by melting them down into new fabrics again and again;
   - Growing Clothes (2019): clothes that grow with a child (from 9 months to 4 years) inspired by space engineering and the folding techniques of origami;
   - Algorithmic Couture (2019): AI-based system for pattern cutting;

3. bio tech
   - Incredible Cotton (2020): growing high-quality cotton in a lab, instead of on big farms, using less water and no land;
   - Feature Fibres (2020): creating fabrics at the DNA level with natural colors, stretch, durability, waterproofness and other features; the proteins found in coral, jellyfish, sea anemones, turtles, oysters and even cow milk can be used to make biodegradable materials with the desired feature;
   - Zero Sludge (2020): jet engine to separate and clean wastewater to eliminate toxic sludge; toxins are separated into a neat, manageable powder while the clean water is turned into a mist that can be released or reused;
   - Airwear (2020): transforming carbon dioxide into sustainable polyester;
   - Lab Leather (2019): biodegradable lab leather derived from Peruvian flowers and fruits; in the production process it is possible to mimic virtually any desired leather texture, color, toughness and thickness;
   - Crop-A-Porter (2018): bio-textiles obtained from left-overs from the food crop harvest;
   - Smart Stitch (2018): dissolvable thread makes repairing and recycling easier; a piece of clothing can be easily disassembled and the fabric can be used again;
   - Fungi Fashion (2018): textile made from decomposable mushroom roots;
   - Manure Couture (2017): textiles made from cellulose extracted from cow manure.

4 The Evolution of Fashion – From 1.0 to 6.0

Fashion's transformation over the decades reflects a complex interplay of tradition, technology, consumer engagement, and sustainability. Each evolutionary stage offers a unique perspective on how design, production, and commerce intersect. The journey from Fashion 1.0 to Fashion 6.0 highlights the role of key innovations and cultural shifts that define the industry.

4.1. Fashion 1.0 – The Era of Traditional Fashion

Fashion 1.0 represents the pre-digital age, where the industry's foundations were built on the key cities driving global fashion – Paris, Milan, London, and New York – served as the epicenters of creativity and prestige. Paris, with its long-standing reputation as the cradle of haute couture, embodied the highest form of symbol, as seen in the works of Chanel, Dior, and Yves Saint Laurent. Milan, with its craftsmanship-focused ethos, cultivated economic capital through luxury goods from houses like Gucci, Prada, and Versace. London's penchant for youth culture and subversion, represented by designers such as Vivienne Westwood and Alexander McQueen, built on culture, embracing movements like punk and new wave. New York, with its emphasis on practicality and sportswear, harnessed social change through designers like Ralph Lauren, Calvin Klein, and Donna Karan, who redefined American style with accessible luxury.

Retail during this period relied on physical storefronts such as Galeries Lafayette in Paris, Harrods in London, Barneys New York in Manhattan, and La Rinascente in Milan. Collections were unveiled during biannual fashion weeks, adhering strictly to Spring/Summer and Fall/Winter cycles. Shows held at venues like the Grand Palais in Paris, the Metropolitan Museum of Art in New York, the Royal Albert Hall in London, and Palazzo della Permanente in Milan underscored the importance of exclusivity and prestige. Media coverage came from magazines such as "Vogue", "Elle", and "Harper's Bazaar", whose editors like Diana Vreeland, Anna Wintour, and Carmel Snow acted as gatekeepers. The process of producing garments was lengthy, with supply chains dependent on skilled artisans and fabric suppliers, particularly from regions like Lyon for silks, Como for textiles, and Northampton for leather goods.

Consumer participation in this era was largely passive, with trends dictated from the top down. Designers' creative authority went unchallenged,

and the notion of exclusivity was reinforced by limited access to high fashion. Symbolic capital derived from owning a couture piece signified status and refinement, while economic capital fueled the luxury industry's growth. Fashion houses operated with long lead times, placing orders months in advance, leading to significant inventory investments. This era laid the groundwork for the modern industry, emphasizing quality, heritage, and the aura of exclusivity.

4.2. Fashion 2.0 – The Digital Revolution and Fast Fashion

Fashion 2.0 marks the disruption of traditional fashion structures with the advent of internet technology, social media platforms, and e-commerce. The dominance of retail giants like ASOS, Net-a-Porter, and Revolve made fashion more accessible, breaking down geographical barriers. The industry witnessed the meteoric rise of fast fashion brands such as Zara, H&M, and Forever 21, which compressed design-to-store timelines from six months to as little as two weeks. Instead of adhering to fixed seasonal collections, these brands introduced new items continuously, responding to real-time consumer demand. This rapid production model was facilitated by data analytics, enabling companies to monitor purchasing trends and adjust inventory accordingly.[14]

Social media platforms like Instagram, Facebook, and YouTube became essential marketing tools. Influencers such as Chiara Ferragni, Aimee Song, and Bryanboy gained prominence, shifting the power dynamics of trendsetting away from magazine editors and designers. Direct engagement with audiences fostered a more participatory fashion culture, where consumers influenced trends through likes, shares, and comments. Brands capitalized on this dynamic by creating digital-first campaigns and leveraging influencer endorsements to drive sales.

The global supply chain underwent significant changes during this period, with production often outsourced to factories in countries like China, Bangladesh, and Vietnam to reduce costs. While this model democratized fashion by making trends available to a wider audience, it also raised ethical concerns regarding labor practices and environmental sustainability. The sheer volume of clothing produced led to issues of textile

14 Bonetti, Patsy, Lee, "The digital".

waste, pollution, and resource depletion. Despite these challenges, Fashion 2.0 set the stage for a more connected, responsive, and consumer-driven industry.

4.3. Fashion 3.0 – Virtual, Smart, and Sustainable Fashion

Fashion 3.0 introduces the integration of advanced digital technologies such as artificial intelligence (AI), augmented reality (AR), virtual reality (VR), and blockchain.[15] Companies like Stitch Fix utilize AI algorithms to personalize wardrobe selections based on customer data, while Heuritech analyzes social media images to predict trends accurately.[16] AR applications, including Dior's virtual try-on filters and Snapchat's AR lenses, allow consumers to visualize garments on themselves without visiting a store. VR technology enhances fashion shows, with Balenciaga's 2021 Afterworld offering an immersive virtual runway experience that redefined the presentation format.

Blockchain technology supports the creation and ownership of digital fashion assets. Brands like Nike introduced CryptoKicks, blockchain-verified digital sneakers, while Gucci's NFT collections explore the possibilities of digital ownership in the luxury market. Sustainability gains traction with virtual-only fashion houses such as The Fabricant, which create digital garments that exist solely online, reducing the environmental footprint of production.

3D design software like CLO3D and Marvelous Designer streamlines the sampling process, allowing designers to create digital prototypes before committing to physical production.[17] This approach minimizes waste and accelerates the design cycle. Digital fashion blurs the boundaries between the physical and virtual worlds, reflecting a shift towards more sustainable, innovative, and inclusive practices.

15 Yuli Liang, Seung-Hee Lee, Jane Evelyn Workman, "Extending the technology acceptance model to consumer perceptions of fashion AI" *International Textile and Apparel Association Annual Conference Proceedings*, No. 1 (Iowa State University Digital Press, 2018).

16 Pertti Saariluoma, Hanna-Kaisa Alanen, Rebekah Rousi, "Fashion Technology–What Are the Limits of Emerging Technological Design Thinking?." *Human Interaction, Emerging Technologies and Future Applications IV: Proceedings of the 4th International Conference on Human Interaction and Emerging Technologies: Future Applications (IHIET–AI 2021), April 28-30, 2021, Strasbourg, France 4* (Springer International Publishing, 2021).

17 Agita Sun, "3D printing".

4.4. Fashion 4.0 – Smart Manufacturing, Biotechnology, and Wearables

Fashion 4.0 represents the convergence of physical manufacturing, digital innovation, and biological science to create a more efficient, responsive, and sustainable industry. At the heart of this stage is smart manufacturing, enabled by the Internet of Things (IoT) and automation. Factories such as Adidas' Speedfactory (moved from Germany and the U.S. to Asia) exemplify this approach, using robotics and IoT sensors to streamline production processes. These facilities collect real-time data on manufacturing operations, ensuring precise quality control, reducing waste, and speeding up production cycles. Unlike traditional factories, Speedfactory produces customized sneakers locally, eliminating the need for long supply chains and reducing carbon emissions.

Biotechnology is another hallmark of Fashion 4.0. Companies like Bolt Threads have pioneered the development of Mylo™, a mycelium-based leather derived from the root structure of mushrooms. This biofabricated material is used by brands like Stella McCartney, Hermès, and Adidas as a sustainable alternative to animal leather. Meanwhile, Japanese company Spiber produces lab-grown silk by replicating spider silk proteins, providing a cruelty-free and resource-efficient textile. These innovations reflect a shift toward materials that are not only sustainable but also biologically advanced, offering durability and versatility without harming the environment.

Wearable technology continues to evolve, integrating smart functions into everyday clothing.[18] Google Jacquard's collaboration with Levi's resulted in a denim jacket equipped with conductive fibers that allow the wearer to control smartphone functions through gestures. In sportswear, Under Armour and Hexoskin offer smart apparel with embedded sensors that track heart rate, movement, and other biometric data. This technology caters to athletes, health-conscious consumers, and professionals, enhancing performance and providing real-time feedback.[19]

The digital and physical realms merge further with the rise of the metaverse. Brands like Nike and Balenciaga now offer both physical products

18 Seyed, "Technology".

19 Lianne Toussaint, Marina Toeters, "Keeping the data within the garment: Balancing sensing and actuating in fashion technology" *Proceedings of the 2020 ACM Designing Interactive Systems Conference*, (2020).

and their digital twins, which can be worn by avatars in virtual spaces like Decentraland, Roblox, and Fortnite. This seamless integration allows consumers to express their identities across multiple realities, creating new revenue streams and redefining ownership. Fashion 4.0, therefore, represents a sophisticated intersection of efficiency, sustainability, and technological enhancement.

4.5. Fashion 5.0 – Hyper-Personalization and Symbiotic Design

Fashion 5.0 takes personalization to an extreme level, driven by artificial intelligence, neurotechnology, and biometrics to create garments tailored to individual needs, preferences, and even emotional states. Companies like Unspun are leading this movement by offering jeans that are custom-made using 3D body scanning technology. This eliminates the need for standard sizing, reduces returns, and minimizes waste by producing only what is necessary. The level of customization extends beyond fit to include fabrics and design elements chosen specifically for each customer.

Symbiotic design emphasizes a relationship between the garment, the wearer, and the environment. Clothing in this era interacts dynamically with the wearer's body and surroundings. Vollebak's algae-based T-shirt represents this concept by being fully biodegradable and capable of decomposing into nutrient-rich soil. Similarly, researchers are developing fabrics made from photosynthetic algae, which produce oxygen as they are worn. These garments contribute positively to the environment, transforming fashion into a regenerative system rather than a consumptive one.

Neurotechnology introduces another dimension to hyper-personalization. Wearables may soon be equipped with neural interfaces that detect brain signals and respond accordingly. For example, clothing could adjust its texture, temperature, or color based on the wearer's mood or stress levels. Startups like Neuroon and Emotiv are exploring brainwave-sensing headwear, pointing toward a future where apparel can enhance mental well-being. Blockchain technology further supports this decentralized, hyper-personalized future by allowing consumers to co-create,[20] verify,

20 Frances Ross, "Co-creation via digital fashion technology in new business models for premium product innovation: Case-studies in menswear and womenswear adaptation" *Advanced fashion technology and operations management* (IGI Global, 2017), 38-63.

and own unique digital and physical designs. Platforms like Digitalax empower independent designers to collaborate directly with consumers, bypassing traditional retail channels.

The principles of ethical production and inclusivity are integral to Fashion 5.0. This era reflects a commitment to reducing environmental harm, promoting transparency, and ensuring that fashion is accessible and reflective of diverse identities. Hyper-personalization and symbiotic design blur the lines between technology, biology, and personal expression, creating a future where fashion enhances both the individual and the planet.

4.6. Fashion 6.0 – Post-Human and Transhuman Fashion

Fashion 6.0 envisions a speculative future where the boundaries between clothing, identity, and the human body are redefined by post-human and transhumanist concepts. In this era, fashion integrates seamlessly with biology and technology, transforming garments into extensions of the body. Bio-integrated clothing could be grown from the wearer's own DNA or cells, resulting in garments that are biologically unique to each individual. Researchers in fields like synthetic biology and bioengineering are exploring the potential for creating fabrics that mimic the body's properties, such as skin-like materials that heal themselves when torn.

Quantum technology offers the potential for revolutionary advancements in materials science. Fabrics designed with quantum dots or programmable fibers could change their color, texture, or function instantaneously. This level of customization would allow wearers to adapt their clothing to different environments or social contexts without changing garments. The development of quantum computing may also enable instantaneous design processes, where consumers can create and visualize custom clothing in real time.

The convergence of digital and physical identities reaches its zenith in Fashion 6.0. Individuals can seamlessly transition between virtual avatars and physical forms, wearing garments that exist in both realms simultaneously. In virtual environments like Decentraland, The Sandbox, and Meta's Horizon Worlds, digital fashion becomes an essential aspect of personal identity. Brands are already exploring this space; for instance, Ralph Lauren and Balenciaga have released digital collections for gaming platforms, hinting at a future where virtual fashion holds the same cultural significance as physical fashion.

Another frontier in this evolution is self-aware fabrics. These textiles, equipped with artificial intelligence, could interact with the wearer on an emotional and cognitive level. For example, a garment might sense anxiety and provide calming vibrations or adjust its fit to enhance comfort. While still speculative, these innovations challenge traditional notions of what clothing can achieve, turning fashion into a tool for personal enhancement and well-being.

Fashion 6.0 ultimately transcends current definitions of clothing, blending technology, biology, and identity to create a world where fashion is fluid, adaptive, and deeply integrated with the human experience.

5 The Interplay of Cultural, Social, Economic, and Symbolic Capital in Fashion

Introduction

Fashion is an intricate system that both reflects and reinforces social stratification, serving as a key vehicle for expressing identity, prestige, and power. Pierre Bourdieu's theory of capital – encompassing cultural, social, economic, and symbolic capital – offers a comprehensive framework for understanding these dynamics within the fashion industry.[21] These forms of capital do not exist in isolation; rather, they intersect, influencing the ways designers, consumers, and brands achieve and maintain status. By applying Bourdieu's insights, we can analyse the mechanisms through which fashion shapes society and perpetuates systems of privilege.

21 Pierre Bourdieu, "The forms of capital", [in:] *The sociology of economic life*. (London: Routledge, 2018), 78-92; Pierre Bourdieu, "The forms of capital.(1986)" *Cultural theory: An anthology*, 1.81-93 (2011): 949; Pierre Bourdieu, Loïc Wacquant, "Symbolic capital and social classes" *Journal of classical sociology*, 13.2 (2013): 292-302; Grace Ramsey, "Cultural Capital Theory Of Pierre Bourdieu" *Simply Sociology. Päivitettävä verkkosivusto. Päivitetty*, 25 (2023): 2023; Pierre Bourdieu, *Medytacje pascaliańskie*, trans. Krzysztof Wakar (Warszawa: Oficyna Naukowa, 2006); Pierre Bourdieu, *Rozum praktyczny. O teorii działania*, trans. Joanna Stryjczyk (Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego, 2009); Pierre Bourdieu, „The Force of Law. Toward a Sociology of the Juridical Field" *The Hastings Law Journal*, 38 (1987).

5.1. Cultural Capital – The Language of Fashion Expertise

Cultural capital in fashion is manifested through the accumulation of knowledge, skills and training that enable individuals to navigate the fashion system with fluency. For example, an experienced fashion editor at Vogue might have an encyclopaedic understanding of 20th-century couture, including the revolutionary impact of Christian Dior's New Look in 1947 and the minimalist aesthetic pioneered by Jil Sander in the 1990s. This knowledge distinguishes the editor from a casual observer and enhances her ability to critically interpret collections and set trends.

In the world of fashion design, embodied cultural capital is exemplified by the nuanced techniques mastered by graduates of elite institutions such as Central Saint Martins or the Royal College of Art in London. A designer who can effortlessly integrate historical references – like Alexander McQueen's recurring themes of Gothic Romanticism and British history – into their work displays a depth of cultural capital that elevates their status. Objectified cultural capital in this context is the possession of artifacts like a *Yves Saint Laurent Mondrian Dress* from 1965 or an original *Issey Miyake pleated piece*, each representing milestones in fashion history that can only be fully appreciated by those with the requisite cultural literacy.

Institutionalised cultural capital comes into play when a designer's training is validated by diplomas from prestigious schools. For example, Phoebe Philo's status as a graduate of Central Saint Martins became a crucial component of her credibility in her rise to creative leadership at Céline. Such credentials are not just educational markers; they act as gatekeepers, reinforcing hierarchies within the industry and granting access to exclusive platforms and resources.

5.2. Social Capital – The Fabric of Fashion Networks

Social capital in fashion is the product of networks, relationships, and affiliations that confer advantages and facilitate upward mobility. The fashion industry thrives on interconnectedness, and success often depends on who one knows rather than solely on talent. The career of designer Virgil Abloh illustrates this principle vividly. His early collaboration with Kanye West and connections within the hip-hop and streetwear communities enabled him to transition from his brand, *Off-White*, to becoming the first

Black artistic director of *Louis Vuitton*'s menswear line. This rise was not just the result of design acumen, but was deeply rooted in social alliances and visibility in influential circles.

Events like the *Met Gala* or *Paris Fashion Week* are quintessential spaces where social capital is accumulated and exchanged. Being seen alongside influential figures like Anna Wintour or Edward Enninful can open doors that remain closed to outsiders. For models, attending exclusive parties hosted by brands such as *Balmain* or *Dolce & Gabbana* often leads to casting opportunities, as proximity to decision-makers translates into professional advantages.

Fashion PR firms, such as *KCD* or *The Communications Store*, leverage their social capital to ensure that their clients – whether designers or celebrities – receive maximum exposure. Relationships with editors at *Harper's Bazaar* or influencers like Chiara Ferragni create pathways to visibility, demonstrating how social capital lubricates the machinery of fashion promotion and success.

5.3. Economic Capital – The Currency of Fashion Influence

Economic capital underpins every facet of the fashion industry, determining who participates, who leads, and who consumes. The creation of a haute couture collection, such as those presented by *Chanel* or *Christian Dior*, requires immense financial resources. Initially co-founded and financially backed by Coco Chanel and Pierre Wertheimer, Chanel continues to be privately owned by the Wertheimer family today. Conversely, Christian Dior, established by Marcel Bouac, is now owned by the LVMH Group, providing both fashion houses with the immense financial resources required to create their esteemed haute couture collections. The elaborate craftsmanship, which might involve thousands of hours of handwork, is sustained by the economic power of conglomerates like *LVMH* and *Kering*. These entities, led by figures like Bernard Arnault and François-Henri Pinault, wield unparalleled economic influence, dictating market trends and the fortunes of smaller fashion houses.

For consumers, the ability to purchase items from luxury brands signifies economic capital. A client who regularly shops at *Hermès* or commissions bespoke suits from *Savile Row* tailors demonstrates their financial status through conspicuous consumption. This purchasing power is further amplified through access to exclusive services, such as *Louis Vuitton's* VIP

personalization programs or *Gucci's* custom-order ateliers. Economic capital also extends to the realm of investment; for instance, the resurgence of *Balenciaga* under Demna Gvasalia was fueled by significant financial backing from Kering, demonstrating how economic resources shape creative outcomes.

5.4. Symbolic Capital – The Illusive Power of Prestige

Symbolic capital in fashion is the intangible currency of prestige, honor, and legitimacy. It represents the culmination of cultural, social, and economic capital but transcends them by bestowing lasting influence and authority. Designers like Karl Lagerfeld achieved symbolic capital not merely through design talent but through decades of consistent innovation, celebrity associations, and cultural commentary. His tenure at *Chanel* transformed him into a cultural icon whose mere approval could elevate a model or collection to legendary status.

Awards and accolades serve as institutional markers of symbolic capital. The *CFDA Fashion Awards* or the *LVMH Prize for Young Fashion Designers* signal not only talent but recognition by the industry elite. For example, Jonathan Anderson's multiple awards from the British Fashion Council cemented his status as a visionary, enhancing the prestige of his brand, *JW Anderson*, and his role at *Loewe*.

Symbolic capital also attaches itself to brands with storied histories. The aura surrounding *Maison Margiela*, for instance, is not based solely on its avant-garde designs but on its founder's mysterious persona and commitment to anonymity. Similarly, *Prada*'s intellectual branding – referencing art, architecture, and politics – has given it symbolic capital that transcends mere luxury.

Table 1. Key features and examples in fashion for types of capital

Type of Capital	Key Features	Examples in Fashion
Cultural	Knowledge, skills, education, and taste	Understanding fashion history, holding a degree from Central Saint Martins, owning a rare *Yves Saint Laurent Mondrian Dress*
Social	Networks, relationships, and affiliations	Attending Paris Fashion Week, collaborating with celebrities like Kanye West, being part of alumni networks from Parsons

Type of Capital	Key Features	Examples in Fashion
Economic	Financial resources and assets	Owning a *Hermès Birkin Bag*, investing in *LVMH* stock, commissioning bespoke tailoring from *Savile Row*
Symbolic	Prestige, recognition, and social honor	Winning a *CFDA Fashion Award*, being an iconic designer like *Coco Chanel*, having a prestigious family name like *Gucci*

6 Evolution of Fashion – From 1.0 to 6.0 via Bourdieu's Capitals

1. Cultural Capital:
   Refers to the knowledge, skills, and creative practices that define each stage's innovations:
   - Fashion 1.0: The tradition of haute couture and artisanal craftsmanship.
   - Fashion 2.0: The rise of influencer culture and digital content creation.
   - Fashion 3.0: Innovations in virtual fashion, digital-only designs, and AR/VR experiences.
   - Fashion 4.0: The integration of sustainable and biotech-driven design principles.
   - Fashion 5.0: Personalized design through AI, neurotechnology, and symbiotic fashion.
   - Fashion 6.0: Exploration of transhuman and post-human design concepts.

2. Social Capital:
   Represents the networks, relationships, and communities shaping each stage:
   - Fashion 1.0: Elite fashion circles, runway audiences, and exclusive clientele.
   - Fashion 2.0: Digital communities, influencer networks, and online engagement.

- Fashion 3.0: Virtual communities, blockchain networks, and metaverse users.
- Fashion 4.0: Ethical and sustainable fashion collectives.
- Fashion 5.0: Inclusive design networks promoting ethical and personalized fashion.
- Fashion 6.0: Communities exploring post-human identity and technological enhancement.

3. Economic Capital:
   Focuses on the financial and operational systems driving each stage:
   - Fashion 1.0: Luxury brands and high-end retail establishments.
   - Fashion 2.0: Fast-fashion brands and large-scale e-commerce.
   - Fashion 3.0: Tech-integrated luxury markets and digital commerce platforms.
   - Fashion 4.0: IoT-driven smart manufacturing and biofabricated materials.
   - Fashion 5.0: Custom production models and decentralized fashion platforms.
   - Fashion 6.0: Advanced technologies such as quantum computing and bio-integrated materials.

4. Symbolic Capital:
   Represents the prestige, status, and symbolic value associated with each stage:
   - Fashion 1.0: The prestige of haute couture and traditional luxury.
   - Fashion 2.0: The democratization of trends through influencers and social media.
   - Fashion 3.0: The value of NFTs and digital ownership in virtual spaces.
   - Fashion 4.0: The prestige of wearables and smart textiles blending fashion and tech.
   - Fashion 5.0: The ethical and regenerative symbolism of sustainable fashion.
   - Fashion 6.0: The transformative potential of AI-driven and post-human design.

Table 2. The Evolution of Fashion 1.0 to 6.0

Stage	Focus	Key Innovations	Capitals	Specific Examples
Fashion 1.0	Traditional fashion, exclusivity, seasonal cycles	Brick-and-mortar stores, linear supply chains, top-down communication, seasonal collections	**Cultural Capital:** Haute Couture Craftsmanship; **Social Capital:** Elite Networks; **Economic Capital:** Luxury Brands; **Symbolic Capital:** Prestige and Tradition	Chanel haute couture, Dior's "New Look" (1947), Paris Fashion Week, Harrods, Barneys New York
Fashion 2.0	Digital revolution, fast fashion, influencer-driven trends	E-commerce, social media, fast fashion production, influencer marketing, data analytics	**Cultural Capital:** Influencer Platforms; **Social Capital:** Digital Communities; **Economic Capital:** Fast Fashion Brands; **Symbolic Capital:** Democratized Trends	ASOS, Net-a-Porter, Zara's 2-week production cycle, Chiara Ferragni, H&M, Instagram marketing
Fashion 3.0	Virtual fashion, smart tech, and sustainable design	AI-powered personalization, AR/VR try-ons, blockchain, NFTs, digital-only fashion, 3D design	**Cultural Capital:** Digital Fashion Innovation; **Social Capital:** Virtual Networks; **Economic Capital:** Tech-Integrated Luxury; **Symbolic Capital:**NFTs and Digital Ownership	Balenciaga VR show (2021), Gucci's NFT collections, The Fabricant, Stitch Fix AI personalization, Dior AR
Fashion 4.0	Smart manufacturing, biotechnology, and wearable technology	IoT-enabled factories, biofabricated materials, wearables, metaverse integration	**Cultural Capital:** Sustainable Innovation; **Social Capital:** Ethical Communities; **Economic Capital:** IoT Factories; **Symbolic Capital:** Wearables and Smart Textiles	Adidas Speedfactory, Bolt Threads Mylo™, Google Jacquard x Levi's smart jacket, Spiber lab-grown silk
Fashion 5.0	Hyper-personalization, human-centric design, and symbiotic sustainability	AI personalization, neurotech, regenerative design, decentralized blockchain platforms	**Cultural Capital:** Symbiotic Tech Design; **Social Capital:** Inclusive Design Networks; **Economic Capital:** Custom Production; **Symbolic Capital:**Regenerative and Ethical Fashion	Unspun 3D-scanned jeans, Vollebak algae T-shirt, Digitalax decentralized design platform
Fashion 6.0	Post-human fashion, transhumanism, and identity transformation	Bio-integrated clothing, quantum materials, digital-physical hybridization, self-aware AI textiles	**Cultural Capital:** Transhuman Identity Exploration; **Social Capital:** Post-Human Communities; **Economic Capital:**Quantum Technology; **Symbolic Capital:**AI-Driven Adaptive Design	Hypothetical DNA-grown garments, Nike Cryptokicks, Ralph Lauren virtual collections, AI-driven adaptive fabrics

7 The Transformation of Capitals in Fashion 3.0 to 6.0 – A Discussion

In the context of fashion's evolving landscape, the forms of capital described by Pierre Bourdieu – cultural, social, economic, and symbolic – are undergoing significant transformations as the industry shifts from Fashion 3.0 to Fashion 6.0. These phases reflect the movement from traditional practices to more innovative, technology-driven, and socially conscious models, where digitalization, sustainability, and inclusion reshape the meanings and applications of these types of capital.

7.1. Cultural Capital in the Era of Digital Fashion

In the transition from Fashion 3.0 to 6.0, cultural capital is no longer confined to traditional knowledge of historical design houses or physical craftsmanship. The rise of digital fashion and virtual garments demands new forms of expertise, such as understanding 3D design software like CLO3D or Blender. Creators who can master the digital craftsmanship of virtual garments – like the designs produced by The Fabricant or DressX – now hold elevated cultural capital within the industry.[22]

Moreover, cultural capital in the form of knowledge is increasingly democratized. Platforms like TikTok and YouTube allow users to disseminate fashion insights and historical context, previously exclusive to insiders. Fashion enthusiasts, such as HauteLeMode or Blake Gopnik, are building cultural capital by breaking down haute couture shows or contextualizing trends for a broader audience. As fashion becomes more phygital (physical + digital), the ability to navigate both real-world and virtual aesthetics becomes a new hallmark of cultural distinction.

22 Sun, "3D printing"; Alyson Vanderploeg, Seung-Eun Lee, Michael Mamp, "The application of 3D printing technology in the fashion industry" *International Journal of Fashion Design, Technology and Education*, 10.2 (2017): 170-179.

7.2. Social Capital in the Age of Social Media and NFTs

Social capital in Fashion 3.0 revolved primarily around in-person events, exclusive fashion shows, and face-to-face networking within elite circles. However, in the era of Fashion 6.0, social capital transcends physical boundaries through social media platforms, virtual communities, and blockchain networks. Platforms like Instagram, TikTok, and Twitter Spaces offer new avenues for connection and collaboration, where followers, shares, and engagement rates define influence.

Digital-native brands like Telfar and MSCHF have leveraged online communities to build immense social capital without relying on traditional gatekeepers. The rise of NFTs (non-fungible tokens) in fashion introduces new networks where designers and collectors collaborate directly, bypassing conventional hierarchies. Social capital now thrives in decentralized spaces like Discord channels dedicated to NFT drops or Metaverse Fashion Weeks hosted by platforms such as Decentraland.

7.3. Economic Capital in the Sustainable and Digital Economy

Economic capital in Fashion 3.0 was traditionally rooted in material consumption, where ownership of physical luxury goods from houses like Louis Vuitton or Chanel signified wealth. In Fashion 6.0, economic capital is expressed through both sustainable investments and digital assets. As environmental consciousness grows, purchasing decisions are increasingly evaluated on their sustainability credentials. Brands like Stella McCartney and Patagonia have redefined the meaning of luxury by aligning economic capital with ethical and eco-conscious values.

Simultaneously, the digital economy enables new forms of wealth creation. Investing in digital wearables, virtual skinsfor gaming platforms like Fortnite, or NFT fashion collectibles represents a modern expression of economic capital. High-value transactions in platforms like OpenSea or Rarible for virtual garments underscore how digital assets can match – or even surpass – the prestige of physical luxury goods.

7.4. Symbolic Capital in the Pursuit of Inclusion and Authenticity

Symbolic capital in Fashion 3.0 was traditionally monopolized by heritage brands and celebrated designers, whose prestige was rooted in legacy and exclusivity. Moving toward Fashion 6.0, the markers of symbolic capital are shifting toward inclusion, authenticity, and social responsibility. Brands that champion diversity and engage meaningfully with social causes – like Pyer Moss or Fenty – gain symbolic capital by aligning their prestige with progressive values.

The notion of symbolic capital now extends to individuals and collectives who challenge the status quo. Figures like Aurora James (founder of the 15 Percent Pledge) and activists advocating for fair labor practices have redefined what it means to possess influence and legitimacy in fashion. Authentic storytelling, transparency, and cultural sensitivity are becoming key drivers of symbolic capital, eclipsing traditional markers of prestige.

8 Intellectual Property Rights and Capital Dynamics in Fashion Profitability – A Discussion and Conclusion

In Fashion 6.0, intellectual property (IP) rights are fundamental to protecting and monetizing a brand's unique creations[23], yet they alone do not ensure profitability. The integration of Pierre Bourdieu's capitals – cultural, social, economic, and symbolic – provides a comprehensive framework for understanding the multifaceted drivers of success in the modern fashion industry.[24]

IP rights safeguard a brand's distinctive designs, trademarks, and innovations, preventing imitation and maintaining exclusivity. This legal protection is essential for preserving a brand's competitive edge and enabling revenue generation through licensing, collaborations, and exclusive releases. However, the true profitability of a fashion brand emerges from

23 Cf. John Palfrey, *Intellectual property strategy* (Boston: MIT Press, 2011).

24 Clara Eloise Fernandes, "Fashion design entrepreneurship: Skills and solutions to create a fashion business" *Journal of Textile Science & Fashion Technology*, 3.1 (2019): 1-10.

how these IP rights interact with other forms of capital. Cultural capital, encompassing expertise in digital design and sustainable practices, allows brands to innovate and create products that resonate with contemporary consumers. Brands like The Fabricant leverage their cultural capital by mastering digital garment creation, which IP rights then protect and monetize through virtual fashion markets.

Social capital amplifies the value of IP by fostering robust networks and communities. Brands that engage effectively on social media and build strong online communities, such as Telfar and MSCHF, enhance their IP-protected assets' visibility and desirability. These connections facilitate collaborations and create loyal customer bases that drive sales and brand loyalty. Additionally, social capital supports the enforcement of IP rights through community advocacy, reducing the risk of infringement and strengthening brand integrity.

Economic capital in Fashion 6.0 extends beyond traditional sales of physical goods to include sustainable and digital investments. IP rights enable brands to diversify their revenue streams by protecting eco-friendly innovations and digital assets like NFTs and virtual wearables. This diversification not only mitigates the risks associated with physical markets but also taps into emerging digital economies, enhancing overall profitability. Brands such as Stella McCartney exemplify this by integrating sustainability with strong IP protection, attracting ethically conscious consumers and investors.

Symbolic capital, reflecting a brand's prestige and reputation, is significantly bolstered by IP rights. Protecting unique designs and brand narratives reinforces authenticity and exclusivity, key factors in building a prestigious brand image. Brands committed to inclusion and social responsibility, like Fenty, leverage their IP to communicate their values, thereby enhancing their symbolic capital. This alignment fosters deeper emotional connections with consumers, driving loyalty and differentiating the brand in a crowded marketplace.

The synergy between IP rights and Bourdieu's capitals creates a resilient and dynamic foundation for profitability. IP provides the necessary legal framework to protect and monetize creative assets, while cultural capital drives innovation, social capital expands reach and engagement, economic capital diversifies revenue, and symbolic capital builds a prestigious brand identity. Together, these elements ensure that fashion brands can navigate the complexities of Fashion 6.0, achieving sustained profitability and a strong market presence.

In conclusion, while intellectual property rights are crucial for safeguarding and monetizing a fashion brand's unique assets, true profitability in the modern fashion landscape requires a strategic integration with cultural, social, economic, and symbolic capitals. This holistic approach enables brands to innovate, engage, diversify, and build prestigious identities, ensuring long-term success beyond the protection of intellectual property alone.

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