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Research on the Coupling Relationship and Coordinated Development of Rural E-Commerce and Logistics under the Background of Rural Revitalization

-- Based on the Empirical Study in Rural Areas of Huangshan City, Anhui Province

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Abstract

With the rural revitalization strategy, our rural electricity and logistics developed rapidly, but rural logistics level is relatively backward, and rural electricity and logistics coordinated development to promote "agricultural products" and "industrial products to the countryside", improve the efficiency of goods, promote agricultural and rural economic development, has important practical significance, but less research from the rural electricity logistics on the coupling relationship solution path. This project will conduct an empirical investigation on the rural areas of Huangshan City, Anhui Province, adopt the coupling degree model, qualitative and quantitatively analyze the coordination degree of rural e-commerce and logistics development, and put forward the coordinated development countermeasures of the two.

Keywords

Rural Revitalization; Rural E-Commerce; Rural Logistics; Coupling Relationship.

1. Research Background

The rapid development of rural e-commerce has greatly changed the farmers 'production, life style and market trading mode, widened the sales channels of agricultural products, driven the enthusiasm of farmers' consumption, and promoted the two-way circulation innovation of industrial products down and agricultural products upward. For rural e-commerce, the seasonal, frequency, frequency, individual packaging, etc., on the industrial products, because of the vast rural area, complex road conditions, the dispersion of farmers living brings challenges to logistics activities. On the basis of the above basic judgment, this paper puts forward the coupling development relationship between rural e-commerce and logistics, and makes a qualitative and quantitative analysis, which enriches the relationship between e-commerce and logistics, which has certain theoretical significance. The study of rural logistics and rural e-commerce, by exploring the relationship between the two and their development law, is helpful to fully understand the mechanism of mutual promotion and mutual restriction of rural logistics and rural e-commerce in China. The conclusions drawn in this paper by using the development data of logistics and rural e-commerce in Huangshan City, Anhui Province can provide reference for practical departments and government functional departments, and have certain reference significance when formulating development policies and development plans.

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2. Coupled and Coordinated Development Status of Rural E-Commerce and Agricultural Logistics

2.1. Backward Rural Infrastructure

Although our country invested a lot of money in infrastructure, but also made certain achievements, but there are still a large number of rural locations in remote places, even built the road, they will still face the problem of transportation inconvenience, public transportation is not, home no travel tool family want to go out of the village to the market or the city still need to pay a lot of time cost and money, selling agricultural products still exist certain difficulties for them. Rural logistics development is still lagging behind, the town logistics point is far away from the countryside, farmers want to take express still pay a lot of additional costs, and the town logistics points will charge a certain storage fee, which greatly curb the enthusiasm of farmers shopping; in addition, the lag of logistics development, the speed of logistics determines the freshness of agricultural products

2.2. Lack of E-Commerce Talents

According to the data, most rural population is aging, and the main group of —— is unwilling to stay in the countryside but mostly choose to work in cities. In addition, even though most universities set e-commerce or logistics management majors, college students are almost reluctant to return to the countryside, especially in the current economic downturn, their employment faces many bottlenecks, and fewer e-commerce talents develop.

2.3. The Platform Needs to be Improved

Platform is the main battlefield for selling agricultural products, and the platform is very important for the quality supervision of agricultural products. But now many sales platform of supervision of agricultural products, and even the supervision of logistics aspects, resulting in the quality of the agricultural products and customers, which will seriously affect the sales platform and the reputation of agricultural products suppliers, will also have a certain impact on the production of farmers. Nowadays, the sales system of agricultural products is not perfect, and most of the ways to sell agricultural products in rural areas still remain in the traditional sales mode. There is no perfect e-commerce sales system, and there is no perfect industrial chain, which is very unfavorable to the development of rural e-commerce.

3. Empirical Study on the Coupling Relationship between Rural E-Commerce and Logistics

3.1. Construction of the Index System

E-commerce usually refers to a new business model, based on the application between customers / services, buyers and sellers, online shopping, electronic payment between online merchants and various business activities, transaction activities, financial activities and related comprehensive service activities are not affected by time and space.

Rural logistics refers to the logistics activities serving agricultural production and rural residents 'life in the rural areas, which specifically includes the transportation and distribution of rural residents' daily necessities, the means of agricultural production and the transportation of agricultural products. The main difference between rural logistics and urban logistics lies in the area where logistics activities are carried out. The area where rural logistics occurs is in rural areas, which is the logistics activities serving the life and production of rural residents. Therefore, rural logistics has the characteristics of scattered logistics demand, strong seasonality, prominent direction, obvious regional differences, and other aspects of rural logistics operation and organization difficulty.

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Due to the rural logistics system is relatively weak and backward conditions, the circulation of rural commodities is generally "difficult to buy" and "difficult to sell" problems. On the one hand, it is inconvenient for farmers to buy the means of life and production; on the other hand, it is difficult for farmers to sell them and realize them. With the advantages of high efficiency and convenience, e-commerce can drive the development of rural economy, and e-commerce with its unique transaction characteristics undoubtedly plays an important role in the development of rural logistics. Therefore, the next paper will explore the degree of coupling between e-commerce and rural logistics.

Therefore, this paper first to the development foundation, development scale, development potential three dimensions, build indicators to measure e-commerce, development level, and then to the logistics development level, infrastructure, development environment three dimensions to measure the level of rural logistics development indicators.

3.2. Data Source

The data of this paper are derived from China Statistical Yearbook and other public data. The indicators of this article are selected as follows:

Table 1. Comprehensive Evaluation system of E-commerce and Rural Entrepreneurship Development

Level 1 indicators	Secondary indicators	Level 3 indicators
Rural e-commerce	Development foundation	The proportion of rural broadband users
		The density of rural express delivery outlets
		Online shopping, net business users account for the proportion
	Development scale	E-commerce transaction volume (year)
		Express delivery transaction volume (year)
		Number of express packages per capita (month)
	development potential	Rural e-commerce market share
		The share of e-commerce economy
Rural logistics	Logistics development level	The number of logistics enterprises
		Logistics industry added value
	infrastructure	Highway mileage
		Civil car ownership
	Development environment	Support for the development of the tertiary industry
		government support
		Logistics human resources support

3.3. Methods and Models

The entropy method is used to comprehensively evaluate the development of e-commerce and rural logistics in each city, and then the coupling coordination model is used to measure the coupling coordination of the two systems and analyze their dynamic evolution process. The linear regression of e-commerce and rural logistics development systems, measures the degree of e-commerce in promoting the development of rural logistics on the whole, and finally analyzes the specific path of e-commerce technology to promote the development of rural logistics by using the intermediary effect model.

1. Entropy value method

(1) Standardize the original index data to eliminate the impact of different index units.

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$$z_{ij} = \frac{x_{ij} - \min\{x_{1j}, x_{2j}, ..., x_{nj}\}}{\max\{x_{1j}, x_{2j}, ..., x_{nj}\} - \min\{x_{1j}, x_{2j}, ..., x_{nj}\}} \quad (1)$$

Calculate the weight of each index. The normalized values were used as follows.
Calculate the proportion of each index;

$$p_{ij} = \frac{z_{ij}}{\sum_{i=1}^{n} z_{ij}} \quad (2)$$

In which, (2), Z is in the middleij Represents the standardized each index data
According to the definition of information entropy in information theory, the information entropy of a set of data;

$$e_j = -\frac{1}{\ln n} \sum_{i=1}^{n} p_{ij} \ln p_{ij} \quad (3)$$

In which, (3), the P The ij is The proportion of each index
The weight of each index is calculated by the information entropy:

$$w_j = \frac{1 - e_j}{n - \sum_{j=1}^{m} e_j} \quad (4)$$

Where (4) in ej It represents the information entropy of each index obtained
(3) Calculate the comprehensive score

$$s_{ij} = \sum_{j=1}^{m} w_{ij} p_{ij} \quad (5)$$

Where (5) in Wij Represents the weight of each indicator

2. Coupling and coordination model
The coupled coordination model is adopted to measure the dependence relationship between e-commerce and rural logistics development. U1, U2The comprehensive evaluation score of the development of e-commerce and rural logistics is calculated respectively, and the coupling degree of e-commerce and rural logistics systems is calculated by type (6): C:

$$C = \frac{2\sqrt{U_1 \times U_2}}{U_1 + U_2} \quad (6)$$

Calculate the coupling and coordination degree of e-commerce and rural logistics systems through formula (7) D:

$$\sqrt{C \times T}\ D =, \quad T = \alpha U_1 + \beta U_2 \quad (7)$$

(7) In the equation, T represents the comprehensive evaluation index of the two systems and the evaluation weight coefficient of the two systems, where the value is 0.α, βα, β.5

3.4. Results Analysis

Based on the evaluation index system of e-commerce and rural logistics, the entropy method is used to measure the weight of each index, and the results are as follows.
From Table 2, the shows that transaction users account for a high proportion shows that e-commerce users play an important role in e-commerce, and the development potential plays an important role in the development of e-commerce.

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Table 2. Weight measures

metric	weight
The proportion of rural broadband users	0.1187
The density of rural express delivery outlets	0.1260
Online shopping, net business users account for the proportion	0.1598
E-commerce transaction volume (year)	0.1312
Express delivery transaction volume (year)	0.1439
Number of express packages per capita (month)	0.1070
Rural e-commerce market share	0.1596
The share of e-commerce economy	0.1641
The number of logistics enterprises	0.1342
Logistics industry added value	.10257
Highway mileage	0.1189
Civil car ownership	0.1148
Support for the development of the tertiary industry	0.1177
government support	0.1305
Logistics human resources support	0.1280

The coupling dynamic evolution of e-commerce and rural logistics development systems is shown in the following table (figure):

Table 3. Coupling degree evolution

a particular year	degree of coupling
In 2016,	0.6365
In 2017,	0.6992
In 2018,	0.7223
In 2019,	0.7711
In 2020,	0.8800
In 2021,	0.9959

From Table 3, the coupling degree between the two systems has been at a high level, and it has basically reached the coordinated coupling since 2016.

Table 4. Coupled coordination degree evolution

a particular year	Coupling coordination degree
In 2016,	0.4325
In 2017,	0.5326
In 2018,	0.6548
In 2019,	0.7158
In 2020,	0.8489
In 2021,	0.9087

From Table 4 to see, in 2016 e-commerce and rural logistics development coupling coordination is only 0, after a few years, the two systems coupling coordination rising, by 2021, the two systems coupling coordination has reached 0, experienced the moderate disorder, basic coordination, moderate coordination until highly coordination, that in 2016, the two systems in moderate imbalance stage, e-commerce and rural logistics development at a low level of

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mutual inhibition, by 2021, e-commerce and rural logistics development to achieve mutual promotion at a high level.

4. Policy Suggestions on the Coupling and Coordinated Development of Rural E-Commerce and Rural Logistics

4.1. Improve the Infrastructure

The local government should step up efforts to improve the infrastructure, especially for the construction of network infrastructure. Local network finance office facilities have a decisive role in the development of e-commerce, which depends on the network, and there is no e-commerce at all. Although the current implementation of the "every village access" plan is very effective, but in order to make e-commerce thrive, then the construction of network facilities should not only stay at the level leading to. The government should make great efforts to achieve the whole network coverage of rural areas, accelerate the pace of 5G construction, so that villagers can not only access the Internet unimpeded, whether live broadcast, watching video will not be affected.

4.2. Introducing E-commerce Talents

There is a lack of e-commerce talents in rural areas, so to introduce e-commerce talents, the local government needs to formulate relevant policies to benefit the people to attract talents. Another local township government can take advantage of the rural revitalization of the opportunity, choose excellent mastering to cultivate rural electricity talent, most farmers have low education, for the Internet is not better grasp, but it is the main force of the Internet era, under the government policy, mastering to appropriate training and training, rural electricity talent is just around the corner. In addition, township agricultural bases should also properly cooperate with universities appropriately, and make appropriate publicity in this way to attract e-commerce talents.

4.3. Improve the Logistics and Transportation System

The development of rural e-commerce not only relies on the Internet, but also relies on the rural logistics and transportation system. To ensure the safety and efficiency of transportation, it is necessary to improve the logistics and transportation system. First of all, the government should break through the "last kilometer" problem, to ensure that logistics can reach rural remote areas and not just in the town, but also to ensure that logistics can be shipped from remote places, such remote areas of farmers' agricultural products can also rely on rural electricity to sell, solve the problem of remote and unsalable agricultural products. In addition, it should be reasonably set up logistics service outlets, logistics service outlets should play a role of radiation driving, it is strictly prohibited to cast a net placement network, to reasonably integrate the resources of various regions, to realize the greatest interests of farmers as the starting point, to facilitate the convenience of farmers. Finally, the logistics service outlets are to carry out reasonable supervision and control, strictly investigate the problem of arbitrary charges, the service outlets should open the charging standards, and at the same time, to obtain the government permission, cannot charge at will.

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