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Study of agricultural industrialization and green supply chain of agricultural products based on the new urbanization of China---Anhui province as example

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ABSTRACT

China's urbanization will influence the future world economic development. China's s urbanization rate is from 10.6% in1949 to 53.73% in 2013, and the research center of the experts predict that China's urbanization rate will reach 60% in 2020.The characteristic of China's urbanization is the coordinated development of four modernizations, which includes informatization, industrialization, urbanization and agricultural modernization. This paper analysis the agricultural industrialization and green supply chain of agricultural products based on the new urbanization of China. At last, some suggestions are put forward, that is we should pay attention to the green supply chain of agricultural products based on internet of things (IOT). IOT is aimed at enabling the interconnection and integration of the green supply chain which represents the trend of the green supply chain of agricultural products performance improvement of advanced technical platform networking, and leads the green supply chain of agricultural products revolution.

Keywords: Urbanization; Agricultural Industrialization; Green Supply Chain

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INTRODUCTIONS

Since the 1990 s, many of the problems facing the rural reform and development of China especially the problem of agriculture, rural areas and farmers, both related to urbanization directly and indirectly. China is facing two transformations, that is, from a command economy to a market economy transformation, and from the countryside, agricultural society to the city, the transformation of industrial society.

By the end of 2011, the urban population of China has reached 691 million, that the urbanization has reached 51.27%. This shows that China have already said goodbye to rural society as the main body of the era, which reached into an urban society as the main body of the new era. It is on this basis, the eighteenth big Chinese characteristics of the "four modernizations" target was proposed, and for the relationship of the four modernizations, also will be very accurate description. First, informatization and industrialization depth fusion, this is the only way to improve the economic efficiency, and improve the industrial economy and an important means of enterprise core competitiveness. Informatization will be the wings of take-off industrialization, which is the solid foundation. Second, the benign interaction of industrialization and urbanization is the defining feature of modern economic and social development. Industrialization is the economic support of urbanization, and the urbanization is the space of the industrialization, which promoting the positive interaction between industrialization and urbanization, and creating conditions for industrialization, as well as the inherent law of urbanization development. Third, urbanization and agricultural modernization coordination is the main stream of the development of rural China. No agricultural modernization, urbanization becomes like water without source, and without urbanization, and agricultural modernization will lose he goal of depending. This paper analysis agricultural industrialization and green supply chain of agricultural products based on the new urbanization of China ----Anhui Province as example.

2. General situation of agricultural industrialization
----Anhui province as example

2.1Introduction

Anhui province is a typical agricultural province with vast population, limited land and dispersed farm land. Agricultural population accounted for the total population is about for 80.23%. Gross output of agriculture accounted for GDP is 32.86%, and it is higher than the average level of our country at present. With the enlargement of the difference between town and country in Anhui province, "the three agricultural problems" come out prominently day by day in our Anhui province's socio-economic development. Since the reform and opening up, with the rapid development of Anhui industrialization, the gap between urban and rural areas is increasing continuously, and it is in turn affected agricultural industrialization. Realizing the agricultural industrialization is the only road to the rural modernization, agricultural industrialization is not some single indivisible thing, but instead it refers to the movement toward more direct production and marketing relationships between producers and processing.

At present, Anhui agricultural industrialization is in the growth stage. While the point of industrial agriculture more or less coincides with that of the innovation in agricultural machinery in general.This paper discusses on the method of principal component and analysis's to the agriculture industrialization in Anhui province.

2.2Empirical Analysis of Anhui agricultural industrialization by PCA

(1) Introduction of PCA

Principal component analysis (i.e. PCA, for short) is one of the primary statistical techniques for feature extraction and data modeling which is a fundamental operation in computational data analysis, with myriad applications ranging from web search, to bioinformatics, to dynamical system identification, to computer vision and image analysis. PCA is a common technique for finding patterns in data of high dimension, and transforming multiple indices into a small amount of uncorrelated random variables which can not be observed, so as to extract most of the information of original indices. PCA method is just a desired and practicable approach to project the data onto a low dimensional space, which compress normal process data and extract main information of process, while attempting to preserve as much of the structural nature of the data as much as possible. This paper discusses on the method of PCA to the agriculture industrialization level in Anhui.

(2)The establishment of the index system

Agricultural industrialization is an area of agricultural economic development, which is necessary to establish a comprehensive evaluation index system of agricultural industrialization. The establishment of the index system is such as follows. Development index includes average net income of farmer, which is a reflection of agricultural productivity level. Structure index includes agricultural industry and agricultural labor force. Structure index of agricultural industry is aimed at the reorganization and upgrading process of agricultural industrialization, which reflects agricultural economy, agricultural technology progress and the competitiveness of industrial structure. The urbanization rate as the change of industrial structure index measures the development situation of agricultural industrialization, and urbanization rate in agriculture industrialization is an important sign. Index of science and technology includes total power of agricultural machinery which is the development level of agriculture mechanization**.** Infrastructure index includes water benefit village and the number of auto village. Resources and environment index includes the proportion of industrial wastewater treatment of the total emissions. Agricultural industrialization must consider bearing capacity of the agriculture ecological environment.

(3)Empirical Analysis of Anhui agricultural industrialization by PCA

According to the development evaluation index system of the agriculture industrialization in Anhui province,this paper selects index statistics of Anhui province from 2013. Samples include Huaibei, Bozhou, Chizhou, Huangshan, Hefei, Chaohu, Luan, Anqing, Chuzhou and Wuhu City. Empirical analysis process include four steps as follows.

Table 1. Standardization of original data

City	Zx_1	Zx_2	Zx_3	Zx_4	Zx_5	Zx_6	Zx_7
Huaibei	-0.59	-1.13	1.22	-0.03	0.08	-1.14	-0.20
Bozhou	-1.22	-0.95	0.72	2.10	-1.76	0.52	1.58
Chizhou	0.08	0.13	-0.38	-0.43	0.21	-0.74	-0.69
Huangshan	0.66	-1.22	-1.69	-0.56	1.98	-0.33	-0.69
Hefei	0.89	1.03	-0.92	-0.86	-0.76	-0.21	2.10
Chaohu	0.15	0.67	1.11	-0.03	-0.12	-0.38	-0.33
Luan	-1.22	0.44	-0.54	1.52	-0.71	2.12	-0.69
Anqing	-0.65	0.68	-0.54	-0.59	0.02	0.65	-0.12
Chuzhou	-0.08	-1.06	-0.06	-0.41	0.21	0.62	-0.43
Wuhu	1.98	1.40	1.11	-0.69	0.86	-1.10	-0.49

First, we should standardization of the original data,which can eliminate the effects of different dimensions of indices on analysis result. The comparable standardized data follow the normal distribution (0, 1). The results are shown in Table 1.

Second, choosing components and forming a feature vector. If we have a data set with more than 2 dimensions, there is more than one covariance measurement that can be calculated. PCA transforms the data to a new coordinate system such that the greatest variance by any projection of the data comes to lie on the first coordinate, the second greatest variance on the second coordinate, and so on. The calculation of characteristic root and contribution rate shows in table 2. As can be seen in table 2, according to the principle of cumulative contribution rate≥85% and we should extract the front four factors as principal components to take the place of 10 original variables.

Table 2. The characteristic roots and the contribution rate of variance

Principal components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Eigen value	Percent (%)	Accumulative percent (%)	Eigenvalue	Percent (%)	Accumulative percent (%)
1	2.99	42.83	42.83	2.99	42.83	42.83
2	1.54	22.09	64.93	1.54	22.09	64.93
3	1.19	17.04	81.97	1.19	17.04	81.97
4	.86	12.36	94.34	.86	12.36	94.34
5	.24	3.48	97.82	.24	3.48	97.82
6	.12	1.70	99.53	.12	1.70	99.53
7	.03	.46	100.00	.03	.46	100.00

Third, the calculation results of principal components score and comprehensive evaluation. We can draw the following evaluation. Comprehensive value of Bozhou and Luan city is higher than other cities, and they ranked first and second city which belongs to higher level of the agricultural industrialization. Hefei, Anqing and Chaohu city were ranked three to five which belongs to the medium level of agricultural industrialization. Chuzhou, Huaibei, Chizhou, Wuhu and Huangshan city belongs to the lower level of the agricultural industrialization.

3. Anhui agricultural industrialization should go the road of green supply chain of agricultural products

To quicken agricultural industrialization, the government of Anhui should take due action and make relevant polices to promote the construction of new countryside and develop modern agriculture. Advance in agricultural technology which includes industrialization of breeding, cultivation of excellent new varieties, fine strains, high-efficiency, eco-friendly planting, aquatic breeding technology, water-saving and precision technologies allow information to be shared more efficiently. It also enables agricultural production to become more precise, so that products can be fine-tuned to meet customer demands. Processing transportation, storage of farm products, and so on, are the important aspects of agricultural industrialization in Anhui. Government should create the environment and conditions actively, including market conditions, to promote agricultural industrialization management. Besides, government should promote agricultural marketization. Anhui agricultural industrialization of China should go the road of the green supply chain of agricultural products.

Based on this environment friendly behavior, green supply chain of agricultural products is formed in a close circular net on the basis of traditional forward the supply chain together with reverse feedback. It is a kind of modern management model throughout the supply chain to consider the agricultural environmental impact and agricultural resource efficiency, which includes recovery operations, such as remanufacturing, recycling, and reuse adds an additional level of complexity to supply chain design, and a new set of potential operational and strategic considerations.

We should pay attention to the green supply chain of agricultural products based on internet of things (IOT). IOT is aimed at enabling the interconnection and integration of the green supply chain. It represents the trend of the green supply chain of agricultural products performance improvement of advanced technical platform networking, and leads the green supply chain of agricultural products revolution. Studying on green supply chain of agricultural products based on IOT is imperative. In all literatures of China, cooperation and coordination among the members of the supply chain is the foundation and key to a green supply chain of agricultural products efficient operation. The traditional internet is oriented towards person-to-person connection, whereas the IOT is oriented towards connections between inanimate objects, IOT covers a larger range of connections and involves more semantics than traditional internet.

The implementation of green supply chain of agricultural products management is extremely important to promote sustainable agricultural development in agricultural industrialization, which can settle the problems of the supply chain development. Green supply chain of agricultural products, which has played critical role in improving the

competitiveness of agricultural enterprises, solving environmental problems and implementing national sustainable development strategy in agricultural industrialization. We must pay attention to the design of the system of green supply chain operation, and strengthen the construction and development of green supply chain of agricultural products which under the IOT platform, from government, producers and consumers. Building the integrated supply chain management system of agricultural products which is conducive to the government's macro-control in the IOT technology, promote the sharing of information resources within the industry and improve the policy and legal system in time.

CONCLUSION

Anhui agricultural industrialization is still at a relatively low level, thus accelerating the pace of agricultural industrialization has become the key of economic development in Anhui province. Anhui agricultural industrialization should go the road of the green supply chain of agricultural products.

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