Research on Index System Construction of Agricultural E-commerce of Hubei Province

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Abstract: The e-commerce of agricultural products is an important part of "internet plus modern agriculture". As a major agricultural province in China, the inefficient circulation of traditional agricultural products of Hubei has become a bottleneck hindering the development of agriculture of the province. The use of e-commerce to enhance the circulation efficiency of agricultural products has made it a new growth point for agricultural and rural development and an innovative driving force for the sustained and rapid income increase of farmers. The index system of e-commerce for agricultural products should follow the scientific principle, systematic principle, simplicity principle and operability principle. By the means of questionnaire survey and literature analysis, the index system of e-commerce for Hubei's agricultural products, including four first-level indicators and sixteen second-level indicators, is given in this paper. Based on AHP, the weight of each index is given to calculate the result of index system of agricultural e-commerce of Hubei province.

1. Introduction

Hubei is a large agricultural province, with suitable agricultural climate conditions, many varieties of agricultural products and large scale, which is an important part of the agricultural economy. By the end of March 2017, the total number of geographical indications of agricultural products reached 313, and the number of registered brands ranked third in China. Among them, many brands of agricultural product geographical indications are famous for the famous Chinese regional "Top Hundred Brands", forming a competitive industrial cluster with certain competitiveness in the international and domestic markets. At present, there are still some problems, such as low degree of sales organization, single transaction mode, asymmetric supply and demand information, and unimpeded marketing channels. The resources and industrial advantages of the characteristic agricultural products cannot be transformed into commodity advantage and market advantage effectively, and they cannot play a role in the development of regional economy and the increase of farmers' income.

As a new type of business model, e-commerce has shown great potential after more than ten years of development. It has a great influence on the circulation of agricultural products. It not only reduces circulation, shortens circulation time, reduces circulation cost, improves circulation efficiency umbrella, but also promotes the construction of agricultural products standard, cold chain logistics, and safety traceability system. To promote the establishment of a modern market system for agricultural products. In recent years, the state has issued a lot of policies to support the development of agricultural products logistics and distribution system, agricultural products online trading and farmers' network stores, which have promoted the great development of the electronic commerce of agricultural products in China. Hubei also attaches great importance to the development of electronic commerce for agricultural

products. To seize opportunities, the relevant departments have also introduced a series of policies involving rural e-commerce to speed up the construction of the platform, promote the application scope, strengthen the support, innovate the way of development, perfect the service system, and open the environmental protection for the development of the electronic commerce of agricultural products. Barrier. All the parties in Hubei have actively accelerated the pace of rural e-commerce development. There are tens of thousands of agriculture related websites, and constantly open the online sales platform. A batch of special products have been formed around the characteristic industries. In addition to a batch of agricultural products business enterprises, Taobao professional villages and parks, the flow links, the reduction of circulation costs and the mitigation of circulation costs are reduced. It has played an active role in selling difficulties and cultivating rural e-commerce market. At present, the construction of electronic commerce infrastructure in the province is relatively perfect, which can meet the development of electronic commerce in Hubei province. Some agricultural products production and processing enterprises are also actively adapting to the market requirements.

2. Meaning, principles and methods of construction of the index system of agricultural e-commerce of Hubei province

2.1 Meaning

Evaluation index refers to a scientific method based on a definite goal and a certain standard to reflect the specific concept of the evaluation object and to make a rational measurement of the evaluation object. It has the characteristics of quantity, substitution, comprehensiveness and timeliness. The index system is composed of a series of interrelated and interdependent indicators. To evaluate and select different evaluation objects, we must establish a unified scale that can control and measure each object. The establishment of a complete set of evaluation index system helps to improve and control the evaluation objects reasonably. The key to decide whether the evaluation work is successful or not is to set up the evaluation index system scientifically according to the difference between the object of evaluation and the purpose of evaluation. How to evaluate the electronic commerce of agricultural products in Hubei Province, provide timely feedback information for the practice of sustainable development, and control the system is one of the hot issues in the present study. The electronic commerce of agricultural products is to introduce modern information technology and business means into the production and distribution of agricultural products, to publish and collect the information of agricultural products through the information network technology, and to realize the means of product transaction in the network. The electronic commerce of agricultural products has realized the effective link between the supply side and the demand side of the agricultural products, which not only solved the problem of the marketing of agricultural products, but also realized the maximization of the farmers' interests. With the popularization of electronic commerce in rural areas, the electronic commerce of agricultural products, including fresh products, has developed rapidly, and agricultural products have become another major commodity system that has been transferred into a new circulation model. Therefore, the selection and setting of the evaluation index of agricultural product e-commerce must seize the main and essential features of its development process, highlight the key indicators of the essential characteristics of agricultural products, and express the content of the evaluation with as few and accurate indicators as possible.

2.2 Principles

Scientific Principle. The design of the evaluation index system must be based on the scientific basis. The selection of the index, the determination of the weight of the index, the selection of the data and the calculation must be based on the accepted scientific theory. Each indicator should have a clear goal orientation, which can directly or indirectly reflect the characteristics of the website itself and avoid those ambiguous indicators. In addition, the hierarchical division of indicators should be consistent with logical thinking, and it cannot be classified by different standards and cross boundary division.

Systematic Principle. The evaluation index system should comprehensively and systematically reflect every aspect of the evaluated object. A system is a whole consisting of similar or related things according to certain internal relations. The index system must be measured by several indicators, and each index may be related to each other and restrict each other. But in actual evaluation, each index must be relatively independent, that is, we must consider the systematic nature of the index system.

Simplicity Principle. Scientific and reasonable evaluation index system should be easy to operate. The setting of the index system should be as simple and clear as possible to avoid the formation of a huge index group or the complex index tree. The setting of the index should consider the quantification of the index and the difficulty and reliability of the data acquisition. Its contents should be obtained directly or indirectly. In addition, when designing the index system, we must clarify the calculation method, expression method, and establish a general mathematical model, to facilitate the relevant departments to master the use.

Operability Principle. Whether the index system is practical is the vitality of the index system. The smaller the target is, the clearer the assessment is, but the entry is too cumbersome. It will also bring difficulties to the implementation of the evaluation. The content and operation of the practical requirement index system are simple. At the same time, practicality also requires comparability of the index system. The index system can distinguish different degree of evaluation objects and decides to look at the credibility of the evaluation results. The network information is very dynamic. Therefore, we must adhere to the principle of development, and the evaluation criteria of the object of rapid development must also be dynamic and developing. When the standard and evaluation index can be adjusted with the change of evaluation objects, the applicability of the evaluation index system is stronger.

2.3 Methods

We use the profound experience and impression of the third party electronic commerce website to make the small and medium-sized enterprise customers the most speaking group. In the evaluation of the construction of the third-party e-commerce websites, we can list several indicators in advance according to the status and characteristics of the third-party e-commerce websites, and then make a questionnaire survey. Small enterprises express their real experience and feelings, and in the design of questionnaires, the answers to questions can be set up very flexibly, and can be answered by scoring, rating and so on. After collecting the questionnaire, the questions will be collected and summarized. The standard of the quality and safety of agricultural products should be adapted to the needs of e-commerce, set up perfect matching standards, and provide guarantee for the development of electronic commerce and safety supervision of agricultural products. The standard of quality and safety is an important guarantee to ensure the safe consumption of agricultural products on the Internet. However, due to the lag of standard construction, the existing standard male is to meet the new model of the marketing of agricultural products. By using the characteristics of the inquiry and traceability of the transaction process of the e-commerce platform, it can help the agricultural product providers to establish the security reputation and ensure the value of the ecological quality agricultural products, thus attracting more consumers and forming a virtuous cycle of agricultural products trading. After having a certain theoretical basis, the designer can use some related and mature index system as a reference, and interviews with professionals can be used to construct the framework of the evaluation index system. When designing evaluation indicators, we should grasp the overall position and select representative indicators. We can invite experts in the direction of electronic commerce and website technical developers to form an expert evaluation group to refer to the design of the evaluation index system of the third-party e-commerce websites, and then evaluate the construction quality of the third-party e-commerce websites according to a certain index system. Evaluation of the way to evaluate the results of the results of the site to determine the scores or levels of the website, the score in the back of the website needs to further improve the level of its construction. The operation of expert comprehensive evaluation is like that of customer survey.

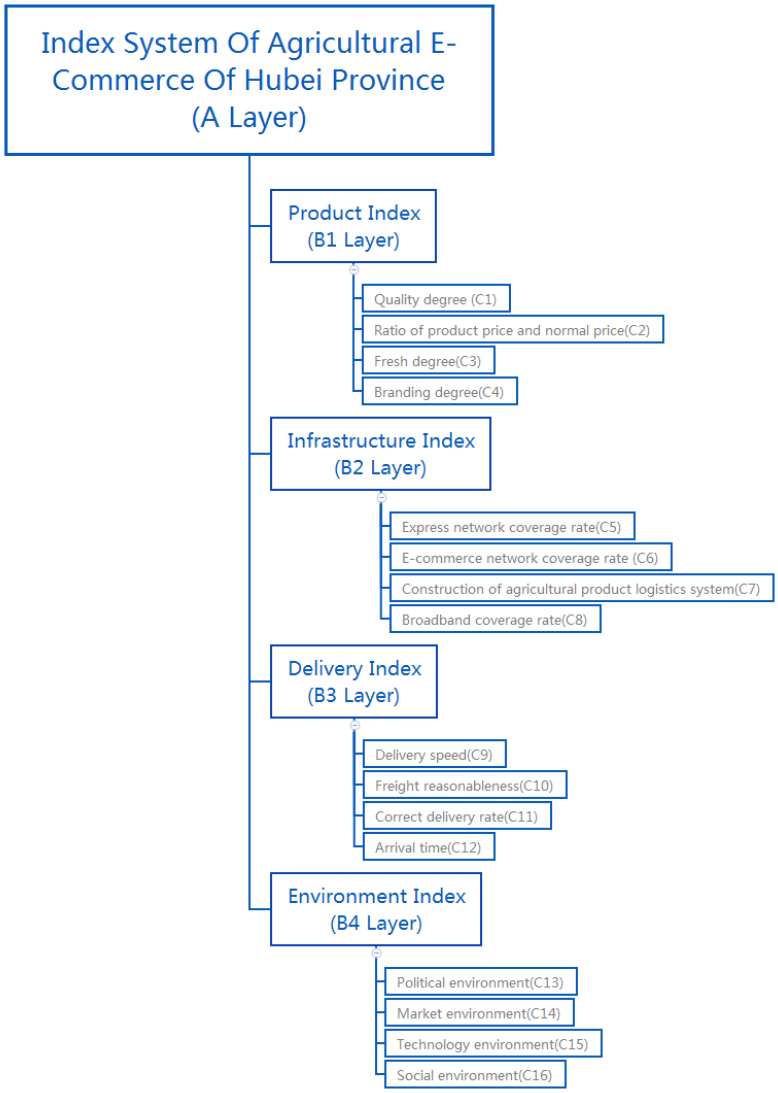

Figure 1. Index system of agricultural e-commerce of Hubei province

3. Construction of index system of agricultural e-commerce of Hubei province

3.1 Product index

To carry out agricultural products trading on e-commerce platform has higher requirements for uniform standards, which is determined by the convenience and virtuality of network transactions. Unified agricultural product standards can meet the standardization of network transactions, and easier to distribute through logistics. The more well-known goods, the more they can be accepted by more customers, will have better sales, can truly highlight the advantages of e-commerce in commodity trading. In Hubei, the production of agricultural products is relatively scattered, the standardization of production and packaging is low, it is difficult to unify the various indicators of product quality, and the lack of famous brand in the country. The number of enterprises developing network marketing is large, but sales volume is not high. The online transaction of fresh agricultural products has always been the bottleneck of the development of the agricultural e-commerce. The circulation cost of the fresh fruits and vegetables in our country is about half of the circulation cost. Although the e-commerce can reduce the intermediate link and reduce the cost of the logistics, the logistics cost of small scale production may

be more than the traditional way if there is no sales support. It's higher. In addition, because of the characteristics of fresh agricultural products, they want to preserve quality and freshness, and put forward higher requirements for logistics distribution and storage conditions. Agriculture is greatly influenced by the natural environment, and the agricultural products reflect the characteristics of the record. Because of the imperfect quality standard system of the agricultural products and the lack of farmers' consciousness, the standardization degree is low, and a considerable number of farmers are not very aware of the agricultural standardization. It is difficult to implement the standardization of agricultural products in Hubei Province, which is more difficult to implement the standardization of agricultural products, and the agricultural products on the Internet have a high requirement for the unified packaging standard, but they also have difficulties in selecting and identifying them at the same time. It has a certain restrictive effect on the development of Hubei's agricultural e-commerce.

3.2 Infrastructure index

Electronic commerce is built based on network infrastructure, and the coverage rate of the network is a basic condition to drive the development of e-commerce of characteristic agricultural products. In recent years, the basic construction of rural information network in Hubei province has been greatly developed, but because of the uneven development of the region, the level of rural e-commerce infrastructure is also different, and the farmers in some remote areas do not have access to the Internet. Compared with the developed areas in eastern China, the development of agricultural e-commerce in various provinces is still lagging. The asymmetry of production and marketing information of agricultural products has occurred frequently. The electronic commerce in Hubei is still in its infancy, the atmosphere of development is not strong enough, most of the local farmers are conservative and the level of culture is low. It is more accustomed to the traditional business mode of delivering one hand by one hand, and the development of the electronic commerce of agricultural products is not enough with some local governments, agricultural products related enterprises and agricultural organizations. Attention, resulting in a strong awareness of the national electricity supplier is not strong enough. In addition, the rural infrastructure in Hubei is not perfect. There are few outlets in Township banks, and it is even harder to see other joint-stock commercial banks. Hubei also lacks influential e-commerce platform, warehousing, gas storage, cold chain logistics and cargo operation centre to support the development of the county e-commerce infrastructure. The cold chain foundation and cold chain equipment are still different from the national average in the construction of cold chain logistics system in Hubei area. The local government of Hubei province should summarize and analyse the infrastructure construction of each link of cold chain logistics. From the aspects of preservation, cold storage, pre-cooling, inspection and other aspects, a batch of key construction projects are introduced to encourage the construction of the infrastructure of cold chain logistics enterprises. Taking the important link as the breakthrough point, we need to make a reasonable plan for a batch of processing fresh products centres which need low temperature treatment. With the special agricultural products plate base, county and some areas in the centre of the city, a perfect wholesale market for agricultural products is set up, and the construction of refrigerated facilities is strengthened.

3.3 Delivery index

In the whole process of e-commerce transactions, the acquisition of commodity information, the purchase of the purchase order and the payment of the consumption amount are all completed directly through the network. However, as an important part of the e-business process, logistics must be sent out of the warehouse by the warehouse personnel, then received by the express company, and finally sent by the distribution personnel to the customer's hand. In the middle. The efficiency of logistics delivery and distribution directly affects customer satisfaction. In the first half of the year, there are logistics and shipping problems in the ten major hot spots of network retail, and the traditional e-business evaluation system is relatively general on logistics service indicators. In fact, from the information of consumer feedback, logistics service indicators can be roughly divided into distribution mode selectivity, freight rationality, order processing efficiency, delivery speed, delivery correctness, commodity packaging, and

good goods and so on. With the rapid development and expansion of e-commerce, e-commerce enterprises have become more and more dependent on logistics. At the same time, the customer satisfaction of e-commerce is becoming more and more affected by the efficiency of logistics distribution and the effect of distribution. Therefore, e-commerce enterprises should attach importance to the entire logistics and distribution links and pay attention to the problems in logistics delivery. The characteristics of the circulation of special agricultural products have its special characteristics, such as strong regional, strong seasonal, dispersed producers and perishable and so on, which have increased the difficulty and cost of transportation and limited the circulation radius. At the same time, with the improvement of consumers' expectation of e-commerce logistics service, the timeliness and low-cost requirements of logistics distribution are becoming more and more prominent. At present, the logistics and distribution system of agricultural products in Hubei is not perfect, especially the relative lag of the development of cold chain logistics, there are many problems such as low organizational level, low logistics specialization, low socialization, high cost, long distribution time, serious loss and so on. The logistics status of agricultural products in Hubei and the characteristics of the characteristics of agricultural products are required. There is a big gap, which needs further efforts to improve together.

3.4 Environment index

Politics will exert a great influence on business regulation, consumption and other business related activities. The political system, system, principles, policies, laws and regulations of a country or region. These factors often restrict and affect the business behavior of enterprises, especially affecting the long-term investment behavior of enterprises. It refers to the general situation of the development of the national economy, the international and domestic economic forms and trends of economic development, the industrial environment and competitive environment which the enterprise faces. The marketing personnel need to look at the economy and trade of a country from two aspects in the short and long term, especially in the time of international marketing. Other general economic conditions and trends are also important for the success of an enterprise. The price changes of wages, suppliers and competitors, as well as government policies, affect the production cost of the product and the cost of the service provided, as well as the situation of the market they are selling. These economic factors may lead to competition in the industry, or the elimination of the company from the market. It may also prolong product life, encourage enterprises to replace manual labour with automation, promote foreign investment or introduce local investment, weaken the strong market or make the safe market risk. Lifestyle changes mainly include current and emerging lifestyles and fashions. Cultural issues reflect the fact that when international exchanges make society more diversified and external influence more open, the demand for material is getting higher and higher. With the improvement of material demand, people's need for social interaction, self-esteem, knowledge and aesthetics is more intense. This is also one of the challenges facing enterprises. In the event of an electric business, the gift is generally set up, and the quality and practicality of the gift is also very important. When the quality of the gift is poor or there is no use, it will also bring the complaint of the buyer. In addition, we often see in the seller's evaluation information like just a few days after the purchase of goods, the commodity because of activities or other reasons to reduce the discontent, so the business should make a reasonable price difference scheme to cope with the problem of seed delivery.

4. Determination of index weight of agricultural e-commerce of Hubei province

4.1 Determination method

The analytic hierarchy process (AHP) is a multi-criteria decision-making method combining quantitative and qualitative analysis. It provides a new, concise and practical modelling tool for this kind of problem decision. The AHP method decomposes a complex problem into a component and forms a hierarchical structure according to the dominating relationship. Then the relative importance of the decision scheme is determined by the comparison method based on the Delphi method. The AHP method is quantifying the thinking process of experts and can handle the inconsistent opinions of experts by

consistency checking. Although the AHP method is derived from the deeper mathematical knowledge, the whole process embodies the decomposition, judgment and synthesis of human decision thinking characteristics, and expresses and deal with the subjective judgment of people in the form of quantity. By quantitative research based on the qualitative analysis of our people's thinking, we not only maintain the integrity and consistency of our thinking process, but also let our thinking control the accuracy based on quantitative analysis and improve the accuracy and effectiveness of our decision making. In the hierarchical structure model, the upper level factors are identified by the action line and the relationship between the next level factors is used. If a factor is related to all factors in the next level, it is said that there is a complete hierarchical relationship between this factor and the next level. If a factor is only related to some factors in the next level, the relationship between this factor and the next level is incomplete. A sub level can be established between the layers, and the sub level is a factor belonging to the main level. Its factors are associated with the next level of factors, but they do not form an independent level. When a certain level contains many factors, it can be further divided into several sub levels.

The first step is to establish a hierarchical structure model. Based on in-depth analysis of practical problems, various factors are decomposed from top to bottom into several levels according to different attributes. The factors of the same layer are influenced by the factors belonging to the upper layer or on the upper factors, and at the same time, the factors of the next layer or the role of the lower factors are dominated. The top level is the target layer, usually with only 1 factors, the lowest level is usually the plan or the object layer, and there is one or several levels in the middle, usually the criterion or the index layer. When there are too many criteria, we should further decompose the sub criterion level.

The second step is to construct a pair comparison matrix. Starting from the second layer of the hierarchical structure model, the comparison matrix is constructed by the comparison method and the comparison scale from the same layer of each factor that belongs to the upper layer of the upper layer until the lowest level.

The third step is to compute weight vectors and do consistency checking. For each pair of paired comparison matrices, the maximum characteristic roots and corresponding eigenvectors are calculated, and consistency tests are made using consistency index, random consistency index and consistency ratio. If the test is passed, the eigenvector is the weight vector. If not, we need to reconstruct the paired comparison matrix.

The fourth step is to compute the combinatorial weight vector and make the consistency test. The combination weight vector of the lowest level to the target is calculated, and the combination consistency test is done according to the formula. If the test is passed, the decision can be made according to the result expressed by the combination weight vector. Otherwise, the model or the pair comparison matrix with large consistency ratio need to be reconsidered.

4.2 Weight result

The result is showed in the following table.

Table 1. Determination of evaluation index weight according to AHP

index name	weight
Quality degree	0.0535
Ratio of product price and normal price	0.0547
Fresh degree	0.0237
Branding degree	0.0841
Express network coverage rate	0.0761
E-commerce network coverage rate	0.0456
Construction of agricultural product logistics	0.0792

Broadband coverage rate	0.025
Delivery speed	0.223
Freight reasonableness	0.0354
Correct delivery rate	0.0408
Arrival time	0.0885
Political environment	0.0639
Market environment	0.0348
Technology environment	0.0214
Social environment	0.0503

5. Conclusions

According to the concept and connotation of agricultural e-commerce, a set of index system of agricultural e-commerce of Hubei province is designed with reference to the relevant literature. The main conclusions are shown as follows:

(1) This paper points out meaning, principles and methods of building the index system of agricultural e-commerce of Hubei province. Based on the relevant literature, the article draws the index system structure chart of index system of agricultural e-commerce of Hubei province.

(2) The objective layer of the index system of agricultural e-commerce of Hubei province is divided into four rule layers. Each rule layer is decomposed into four scheme layers, and all the scheme layers are explained and illustrated.

(3) The weight of the sixteen second-level index is the key to the index system of e-commerce. In this paper, AHP is used to determine the weight of each evaluation index.

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