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Research Article

Fuzzy Multicriteria Decision-Making Analysis of Agricultural Product Logistics in Agricultural Economic Management

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The purpose is to establish a logistics supplier evaluation and selection model for green supply chain, which can effectively take into account the environmental problems, while the enterprise economy is developing. The logistics supplier evaluation index system is established under the background of green logistics based on fuzzy theory and multicriteria decision-making theory. The green competitiveness index is innovatively introduced into the system. Moreover, a fuzzy hybrid multicriteria decision-making method model is established based on the deficiency of the current supplier evaluation and selection methods, so as to select logistics suppliers; finally, the established logistics supplier evaluation and selection method is applied to real enterprises for example verification. The results are as follows. The direct relationship matrix is obtained according to the opinions of the expert group, and the relationship matrix is defuzzified and standardized to obtain the clear value of the secondary index. Finally, the fit between the evaluation results of the five logistics companies and the positive and negative ideal values is calculated. According to the principle of maximum fit, the evaluation priority of the five companies is $4 > 3 > 2 > 5 > 1$. Thereby, taking the fuzzy multicriteria decision-making analysis method as the evaluation model has high reference value for the evaluation of green logistics companies, solves the problem of how production and sales enterprises choose green logistics suppliers, fully meets the needs of enterprises and governments that focus on the green degree of suppliers in the supply chain, and can effectively promote the efficient operation of green supply chain management.

1. Introduction

The division of labor in all sectors of society becomes increasingly professional and meticulous with the continuous development of global economic integration and the increasingly fierce international competition. In order to better adapt and develop, enterprises must focus their limited capabilities and resources on their core competitiveness and hand over the remaining uncompetitive activities to relatively more professional enterprises, the most typical of which is logistics outsourcing; besides, the proportion of circulation cost is increasing with the gradual decline of enterprise production cost. Thereby, enterprises will continue to outsource transportation business to logistics enterprises, that is, third-party logistics enterprises, so as to make their own operation more professional and efficient [1–3]. In western developed countries, the proportion of production and sales enterprises participating in logistics outsourcing business has exceeded 50%. It is also an inevitable trend for more and more domestic production and sales enterprises to outsource logistics [4].

At present, the research on logistics supplier selection methods mostly follows the research on supplier selection methods by scholars in the world. Various researchers or organizations hold different views on the origin of the concept of logistics. However, as an official statement, logistics officially entered people’s vision in 1905. More specifically, the current circulation of logistics as a business field really began during World War II. At that time, logistics was defined as the relevant transportation and logistics supplies provided by the participating countries to the participating troops [5]. With the development of society and research fields, people gradually realize that logistics is a more complex huge structure in addition to military transportation and supply, which exists in any economic system of the three major industries of any country. It suggests that human understanding of logistics is slowly growing up.

The selection of agricultural product logistics will be analyzed and studied based on the agricultural economy. The method of combining multicriteria analysis and triangular fuzzy number method is creatively put forward to establish the evaluation model of agricultural product green logistics. On the one hand, multicriteria decision-making (MCDM) is a research hotspot of scholars in the world in recent years, but it is mostly used to study upstream supplier selection or green supplier selection. There is little research on logistics supplier selection, and few research methods combine multiple methods. For the logistics supplier selection problem studied, two MCDM methods are adopted and combined with fuzzy theory, which provides a new fuzzy hybrid MCDM method for the study of supplier selection and opens up a new research idea; on the other hand, in the establishment of the supplier evaluation system, it is in line with the idea of green supply chain management to raise the green capability to the important position of primary indicators, that is, in the crucial part of transportation, try to reduce the negative effect on the environment, and improve the efficiency of resource utilization. First, the theoretical basis and methods involved are analyzed; on the basis of discussing the establishment principles and specific contents of the index system, the evaluation index system of green logistics suppliers is established; finally, the proposed green logistics supplier selection model is applied to real enterprises to verify the effectiveness of the model.

2. Literature Review

2.1. Green Supply Chain. In foreign countries, the earliest concept of the green supply chain was published in the manufacturing research association of Michigan State University in order to study how to comprehensively consider environmental impact and resource utilization, so as to promote the development of manufacturing supply chain; Aroonsrimorakot and Laiphrakpam (2020) [6] used the methods of questionnaire and statistical analysis to study the green supply chain management practice of manufacturing organizations in Thailand. It is found that green manufacturing practice and green logistics practice are the crucial performance of green supply chain management and operation and can improve the economic and environmental performance of enterprises at the same time; research on the implementation of green supply chain management in the mining industry focuses on reducing the impact of the whole supply chain rather than the whole organization on the environment. Most Indian mining industries have insufficient understanding of the influencing factors of green supply chain management; Dong et al. (2020) [7] pointed out that, in order to make the economy gradually dynamic and improve efficiency, it is essential to use the capabilities, methods, and qualifications of supply chain management to establish an appropriate corporate structure and management mechanism for coordination efforts. Over time, the gradual development of supply chain capability will lead to "snowball effect," and enhancing supply chain capability will have a synergistic effect on enterprises; in the past decades, with the improvement of environmental awareness, consumers and companies have faced greater pressure to reduce the emission of harmful chemicals and implement green practices in the whole process supply chain. However, because the implementation of green practices requires massive investment in technical processes and staff training, environmental practices are regarded as a waste of corporate profits. Song and Xiao (2020) [8] pointed out that supply chain capability refers to the dimension of achieving or completing specific goals through massive controllable and quantifiable capabilities, measurement procedures, or management. These capabilities may involve the following aspects: procurement capacity, inventory management capacity, management capacity, logistics capacity, integrated logistics management service capacity, distribution and storage capacity, and transportation capacity. A green supply chain strategic footprint based on carbon emission reduction is proposed. Its purpose is to help companies achieve carbon emission targets and obtain attractive supply chain savings by putting forward simple guidelines that companies can follow and guide.

2.2. Current Situation of Agricultural Products Logistics. The scholars' research on the evaluation index of logistics supplier selection in the world is different, and the research abroad begins earlier. Gary (1966) [9], a foreign scholar, was the first to study supplier selection, summed up 23 evaluation indicators for supplier selection, and ranked them in importance. Mejjaouli and Babiceanu (2018) [10] established a decision-making model for cold chain logistics operation of fresh agricultural products to analyze the transportation and storage conditions of fresh agricultural products, so as to provide decision-making for related operators; based on the lean logistics theory, Brian and Christopher (2017) [11] used the system structure model to establish the impact matrix of each link of cold chain logistics, so as to improve the efficiency of cold chain logistics.

The massive studies on the evaluation indicator system of logistics supplier selection suggest that the selection of evaluation indexes is mostly based on the previous scholars' research on supplier selection indicators. Moreover, most of the indicators focus on some traditional indicators such as cost price, transportation level, service level, management level, and corporate culture, ignoring the impact of the logistics industry as a large energy consumer on the environment. With the increasingly stringent international environmental protection regulations and environmental protection pressure from the public, enterprises must implement green supply chain management. In particular, as a crucial part of the supply chain, logistics and transportation industry must strengthen the construction of green competitiveness of logistics enterprises [12, 13].

3. Research Method

Figure 1 displays the architecture of green supply chain management:

Figure 1 suggests that the scope of the green supply chain involves a wide range, and the green logistics mainly involved here is only a part of its content. Compared with the traditional supply chain, it is to consider the coordination and optimization of the whole supply chain, focus on the negative impact of each link on the environment, and integrate the green culture into the whole supply chain management process. For modern enterprises, there is no conflict between realizing more economic benefits and implementing green supply chain management. Modern enterprises should not only focus on the improvement of core competitiveness, but also strengthen the construction of the image and reputation of modern enterprises. Hence, the implementation of green supply chain management can enhance the competitive advantage of modern enterprises.

3.1. Principle of MCDM. MCDM is a subdiscipline of operations research primarily used for evaluation and decision-making with multiple criteria and conflicting with each other. Generally, an evaluation system among different conflict factors needs to be established in evaluation [14]. For example, the cost is one of the most commonly used evaluation criteria, followed by quality, environment, safety, and other indicators. The role of MCDM is to find the best ratio among various indicators. For example, the best appearance and quality cannot be guaranteed with the economic and practical MCDM as the primary demand.

In reality, most problems are affected by multiple factors. In this kind of multielement decision analysis, the problem processing can generally be classified into three categories: qualitative analysis, quantitative analysis, and hybrid analysis combining qualitative and quantitative analysis. Qualitative analysis is applicable to the situation of insufficient data sources and fuzzy data; quantitative analysis is adopted when all data are available, and actual values are used for analysis and research; there are available data in most applications, but the data is fuzzy or is of interval value. Meanwhile, language terms can also be employed for qualitative analysis. In this case, people usually use hybrid decision analysis for evaluation [15]. At present, hybrid decision-making is often employed in the selection of commercial, financial, economic, and other schemes. The effectiveness evaluation of a single factor often has some limitations, because a single factor cannot comprehensively and systematically judge the problem accurately. Hence, the effectiveness evaluation of multiple factors and multiple indicators is more scientific in the treatment of comprehensive problems. The decision-making method based on multicriteria function can quickly get the best scheme by prioritizing the objectives. The optimization model of the clustering algorithm based on MCDM has also been widely used in multiple fields. Besides, the decision-making forms based on multicriteria also include multiattribute decision-making (MADM) and multiobjective decision-making (MODM). MADM is primarily applicable to the scheme ranking of different attributes. MODM is applicable to scheme decision-making with different objectives and generally needs to make an optimal selection according to requirements [16].

Decision-making Trial and Evaluation Laboratory (DEMATEL) is a methodology proposed by Bastille National Laboratory in 1971. It is a method to analyze system factors by using tools such as matrix and graph. The purpose is to solve the difficult and complex problems encountered in practical research. Through the direct relationship matrix in the system and the relationship among various parallel factors, the influence and affected degree of each factor on other factors can be obtained, and then the centrality and cause degree of each factor can be calculated; that is, the relationship and status of each factor in the system are determined, and then the model is constructed on this basis.

DEMATEL method can express the logical relationship among factors more intuitively; that is, it can simplify complex problems. Hence, it is an effective factor analysis and judgment method, which can make full use of experts' knowledge and experience to solve complex and difficult social problems. It is an effective method to solve the problem of MADM. In recent years, the DEMATEL method is widely used in the analysis of urban influencing factors and the evaluation and analysis of transportation influencing factors.

Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) was first proposed by Hwang and Yoon in 1981. It is a multicriteria comprehensive judgment method for analyzing priority schemes according to distance judgment. The basic idea of the TOPSIS method is as follows. First, the positive and negative ideal solutions in the finite scheme are determined according to the normalized matrix; next, the distance between each candidate scheme and positive ideal solution and negative ideal solution is calculated; finally, the pasting progress of each scheme to be selected is calculated according to the mathematical equation, and then the optimal scheme is determined.

Due to the simplicity and effectiveness of the TOPSIS method and its increasingly wide application, it is often used to solve the MODM problem facing multiple object schemes. The research and application of the TOPSIS method is to combine it with the triangular fuzzy number, which is actually an improvement of the TOPSIS method; that is, the matrix established here is the triangular fuzzy number matrix. The triangular fuzzy number can well transform qualitative problems into quantitative problems, so the combination of fuzzy number and the TOPSIS method can better solve some complex multiattribute decision-making problems.

Theoretically, a logistics supplier evaluation and selection model for the green supply chain is established based on fuzzy theory and MCDM theory. On the one hand, MCDM is a research hotspot of scholars in the world in recent years.

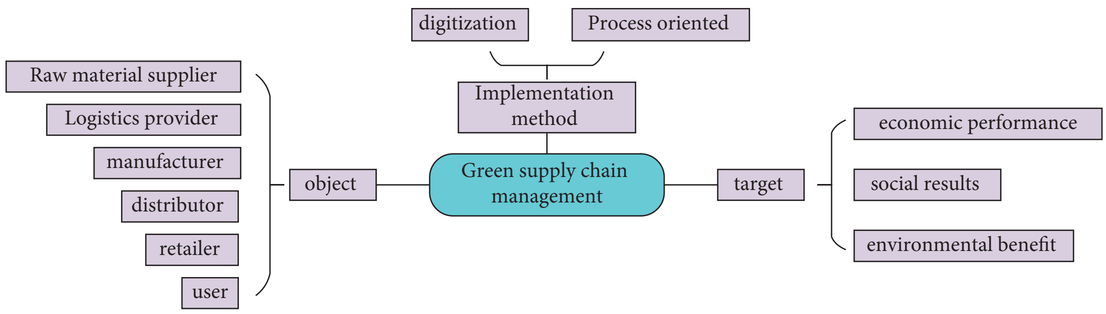

Figure 1: Structure diagram of green supply chain management system.

However, it is mostly adopted to study upstream supplier selection or green supplier selection, and there is little research on logistics supplier selection. Moreover, few research methods combine multiple methods. For the logistics supplier selection problem studied, two MCDM methods are adopted and combined with fuzzy theory, providing a new fuzzy hybrid MCDM method for the study of supplier selection and opens up a new research idea; on the other hand, the green capability is improved as a crucial position of primary indicators in the establishment of the supplier evaluation system, which is in line with the idea of green supply chain management. It indicates that, in a crucial part of transportation, the negative impact on the environment needs to be reduced, and resource utilization efficiency should be improved [17].

On the basis of fully considering this point, green competitiveness is defined and added as the primary index for evaluating logistics enterprises in the establishment of the evaluation index system of logistics suppliers [18].

3.2. Triangular Fuzzy Number. A triangular fuzzy number is a special fuzzy number that uses a fuzzy function set to solve decision-making problems in an uncertain environment. It belongs to a comprehensive fuzzy evaluation method [19]. Its particularity is that it uses the principle of fuzzy relationship integration to determine the dominant order of each evaluated object after the attribute description of multiple evaluated objects. Generally, a triangular fuzzy number is a method to convert uncertain semantic variables into explicit values by defuzzification.

Equation (1) is the definition of a triangular fuzzy number:

$$c = \left(c^1, c^2, c^3\right), \tag{1}$$

c^2 is the intermediate value in the triangular fuzzy number, which is the most possible value in the fuzzy number, while c^1 and c^3 are boundary values. These three are called canonical triangular fuzzy numbers when meeting the conditions in

$$0 \leq c^1 \leq c^2 \leq c^3 < 1. \tag{2}$$

The operation rules of normalized triangular fuzzy numbers are as follows:

$$\begin{aligned}
\left(c^1, c^2, c^3\right) + \left(d^1, d^2, d^3\right) &= \left(c^1 + d^1, c^2 + d^2, c^3 + d^3\right),\\
\left(c^1, c^2, c^3\right) + \left(d^1, d^2, d^3\right) &= \left(c^1 d^1, c^2 d^2, c^3 d^3\right),\\
\alpha c &= \left(\alpha c^1, \alpha c^2, \alpha c^3\right),\\
\frac{1}{c} &= \left(\frac{1}{c^1}, \frac{2}{c^2}, \frac{3}{c^3}\right).
\end{aligned} \tag{3}$$

According to the definition, the triangular fuzzy number has strong interval. Table 1 presents the evaluation semantic variables and their corresponding interval fuzzy numbers. Besides, Figure 2 is the membership function of fuzzy semantic variables:

The application of the triangular fuzzy number method is to evaluate the primary indicators of different logistics companies through the establishment of the indicator evaluation model of agricultural product logistics suppliers. Here, the expert group needs to comprehensively score the primary indicators, divide the fuzzy semantics, and determine the interval fuzzy number of different indicators according to the overall goal. In the whole process, the triangular fuzzy number method needs to be adopted to transform the fuzzy semantics of different indicators into interval fuzzy numbers, realize the transformation from qualitative analysis to quantitative analysis, and help the subsequent comparative analysis of MCDM.

To establish a scientific and reasonable logistics supplier evaluation and selection model, it is essential to combine triangular fuzzy number with MCDM analysis and use triangular fuzzy number to establish semantic variables and corresponding interval fuzzy numbers. On this basis, the correlation degree of the primary evaluation indexes of different logistics companies is analyzed to obtain the fuzzy direct relationship matrix, so as to transform the qualitative problem of the primary indicator into quantitative problem. Meanwhile, combining multicriteria decision analysis can realize the combination of qualitative and quantitative analysis and evaluate logistics companies from multiple levels. MCDM method refers to a method to solve the problem of selecting multiple schemes with mutual conflicts, and it can be classified as MADM and MODM [20, 21] according to whether the decision object is one or more. People face the problem of MADM when the weight

Table 1: Semantic variables and corresponding interval fuzzy numbers.

Interval fuzzy number	Semantic variable
Very unimportant	(1, 1, 2)
Unimportant	(1, 2, 3)
Generally important	(2, 3, 4)
Important	(3, 4, 5)
Very important	(4, 5, 5)

of each indicator is calculated. Hence, the method of combining the triangular fuzzy number with the MCDM method not only achieves the combination of qualitative and quantitative, but also meets the needs of solving the problem of MADM.

3.3. Establishing the Evaluation and Selection Model of Agricultural Product Logistics Suppliers. Triangular fuzzy number and MCDM method are studied, but few studies combine the two to establish a scientific and reasonable logistics supplier evaluation and selection model. Based on the summary of current supplier evaluation methods, the research method of evaluating and selecting green logistics suppliers is determined, the specific calculation model is established, and the calculation steps are explained in detail.

The fuzzy MCDM method is employed to calculate the weight of each indicator.

Step 1: the evaluation and selection model of agricultural product logistics suppliers is determined. The overall decision-making objectives, influencing factors at all levels, and the degree of correlation among them are established according to the MCDM method. Figure 3 displays the complex relationship among levels and factors.

The overall evaluation model with the goal as the core is established after the setting of overall goal. The indicators of the evaluation model can be classified as primary and secondary indicators. The primary indicators include cost price (C), service strength (S), technique level (T), and green competitiveness (G), while the secondary indicators are divided into $C1$, $C2$, $C3$, $C4$, and so on. Figure 4 presents the relationship between the primary and secondary indicators of cost price.

Figure 5 displays the influence relationship between primary and secondary indicators of technique level.

Figure 6 presents the relationship between the primary and secondary indicators of service strength.

Figure 7 shows the relationship between the primary and secondary indicators of green competitiveness.

The impact relationship between primary indicators and secondary indicators differs for different logistics enterprises, which needs to be evaluated by an expert group.

Step 2: fuzzy interval and semantic evaluation can be designed.

The triangular fuzzy number method is adopted to determine the influence degree of primary indicators on the overall goal. Fuzzy semantics with different degrees of influence are classified as very low influence, low influence, medium influence, high influence, and very high influence. The interval fuzzy numbers of these five semantics are (0, 0.1, 0.3), (1, 0.3, 0.5), (0.3, 0.5, 0.7), (0.5, 0.7, 0.9), and (0.7, 0.9, 1). Table 2 displays the specific semantic variables and the corresponding interval fuzzy numbers.

Step 3: an expert decision-making group is organized to compare and score the influence degree among the primary indicators based on the above fuzzy semantic variables, so as to obtain an $n \times n$ fuzzy direct relation matrix $A = [u_{ij}, m_{ij}, l_{ij}]$. Among them, each element represents the influence degree of i index on j index judged by experts;

Step 4: the equation is adopted to standardize the direct relationship matrix to obtain matrix N;

$$t = \frac{1}{\max_{1 \leq i \leq n} \sum_{j=1}^{n} l_{ij}},$$
$$N = t \times A. \tag{4}$$

Step 5: the equation is adopted to change it to obtain the comprehensive influence matrix T based on the standardized direct relation matrix N. E is the identity matrix;

$$T = N(E - N)^{-1}. \tag{5}$$

Step 6: the sum of each row in matrix T is defined as D_i; the sum of each column is defined as R_i.

$$D_i = (o', p', q') = \sum_{j=1}^{n} t_{ij}, \quad i = 1, 2, 3, \ldots, n,$$
$$R_i = (\widehat{o}, \widehat{p}, \widehat{q}) = \sum_{j=1}^{n} t_{ij}, \quad i = 1, 2, 3, \ldots, n. \tag{6}$$

Step 7: defuzzification, that is, the triangular fuzzy number is converted into a clear value, and then the clear value of each primary indicator weight is calculated through equations (7) and (8):

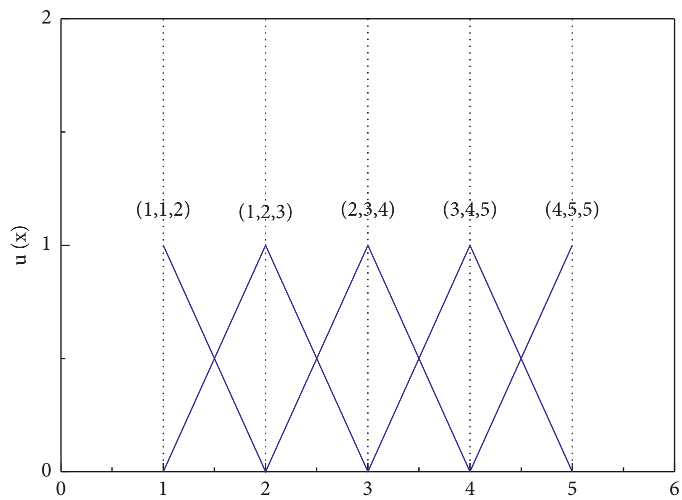

FIGURE 2: Membership function of fuzzy semantic variable.

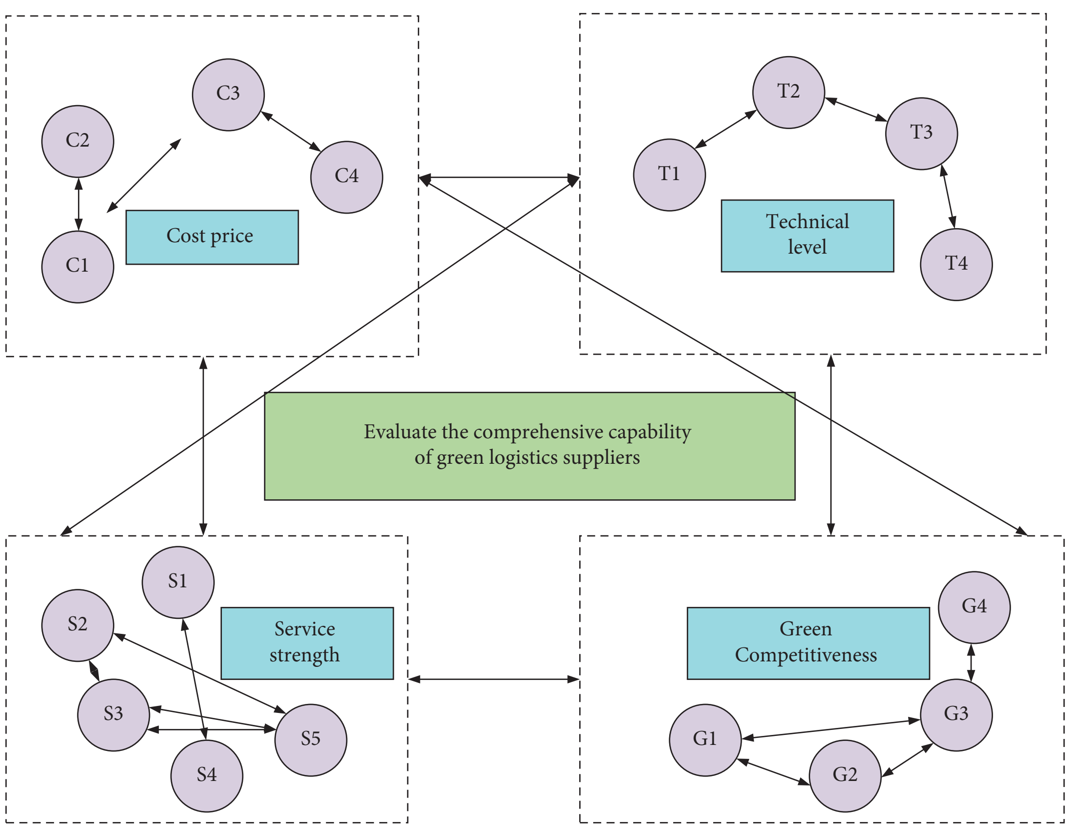

FIGURE 3: MCDM evaluation model.

$$\text{def} = \frac{\sqrt{1/3\left(o^2 + p^2 + q^2\right)}}{\sqrt{1/3\left((1-o)^2 + (1-p)^2 + (1-q)^2\right)} + \sqrt{1/3\left(o^2 + p^2 + q^2\right)}}, \tag{7}$$

$$w_i = \left[\left(D_i^{\text{def}} + R_i^{\text{def}}\right)^2 + \left(D_i^{\text{def}} - R_i^{\text{def}}\right)^2\right]^{(1/2)}. \tag{8}$$

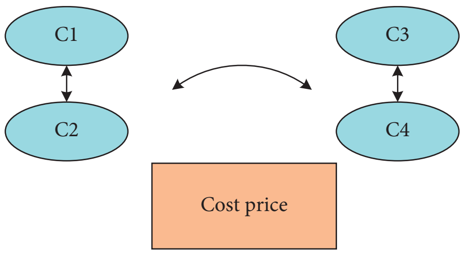

FIGURE 4: Correlation model of influencing factors of cost price.

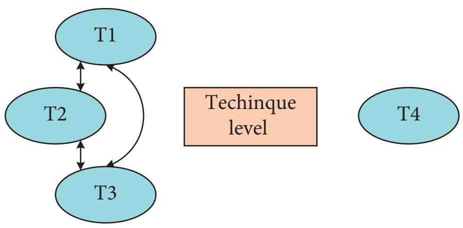

FIGURE 5: Correlation model of influencing factors of technique level.

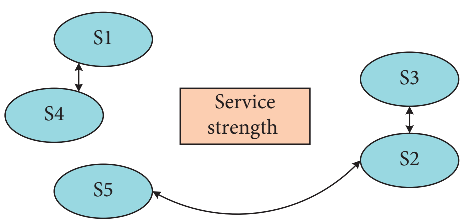

FIGURE 6: Correlation model of influencing factors of service strength.

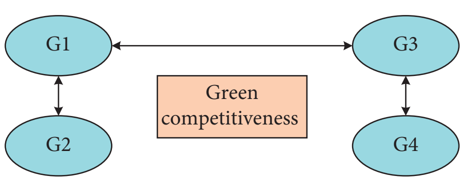

FIGURE 7: Correlation model of influencing factors of green competitiveness.

Step 8: standardization. The weight w_i is standardized by equation (9); that is, the weight value of each primary indicator relative to the overall goal is obtained:

$$W_i = \frac{w_i}{\sum_{i=1}^{n} w_i}. \tag{9}$$

Step 9: the weight value of each secondary index relative to the overall target is calculated. To sum up, in the same way, the weight value W_{ij} of the secondary index under the primary index relative to the primary index is obtained by using the above method, and then the weight value w_{ij} of each secondary index relative to the overall target is calculated through

$$w_{ij} = W_i \times W_{ij}. \tag{10}$$

Finally, the whole green logistics supplier evaluation and selection model system is applied to the qualified agricultural product production enterprise A, including the application of green logistics supplier evaluation indicator system and green logistics supplier evaluation and selection method. According to the MCDM analysis fuzzy evaluation system, the green logistics evaluation is conducted for the five logistics suppliers of enterprise A. The evaluation indicators of the expert decision-making group are employed to score the logistics companies 1–5. According to the semantic variables and the interval fuzzy numbers, the fuzzy evaluation analysis is conducted from four aspects of cost price (C), service strength (S), technique level (T), and green competitiveness (G), and the best scheme is selected.

4. Case Study Analysis

4.1. Direct Relationship Matrix of the Logistics Evaluation System. The expert group evaluates and scores the four primary indicators of five logistics suppliers according to the evaluation and selection model of logistics suppliers. The direct relationship matrix N is obtained after the fuzzy evaluation matrix is calculated, as shown in Table 3:

The table reveals that there is an interaction among primary indicators, and the cost price exerts relatively little impact on the technique level and green competitiveness; service strength exerts a great impact on cost and price. Generally, the better the service quality is, the higher the cost is; the technique level exerts a high impact on the success price and service strength; green competitiveness exerts little impact on the other three.

4.2. Sorting and Selection of Logistics Suppliers. Since the established research method model meets the characteristics and requirements of logistics companies, it is applied to the logistics companies to verify its feasibility and rationality. It is assumed that, after the selection process, there are 5 qualified logistics suppliers recognized by the logistics company. After the best logistics supplier is selected through the method model established, the data of the other four logistics suppliers will be archived and kept as an alternative.

D_i^{def} and R_i^{def} are calculated according to the direct relationship matrix, and the distance and relative fit between the evaluation results of each logistics company and the fuzzy positive and negative ideal solutions. Figures 8 and 9 display the results:

Figure 7 displays that the fit between the evaluation indicator of the five logistics companies and the ideal results is 0.225, 0.472, 0.6, 0.681, and 0.441, respectively. Among them, the forward distance deviation of logistics company 1 is the largest and that of company 4 is the smallest; the negative distance deviation of company 4 is the largest and that of company 1 is the smallest. It means that, based on the establishment of green logistics index system and this fuzzy mixed MCDM method, according to the requirements of enterprises and taking full account of the green degree of logistics suppliers, it is calculated that logistics company 4 is the best choice, and the verification method is feasible.

Table 2: Semantic variables and interval fuzzy numbers.

Interval fuzzy numbers	(0, 0.1, 0.3)	(1, 0.3, 0.5)	(0.3, 0.5, 0.7)	(0.5, 0.7, 0.9)	(0.7, 0.9, 1)
Qualitative judgment	Very low influence	Low influence	Medium influence	High influence	Very high influence
English abbreviation	VL	L	M	H	VH

Table 3: Standardized direct relation matrix of indicators.

	C	S	T	G
C	—	(0.03, 0.1, 0.17)	(0.1, 0.17, 0.24)	(0, 0.03, 0.1)
S	(0.17, 0.24, 0.31)	—	(0.1, 0.17, 0.24)	(0.03, 0.1, 0.17)
T	(0.24, 0.31, 0.34)	(0.24, 0.31, 0.34)	—	(0.17, 0.24, 0.31)
G	(0.03, 0.1, 0.17)	(0, 0.03, 0.1)	(0, 0.03, 0.1)	—

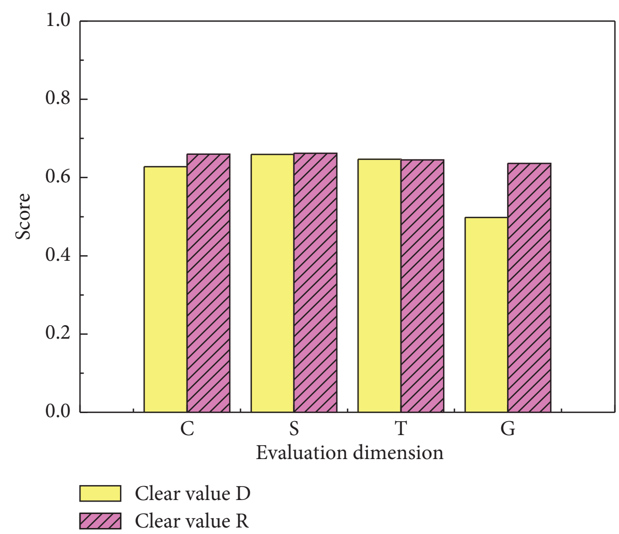

Figure 8: Clear values of indicators in different evaluation dimensions.

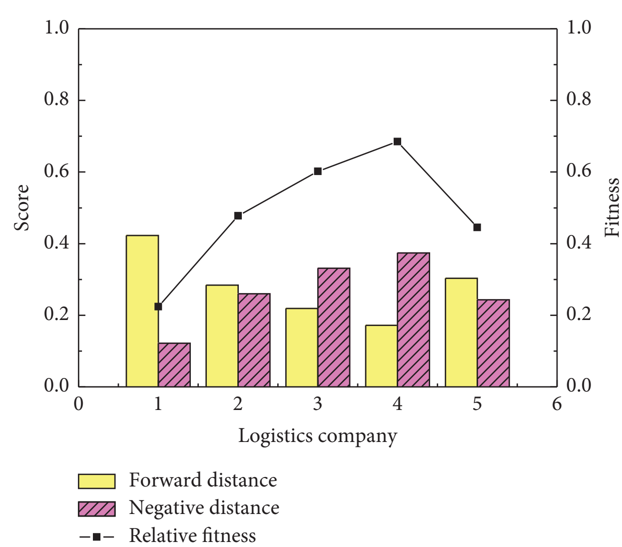

Figure 9: Evaluation results and relative fit of different logistics companies.

5. Conclusions

In recent years, the development of the logistics industry has increasingly shown rapid momentum. In particular, the Chinese logistics industry is regarded as one of the industries with the most development potential in the next few decades. In society, more and more production and sales enterprises realize the necessity of saving the cost of logistics links in the supply chain and regard it as the third profit source of enterprises, even more important than the traditional first and second profit sources. In addition, with the increasing specialization and refinement of the social division of labor, enterprises must focus more on core business in order to improve their competitiveness, while noncore business will be outsourced to more professional outsourcing companies. Thereby, logistics outsourcing is the development trend of production and sales enterprises. Green supply chain management is one of the crucial trends of supply chain development in the future. It aims to make enterprise management focus more on the optimal allocation of resources and the protection and improvement of the environment in the development process and can alleviate the pressure of resource and environmental problems faced by the world economic development. Under the background of the increasing prosperity of logistics outsourcing and green supply chain management, first, the decision-making analysis of logistics supplier selection of agricultural products enterprises is carried out. The logistics company is comprehensively analyzed by establishing the evaluation model of the combination of MCDM analysis and triangular fuzzy number. The evaluation results of the expert group are compared with each other to obtain the direct relationship matrix among the evaluation indexes. Then, the relationship matrix is defuzzified and standardized to obtain the explicit value of the secondary index. Finally, the fit degree between each logistics company and the positive and negative ideal values is calculated, and the logistics companies are prioritized according to the principle of maximum fit to select the optimal scheme. This exploration solves the problem of how production and sales enterprises choose green logistics suppliers, fully meets the needs of enterprises and governments that focus on the green degree of each supplier in the supply chain, and can effectively promote the efficient operation of the green supply chain management. Moreover, this exploration serves the production and sales enterprises that pay increasing attention to environmental problems. As increasing attention is paid to social resources and environmental issues, the government will introduce more policies and systems on resource conservation and environmental protection. As large energy-consuming enterprises, manufacturing enterprises and logistics enterprises have the responsibility and obligation to pay attention to resources and environmental issues in all links of the supply chain.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

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