

# **VeChain: A Renovation of Supply Chain Management -- A Look into its Organisation, Current Activity, and Prospect**

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**Abstract:** There have been discussions around VeChain on how it is helping the world supply chain now and more so in the future. To reach a strong understanding of these views, a description of the organisation, an explanation of their current activity and an analysis of their future activity will be discussed in this essay. A conclusion will then be made to understand the extent to which this idea is valid.

## **1. Introduction**

VeChain was founded in 2015 by Sunny Lu as a subsidiary company of Bitse. In 2018, it successfully transitioned onto its own blockchain, away from the Ethereum block chain. With its own blockchain, VeChain is able to track the data of products that are traded and transported. This includes products such as food, where VeChain tracks the origin, processing, and selling of the product, indicating whether the product is flawed or a counterfeit. These abilities are powered by the VET tokens, however, VeChain provides not only its VET coin, but it also awards users with VTHO tokens. VTHO stands for VeChain Thor, the VTHO tokens power the transactions on the VeChain blockchain and act as the payment for each transaction.

VeChain is currently involved in many industries with many partnerships. Their main area of focus is to track the manufacturing of the companies' products and ensure the quality of them while also preventing counterfeits through its blockchain that stores the information of individual products. VeChain has developed its own products. Its product is a piece of software called VeChain Toolchain which provides a base for the VeChain tracking system. Toolchain is split into 3 different versions: PaaS, SaaS, and BaaS, designed for developers, partners, and other small firms respectively. PaaS provides developers with the ability to develop customized applications on the blockchain [1]. SaaS provides the tracing service to firms; it focuses on providing food safety traceability platforms and digital carbon footprint tracking. However, these features are currently only provided in China. BaaS provides smaller firms with the service of storage and fee delegation [2]. The feature of product tracking is done through giving each item a unique code, which then scanned and traced at every stage of production. The special part is the carbon footprint tracker. As there has been growing concern for pollution, VeChain tackles the problem of false and inaccurate reports of carbon emission. VeChain tracks the product produced and collects the information on its carbon emission and saves it on to its own blockchain, making the information collected and given reliable through adding a third party.

## **2. The Partnerships of VeChain**

The Partnerships of VeChain vary to a large extent:

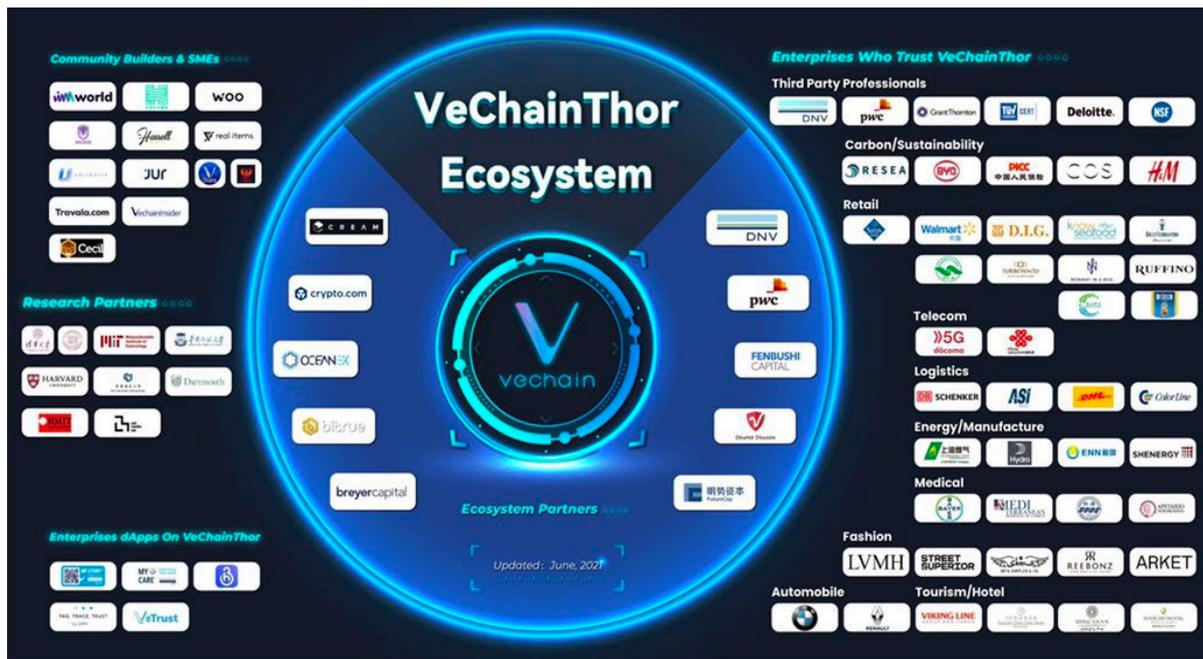


Figure 1 VeChainThor ecosystem.

In 2019 VeChain and Walmart announced their establishment of Walmart China Blockchain Traceability Platform. The platform aims to use VeChain’s tracking system to trace products sold and present the information to consumers upon purchase. Customers and any organisation involved with the supply chain can scan a QR code of the product and check the manufacturing. Furthermore, the Walmart-VeChain partnerships extends to Sam’s Club. Sam’s Club uses a modified version of ToolChain in combination with the Internet-of-things technology to “automatically upload data from across the company’s supply chain onto the blockchain” [3]. To access the details of the products, the process is identical to the Walmart main store.

VeChain also has stepped into the pet food industry, a highly active industry. Although the market is highly lucrative, “it does not follow any unified standards” [4]. This leads to the problems of uneven quality and manufacturing. VeChain aims to resolve these problems using its own blockchain. Through the immutable characteristic of blockchain, VeChain is able to trace different brands of pet food during their production and present the information collected to consumers and the producer. Through such data, consumers can select the brand that fits their pets while producers are able to improve on their production line and control the quality of its products [4].

VeChain also has a strong presence in the fashion industry. This is mainly due to Sunny Lu being in the fashion industry for 5 years. The industry is riddled with fakes and counterfeits of “more than \$500 billion”, the emergence of VeChain can change this situation and LVMH has already established a partnership with VeChain to resolve these problems [5]. Similar to the partnership with Walmart and Petfood companies, VeChain provides a tracking service that allows consumers to scan a code and check if the product is a counterfeit as actual products from LVMH will be labelled with a unique VeChain tag which is stored on the blockchain. This links to another service of VeChain; through tracking the manufacturing process of the products, VeChain can track the carbon emission of fashion companies using its SaaS. “With clothes production often involving complex global supply chains, companies can’t always provide their consumers with guarantee of whether environmentally friendly materials are being used” [6]. This not only helps the fashion industry to trace their carbon footprint, but it also helps the government to monitor negative externalities caused by manufactures and improve the regulations on firms.

### **3. The Drawbacks and Improvements can be Made of VeChain**

#### **3.1. Overdiversification of VeChain**

While the VeChain road map is looking full of partnerships, this may not always represent a thriving economy. VeChain's involvement in many industries may be seen as overdiversification and may become a burden for the company. This is because of the thinking that VeChain will need to adjust its product for each of its partners which will inflict a great cost as VeChain has to design each product differently. This may be a potential burden for employees who require skillsets in multiple industries to perform their duties. There is no "one size fits all" methodology in practice, and this can add many complications to the setup and implementation of VeChain system. An example will be VeChain's partnership with medical companies such as Bayer, a large pharmaceutical company. VeChain will need to have sufficient knowledge on medicine and production processes involved in medicine. Secondly, they will need to identify what countries accept what medicine in the consistently changing landscape. It will also need to guarantee that these processes are resulting in the stated output and are not secretly shipped in from another factory. This will require a high level of expertise and tracking to create a tracking system just for Bayer. Furthermore, the creation of different models for different companies is also very time consuming. This could lead to poorer results in VeChain losing a very important asset to their business in the form of specialization.

However, if VeChain is able to develop specific templates for different industries, it will reduce its operating cost and time of implementation drastically as many companies, especially small ones, can use one of the templates that fits their business model. The creation of high-quality templates may take long periods of time initially for tweaks and updates, but it has a high return. An example would be shopping carts on Wordpress, where Ecommerce plugin led to great success (chrislema.com, (2021)). Moreover, as VeChain provides only tracking service, it will fit in many industries that produce a physically product through manufacturing, namely the secondary sector, giving VeChain a wide range of industries to operate, meaning that VeChain's current quantity of partnerships is not harmful in the long run. VeChain's expansion to other companies and greater number of partnerships depends on its current ones. The service that VeChain provides may not appeal to many companies as these companies do not intend on disclosing their production and the raw materials used to the world. For example, Xinjiang cotton, currently rejected by many western companies, can get shipped to other places and sold as cotton produced in other places, such as Japan [7]. With it being tracked by a blockchain, there is no use in transporting the cotton and it will not be bought on the international market. Other companies may not want to present their production secrets to the world as it increases competition drastically. A case in point is Coke, as it does not want to reveal its hidden recipe. The power of large partners of VeChain such as Walmart China addresses problem of production secrets. Due to the size and power of Walmart, it can ask its suppliers to adopt VeChain technology and track the manufacturing processes of the supplied products. This means that with the help of strong partners VeChain is able to expand further within the supply chain. To solve harder problems like Coke's hidden recipe and Xinjiang cotton, VeChain may have to acknowledge these difficulties and go around them through reducing the details of the information collected and presented. Ultimately, it is challenge integrating VeChain's technology in many companies without large supplier pressure; the more powerful partners VeChain can develop, the stronger and larger it will be.

#### **3.2. Disadvantages in Centralization**

VeChain operates on a centralized blockchain, meaning that all data goes to one place to be stored and all services are provided and governed by one provider. This allows it to monitor all tracking services it provides and gives it quick accesses to errors in the blockchain. Centralized blockchain also provides fast transaction speed as the servers are concentrated, with direct control from VeChain which also allows for quick changes and editing to the blockchain. However, the use of centralized blockchain lays the grounds for potential problems such as disturbance in global service providing due to technical issues within the VeChain company. The centralization problem was demonstrated recently through a global outage that happened to Amazon AWS. This caused a global outage of

many web services such as Amazon's own web servers and its package tracking app. The rippling effect caused "outages for Disney Plus and Netflix streaming, as well as games like PUBG, League of Legends, and Valorant" [8]. It is clear that centralization can result in serious issues if the main server is compromised. The same issue can occur to VeChain, and it could be more serious as its partners cannot stop producing and sending goods just because the tracking service is unavailable. It may cause problems in the supply chains as packages cannot be verified. As a centralized platform, VeChain should always be looking out for issues in its blockchain and its products to make quick adjustments and corrections to avoid greater problems. If VeChain was to be decentralized, one compromised server would not cause serious issues in this regard, as 51% of servers would need to be compromised. Decentralization offers greater security.

### **3.3. The Limitation of Operation of VeChain**

As VeChain is a Chinese company, it falls under the control of the Chinese government. This may lead to problems in its operation as crypto currency is currently illegal in China and VeChain may fall under the classification of crypto currency. There are also problems with data protection as the Chinese government and firms may not want to reveal the complete source of every product internationally. This may hinder the growth of VeChain as it may not be able to deliver all the information the consumers want, making it redundant as it loses its purpose. However, VeChain has established many connections with the Chinese government and Chinese public firms such as China Unicom. Furthermore, the main goal of VeChain is to provide tracking services to firms, and as blockchain "has been viewed as an important technology for China", there is very little chance that VeChain will be directly affected by government policies [9]. Although VeChain will not be regulated to a great extent, the clarity and reliability of the information it provides to the consumers may not be 100% accurate as the government may control parts of the information and its output. It is worth mentioning that DHL has rejected to partner with VeChain, a lost opportunity for both companies [10]. If DHL was to establish a partnership with VeChain, deliveries will be more efficient, especially when clearing customs, as VeChain can provide the full information of the package delivered internationally. Ultimately customer service is paramount to achieving success and using the blockchain to successfully share information and help customers track their deliveries without having to waste time clearing with customs would serve greatly in such a large, convoluted industry. A failure to successfully partner with a large delivery firm is a huge setback, and measures should be taken to rectify this.

### **3.4. VeChain is Facing Stiff Competition**

Although VeChain provides a unique service, there are strong competitors. Originaltrail, one of VeChain's competitors, started around half a year later than VeChain. It is more decentralized than VeChain and has greater access to the world market while VeChain is heavily embedded in the Chinese market [11]. This presents a problem for VeChain as it shows that VeChain must overcome its disadvantages in centralization and have a presence in the world market to compete against Originaltrail. However, as VeChain stands strong in the Chinese market, it has secured a stable base for its growth such as its partnership with China Unicom, Walmart China, Meijiada Fresh Foods and PICC. Furthermore, as shown through VeChain's partnerships, VeChain is trying to expand overseas. This is because, ultimately, product tracking is global and limiting to one country will result in severe growth restrictions after the incubation period. VeChain has also adapted through constantly upgrading their technology in terms of validation mechanism from proof-of-stake (PoW) to proof-of-authority (PoA). The new mechanism allows VeChain to decrease their electricity consumption greatly as PoA does not require nearly as much electricity as PoW to function. This cuts operation costs for VeChain making it more competitive. If VeChain is able to sustain its current rate of development (e.g., faster rate of transactions, greater popularity), it will keep on top of its competitors. However, the competition is strong, it is uncertain if VeChain will choose to cooperate with its competitors or to maintain the competing relation in the future. The concerning factor for VeChain is that there is a lack of marketing and general statements from the CEO since 2021, which may mean that VeChain is not developing and may fall behind its competitors. Fortunately for VeChain, it is

relatively well protected by the Chinese government and may receive support to expand.

A further point to consider is how VeChain decide to interact with global competitors. As the service provided by VeChain overlaps heavily with many of its competitors, it may be wise to establish partnerships with the current competitors for example DHL, and share certain information gathered with them. This not only benefits the companies, as they can expand in harmony, it also benefits the consumers as consumers are provided a full set of information of products around the world. For example, details of a good sent from China to the UK can be viewed from both China and the UK by customers using any blockchain tracking services under VeChain's partnership; this will improve the overall customer experience and gain popularity for both VeChain and its competitors. However, there are also resistances to achieve such level of interactions such as legal restrictions. Every country has its own level of data protection and laws over it. To have effective and successful partnerships with competitors, VeChain needs to find the balance between data protection laws in different countries and be sensitive to any changes to these laws, so it does not encounter any legal problems. This would require a large number of human resources. If collaboration does not happen, the industry will become more fragmented. There will be the need for VeChain to develop its own international channels, which may be incredibly costly.

#### **4. Conclusion**

We have discussed the growth of VeChain, its partnerships and its current state in the market. It is clear that VeChain is providing many innovative services for stakeholders. These stakeholders include the government, a large amount of product conscious consumers and firms. First the government aims to regulate firms for externalities and VeChain can provide a more efficient measurement of an organization's carbon emission. Second being the general public as VeChain can provide them will more information on products of firms and possibly less pollution due to regulation. Last being the firms that are able to monitor the entire process of their supply chain with more precision, leading to guarantees in authenticity of produce. The future of VeChain depends on its ability to sustain its current partnerships with large organizations and how much it embeds itself into them. VeChain's remaining competitive through constant innovation is also vital as it has many strong competitors such as Originaltrail. This includes lowering operation costs, consistent innovation and growing or maintaining influence on companies and the government. In conclusion, VeChain has the opportunity to make this world a cleaner, more efficient and more knowledgeable place. Consistent product innovation is the key.

#### **References**

- [1] Kratzke, N. and Siegfried, R. (2021). Towards Cloud-Native Simulations – Lessons Learned From The Front-Line Of Cloud Computing. *The Journal of Defense Modeling and Simulation*, 2021, 18(1), 39-58.
- [2] Gai, K., Guo, J., Zhu, L. and Yu, S. (2020). Blockchain Meets Cloud Computing: A Survey. *IEEE Communications Surveys & Tutorials*, 2020, 22(3), 2009-2030.
- [3] Xu, L. X., Xu, Q. and Liu, X. (2014). Wal-Mart and Carrefour's Supply Chain Management Strategies in China. *International Journal of Business and Management*, 2020, 9(7), 155.
- [4] Kayikci, Y., Subramanian, N., Dora, M. and Bhatia, M. S. (2020) Food Supply Chain in the Era of Industry 4.0: Blockchain Technology Implementation Opportunities and Impediments from the Perspective of People, Process, Performance, and Technology. *Production Planning & Control*, 2020,1-21.
- [5] Bullón Pérez, J. J., Queiruga-Dios, A., Gayoso Martínez, V. and Martín del Rey, Á. (2020) Traceability of Ready-to-Wear Clothing through Blockchain Technology. *Sustainability*, 2020, 12(18), 7491.
- [6] Li, J. C., Zhou, Y. W. and Huang, W. (2017) Production and Procurement Strategies for Seasonal

Product Supply Chain under Yield Uncertainty with Commitment-Option Contracts. *International Journal of Production Economics*, 2017, 183, 208-222.

[7] Zhou, Z. and Cai, Y. (2021) Research on the Mechanism of Consumers' Purchase Intention under the Xinjiang Cotton Incident. *Frontiers in Business, Economics and Management*, 2021, 2(1), 30-34.

[8] Barman, N., Deepak, G. C. and Martini, M. G. (2020). Blockchain for Video Streaming: Opportunities, Challenges, and Open Issues. *Computer*, 2020, 53(7), 45-56.

[9] Marbough, D., Abbasi, T., Maasmi, F., Omar, I. A., Debe, M. S., Salah, K., ... and Ellahham, S. (2020). Blockchain for COVID-19: Review, Opportunities, and a Trusted Tracking System. *Arabian Journal for Science and Engineering*, 2020, 45(12), 9895-9911.

[10] Teoh, B. P. C. (2022). Navigating the Blockchain Trilemma: A Supply Chain Dilemma. In *Advanced Maritime Technologies and Applications*, 2022, 291-300.

[11] Chowdhury, M. J. M., Ferdous, M. S., Biswas, K., Chowdhury, N. and Muthukkumarasamy, V. (2020) A Survey on Blockchain-Based Platforms for IoT Use-Cases. *The Knowledge Engineering Review*, 2020, 35.