

The Application of Block Chain Technology in Supply Chain in New Retail Times

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Abstract

In recent years, "new retail" and "block chain" has risen suddenly. The emergence of "new retail" have brought great opportunities and challenges to the traditional retail industry. "Supply chain management", one of the focus topics under the traditional retail model, has come to the people's attention again. Under the new business perspective, industry urgently needs to seek a new mode of supply chain management or technology to comply with the trend of development. Therefore, the "block chain technology research and application" is particularly important. Under the new retail background, researching the application of block chain in supply chain, mainly includes the following aspects: firstly, Analysis of the current situation and development prospects of new retail supply chain management. Secondly, it briefly introduces block chain technology and its application in logistics scene. Thirdly, it illustrating the necessity of application of block chain in supply chain management by example.

Keywords

Block chain technology, New retail, Supply chain management.

1. Introduction

In recent years, with the development of science and technology, Owing to disadvantages of the distribution system, e-commerce industry has made traditional retail weakness more prominent ^[1]. The long customers' response chain and the complex hierarchical distribution system can not meet the changing situation of consumers' demands. In this context, more and more people pay attention to the new retail model which is combined by line and line.

2. Analysis of the current situation and development trend of supply chain management under the new retail

2.1 The current situation of supply chain development under the new retail background

Industry experts believe that the "new" feature of new retail is the reconfiguration of three commercial factors: people, goods and fields, which is the transformation of "person", "goods", "field" into "Recognize human", "accurate management of goods", "combination actual field and virtual field" ^[2]. In the context of "new retail", supply chain management is still a key topic. In the traditional logistics supply chain management, the information between the entities is seriously destitute of transparency and easy to produce higher management costs. Therefore, the concept of "intelligent supply chain" has emerged.

New retail is a new concept, the retail model is also in the exploratory stage for the industry. The actual operators are still in the primary stage of the simple establishment and integration of the online and offline entity stores ^[3]. The discussion on the intelligent supply chain management under the new retail background is relatively few. In fact, no matter how many prefix words are added to the supply chain management, they can not actually be divorced from the essence of supply chain management, that is "To plan, organize, coordinate and control the business flow, logistics, information flow and capital flow in the supply chain by computer network technology" ^[4]. "New" of "Intelligent supply

chain management" is reflected in the traditional supply chain management concept with a certain era nature.

2.2 Analysis on the trend of supply chain development under the new retail background

Under the background of new retail, "intelligent supply chain management" is an innovative management model that uses large data and information systems to integrate goods, supply chain and consumers flexible, constantly close the distance between goods and consumers, and provide high precision customer service^[5]. Among them, the set analysis of large data is helpful for the merchants to intelligence and classify the goods according to the needs of the customers. The flexible supply chain is more conducive to the enterprise to provide a higher response to the customers with different needs, which indicates that the intelligent management has become the direction of the advance of the time generation. The new retail model uses the combination of online and offline mode, which means that it has a larger database than the traditional retail model, and the customer's demand has become more diversified. The one-way traditional chain supply chain management is obviously exhausted to support the contact work of the modernized business, information flow, and capital flows. To sum up, transforming the chain operation to the network operation mode has become one of the trend of smart supply chain management in the future new retail. In fact, the transformation of operating mode is the expansion of service nodes. The entities in the structure of traditional chain basically work in order one by one. once the goods are shipped, it will be difficult to make a consistent adjustment in the short term. At the same time, the enterprises in the supply chain are also faced with a huge cost problem. In other words, the single supply chain is less flexible and difficult to bear the diversified needs of the new retail mode^[6]. In a supply chain which formed by multitude, a number of different service nodes are set up in different parts, and their ability to respond to different customer needs is greatly improved^[7].

It is not difficult to see the inevitability of the development of supply chain network operation mode that the supply chain will have more flexibility and agility in the future new retail. With the development of the society, the diversification of customer demand is forcing the supply chain management to be developed in the two key directions: flexible and agile. Therefore, flexibility and agility are also an important trend in the development of new supply chain management.^[8]

The emergence of new management mode will inevitably involve new technology^[9]. The extensive application of AI technology in different fields which makes the "unmanned management" of the production line possible. In recent years, with the development of science and technology, artificial intelligence has become a hot topic nowadays. In the first time, CEO Zhang Hui put forward a new concept of "no man and no car everywhere" at the first digital China Construction Summit, that is: Unmanned, car free transportation, large data application, "unmanned" vehicle is one of the application cases of artificial intelligence. According to the related reports, Jingdong has also identified the intelligent industrial base project of unmanned vehicle at the end of 2017. In supply chain, more and more manufacturing enterprises pay attention to the introduction of intelligent equipment and actively develop automation products. Obviously, artificial intelligence has become another important way to increase the competitiveness of enterprises. So, the prevalence of new retail is not only a major test for the success of the traditional supply chain management, but also an important opportunity to promote the combination of social science and management ideas. For supply chain management, the business background of new retail is both an opportunity and a challenge.

3. Block chain technology and its application in logistics scene

At the 2016 cloud meeting, Jack Ma proposed the concept of "new retail" for the first time. An upsurge of research on "new retail" has been launched. The discussion of "new retail" has not yet been draped, and the emergence of "block chain" in 2018 pushed the topic of science and technology to the peak again. In fact, ten years ago, bit-coin, which was popular in the network, included "block chain"

technology. It was a series of data blocks associated with cryptographic methods. Each block contained a bit of bit-coin network transaction information to verify the effectiveness of its information (anti-counterfeit) and generate the next block. ^[10]

3.1 Brief introduction of block chain

Temporary not to discuss what block chain is, It is very valuable to study the non tampering of block chain information. The information security of block chain and the generation of the next block are highly consistent with the supply chain management system to some extent: in the supply chain management, the upstream and downstream enterprises should ensure the authenticity of the information and the degree of interconnections among each block,Block chain can ensure the smooth operation of the supply chain system for the decentralization,the information that can not be tampered, the characteristics of openness, autonomy and anonymity, and provide a guarantee for the authenticity of the circulation information in the supply chain ^[11].

The decentralization of the block chain refers to the realization of direct interaction between point to point,it make the transaction independent and simple.It means there is no intermediary in communication.Each entity can communicate with each other,coordinate production progress so that expand the flexibility of the supply chain system to the maximum extent ^[12]. In fact,as the biggest advantage of the application of the block chain , it can guarantee the authenticity of the information, which is very important to the supply chain management. Highly shared production information is the most important aspect of improving supply chain efficiency.Since the block chain uses a one-way hash algorithm, each newly generated block is pushed forward strictly in the linear order of time. The irreversibility of time and the unrevocable can lead to any attempt to invade the data information of the tampered block chain easily traced,which can limit the related wrongful behavior. So,each entity can not only be guaranteed to synchronize information,the authenticity of the information they get when the block chain is applied to the supply chain.

3.2 The application of block chain in Logistics

There is a natural connection between the block chain and the supply chain.Many entities, such as business, goods, information, are often involved in the supply chain. There are a lot of complex cooperation and communication between these entities. The difficulty of mutual cooperation between the new retail background entities is only increasing ^[13]. In traditional supply chain mode, supply chain information of different entities is not shared externally so that the production information is lack of transparency. It is easy to make the whole supply chain produce higher time cost and capital cost, and lack the ability to deal with emergencies. If the block chain is applied to the supply chain, each entity can get a transparent and reliable unified information platform, which can view product information in real time. Therefore, the application in supply chain is considered as a promising development direction of block chain ^[14].

The development of the block chain is very swift and violent. At present, a global block chain freight Union (BiTA) has been set up in the world. It is a globalized block chain education and standard development industry organization. So far, more than 230 companies including general electric transport group and Jing dong logistics have joined the alliance. WAL-MART, the world's first business, also follows the pace of the block chain, and has developed a "smart package" technology. "Block chain" is mainly applied to the encryption of distribution address information. In February this year, rookie network and Tmall International (Tmall cross-border e-commerce platform) jointly issued, based on the block chain of tamper resistant logistics tracking data. In the mobile Taobao logistics details page, Consumers could through the button of the "check commodity logistics trace-ability information" enter the product trace-ability page,and check the purchase of all the trace-ability information to check the real source of goods.

4. Case analysis

In the background of the big information explosion, not only because of its own scientific and technological color, but also the Identity information is available and information, the promotion of "block chain" is more and more indiscernible from the media age, particularly the important degree of the timely mastering the information by large chain enterprises and so on, It all shows that the practical application of block chain is meaningful.

From the "chicken shortage" in KFC at the beginning of the year to the Spanish milk powder incident some time ago, food supply and safety issues became the focus of discussion. At the beginning of the year, the "chicken shortage" incident, KFC, which specializes in chicken for decades causes problems in distribution due to the "operational failure" of new logistics providers, all the chicken raw material in all the UK are stored in the town of Rugby, because the flow of logistics vehicles is blocking the nearby freeway, the supply is not up. KFC has to close to seven hundred stores for the time being. This event shows that the large enterprise scale, the higher stability coefficient requirements of supply chain operation. If any part of the supply chain has problems, it will lead to an unmeasurable loss, especially for a chain of catering enterprises like KFC, the importance of efficient and controllable supply system is self-evident. This shows the importance of information transmission in the supply chain.

The 8 tons of fake milk powder in Spain at the end of April was confirmed by police. The criminal organization bought fake milk powder in bulk in Poland for 1 euros per kilogram, and sent it to Spain with internal packaging bags and packing boxes with internationally known milk powder brands. When the bulk fake milk powder enters the packaging plant in Girona. Because of the absence of safety, the workers manually put the fake milk powder into a famous brand bag and put them in a famous brand packing box and ready to be distributed at any time. The fake milk powder after packaging is priced at 10 euros per 600 grams. In this case, because of the opaque material procurement information in the supply chain, consumers can not know the real source of milk powder, and the authenticity of the goods is difficult to identify.

From the above two cases, for the chain catering enterprises like KFC, the disunity of information can easily lead to the failure of many stores to operate normally. If the block chain technology can be applied on the basis of its original supply chain, the high transparency of information can make the supply chain more coordinated development; For the fake milk powder incident, using block chain technology in the supply chain, the powder can record the whole circulation process from the origin to the distribution in the supply chain, Providing more high-quality products and services for consumers.

In fact, there are already domestic teams working on the application of block chains to supply chain products.

Linfinitly is a distributed supply chain platform based on block chain, material association and data technology, it is establish for the actual business pain and development needs of enterprises. Linfinitly CEO Wang Xiao Tong proposed the Linfinitly's block chain ecological solution -- the Linfinitly supply chain trace-ability data platform and the Linfinitly block chain intelligent gateway and the intelligent material united data platform. He said that Linfinitly will be committed to the whole process of production and movement in the process of joint research and development with cooperative enterprises. Storing the digital information of the product into the block chain network by the "one thing and one code, the code is chased".

Through the one-to-one correspondence of RFID, QR code and other digital tags, data can be collected, traded and circulated, and every step record from calculation and analysis can be left on the block chain. Linfinitly is based on the block chain intelligent contract, which ensures the openness and transparency of information can greatly enhance the anti-counterfeiting ability of high-end products, restrain the occurrence of illegal behavior, and provide consumers with more real and quality assurance items ^[15].



Figure 1 from Linfinity

The organic combination of block chain and supply chain is a win-win for both sides. On the one hand, because the block chain has the characteristics of transparency, extensibility and high security, it can weaken the disadvantages of the supply chain. On the other hand, The application of block chain in supply chain will accelerate the public's understanding of block chain. Through specific cases, we can better understanding and applying block chain technology to promote the development of block chain, and lay a mass foundation for the application of block chain in other fields^[16].

5. Conclusion

With the development of science and technology, "block chain technology" and "new retail" have become the focus of topic. How to correctly explore these technologies to combine the traditional industries with the original traditional industries is a direction that people should consider and study at the moment, The online and offline integration development of " new retailing" and the embedded application of " block chain technology" in supply chain management seem to be independent of each other. If we use a certain mechanism to develop the three together and give full play to their respective advantages, it will produce greater benefits.

Professor Huang You Fang of Shanghai Maritime University said that block chain technology can be widely used in many aspects, such as finance, medical treatment, education, Internet of things, electronic commerce and so on. Times are developing towards technology, but he also made it clear that the practical in application of block chains will take some time. Finally, it concludes with a paragraph by Professor Huang You Fang: " Looking back, we think the current situation is still good at the supply chain level before there is no block chain technology, and with block chain technology, we can study what defects exist in the industry. First of all, there is a lack of transparency, for example, the relationship between the customer price and the real cost of products cannot be established, and it is difficult for all participants in the supply chain to know about the related current situation and existed problems. Therefore, the efficiency of supply chain is affected. When disputes arise, the process of proving or chasing responsibility is very time-consuming and even sometimes difficult to realize, which is the attractive place for the supply chain in the future application of block chain, and it is also worthy of our attention."

References

- [1] Chen Runsheng. Supply chain Management in New Retail [A]. The modernization of commerce is in 2018
- [2] Wang Baoyi. The essence, cause and practice of New Retail [J]. China's Circulation economy
- [3] Huang Shuo. Read the new retail supply chain: retailers, distributors, logistics services brand [OL]. Logistics Salon 2010

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- [4] Wang Yan. *Integrated supply chain-Strategic Design and Management* [M]. Beijing: China material Publishing House
- [5] Li Yingwu. Application of Block chain Technology in New Retail [OL]. The power network is now in place in 2008.
- [6] Bradley.p..2001.The certainty of uncertainty.Supply Chain Management Review5(2)
- [7] Zhang Yuanchang. *Logistics Operations and process Reengineering* [M]. Beijing: China Textile Publishing House 2004
- [8] Bradley.p..2001.The certainty of uncertainty.Supply Chain Management Review5(2)
- [9] Chapman.RJ.2006.Simple Tools and Techniques for Enterprise Risk Management.John Wiley&sons.pp.494
- [10] Xu Ming Ming. The principle of block chain and its application case [J]. New economy
- [11] Lin Xiao Chi, Hu Ye Qianwen. A Review of the Research on Block chain Technology [J]. Financial Market Research! 2016! 12)
- [12] Lin Xiao Chi, Hu Ye Qianwen. A Review of the Research on Block chain Technology [J]. Financial Market Research! 2016! 12)
- [13] Huang Shuo. Read the new retail supply chain: retailers, distributors, logistics services brand [OL]. Logistics Salon 2010
- [14] Wang Yan. *Integrated supply chain-Strategic Design and Management* [M]. Beijing: China material Publishing House
- [15] Linfinity. Application of block chain technology to supply chain scene[OL].
- [16] Wang Yan. *Integrated supply chain-Strategic Design and Management* [M]. Beijing: China material Publishing House