Modeling Agricultural Logistics Distribution Center Location Based on ISM

Lijuan Huang
Information Management School, Postdoctoral Workstation
Jiangxi University of Finance and Economics, Nanchang, 330013, China
hljrap@sina.com

Jie Yu, Xingwang Huang
Information Management School
Jiangxi University of Finance and Economics, Nanchang, 330013, China
yuguoping66s@126.com

***Abstract*—Governments in many countries are applying themselves to improve life of peasants, and planning and building agricultural logistics distribution center is key content of New Countryside Construction in china nowadays. This paper uses theories and methods of Interpretative Structure Model (ISM) to discuss and analyze on agricultural logistics distribution center location. The first is to select main factors of modeling agricultural logistics distribution center location. The second is to map the relationship between all location factors with the aid of directional hierarchy graph and adjacency matrix. The third to construct the ISM of agricultural logistics distribution center location. The last is to explain the ISM for providing scientific and reasonable suggestions on the agricultural logistics distribution center location. Compared with urban logistics distribution center location, less research work has been done to agricultural logistics distribution center location, and ISM is seldom applied to study such issues. So, the fruit of research in this paper is a comparatively novel and meaningful work.**

***Index Terms* –-ISM ;agricultural logistics; logistics center location**

I. Introduction

There are many different approaches to discuss logistics distribution center location, such as genetic algorithm (George B. Vairaktarakis, 2003)[1], AHP (Umit Akinc, 2005) [2], Entropy Method (Kamlesh Mathur, 2007) [3], Fuzzy Neural Network (Katta G. Murty, 2006) [4], Hybrid PSO (Carlos F. Daganzo, 2009) [5]. Generally every approach is only regarded as either qualitative method or quantitative method[6-15]. Compared with other quantitative or qualitative methods, ISM (Interpretative Structure Modeling) combines quantitative with qualitative and majors in qualitative. Also, it has less component of uncertainty and more advantages than other qualitative analysis method. ISM belongs to a conceptual model, which can convert unclear and half-structure ideas into visualized model with good structure.

At present, most of the studies focused on urban logistics distribution center location, little for agricultural logistics distribution center location. There are many interlocking factors that effect agricultural logistics distribution center location and the relation of these factors between each other is complex[16-21]. ISM is seldom applied to study such issues about modeling agricultural logistics distribution center location, so this is interesting and meaningful work.

Agricultural logistics starts lately and develops slowly. In recent years, in order to improve the life of farmers as much as possible, Chinese Government have introduced many policies and pour a large sum of money to develop and promote logistics of New Countryside Construction rapidly. Compared to industry logistics, agricultural logistics' requirements are higher, and the location selection factors are more complicated. The characteristics of agricultural logistics in China can be summarized in five words: "more", "casual", "weak", "large" and "high". Its specific performance appears in the following three areas[16], which can increase agricultural logistics cost, raise empty carrying rate of the vehicles in countryside, and slow velocity of circulation between countryside and city.

1) Links of the agricultural logistics nodes are "loose" and "casual", the scale of logistics operation is "weak" and the logistics nodes are "more", lacking of core businesses;

2) Logistics volume and the number of agricultural product varieties is very "large", and there are "large" different logistics capacity in different seasons;

3) There are "high" requirements of products' quality and logistics technology in the agricultural supply chain, which appears to be green logistic, and the logistics technology needs to be widely used in the packaging, processing, transportation and storage to ensure the quality and safety of agricultural products.

So, how to reduce logistics cost of agriculture and speed up circulation between countryside and city is one of the key factors that ensures improving the life of farmers. Naturally, agricultural logistics distribution center location of the New Countryside Construction has also be paid more attention to. In fact, from the year of 2008, how to design and plan agricultural logistics distribution center location has begun to get the wide

doi:10.4304/jsw.7.3.638-643

attention and deep concern from the Chinese Government and many experts on rural affairs. As a result, the research result in this paper has more theoretical and practical significance.

II. BASIC WORKING PRINCIPLE OF ISM

A. Theory and Method of ISM Technology

ISM, developed by J. White Felter professor in 1973[8], is used to analyze the problem related with the complex social economical system, whose feature is to decompose the complex system into some subsystems, using people's practical experience and knowledge, and finally construct the system of a multi-lever progressive structure model with the help of computer.

System structure based on ISM can be mapped by directional hierarchy graph (seen in Fig. 1) or adjacency matrix graph with m×m (seen in Fig. 2). In this paper, we mainly adopt matrixes to describe system structure. In Fig. 2, m denotes number of system element, S_i denotes a row system element, S_j denotes a column system element, and sets matrix element a_{ij} to 1 while there is relation between S_i and S_j, or sets matrix element a_{ij} to 0. $i\in[1,m]$, $j\in[1,m]$.

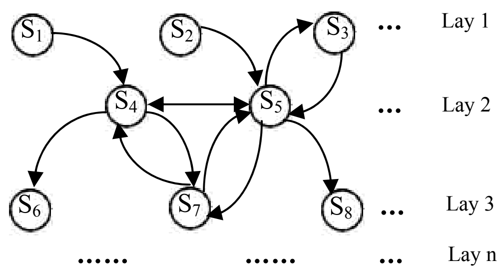

Figure 1. Directional hierarchy graph

$$A=\begin{bmatrix} a_{11} & a_{12} & \cdots\cdots & a_{1m} \\ a_{21} & a_{21} & \cdots\cdots & a_{2m} \\ \cdots\cdots & \cdots\cdots & \cdots\cdots & \cdots\cdots \\ a_{m1} & a_{m2} & \cdots\cdots & a_{mm} \end{bmatrix}$$

Figure 2. Adjacency matrix graph

B. Working Steps of Building ISM

Main working steps of building ISM are shown as follows:

1) Organizing working group who are in charge of modeling work.

2) Proposing question

3) Choosing elements which constitute the system.

4) Constructing adjacency matrix and reachable matri on the basis of key elements.

5) Establishing ISM after resolving the reachable matrix.

6) Making rational explanation according to ISM.

III. ESTABLISHMENT ISM OF AGRICULTURAL LOGISTICS DISTRIBUTION CENTER LOCATION

A. Chosing Key Factors of Agricultural Logistics Distribution Center Location

Based on "Brain Storm" from experts group and a lot of literature related with the research, the research group draws a total of 14 key factors (seen in Table (I) [22-25], which can largely determine the success of modeling agricultural logistics distribution center location. According to requirements of ISM, let elements of the collection is S, and $S=\{S_1,S_2\ldots\ldots S_2\}$.

TABLE I.
KEY FACTORS OF AGRICULTURAL LOGISTICS DISTRIBUTION CENTER LOCATION

No.	Key factor	No.	Key factor
S_1	Climate	S_8	Competitor condition
S_2	Hydrogeololgy	S_9	Traffic conditions of rural town
S_3	Topography	S_{10}	Situation of rural public infrastructure
S_4	Logistics service level	S_{11}	Condition of existing facilities
S_5	Supplier of agricultural product	S_{12}	Rural environment protection requirement
S_6	Rural market situation	S_{13}	National rural policy
S_7	Characteristics of agricultural products	S_{14}	Human resource

B. Establishing Adjacency Matrix

Adjacency matrix is used to describe the relationship between the system elements. The element a_{ij} of adjacency matrix can be expressed as 0 or 1, matrix element a_{ij}=1 on behalf of the S_i has a direct impact on the element S_j,or else a_{ij}=0. Based on the discussion and suggestion of experts group and working group members, the adjacency matrix A of the agricultural logistics distribution center location is established as Table II and Table III.

TABLE II.
ADJACENCY MATRIX A (1)

	S_1	S_2	S_3	S_4	S_5	S_6	S_7
S_1	0	1	0	0	0	0	0
S_2	0	0	1	0	0	0	0
S_3	1	1	0	0	0	0	0
S_4	0	0	0	0	1	1	0
S_5	0	0	0	1	0	1	0
S_6	0	0	0	1	1	0	0
S_7	0	0	0	1	1	1	0
S_8	0	0	0	1	1	1	0
S_9	0	0	0	1	0	0	0
S_{10}	0	0	0	1	0	0	0
S_{11}	0	0	0	0	0	0	0
S_{12}	0	0	0	0	0	0	0
S_{13}	0	0	0	0	0	0	0
S_{14}	0	0	0	0	0	0	0

TABLE III.
ADJACENCY MATRIX A (2)

	S_8	S_9	S_{10}	S_{11}	S_{12}	S_{13}	S_{14}
S_1	0	1	0	0	0	0	0
S_2	0	1	1	0	0	0	0
S_3	0	1	1	0	0	0	0
S_4	1	0	0	0	0	0	0
S_5	1	0	0	0	0	1	0
S_6	1	0	0	0	0	0	0
S_7	1	0	0	0	1	0	1
S_8	0	0	0	0	0	0	1
S_9	0	0	0	0	1	1	1
S_{10}	0	0	0	0	1	0	0
S_{11}	0	0	0	0	0	0	0
S_{12}	0	0	0	0	0	0	0
S_{13}	0	0	0	0	1	0	1
S_{14}	0	0	0	0	0	0	0

C. Constructing Reachable Matrix

According equations(1) and equation (2), by using rules of Boolean algebra (0+0=0, 0+1=1, 1+0=1, 1+1=1, 0×0 =0, 0×1 =0, 1×0=0, 1×1=1) for operation, we can get the reachable matrix with aid of MATLAB 7. The reachable matrix M is shown in Table IV and Table V.

$$\begin{cases} A_i = (A+I)^i \cdots\cdots i \in [1, r] \\ M = A_{r-1} = A_r \cdots\cdots r \in [n-1, n] \end{cases} \tag{1}$$

TABLE IV.
TREACHABLE MATRIX M (1)

	S_1	S_2	S_3	S_4	S_5	S_6	S_7
S_1	1	1	1	1	1	1	0
S_2	1	1	1	1	1	1	0
S_3	1	1	1	1	1	1	0
S_4	0	0	0	1	1	1	0
S_5	0	0	0	1	1	1	0
S_6	0	0	0	1	1	1	0
S_7	0	0	0	1	1	1	1
S_8	0	0	0	1	1	1	0
S_9	0	0	0	1	1	1	0
S_{10}	0	0	0	1	1	1	0
S_{11}	0	0	0	0	0	0	0
S_{12}	0	0	0	0	0	0	0
S_{13}	0	0	0	0	0	0	0
S_{14}	0	0	0	0	0	0	0

TABLE V.
TREACHABLE MATRIX M (2)

	S_8	S_9	S_{10}	S_{11}	S_{12}	S_{13}	S_{14}
S_1	1	1	1	0	1	1	1
S_2	1	1	1	0	1	1	1
S_3	1	1	1	0	1	1	1
S_4	1	0	0	0	1	1	1
S_5	1	0	0	0	1	1	1
S_6	1	0	0	0	1	1	1
S_7	1	0	0	0	1	1	1
S_8	1	0	0	0	1	1	1
S_9	1	1	0	0	1	1	1
S_{10}	1	0	1	0	1	1	1
S_{11}	0	0	0	1	0	0	0
S_{12}	0	0	0	0	1	0	0
S_{13}	0	0	0	0	1	1	1
S_{14}	0	0	0	0	0	0	1

D. Obtaining Reachable Sets, Antecedent Sets and Factror Sest of Highest Level

By mean of reachable sets $R(S_i)$ and antecedent sets $A(S_i)$, we can obtain factror sets of highest level as $L(S_i)$ (seen in Table VI).

TABLE VI.
FIRST-CLASS REACHABLE SET AND ANTECEDENT SET

	$R(S_i)$	$A(S_i)$	$L(S_i)$
S_1	$S_1,S_2,S_3,S_4,S_5,S_6,S_8,S_9,S_{10},S_{12},S_{13},S_{14}$	S_1,S_2,S_3	S_1,S_2,S_3
S_1	$S_1,S_2,S_3,S_4,S_5,S_6,S_8,S_9,S_{10},S_{12},S_{13},S_{14}$	S_1,S_2,S_3	S_1,S_2,S_3
S_1	$S_1,S_2,S_3,S_4,S_5,S_6,S_8,S_9,S_{10},S_{12},S_{13},S_{14}$	S_1,S_2,S_3	S_1,S_2,S_3
S_4	$S_4,S_5,S_6,S_8,S_{12},S_{13},S_{14}$	$S_1,S_2,S_3,S_4,S_5,S_6,S_7,S_8,S_9,S_{10}$	S_4,S_5,S_6,S_8
S_5	$S_4,S_5,S_6,S_8,S_{12},S_{13},S_{14}$	$S_1,S_2,S_3,S_4,S_5,S_6,S_7,S_8,S_9,S_{10}$	S_4,S_5,S_6,S_8
S_6	$S_4,S_5,S_6,S_8,S_{12},S_{13},S_{14}$	$S_1,S_2,S_3,S_4,S_5,S_6,S_7,S_8,S_9,S_{10}$	S_4,S_5,S_6,S_8
S_7	$S_4,S_5,S_6,S_7,S_8,S_{12},S_{13},S_{14}$	S_7	S_7
S_8	$S_4,S_5,S_6,S_8,S_{12},S_{13},S_{14}$	$S_1,S_2,S_3,S_4,S_5,S_6,S_7,S_8,S_9,S_{10}$	S_4,S_5,S_6,S_8
S_9	$S_4,S_5,S_6,S_8,S_9,S_{12},S_{13},S_{14}$	S_1,S_2,S_3,S_9	S_9
S_{10}	$S_4,S_5,S_6,S_8,S_{10},S_{12},S_{13},S_{14}$	S_1,S_2,S_3,S_{10}	S_{10}
S_{11}	S_{11}	S_{11}	S_{11}
S_{12}	S_{11}	$S_1,S_2,S_3,S_4,S_5,S_6,S_7,S_8,S_9,S_{10},S_{12},S_{13}$	S_{12}
S_{13}	S_{12},S_{13},S_{14}	$S_1,S_2,S_3,S_4,S_5,S_6,S_7,S_8,S_9,S_{10},S_{13}$	S_{13}
S_{14}	S_{14}	$S_1,S_2,S_3,S_4,S_5,S_6,S_7,S_8,S_9,S_{10},S_{13},S_{14}$	S_{14}

In Table VI, $L(S_i)=R(S_i)\cap A(S_i)$, and there are the related three kinds of data sets described as follows.

1)Reachable sets:

In reachable matrix M, if all the corresponding row elements of S_i are 1, all factors of the corresponding column gather to constitute Antecedent sets $R(S_i)$.

2)Antecedent set:

If all the corresponding column elements of S_i are 1 in reachable matrix M, all factors of the corresponding row gather to constitute antecedent sets $A(S_i)$.

3) Factor sets of highest level

After finding out $L(S_i)$, delete corresponding rows and columns from reachable matrix,then continue searching for new $L(S_i)$ from the remaining reachable matrix till find out no $L(S_i)$ from every level. All the highest level sets founded from every level constitute $\{ L(S_i)\}$.

E. Generating Reduced Reachable Matrix

Through sets division, we can get reachable matrix M_0 ordered by set level $L(S_i)$, which is shown in Table VII and Table VIII. After levels division, there may be strongly connected sets among all levels. The sets communicating with each other are called strongly connected blocks at the same level elements in the same region. For example, in Table VII and Table VIII, there are sets with strongly connected blocks such as $\{S_4, S_5, S_6, S_8\}$ and $\{S_1,S_2,S_3\}$.

TABLE VII.
REACHABLE MATRIX M_0 (1)

	S_{11}	S_{12}	S_{14}	S_{13}	S_4	S_5	S_6
S_{11}	1	0	0	0	0	0	0
S_{12}	0	1	0	0	0	0	0
S_{14}	0	0	1	0	0	0	0
S_{13}	0	1	1	1	0	0	0
S_4	0	1	1	1	1	1	1
S_5	0	1	1	1	1	1	1
S_6	0	1	1	1	1	1	1
S_8	0	1	1	1	1	1	1
S_7	0	1	1	1	1	1	1
S_9	0	1	1	1	1	1	1
S_{10}	0	1	1	1	1	1	1
S_1	0	1	1	1	1	1	1
S_2	0	1	1	1	1	1	1
S_3	0	1	1	1	1	1	1

TABLE VIII.
REACHABLE MATRIX M_0 (2)

	S_8	S_7	S_9	S_{10}	S_1	S_2	S_3
S_{11}	0	0	0	0	0	0	0
S_{12}	0	0	0	0	0	0	0
S_{14}	0	0	0	0	0	0	0
S_{13}	0	0	0	0	0	0	0
S_4	1	0	0	0	0	0	0
S_5	1	0	0	0	0	0	0
S_6	1	0	0	0	0	0	0
S_8	1	0	0	0	0	0	0
S_7	1	1	0	0	0	0	0
S_9	1	0	1	0	0	0	0
S_{10}	1	0	0	1	0	0	0
S_1	1	0	1	1	1	1	1
S_2	1	0	1	1	1	1	1
S_3	1	0	1	1	1	1	1

All elements strongly connected blocks contact with each other among M_0 and then constitute a loop, which can be selected as a representative. In such a way of ordering and sorting, S_4 and S_1 as the representative elements respectively, we can get the reduced reachable matrix M_1 (seen in Table IX).

TABLE IX.
REDUCED REACHABLE MATRIX M_1

	S_{11}	S_{12}	S_{14}	S_{13}	S_4	S_7	S_9	S_{10}	S_1
S_{11}	1	0	0	0	0	0	0	0	0
S_{12}	0	1	0	0	0	0	0	0	0
S_{14}	0	0	1	0	0	0	0	0	0
S_{13}	0	1	1	1	0	0	0	0	0
S_4	0	1	1	1	1	0	0	0	0
S_7	0	1	1	1	1	1	0	0	0
S_9	0	1	1	1	1	0	1	0	0
S_{10}	0	1	1	1	1	0	0	1	0
S_1	0	1	1	1	1	0	1	1	1

F. Establishing Hierarchical Structure Model

According to the conclusion from Table IX, we can map directional hierarchy graph, and get the hierarchical structure model of agricultural logistics distribution center location (shown in Fig. 3), where S_0 denotes the element of locating agricultural logistics distribution center.

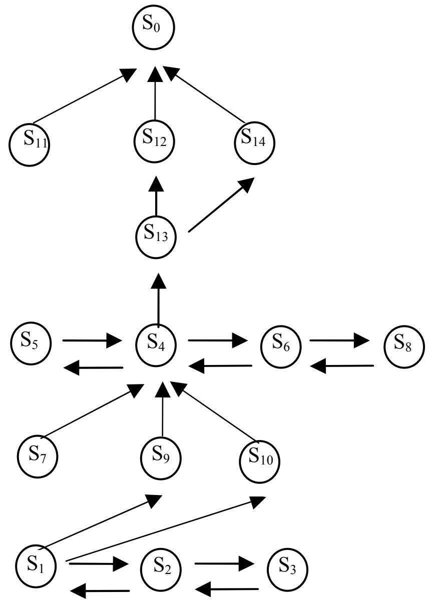

Figure 3. Hierarchical structure model

G. Factors Analysis Of Agricultural Logistics Distribution Center Location Based on ISM

Based on the above hierarchical structure model, we can obtain the corresponding ISM, which is shown in Fig. 4. From Fig. 4, we can differ influence degree of every factor that affects agricultural logistics distribution center location and the relationship among all factors.

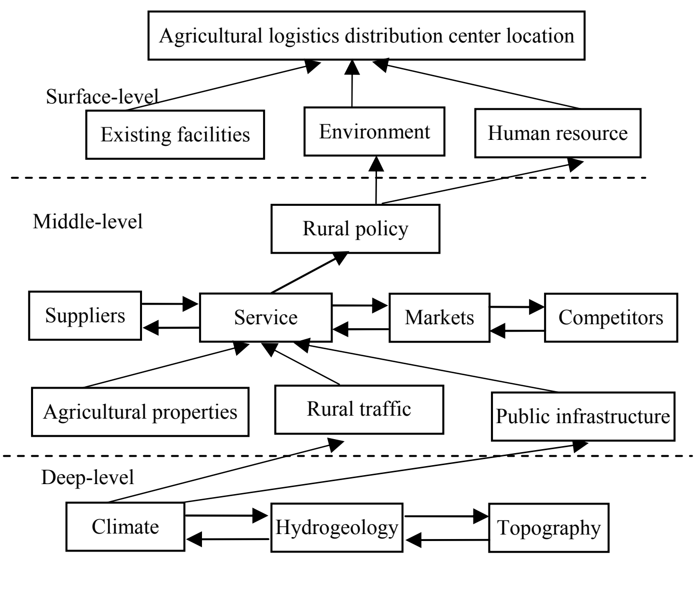

Figure 4. Explanative structure model based on ISM

In Fig. 4, all the factors are divided into three categories according to their influence degree on agricultural logistics distribution center location: Surface-level factors, middle-level factors and deep-level factors. Observe from the figure, we can obtain the three categories with detail as follows: Surface-level factors include status of existing facilities, requirements of rural environmental protection, human resource; middle-level factors include national rural policy environment, the condition of agricultural product suppliers, logistics service level, rural market situation, competitors, characteristics of agricultural products, traffic conditions of rural town and the condition of rural public infrastructure; deep-level factors include climate, hydrogeology and topography.

Among the three categories, deep-level factors play the most imporant role in the agricultural logistics distribution center location, middle-level factors play less role, and surface-level factors play the least role.

IV. CONCLUSION

Analyzing from the above ISM, We can made the following recommendations aim at how scientifically and reasonably to locate agricultural logistics distribution center.

- Climate, hydrogeology and topography are the deepest factors that mainly affect agricultural logistics distribution center location. Besides, these three factors affect construction of rural traffic and rural public infrastructure directly. Therefore, decision-makers should start to make a feasibility analysis on deep factors such as climate, hydrogeology and topography.
- There are more complex relationships derived from large number middle-level factors such as rural policy, supplier of agricultural product, logistics service level, rural market situation and human resource. Decision-makers should understand the relationship among middle-level factors especially with the strong connected block. If climate is available, and hydrogeology and topography can also meet the requirements of logistic center location, traffic conditions of rural town and situation of rural public infrastructure should make further improvement as soon as possible.
- With further promotion and development of New Countryside Construction, the Chinese Governments pay more attention to and pours huge amount of money into construction of rural logistics infrastructure. However, Compared with urban logistics distribution center location, less research work has been done to agricultural logistics distribution center location, especially in China. Development of Chinese agricultural logistics is just in the early stage, which needs the support of the governments and various walks of society to create favorable conditions and harmonious environments for agricultural logistics distribution center location. Because the ISM technology is seldom applied to study such issues about modeling agricultural logistics distribution center location, so this research is interesting, meaningful and exploratorywork, and the result of research in this paper is just for reference.

ACKNOWLEDGMENT

The author thanks the anonymous reviewers for their valuable remarks and comments. This work is supported by 2010 National Social Science Fund of China (Grant No. 10BGL028), National Natural Science Fund of China (Grant No. 70861002), China Postdoctoral Science Fund (Grant No. 200902535), 2010 Science and Technology Project of education department of Jiangxi Province (Grant No. GJJ10430), and 2010 Social Science Planning Project of Jiangxi Province (Grant No. 10GL35).

REFERENCES

[1] Jonathan P. Doh, Kraiwinee Bunyaratavej and Eugene D. Hahn, “Separable but Not Equal: The Location Determinants of Discrete Services Offshoring Activities,” *Journal of International Business Studies*, Vol. 40, No. 6, pp. 926-943, August 2009.

[2] Gilbert Laporte and Abdullah Dasci, “A Continuous Model for Multistore Competitive Location,” *Operations Research*, Vol. 53, No. 2, pp. 263-280, March 2005.

[3] Margaret L. Brandeau and Samuel S. Chiu, “An Overview of Representative Problems in Location Research,” *Management Science*, Vol. 35, No. 6, pp. 645-674, June 1989.

[4] O. Berman, Z. Drezner and G. O. Wesolowsky. “The Multiple Location of Transfer Points The Multiple Location of Transfer Points,” *Journal of the Operational Research Society*, Vol. 59, No. 6, pp. 805-811, June 2008.

[5] Yasanur Kayikci, “A conceptual model for intermodal freight logistics centre location decisions,” *Procedia-Social and Behavioral Sciences*, Volume 2, Issue 3, 2010, pp. 6297-6311.

[6] Rafay Ishfaq and Charles R. Sox, “Hub location–allocation in intermodal logistic networks,” *European Journal of Operational Research*, Volume 210, Issue 2, pp. 213-230, April 2011.

[7] Kevin O’Connor, “Global city regions and the location of logistics activity,”, *Journal of Transport Geography*, Volume 18, Issue 3, pp. 354-362, May 2010.

[8] Yoshiaki Shimizu and Takeshi Wada, “Logistic optimization for site location and route selection under capacity constraints using hybrid Tabu search,” *Computer Aided Chemical Engineering*, Volume 15, 2003, pp. 612-617.

[9] G. Qin, “The algorithm of mutiple logistics distribution center location based on ant colony optimization,” *Journal of system engineering theory and practice*, pp. 5-8, August 2010.

[10] Y. L. Wang, *Research on logistics distribution center location strategy*. DL: dalian maritime university, 2004.

[11] H. J. Sun and Gao Z. Y, “The bi-level programming model and its' algorithm of logistics distribution center location considering the route arrangement,” *Journal of transportation engineering*, pp. 65-68, Februay 2003.

[12] B. Gao and R. Y. Zhang, “A new model on logistics center location, “ *Journal of logistics technology*, pp. 44, May 2003.

[13] T. Chen, “A fuzzy approach to select the location of the distribution center,” *Fuzzy Sets and Systems*, 2001.

[14] B. Yang, “The issue of logistics distribution center location of multiple random mathematical model,” *China science management*, pp. 45-49, November 2009.

[15] J. Xu and K. Zheng, “Analysis on effect factors of logistics center location and case,” *Journal of Northern Jiaotong University*, 2001.

[16] L. J. Huang, “Strategies on the Chinese agricultural supply chains management based on the SCOR-model in the E-commerce environment”, *Journal of Life Sciences*, pp. 1–7, August 2010.

[17] Y. Wang and W. K. Zhang, “Research on agricultural product logistical development under the New Rural Construction,” *China Storage*, 2009.

[18] X. M. Huang and D. Ch. Liu, “Analysis on agricultural products logistical development status and challenges,” *Modernization*, 2008.

[19] X. D. Gao and Z. Y. Li, “The model of logistics center location and a heuristic algorithm,” *Journal of strategy and management*, pp. 56-62, March 2010

[20] D. S. Li and B. L. Luo, “The theories about agricultural circulation problems,” *Southern rural*, 2006.

[21] S. X. Wang and M. Y. Zhang, “China agricultural modern logistics development strategy study,” *China's circulation economy*, 2011.

[22] Y. G. Zhao, “Research on construction of agricultural products central issues,” *China Market*, 2007

[23] Z. L. Suo and D. Wang, “The model of agricultural logistics center location and its application,” *Agricultural technology economy*, pp. 51-55, June 2007.

[24] Z. M. Guan, “Research on logistics distribution center location,” SY: Northeast University, pp. 27-29, 2006.

[25] X. L. Ma and K. L. Xu, “Research on agricultural logistics distribution center location,” *Journal of analysis and decision making*, pp. 54-56, June 2007.

Lijuan Huang Jiangxi Province, China. Birthdate: February, 1971. is Management Science and Engineering Ph.D., graduated from Nanchang University. And research interests on e-commerce and Logistics and Supply Chain Management.

She is a postdoctor of Jiangxi University of Finance and Economics.

Jie Yu JiangXi Province, China. Birthdate: September, 1985. study in Jiangxi University of Finance and Economics., major in Management Science and Engineering. And research interests on Logistics and supply chain management.

He is a postgraduate of Jiangxi University of Finance and Economics.

Xingwang Huang JiangXi Province, China. Birthdate: June, 1987. study in Jiangxi University of Finance and Economics., major in Management Science and Engineering. And research interests on Logistics and supply chain management.