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How Blockchain could revolutionize Ethical and Sustainable Fashion

Introduction

In the recent years interest in supply chains has risen drastically and significantly in the fashion industry, a global trillion dollar sector devoted to the business of making and selling apparel, footwear and accessories. The fashion industry provides employment to approximately 100 million people across the globe, directly and indirectly. (Source: McKinsey &Company report the State of Fashion, 2019).

With thousands of companies manufacturing apparel the industry remains the second biggest polluter of the environment. Reeling from issues of human rights violations in overcrowded factories, high levels of pollution caused by chemical dyes and synthetic fibres, massive overproduction of clothes and poor waste management the industry is in dire need of transformation (Source).

Today ethical fashion advocates and consumers are becoming more demanding in asking how their clothes are made, with what fabrics, by whom and under what conditions. (Source)

This has caused a need for the players in the fashion industry to examine their supply chains.

A fashion supply chain traces all parts of the process, from concept to customer, which goes into creating a consumer product. This includes where and what materials are sourced, how they are developed into something larger, and the journey the finished item takes in order to arrive in store or on someone’s doorstep. (Source)

Numerous traditional fashion supply chains, have been criticized as environmentally hazardous with high levels of synthetic chemicals polluting water sources and causing wastage of massive amounts of water. Additionally, child labour are clandestinely practised in some unregulated factories in the Global South. The Ethical Fashion Report 2019 highlights traceability and transparency as one of the key challenges in order to promote an ethical supply chain.

Traditional supply chain systems are centralized, non-standardized and data sharing between stakeholders is minimal and cumbersome. Distributed Ledger Technologies (DLT) overcome this challenge by establishing a chain of transactions. For each virtual or physical good, there will be a complete list of transactions leading all the way up to the origin of an item. Data cannot be controlled or manipulated by a single party. (Source)

Distributed Ledger Technology and blockchain

This article will focus on how distributed ledger technologies and blockchain can be used to promote ethical fashion across the fashion supply chain. It will interrogate issues with regards to traceability of raw materials, protection of labour rights and sustainability.

Distributed ledger technology is a decentralised database of records managed by multiple participants across what is termed as “multiple nodes”. Each node replicates and saves an identical copy of the ledger and each participant of the network updates itself independently. (Source).

Blockchain is a form of digitized ledger that is decentralized and often times public, which is used to record transactions across many computes. This ensures that any involved record termed as ‘blocks’ cannot be altered retroactively, without the alteration of all subsequent blocks. Its main selling point is that, since it is a distributed ledger, it can exist without a centralized authority or server managing it, hence its data quality can be maintained by database replication and computational trust. (Source)

The terms blockchain and DLT are often used interchangeably, this should not be the case as there exists stark differences between them. However, it is generally agreed that every blockchain is a distributed ledger, but not every distributed

ledger is a blockchain, this is because both technologies record information in a distributed pattern across a network. (Source)

The difference between the two technologies can be summed up in three main points, according to Simon Chandler: openness, decentralization and cryptography. Openness refers to who may access and alter the technologies. Blockchains are generally public, meaning that anyone can view the transaction histories and can participate in the operations and alterations by becoming a node. This means they are 'permission less' as coined by Marta Piekarska. On the other side, a DLT does not enable any or most of these features, it restricts who can use, access and operate it (permissioned technology),

The second and third main difference; decentralization and cryptography, are tied together. Blockchain technology utilises a series of time-stamped "blocks" that record the information; these blocks must be cryptographically validated by the majority of the network to form the next entry (cryptographic consensus feature). Some DLT's, though they utilise the same distributed technology that allows for cryptographic consensus, are not cryptographically validated through chains of blocks. They rely on what is termed as nodes reaching consensus over time-stamped transactions. (Source)

In the fashion industry DLT and blockchain have been utilised to bring about transparency in the supply chain. (Source)

Traceability of products

According to the United Nations Economic Commission for Europe (UNECE), clothing sector, supply chain traceability has been a lower priority than in other industries, like pharmaceutical, automobile, food and beverages, where regulations and labeling standards make traceability a prerequisite due to the direct impact on consumers' health.

Nonetheless, change is on the horizon. The Global Fashion Agenda has recently set as a minimum requirement for companies to identify 50% of their Tier 2 suppliers (product manufacturing), while they define best practice as 100 percent identification. To make solid and reliable sustainability claims, even this may not be sufficient, since much of the environmental and social risk lies within Tiers 3

and 4 (raw material extraction, supply and processing).

Novel technologies, such as DLT and blockchain, provide an opportunity to increase traceability and sustainability through the creation of a common source of verifiable information on transactions, accessible to all supply chains parties, regardless of their location, so long as they have access to Internet. A well-designed blockchain-based application has the potential to allow brand retailers to access the blockchain (via a user interface program) and to verify the origin of each input used in manufacturing. Industry regulators will be able to check the data and examine the entire lifecycle process using the blockchain's digital ledger.

Below are some of the notable use case examples of DLT's and blockchain employed to promote ethical fashion.

Asia Pacific Rayon Case Study

Asia Pacific Rayon (APR) produces 100% natural and biodegradable viscose rayon used in textile products and uses blockchain to trace its fibre at every process. Every step from seedling to shipment is carefully tracked. This process is supported by Follow Our Fibre initiative, which uses enterprise blockchain technology developed by Perlin. Using Perlin's value chain a traceability tool allows APR to key into data at all critical points in the supply chain, creating a robust product journey that can be easily traced by customers.

APR's customers can scan a barcode on a viscose bale using a dedicated app to see detailed information on where that bale was produced, where its source material came from, and how it was shipped.

Data is gathered automatically at each stage of the value chain using integrated software tracking programmes. This includes information on planting in the nursery, time of weighing at a weigh bridge and delivery to the mill.

This information is then uploaded to a blockchain ledger where it can be viewed. The advantage of using blockchain is that, once published, the data forms an immutable permanent record. (Source)

Additionally, Fashion for Good, PVH Corp, C&A Foundation & Organic Cotton

Accelerator, Bext 360, and Zalando have successfully collaborated on a pilot project that traces organic cotton from farm to consumers.

In an attempt to further address transparency concerns, this blockchain pilot project seeks to revolutionize the apparel industry by offering a physical and digital trail of organic cotton, making traceability, transparency, and reliability inevitable.

Organic cotton is favoured because it promotes healthy ecosystems, people and soils. Additionally, it is a key fibre when it comes to sustainability strategies fronted by global fashion brands.

Compliance with labour laws and International Human Rights

It is no secret that in the fashion industry, various human rights and laws are often overlooked in the rush to maximise profit and keep up with trends. The exploitative working conditions, especially in the production phase, is alarming. One such case is the Rana Plaza building collapse, which occurred seven years ago, that sent shockwaves in the apparel world.

On April 24th 2013 the Rana Plaza building in Dhaka, Bangladesh, which housed five garment factories, collapsed killing at least 1,132 people and injuring more than 2,500. This came after the collapse of Tazreeb Fashions factory on the outskirts of Dhaka where 112 workers had been killed when they were trapped inside the burning factory.

There were deep structural faults in the building. The day before the tragedy, workers had shown an unwillingness to work in the building; however the managers had urged and forced the workers to carry on with their tasks.

The incident put a spotlight on unethical and unsafe working conditions of factory workers in what is often termed as “sweat shops” as well as bringing up discussions on labour laws and protections of human rights of the minority.

Blockchain technology and DLT’s could be used as a tool to solve many of these challenges. The same process that allows for traceability, could allow for blocks that would be used in transparency. This would allow consumers as well as

regulatory and government authorities to get first-hand information on the working conditions of factory workers in workshops .

When the supply chain is tracked, this information will be available to the public, forcing suppliers to implement fairer working conditions, environmental policies and share more details about their practices. This can be instrumental in pushing for better working conditions, especially to largely known brands that often have their production bases in developing countries where the labour laws are often overlooked. (Source)

Promoting sustainable fashion practices

DLT's and Blockchain technology can be used to fight against unsustainability as it can track each process in apparel production. (Source). Consumers have become more demanding in understanding how their clothes are made and with what fabrics, in an effort to know if products are sustainable and ethical.

Sustainable fashion looks at the impacts clothes have on the environment. The textile industry is after all the world's second largest consumer of the world's water supply and the second biggest producer of harmful emissions after oil. What is often called "fast fashion" lasts three month at most and is thrown away almost immediately after it is produced. This leads to massive pilling of clothes that remain un-utilised.

Notwithstanding the push for ethical and sustainable fashion, there has been an increased production and consumption in the fashion industry, attributed to the rise of fast fashion. Fast fashion utilises innovative production and distribution models to dramatically shorten fashion cycles, sometimes getting a garment from the designer to the customer in a matter of weeks instead of months. The number of fashion seasons has increased from two a year – spring/summer and fall/winter to as many as 20 micro seasons. (Source)

Statistics reveal consumers are buying more, in 2014 they bought 60 % more clothing than in 2000, but kept the garment half as long. Fashion manufacturing alone produces 92 million tons of solid waste which is deposited in landfills or up in smoke.

Blockchain could be used to track the industry's excess fabric, enabling it to be easily identified and resold. This would create a great potential for blockchain and DLT to improve the ability to capture the economic value of resources along the supply chain; this was explained by environmentalist Jahda Swanborough, at the World Economic Forum. (Source)

One example is H&M which has been criticised due to its high inventory turnover, high volume and low prices. Despite this controversy, the company **remains one of the most advanced fashion companies in terms of sustainable development.** Recently, the brand has been offering to its customers the **possibility of accessing,** by scanning each product label**, information that has been out of reach until now, s**uch as the names of suppliers, the names of factories and their addresses. (Source)

Conclusion

Blockchain and DLT have been instrumental in revolutionizing and mechanising various industries: agriculture and technology. However, there also exists some limitations on the use of blockchain and other DLT's considering that the technology is fairly new and, hence, it is expensive.

Notably, for some DLT's the information may not be accessible to all as there could be private blocks, additionally with technologies such as blockchain, the information is susceptible to manipulation and change when the controller of the blocks wishes to change the information and perhaps prevent other users of the technology from viewing the change in the sequence/block. In addition, DLT's alone cannot ensure that the various certificates and information registered are true and accurate. In order to achieve this kind of result, a system of rules (by operation of law or on a contractual basis) should be implemented in order to allow controls made by independent third parties such as experts or auditors.

Blockchain and DLT's are already used by various actors in the fashion supply chain: distributers, suppliers and retailers to meet their customers' expectations of consistency and credibility. The technology could be instrumental in promoting ethical and sustainable fashion as well as creating well informed consumers.

The use of these technologies, of course, is part of the solution, but for first and

for most they require a real sensibility and awareness by the consumers on the ethical issues related to the fashion industry and the impact that this industry may have on the environment.

In this way a clear message could be given to the fashion producers and the fashion markets on what to focus on and how to deal with it.

Rome, 5 June, 2020

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