

## New Thinking about Blockchain in the Fashion Industry

Xingqiu Lou, Washington State University  
Trevor J. Little, North Carolina State University

Keywords: blockchain, design and development, technology

Blockchain is a relatively new and emerging technology that can be considered as a digital, decentralized and distributed public ledger that records data, tracks transactions and updates information (Greene & Longobucco, 2018). Its origins can be traced back to 1991, when Haber and Stornetta published the paper “How to time-stamp a digital document” (Haber & Stornetta, 1991). Blockchain was first successfully implemented in 2009 through “Bitcoin”, a cryptocurrency and digital payment system. Since then, it has grown in popularity and opened a wide range of new possibilities in various industries (Chakrabarti & Chaudhuri, 2017). Blockchain technology offers a system of recording information in a way that makes it nearly impossible to alter or hack. While blockchain finds many applications related to sustainability and transparency, the view expressed in this paper more relates to product attribute information.

The blockchain consists of a chain of information blocks. The first block is known as the genesis block. Each block has two parts: header and body. The body of the block contains the list of transactions. The block header contains various fields, including the set of rules that should be followed for validation, a hash of the previous block header, a timestamp and the Merkle tree root hash that represents the hash value of all the transactions in the block (Zheng et al., 2018). Information such as the timestamp (the time of the transaction) and hash (the identity of the block) are calculated and stored in the header part, while all the transaction information is stored in the body. The hash is a function that converts input (transaction information) into an encrypted output. The beauty of the blockchain is that all the transaction information will be hashed altogether as a unique identity of the block. Each party on a blockchain has access to all the information, and no single person or entity controls a blockchain.

One of the major applications of blockchain in the fashion industry is in supply chain management, including transparency and traceability, product authentication and inventory management (Hanson, 2018). Combined with radio frequency identification technology, which has already been used in many companies, blockchain technology helps track the finished product from the beginning of product lifecycle all the way through the distribution chain until the product reaches the consumer. Due to the structure of blockchain, this information cannot be altered, lost or destroyed. The information saved in the blockchain is visible to all stakeholders, including consumers, retailers and suppliers. These stakeholders can see the product source and process, which reduces the possibility that products are counterfeits (Chakrabarti & Chaudhuri, 2017).

The concept of blockchain technology is already starting to be applied in the fashion industry. Designer Martine Jarlgaard collaborated with Provenance, a supply chain transparency company, and presented her blockchain-tracked garments at the Copenhagen Fashion Summit in

2017 as the first fashion company using blockchain technology (Beckwith, 2018). Her garments came with a tag with a QR code that could be scanned with a mobile phone to access a full history of the supply chain behind each garment. In 2019, LMVH launched the AURA platform with Microsoft and blockchain software company ConsenSys. Several brands of LMVH, including Louis Vuitton and Parfums Christian Dior, enable their consumers to access the product history and proof of authenticity of luxury goods using blockchain technology.

The application of blockchain in the fashion industry will bring many changes. It has the capacity to boost efficiency and bridge the gap between suppliers and brands. Using this technology to track and trace products from raw materials to their end consumption can not only enable full visibility of the fashion supply chain, but also maintain consistent data for all suppliers across the supply chain. This research developed a blockchain model to map out the future fashion supply chain from a product attribute perspective. As presented in Figure 1, the blockchain model consists of one genesis block and five blocks.

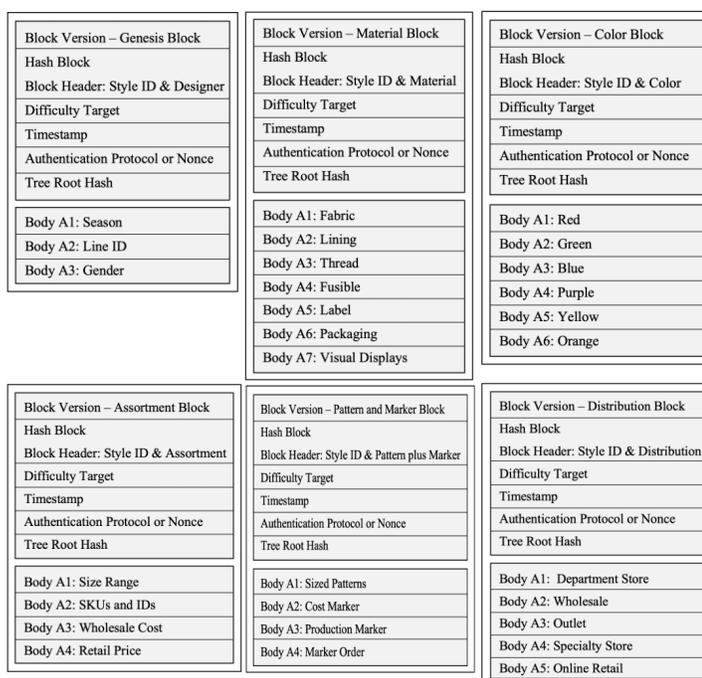


Figure 1. Proposed blockchain model for the future fashion supply chain

While the blocks used in this paper represent only a portion of the total blocks that can be created, the application of blockchain brings a new level of traceability and transparency to the fashion complex. Blockchain will find its way into design and development since many aspects of design and development are fixed early in the process, which is a significant attribute for blockchain. Furthermore, blockchain affords the opportunity to identify people along the way, which is a feature that is not part of today's systematic approach to design and development. Since 80% of design and development is responsible for the subsequent supply chains, there will be an increasing emphasis of blockchain on design and development since it determines many aspects of the supply chain.

---

## References

- Beckwith, C. (2018). Fashion Blockchain startups-A survey of players in the field, Q1 2018. <https://medium.com/@fashiontechguru/fashion-Blockchain-startups-a-survey-of-players-in-the-field-q1-2018-36727660bb14>
- Chakrabarti, A., & Chaudhuri, A. K. (2017). Blockchain and its Scope in Retail. *International Research Journal of Engineering and Technology*, 4(7), 3053–3056.
- Greene, J. H., & Longobucco, A. M. (2018). What is blockchain and what can it do for the fashion industry? <http://www.thefashionlaw.com/home/what-is-blockchain-and-what-can-it-do-for-the-fashion-industry>
- Haber, S., & Stornetta, W. (1991). How to Time-Stamp a Digital Document. In A. J. Menezes & S. A. Vanstone (Eds.), *Conference on the Theory and Application of Cryptography: CRYPTO 1990: Advances in Cryptology-CRYPTO' 90* (pp. 437–455). Springer.
- Hanson, L. (2018). Why Retailers Should Embrace The Blockchain. <https://www.whichplm.com/why-retailers-should-embrace-the-Blockchain/>
- Zheng, Z., Xie, S., Dai, H. N., Chen, X., & Wang, H. (2018). Blockchain challenges and opportunities: A survey. *International Journal of Web and Grid Services*, 14(4), 352–375.