International Journal of Science and Engineering Applications
Volume 12-Issue 03, 108 – 110, 2023, ISSN:- 2319 - 7560
DOI: 10.7753/IJSEA1203.1040

Implementation of Efficiency Tracking and Evaluation Algorithm for Agricultural Product Circulation Based on Radio Frequency Data Tags and Android Platform

ZHOU Na
Hunan University of Technology and Business
Changsha, China

CHEN Liming
Hunan University of Technology and Business
Changsha, China

Abstract:The article believes that the circulation efficiency of agricultural products, especially the efficiency of the circulation system of agricultural products, is the ratio of circulation output to circulation cost in the process of circulation of agricultural products. The circulation efficiency of agricultural products cannot be measured by a single indicator. The article argues that the PCA-DEA combination evaluation model can be constructed by using the market integration degree, market concentration degree, technical efficiency, consumer satisfaction, circulation spread, transaction costs, and using the principal component weight constraint cone to objectively assign DEA values. At the same time, it is necessary to develop a circulation mode of agricultural products led by leading enterprises, promote the intensive processing of agricultural products, and improve the circulation efficiency.

Keywords: Efficiency Tracking, Evaluation Algorithm, Agricultural Product Circulation, Radio Frequency Data Tag

1. INTRODUCTION

The U.S. military not only attaches great importance to the application of radio frequency identification technology, but also attaches great importance to related standardization work. As early as 1996 [1], the "Active Radio Frequency Identification Data Format Specification Version 1.0" was formulated. In 2002, the specification was updated to version 2.0. The specification stipulates the types of tags used by the US military's active radio frequency identification [2], the division of data areas in the tags, and the data format of the US military's active radio frequency identification tags for the two modes of supply support and troop mobility [3]. The circulation of agricultural products connects production and consumption. The core content of the development of the modern agricultural industrial system, production system and management system is the circulation of agricultural products. Research at home and abroad shows [4] that the circulation efficiency of agricultural products plays an important role in the development of agriculture and the entire national economy [5].

After 30 years of market-oriented reform, the vast majority of agricultural products in China have established a market-oriented agricultural product circulation system [6], basically forming a nationwide large-scale circulation of agricultural products. In theory, a perfect market mechanism will automatically follow the principle of comparative advantage to arrange the production and circulation [7] of agricultural products. The development of modern agriculture is no longer limited to the field of agricultural production [8]. The establishment and improvement of the agricultural product circulation system is of great significance to the development of modern agriculture. Since the No. 1 document in 2010, the state has proposed that agricultural products should "reduce circulation links and reduce circulation costs" [9]; in 2013, the Central No. 1 document also proposed: "Improve the circulation efficiency of agricultural products, and vigorously cultivate modern circulation methods [10] and new circulation formats"; Due to the short development time of agricultural product circulation [11], there are still problems such as small scale of circulation entities, single circulation and transaction methods, backward circulation facilities and technologies, high circulation costs, and low quality and safety of agricultural products [12].

In 2014, the Central Document No. 1 clearly stated that "strengthen the system construction to promote the fair trade of agricultural products and improve the circulation efficiency" [13]. The circulation of agricultural products is a complex system in terms of system, which includes not only the circulation problems of micro-enterprises, but also the sum of the relationship [14] between the production and sales of agricultural products, such as the main body of circulation, the circulation carrier [15], the circulation intermediary, the circulation market, and the supporting system. In 2017, the output of vegetables and fruits in my country was about 817 million tons and 250 million tons respectively [16], and the output of aquatic products and meat reached 64.453 million tons and 86.544 million tons respectively, ranking first in the world for many consecutive years [17]. However, due to various reasons, the circulation efficiency of agricultural products in my country has not been significantly improved, and problems such as many links [18], high costs, large losses and low efficiency are still prominent. In 013, it was emphasized again: "Improve the circulation efficiency of agricultural products, seize the opportunity of the new era to vigorously develop a modern circulation model [19], and strengthen the diversified development of circulation".

The No. 1 Central Document in 2014 also clearly stated that "further strengthen the laws and regulations on the circulation of agricultural products in my country [20], improve the infrastructure construction of the circulation efficiency of agricultural products, and promote the improvement and improvement of the circulation efficiency." We will make great efforts to reform [21] the supply side, encourage innovation and development, accelerate the modernization of agriculture, and further improve the modernization of agricultural circulation." There are three types of active RFID tags dedicated to the US military, all produced by SAVI [22], namely: SealTag, 410Tag and 412Tag. Among them, the

storage capacity of SealTag and 410Tag is 2K bytes EEPROM standard memory and 128K bytes RAM expansion memory [23], and the storage capacity of 412Tag is 4K bytes EEPROM standard memory. The reason for using RAM is determined by the technical and economic conditions at that time [24].

2. THE PROPOSED METHODOLOGY

2.1 The RF Data Tag

Evaluating the circulation efficiency of agricultural products in Anhui Province, analyzing its evolution trend, and further discussing the influencing factors of the circulation efficiency of agricultural products, can not only promote the development of Anhui Province itself, but also have certain enlightening significance for the improvement of the circulation efficiency of agricultural products in other provinces. The existence of these problems hinders the further improvement of the circulation efficiency of agricultural products, which not only causes welfare losses to the relevant circulation entities of agricultural products, but also affects the further development of national agriculture and the national economy. This requires us to conduct a more comprehensive study on the circulation efficiency of agricultural products in China. The higher the sales price of agricultural products, the higher the efficiency. The circulation owners believe that the larger the circulation price difference, the faster the circulation speed, the higher the circulation efficiency, while the consumers think that the lower the product price, the more variety, the fresher the product, the better the quality, and the better the circulation efficiency. higher. As a result, it brings great difficulties to the evaluation of the circulation efficiency of agricultural products and vegetables.

Database structure description information area (272 bytes), transportation control information data area (not more than 79 records), military material detailed information data area (not more than 1150 records), other information database area (not more than 1150 records) 5 part, as shown in Table 2. The traditional DEA models include the CCR model and the BCC model. The CCR model can be used to measure the technical efficiency value and scale efficiency value of the evaluation unit, but the technical efficiency here is also called the comprehensive efficiency, which cannot simply be used to evaluate the technical effectiveness of the evaluation unit, while the BCC model is evaluating a Effective evaluation unit technology model, the combination of CCR and BCC model can get the analysis of overall efficiency to technical efficiency and scale efficiency.

Since the 412Tag has only 4K memory, when it is mixed with the 128K 410Tag, it will obviously cause misrecognition. To solve this problem, the US military has formulated the memory address mapping relationship between the two tags to ensure that the data will not be misread. The address mapping of the two labels is shown in Table 3. It can also include logistics information such as transportation; it includes not only code, but also text information, so it can realize the identification of the detailed content of materials without a network.

2.2 The Efficiency Tracking of Agricultural Products Circulation

Referring to the existing research results and combining the actual situation of agricultural product circulation in my country, this paper follows the principles of systematization, completeness and comparability, and constructs the evaluation index of agricultural product circulation efficiency from three aspects: agricultural product circulation speed, agricultural product circulation scale and agricultural product circulation economic benefits. system. First of all, the circulation speed of agricultural products reflects the efficiency of the circulation channels of agricultural products. The shorter the turnover time of agricultural products, the faster the transmission speed is in the circulation process. The circulation efficiency in this paper, especially the efficiency of the circulation system, is the ratio of circulation output to circulation cost in the process of commodity circulation.

What we mean by "circulation is efficient" means that a given circulation output can be obtained with the minimum circulation cost, or the maximum circulation output can be obtained with a given circulation cost. It is not comprehensive to measure the circulation efficiency by only one of them, and the two should be considered comprehensively. Generally speaking, an increase in circulation output will inevitably require an increase in circulation costs. With the gradual establishment and improvement of my country's market economic system, how to realize the efficient allocation of products has become an important research topic. Circulation efficiency is an important indicator to measure the circulation effect. Therefore, the research on circulation efficiency has become a research hotspot in recent years. The market economy of developed countries abroad was established earlier, and the research results on circulation efficiency are also richer. There is no accurate definition of the concept of circulation efficiency at home and abroad. After neoclassical economics abstracts production and consumption, it ignores the circulation factors connecting the two, and always replaces them with transaction efficiency. At present, there are various expressions such as transaction efficiency, circulation efficiency, and operation efficiency. Each expression has different meanings and has its own emphasis.

2.3 The Efficiency Tracking and Evaluation Algorithm of Agricultural Product Circulation on Android Platform

Through the above analysis, the following conclusions can be drawn: During the ten years from 2007 to 2016, the circulation efficiency of agricultural products in six provinces in central my country has generally changed from negative to positive, showing a fluctuating upward trend. The average comprehensive score of agricultural product circulation efficiency in 2007 was -0.5383, rose to 0.5133 in 2016, and the overall rate of increase was relatively fast. The second method is to count the output of the circulation sector according to the "added value" of the circulation sector, which is more operational. Using this method, the purchase price of goods and the value of intermediate inputs are deducted from the sales of the distributors to represent the quantity of services provided by the distributors, that is, the output level of the distribution sector.

Due to different understandings of circulation efficiency, there are also great differences in the evaluation methods of circulation efficiency. Some scholars believe that it is feasible to analyze the circulation structure for circulation efficiency, so from the perspective of industrial organization, SCP, namely market structure-market behavior-market performance method, is used to analyze industrial performance. The "agricultural-supermarket docking" model with supermarkets as the core mainly refers to the circulation model directly established by large supermarkets or chain supermarket enterprises and farmers, agricultural cooperatives, and

primary agricultural product processing enterprises through procurement contracts. The leading role, the pricing power is in the supermarket, and the supermarket determines the terminal price of agricultural products. Vegetable production increased from 257.267 million tons in 1995 to 817.000 million tons in 2017. Calculated according to the commodity rate of 80°/0, the current annual production of vegetables reaches 653.6 million tons, and after at least three circulation links, the total circulation scale will reach 1,960.8 million tons. The number of slaughtered pigs increased from 505.683 million in 2007 to 685.019 million in 2017.

Using the principal component analysis method, select the KMO that meets the principal component validity test index of 0.7, observe the eigenvalues and variance contributions of the sample variance in the statistical results, and extract the principal components of the input-output index according to the requirement that the cumulative contribution rate is greater than or equal to 85%.

3. CONCLUSIONS

The efficiency tracking of agricultural product circulation theoretically explores the connotation and extension of agricultural product circulation efficiency and the evaluation index system of circulation efficiency, and comprehensively studies various factors related to circulation efficiency in the field of agricultural product circulation to form a more comprehensive agricultural product circulation. The qualitative and quantitative analysis framework of efficiency provides a theoretical reference for the scientific definition and evaluation of the circulation efficiency of agricultural products and other products.

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