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Jean Noonan, Patrick Doran

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Blockchain's Impact on Consumer's Perspective in the Luxury Fashion Industry: A Position Paper

Jean Noonan¹ and Patrick Doran²

¹ Technological University Dublin, Ireland

Abstract. Blockchain technology presents an opportunity for industries to implement for a more transparent and sustainable business model. The fashion industry is notoriously known for its complex and opaque supply chain and its negative impact on the environment and the people involved in the processes along the fashion supply chain. To address these long-standing challenges, the integration of blockchain technology has the ability to be the solution towards an ethical supply chain network. The study contributes to the current state of the fashion supply chain and the challenges it faces, outlining what blockchain technology is and its benefits in the context of the fashion industry. It also captures consumer sentiment on the subject of sustainability and transparency in the fashion industry and the perceived use and adoption of technology.

Keywords: Blockchain Technology, Fashion Supply Chain, Transparency, Sustainability, Ethical Supply Chain Management.

1. First Section

1.1. Introduction

The thesis is concerned with the implementation of blockchain technology and how it impacts the consumer's perspective on the luxury fashion industry. Consumers, retailers and all other stakeholders along the supply chain have their own definition of trust. Blockchain technology can verify the claims of the stakeholders throughout the blockchain. The blockchain is shaped by its users. It encourages trust from all stakeholders as it holds everyone accountable for their claims which could hinder their reputation if they are not telling the truth; the system is designed for good behaviour, which is a key characteristic.

The fashion supply chain is a complex and opaque network with a variety of people and processes both domestically and globally. The fashion industry contributes negatively to the environment and people along the supply chain, from the chemicals used at the raw material stage to the welfare of the factory workers and the conditions that they work in. The fashion supply chain can often lead to misleading information for the consumers and retailers about where the garments are produced.

The fashion industry has long-standing issues that must be resolved to gain consumer's trust and build brand loyalty. This is where blockchain technology can offer a solution. Blockchain technology has been touted as having the potential to solve the problem of achieving end-to-end transparency. It is an increasingly popular networking technology for streamlining business processes that uses a peer-to-peer (P2P) network to verify and share data (Cole, Stevenson and Aitken, 2019). It is represented as a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network ("What is Blockchain Technology? - IBM Blockchain", n.d.). Blockchain is a secure and seamless method of exchanging data between two entities on an open ledger, which has the ability to enhance a brand's supply chain and give full transparency and traceability of a product lifecycle to both consumers and retailers.

As blockchain technology in the context of the fashion industry is a relatively new area of research, this study will take a quantitative approach by surveying consumers in the luxury fashion industry on how the adoption and implementation of blockchain technology along the fashion supply chain can create transparency and sustainability.

1.2 Overview of Research Question and Research Objectives

The aim of this research is to analyse how the integration of blockchain technology impacts the consumer perspective of the luxury fashion industry. Using quantitative research methods to carry out this research aim and identifying the following objectives.

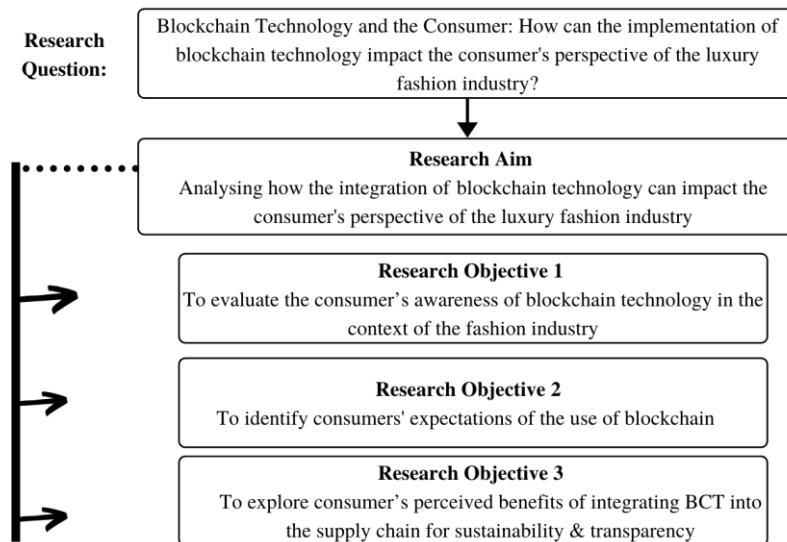


Fig. 1. Research Question and Research Objectives

1.3 The Research Question

This thesis explores the impact of the implementation of blockchain technology on the consumer's perspective in the luxury fashion industry.

Blockchain is a digital database containing information that can be simultaneously used and shared within a large decentralised, publicly accessible network ("Definition of Blockchain", n.d.). It is an emerging technology that is impacting how industries and people see the journey of a product along the supply chain. Blockchain technology has become an area of relevance in recent years with a growing interest in mainstream media and in academic literature across a number of industries, including the fashion industry.

The research question of this paper is: How can the implementation of blockchain technology impact the consumer's perspective of the luxury fashion industry.

1.4 Research Objectives and Rationale

Research Objective 1:

To evaluate the consumer's awareness of blockchain technology in the context of the fashion industry.

Rationale: This research objective will be carried out using a quantitative approach by conducting surveys with luxury consumers to identify their awareness of blockchain technology and the potential impact it can have in the fashion industry by gaining an insight into where their clothes are coming from and who made them.

Research Objective 2:

To identify consumers' expectations of the use of blockchain technology.

Rationale: This research objective will be investigated with a quantitative approach by conducting a survey with luxury consumers to investigate their perceived usefulness of blockchain technology and their attitude towards using this technology to access information about their luxury garment. According to Fred Davis, the Technology Acceptance Model (TAM) explains a users' acceptance of technologies and tests two specific beliefs: Perceived Usefulness (PU); the likelihood of using the technology and how it can improve his/her action and Perceived Ease of Use (PEU) refers to the potential user expects the technology to be effortless. These beliefs can be influenced by external factors in TAM (Lai, 2017).

Research Objective 3:

To explore consumer's perceived benefits of integrating blockchain technology into the supply chain for a more sustainable & transparent environment.

Rationale: Blockchain technology can help boost consumer confidence through its transparent nature. This research objective will be carried out using a quantitative approach by surveying consumers in the luxury fashion industry by using a drop-down menu of questions where they can select the benefits they believe blockchain can have.

The following section will outline the current state of the fashion supply chain industry, outline what blockchain technology is and its benefits. It also provides examples of the implementation of blockchain technology with transparent and ethical transactions in an inclusive fashion industry for all stakeholders along the supply chain.

2. Second Section

2.1 The Fashion Supply Chain

As the fashion industry accelerates and continues to have a negative impact on the welfare of workers along the supply chain and on the environment, consumers are becoming more aware of their consumption habits. While Millennials and Generation Z consumers are driving 85 percent of the global luxury sales growth (Oakes, n.d.), the luxury fashion industry is becoming increasingly conscious of sustainability across the supply chain.

One possible way to prove authenticity and integrity of a brand's products can be achieved through the implementation of blockchain technology. It can address long-standing industry challenges in the fashion industry and create trust as it discloses information to consumers such as where the item was made, who made it and whether workers were paid a fair wage and the conditions in which they worked.

The fashion supply chain is a complex and opaque network that consists of people and processes from design and development to the finished product in-store, outlined in Figure 2. A traditional supply chain is centralised network that is minimal and cumbersome communication between stakeholders and often linked to unsustainable practices and social injustices (Jordan and Bonde Rasmussen, 2018).

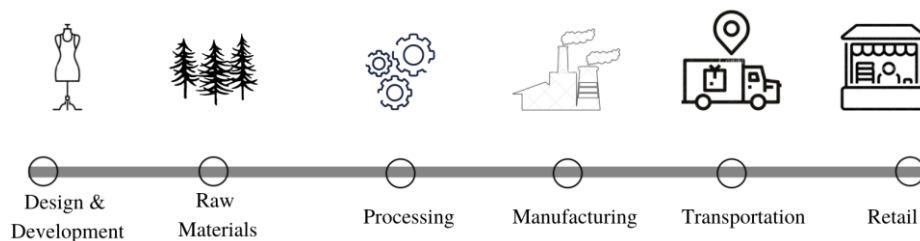


Fig. 2. The Fashion Supply Chain

The challenges along the fashion supply chain affect the workers, environment and process from the raw material to the retailer's reputation. By 2030, the UN Sustainable Development Goals outline 17 objectives to achieve a better and more sustainable future for all (About the Sustainable Development Goals, n.d.). This research will focus on Goal 8: 'Promote inclusive and sustainable economic growth, employment and decent work for all '(Economic Growth, n.d.) which focuses on the workers. Goal 9: 'Build resilient infrastructure, promote sustainable industrialization and foster innovation '(Infrastructure and Industrialization, n.d.), focusing on the implementation of blockchain technology to create transparent and sustainable processes; and Goal 12: 'Ensure sustainable consumption and production patterns, 'which focuses on the optimal use of raw materials across the supply chain (Sustainable consumption and production, n.d.).

By following the goals and objectives outlined by the UN, this can create a fashion supply chain that treats workers fairly, and positively impacts the environment. Consumers are becoming increasingly aware of the conditions that workers endure and the adverse effect that the production process has on the environment. They are beginning to seek more information about the product materials, where their products come from and the condition of the factories in which they were produced.

The fashion industry is known for its negative impact on the environment. As environmental activists became more prominent, so does transparency from brands. The pandemic amplified the awareness of the public about social injustices and human rights along the supply chain where sustainability credentials are becoming more important among consumers. The impact on global garment workers became visible to consumers as a number of brands cancelled orders, and payments were deferred or renegotiated. Suppliers globally were reported to have lost over \$16 million in revenues between April and June 2020 (BOF Team & McKinsey & Co, 2020). In an August 2020 survey by McKinsey, 66 percent of consumers said they would stop or significantly reduce shopping at a brand if they found it was not treating its employees or suppliers 'employees fairly (BOF Team & McKinsey & Co, 2020). Companies should focus on transparency to show their consumers that they are supporting all stakeholders equally along the supply chain.

2.2 The Blockchain Technology

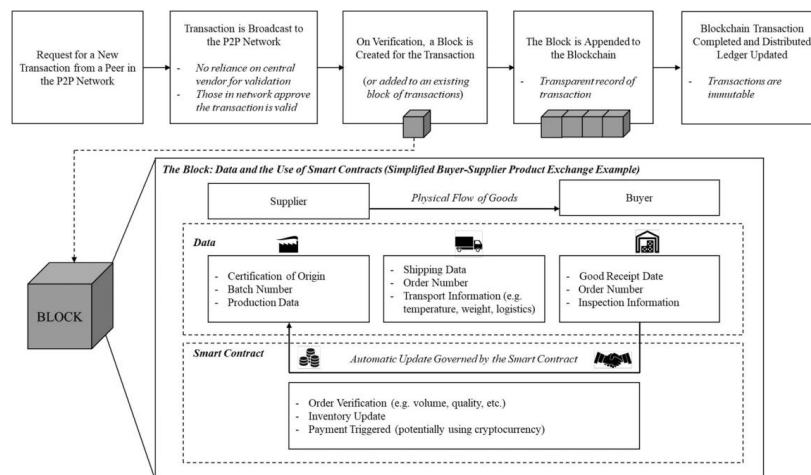
Blockchain technology was developed in 2008 by Satoshi Nakamoto. The blockchain is a data structure that combines data records, called blocks, in a chain, demonstrated in Figure 3 (Cole, Stevenson and Aitken, 2019). It is a decentralised, distributed ledger that stores data transactions consecutively. Its decentralised component of the peer-to-peer network means that there are no intermediaries involved and can be shared over a public or private network. The distributed component of the blockchain is a fundamental advantage in a commercial context as no single entity has control, is that it resolves problems of disclosure and accountability between individuals and institutions where

the interests of the parties are not necessarily aligned (Cole, Stevenson and Aitken, 2019). The blockchain model includes five components: a shared and distributed ledger, immutable and traceable ledger, encryption, tokenization and a distributed public consensus mechanism (Panetta, 2019). The data collected along the blockchain cannot be changed or corrupted, the users can only add to the ledger. The data encryption and coding in a blockchain improves transparency, efficiency and trust in information sharing (Misra, 2018 cited in Cole, Stevenson and Aitken, 2019). The immutability of blockchain technology prevents fraud and improves traditional supply chains in the fashion industry (Joel, 2019) which builds a chain of authenticity with each secure transaction to establish transparency.

The global blockchain technology market was estimated by Statista to be worth \$339.5 million in 2017, and is forecast to grow to \$2.3 billion by 2021 (The State of Fashion 2019, 2019). The adoption of this growing market can bring greater transparency to supply chains (McDowell, 2019) and prove authenticity of a product which can contribute to a more reliable system of product identification (Heubrandner, 2020). The blockchain's fundamental value is enhancing trust, through the nature of its secure record-keeping transactions, it is widely accepted that the ability to track fabric and fibre origins can establish greater trust between consumer and brands (Heubrandner, 2020).

In essence, the blockchain is a technical tool that makes it possible for companies to store and transmit information throughout their entire fashion supply chain network, from producers to distributors and retailers with complete transparency, and in a secure manner (Tudor, n.d.).

Figure 1 How a blockchain works (with simplified example)



Source: Adapted from IBM blockchain, IBM, (2018)

Fig. 3. How the Blockchain Works (Cole, Stevenson and Aitken, 2019)

2.3 Blockchain Technology in Fashion Retailing

The fashion industry is notoriously known for being wasteful and harmful to the environment. Blockchain technology can have a positive impact on the fashion industry as its fundamental value is enhancing trust. The decentralised ledger acts as a single unified source of data that creates an audit trail which is consistent across all vendors involved along the supply chain (Cole, Stevenson and Aitken, 2019). The integration of this technology along the luxury fashion supply chain has the ability to create a transparent and sustainable chain of transactions.

Blockchain technology can create a physical-digital connection between goods and their digital identities on the block (Shawdagor, 2019). The blockchain can give customers the ability to track and trace the integrity of the brand's product. In real time, blockchains provide data to the network on the origins of materials, purchase orders, inventory levels, goods received, shipping manifests and invoices. Smart contracts match and verify this data against the agreement and trigger payment (Cole, Stevenson and Aitken, 2019).

Sustainability

According to the CEO Agenda 2020, sustainability is no longer just a trend, it is a business imperative (CEO Agenda 2020, 2020). A Nielsen report found that 66% of global consumers and 73% of millennials are willing to pay more for sustainable goods ("Blockchain in Retail Fashion and Luxury | ConsenSys", n.d.). Sustainability in the fashion industry is no longer nice to have features in their business model but essential in sustaining their business. The blockchain gives consumers the ability to see the product throughout its lifecycle ("Blockchain in Retail Fashion and Luxury | ConsenSys", n.d.).

Transparency and Traceability

Transparency in the fashion industry is currently close to non-existent. The lack of transparency in the fashion industry has been at the forefront recently, especially since the Rana Plaza factory collapse in 2015 in Bangladesh. The majority of consumers do not have an understanding of the origin of their clothing and do not have the awareness of how or who made it before reaching the store shelf. The only information customers have to find out the source of the garment is the "made in" label, which can be deceiving (Makulova, n.d.).

The fashion supply chain is a complex and global network of stakeholders which makes it difficult for brands to keep track of who made the clothes and where the products are coming from (CEO Agenda 2020, 2020). In most cases, retailers aren't aware of where their suppliers are obtaining goods, they do not know where the manufacturers

are obtaining its raw materials. Blockchain technology allows consumers to see every step of the garment's production journey which assures them that the information that the brand is giving is accurate information since it is protected by a secure, decentralised system.

Transparency along the supply chain provides companies with the awareness of what is happening to communicate accurate information internally and externally. This process has become increasingly important as more consumers are demanding it. According to researchers at the MIT Sloan School of Management, consumers may be willing to pay 2% to 10% more for products from companies that provide great supply chain transparency (Bateman & Bonanni, 2019).

Blockchain technology can guarantee supply chain transparency, secure intellectual property, and improve the efficiency of data sharing (Tudor, n.d.) and has the capabilities to make the production cycle transparent. To enable the consumer with the ability to verify the brand's claim on where the product can from and who made it improves authenticity and enhances consumer trust. The transparent and traceable components of blockchain technology integrated along the supply chain can have the ability to give greater efficiency of processes and information. By equipping consumers with credible and quality information regarding the social and environmental impacts of the clothes, they have the ability to make more informed decisions about the brands they purchase from.

"Blockchain's potential for forging greater trust in businesses along a fashion supply chain, enabling brands to provide verified information about the materials, processes, and people behind products." Martine Jarlgaard (Makulova, n.d.).

Product Authentication

The blockchain is capable of providing a transparent supply chain, therefore, product authentication is a natural extension of transparency. One the brand incorporates the blockchain into the supply chain, this offers the customer an insight into a product's journey. Counterfeit products will cease to exist as a unique digital authentication ID is assigned to each SKU, anyone outside the brand's blockchain network will not have the ability to copy the complex production of the real, luxury product due to the secure decentralised system. When a transaction takes place, the product's ID is assigned to a single consumer. If the product is resold to another person, they will claim ownership.

Blockchain technology is a reliable source of information for all stakeholders along the supply chain as it tracks and traces all transactions which can protect the brand's reputation. Retailers and consumers have a better understanding of the supply chain and can show with a degree of certainty how the goods were produced (Beckwith, 2018). This technology can also help brands promote and verify ethical manufacturing

processes, while proving authenticity and providing sustainable products for their consumers.

In-Store Experience

The retail environment is changing rapidly. Customers are demanding a more immersive experience that they can not get online. Retail is transforming into more meaningful, creative experiences for their consumers, a space where the garments can tell a story (Makulova, n.d.).

The blockchain can act as a storytelling feature of the garment's journey from source to shelf. All aspects of the supply chain transparency and authentication can be reflected in the story (Makulova, n.d.). The customer will be able to learn how to dispose of the product ethically with the data stored on the blockchain. This information is educating the consumer and building valuable brand loyalty.

Circularity

Circular clothing is designed with the end in mind that produces products with sustainable materials that are recyclable or biodegradable (Makulova, n.d.). The blockchain can store the garment details through the smart label to advise the customer on how to recycle the product to benefit the environment.

2.4 Target Market

Target Market and Adoption to Technology

Most Millennials and Generation Z are digital natives and are comfortable with the use of new technologies. Their perceived use or perceived ease of use of new technologies such as blockchain may be more open compared to other demographics.

Rogers outlines five attributes in the diffusion of innovations; relative advantage, compatibility, complexity, trialability and observability (Rogers, 2003, p. 15 cited in Blackburn, 2011). Relative advantage refers to the degree to which an innovation is perceived as better than the idea it supersedes. The greater the perceived relative advantage of a technology, the more it will be adopted by users (Blackburn, 2011). Compatibility is the extent to which a technology is perceived as being consistent with the existing values, past experiences, and needs of potential adopters (Blackburn, 2011). Complexity is the degree to which a technology is perceived to be confusing to understand and use (Blackburn, 2011). Trialability refers to a technology that may be experimented on a limited basis (Blackburn, 2011). Observability is the extent to which a

technology is visible to others; users are more likely to adapt to a technology if it is easy to see results of the action (Blackburn, 2011).

In the context of blockchain, despite the features of this innovative technology, ultimately it is the users' perceptions that establish the relative advantage of the blockchain compared to databases, they will observe the compatibility of their experiences, and observe the complexity of the technology.

Target Market and Sustainability

As well as their perceived use and openness of adoption to new technologies, the young affluent consumers are more conscious about the environment and the social impact of their purchasing behaviour. Their expectation of luxury brands is to be aligned with their values and provide transparency along the supply chain. A Nielson report in 2015 found that 73 percent of the Millennial generation was willing to pay more for sustainable goods (Petro, 2020). Further, 54 percent of Generation Z state that they are willing to spend an incremental 10 percent or more on sustainable products, with 50 percent of Millennials saying the same. This compares to 34 percent of Generation X and 23 percent of Baby Boomers. It is evident that every generation is on a quest to strengthen their sustainability efforts (Petro, 2020).

There are many sustainability routes that resonate with the younger generation such as sustainably sourced materials, recycling and reusing initiatives across the supply chain. Blockchain technology can give consumers, at any age, especially Millennial and Generation Z the opportunity to see the journey of their garments with its transparent transactions and the ability to see if the garment is in fact, sustainably sourced and produced.

Generation Z is becoming the largest generation of consumers. By 2020, Generation Z will account for 40% of global consumers. McKinsey reports that their spending power is at \$150 billion in the US alone (Moran, 2020). Retailers and brands must align their values with theirs and implement sustainability practices in order to keep pace with their expectations for this next-generation of consumers (Petro, 2020).

2.5 Blockchain Examples

Treum

Treum's mission is to help businesses build trust with their customers by bringing transparency, traceability and tradability to supply chains, using blockchain technology

("Treum", n.d.). It is the first blockchain-powered live auction platform for authenticated memorabilia, demonstrating the future of fan engagement. Treum enables fans and collectors to trust the authenticity and ownership of their purchase ("Treum", n.d.).

They provide a trusted, authenticated platform for their consumers by providing a transparent, traceable and tradable platform. Transparency allows brands to verify information with their consumer; increasing consumer confidence. Traceability gives the ability to track the product from source-to-sale. Tradability enables customers to tokenize non-fungible assets and allow them to be held, purchased, exchanged and traded anytime, anywhere ("Treum", n.d.).

Provenance

There is a global movement to increase transparency in the fashion industry. To increase transparency in the fashion industry, Provenance collaborated with Martin Jarlgaaad to provide verified information about the materials, processes and people behind the product ("Provenance", n.d.). Blockchain technology can be the solution to this problem by tracking and tracing products from the first mile, from origin to consumers. The product's journey information is accessible via the garment's smart label displaying the source of raw material, through to spinning, knitting, and finishing the sustainable alpaca fleece garments ("Provenance", n.d.). This gives the consumer the power to access the product's journey at the point of sale.

2.6 Conclusion

The blockchain has become a popular solution to achieve end-to-end transparency in the supply chain at a time where consumers are becoming more aware of provenance and more demanding of where their garments came from and who made them. The fashion industry is continuously evolving to align with the values and demands of their consumer. Blockchain has the ability to transform the fashion industry through its transparent components to show consumers where their clothes are coming from and who made their clothes. The integration of this technology can help brands improve efficiency and transparency which gives the consumer another reason to remain loyal to its brand (Sharma, 2019).

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