Discussion on the Optimization of Web of Things Supply Chain of Agricultural Products and Information Sharing Based on RFID

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Abstract. The emergence of Web of things technology has completely refreshed people's understanding of the relationship between objects and wireless networks. After people realize the use value of the Web of things, people's skilled use of the Web of things helps people to come up with a combination of the Web of things and the SC. This paper mainly introduces the basic framework of the Web of things and puts forward the optimization scheme and information sharing model of the SC of the Web of things for agricultural products based on RFID.

Keywords: RFID, Agricultural Products, Web of Things, SC

1. Introduction

According to the statistics of keywords of the Web of things, we find that the concept of the Web of things first appeared in Bill Gates's book the road to the future. Due to the limitations of wireless networks, hardware devices and sensors at that time, Bill Gates's proposal on the Web of things failed to be recognized by others. The Web of things refers to a network where all items are connected to the Internet through RFID information sensing equipment to realize intelligent identification and intelligent management.

In recent years, with the rapid progress and update of Web of things technology, the form of enterprise interaction has changed completely. This change broadens the flow of information between businesses and the economy. Information sharing has become an important information flow platform. In order to ensure the stability of information flow, people invented the supply information sharing technology. SC technology can be regarded as an information sharing platform based on Web of things technology[1-2].
2. A brief overview of the Web of things

2.1. Key concepts

The Web of things and SC are interrelated. The participants of the Web of things include users of the SC and various中间men. The information communication channels of participants present a network structure through the Internet. The actual concept of the Web of things refers to the network channels for enterprises to query and extract the required information and cooperate and communicate with each other.

2.2. Structure system of Web of things

A mature and stable Web of things system should include six main parts. They are product electronic code (EPC), RFID tag and reader, EPC middleware, intelligent analysis system, EPC information service system and object name resolution service system. There are three main levels in the Web of things system. They are enterprise internal layer, business partner layer and application service layer[3].

3. Application of the combination of Web of things and information sharing in the SC of agricultural products

The Web of things can be regarded as the integration of EPC technology and Internet technology. It can label any commodity with the ability of identification. Web of things technology can help the SC system to share information quickly through the network. It can help people manage the SC system efficiently (see Table 1). In fact, the Web of things can break the transparent SC to facilitate users to extract the required information.

| Functional platform                  | Main functions                                      |
|--------------------------------------|-----------------------------------------------------|
| RFID Middleware                      | Processing label information                        |
| EPC informational service platform    | Communication with server                           |
| ONS service platform                 | Query EPCIS address                                 |
| EPCIS platform                       | Update EPC information and return information        |

At present, many countries use network technology as the core to accurately apply the Web of things SC to the production of agricultural products. With the quality and safety of agricultural products gradually being concerned, the application of Web of things SC in the field of food safety of agricultural products will run through the whole SC of agricultural products.

4. Research on the application model of the Web of things in the SC of agricultural products based on RFID

4.1. Establishment of application model of agricultural products SC based on Web of things

In fact, the emergence of RFID technology provides real-time information sharing of logistics SC
management. As we all know, the safety of agricultural products is an important food safety issue. In the production process of agricultural products, producers input various information into the production database. The Web of things can attach RFID tags to agricultural products. The tag carries the EPC code. This code is also the only identification of agricultural products. Purchasers can query the information of corresponding agricultural products in the Web of things through EPC code[4].

4.2. Establishment of tracking model of agricultural products logistics information

In the process of trade and circulation of agricultural products, when the reader of express delivery site receives the coding information of EPC, the logistics information of agricultural products will be immediately put into the local network system. Through the centralized processing of network system, purchasers can access the logistics information of agricultural products through EPC coding information.

4.3. Static information sharing and dynamic information sharing of agricultural products

When consumers want to query raw information of agricultural products, users can scan EPC code through software to query static information. The original information of agricultural products includes farm information, breeder information, feed information and epidemic prevention information. Original information is also called static information. Similarly, the processing information and logistics information of agricultural products are called dynamic information. By scanning EPC codes, people can easily get them.

5. The optimization scheme of Web of things SC of agricultural products based on RFID Technology

5.1. The SC of agricultural products should meet the needs of customers with faster response speed

It turns out that all enterprises in the SC rely on the Web of things to obtain information. In order to improve the overall competitive level of the SC, we should increase the visibility, information transparency and resource utilization of the SC of agricultural products. More importantly, we need to meet the actual needs of customers faster[5].

5.2. Reasonable internal optimization of agricultural products SC management

As we all know, the Web of things can maximize the sharing of information. It can also coordinate the work of SC members for integrated management of SC. In addition, the internal optimization of SC management can ensure that enterprises can choose the right partners. In addition, it can also help the SC manage the node control of each link.

5.3. To optimize the SC of agricultural products with the concept of product service

The establishment of the SC of agricultural products based on the Web of things should be centered on the service of products. Through the Web of things SC, enterprises can ensure the accuracy of information in the procurement, logistics and production process of agricultural products. Enterprises can effectively monitor the trade and circulation of agricultural products. The basic quality of agricultural product SC should be to improve customer satisfaction[6].
6. Conclusion

The use of the Web of things has increased the frequency of trade cooperation between producers and buyers of agricultural products. The use of the Web of things SC for agricultural products makes this trade relationship more stable. Compared with a single Web of things, the Web of things SC is easier to meet the actual needs of each member.

References

[1] LI RU-nian. Study on the Web of things Based on RFID Technique[J]. journal of china academy of electronics & information technology, 2009.

[2] Hongbo Z , Wei G . Seasonal Agricultural Products Distribution and Traceability System Based on the RFID Web of things[J]. International Journal of Smart Home, 2016, 10(11):1-14.

[3] Weng, Chuanfang, Huang. Cold-chain Logistics Optimization of Fresh Agricultural Products Enterprises Based on Web of things[C] 2019.

[4] Ren S , Xu H , Li A , et al. Meat-productions tracking and traceability system based on Web of things with RFID and GIS[J]. Nongye Gongcheng Xuebao/transactions of the Chinese Society of Agricultural Engineering, 2010, 26(10):229-235.

[5] Zhangi T , Wang X , Chui J , et al. Automotive Recycling Information Management Based on the Web of things and RFID Technology[C] IEEE International Conference on Advanced Management Science. 0.

[6] Zhao Y , Cao N . Research on Traceability of Agricultural Products Based on Web of things[C] 2017 IEEE International Conference on Computational Science and Engineering (CSE) and IEEE International Conference on Embedded and Ubiquitous Computing (EUC). IEEE, 2017.