The Collaborative Relationship among Industrialization, Urbanization, Informatization and Agricultural Modernization and the Path of Synchronous Development in China: An Analysis Based on the Data during 1978 – 2011

Xinzhi LIU[1,2]*, **Lu LI**[2], **Yusong LIU**[2]

1. Agricultural Education Development Research Center, Southwest University, Chongqing 400715, China; 2. College of Economics and Management, Southwest University, Chongqing 400715, China

Abstract The synchronous development of industrialization, urbanization, agricultural modernization and informatization is the basic trend and future requirements of China's economic and social development. By using the relevant data of 1978 – 2011, and establishing the VAR model, we find that in the short term, industrialization is the Granger cause of urbanization; urbanization is the Granger cause of industrialization, informatization, and agricultural modernization; agricultural modernization is the Granger cause of industrialization, informatization and urbanization; informatization is the Granger reason of industrialization, urbanization and agricultural modernization. In the long run, there are long-term and stable relations among them, and at the same time, their changes affect the structure of each other, and there are pulling effect among them.

Key words Industrialization, Urbanization, Informatization, Agricultural modernization, VAR model

1 Introduction

Since the reform and opening up, China's industrialization, informatization, urbanization and agricultural modernization have achieved rapid development, but paradoxically, the development pace of "industrialization, urbanization, informatization and agricultural modernization" is not synchronized. In 2011, China's urbanization rate was 51.3%, and industrialization rate was 46.8%. The ratio between the two was 1.09, while the global average ratio over the same period was 1.95, indicating that compared with most of the countries in the world, the proportion of China's industrialization was too high, while urbanization rate was too low (Zhou Qiren 2012). Currently, China's comprehensive agricultural modernization index is 38, ranking 65th in the world (Chinese Academy of Sciences, 2012); agricultural modernization has become a short board in China's agricultural modernization; as of 2008, the agricultural economy level of China lagged behind that of the United States approximately 100 years (Chuan Qi, 2012). In fact, the synchronous development of industrialization, informatization, urbanization and agricultural modernization is of great practical significance to promoting the scientific development of "agriculture, farmers and countryside" and building of a comprehensive well-off society. Therefore, analyzing the rela-

tionship among "industrialization, urbanization, informatization and agricultural modernization", exploring the mechanism of interaction among "industrialization, urbanization, informatization and agricultural modernization" and promoting the synchronized development of "industrialization, urbanization, informatization and agricultural modernization", has become the focus of attention of academic world and politicians. In recent years, some domestic scholars have studied the issues concerning the synchronized development of industrialization, informatization, urbanization and agricultural modernization, and have achieved some results. Yu Liping et al. (2009) use vector autoregression model to analyze the relationship between industrialization and informatization, and maintain that there is a long-term stable collaborative relationship between the level of informatization and industrialization, and the development of informatization can promote the development of industrialization. Wu Guoyong (2011) points out that agricultural modernization is the inevitable choice of agricultural development; industrialization and urbanization are the basis of agricultural modernization development; there is a synchronized development relationship among agricultural modernization, industrialization and urbanization. Jiang Huiming et al. (2012) use the time series data during 1991 – 2009 to calculate the development index of industrialization, urbanization and agricultural modernization in Jilin Province, and believe that there is an intrinsically collaborative relationship among the three. Xia Chunping et al. (2012) equally consider that there is significant interactive promoting relationship among industrialization, urbanization and agricultural modernization. Based on a questionnaire survey analysis, Li Juan (2013) points out that it is necessary to promote the coordinated develop-

ment of industrialization, urbanization and agricultural modernization. Overall, there have been some scholars aware of the necessity of studying the synchronized development of industrialization, urbanization, informatization and agricultural modernization, but the most of the relevant studies are qualitative, lacking in-depth empirical analysis. In 2013, the 18th National Congress of the CPC viewed the "industrialization, urbanization, informatization and agricultural modernization" as a unified whole, and pointed out that the synchronous development of "industrialization, urbanization, informatization and agricultural modernization" was the only way toward modernization.

Therefore, clarifying the relationship among "industrialization, urbanization, informatization and agricultural modernization" and analyzing the synchronous development path of them is a major political and economic task that the current academia must bear.

2   Empirical analysis

2.1   Model and variable selection   In order to study the short-term and long-term relationship among industrialization, urbanization, informatization and agricultural modernization during 1978 – 2011, this paper uses the time series model for study given that the four are all time series. The traditional econometric method is based on economic theory to describe the relationship between variables, but the economic theory is usually not sufficient to provide a strict description of dynamic relationship between variables. To solve this problem, this paper uses non-structural approach to establish the model of relationships between various variables, namely vector autoregression model (VAR).

General expression of VAR model is as follows:

$$Y_t = C + \Phi_1 Y_{t-1} + \cdots + \Phi Y_{t-p} + \Phi_p Y_{t-p} + H X_t + \varepsilon_t \quad t = 1, 2, \cdots, T \tag{1}$$

where Y_t is the column vector of k-dimensional endogenous varia-

bles; X_t is the column vector of d-dimensional endogenous variables; p is the lag order; T is the number of samples; $k \times k$-dimensional matrix Φ_1, $\cdots$, Φ_p and $k \times d$-dimensional matrix H are the coefficient matrices to be estimated; ε_t is the k-dimensional disturbance column vector.

Taking into account the data availability, based on the study of Yu Liping *et al.* (2009) and Xia Chunping *et al.* (2012), this paper selects machinery power per capita in rural areas to measure and represent the level of development of agricultural modernization (XDH); proportion of urban population to total population as the indicator of urbanization (CZH); sum of per capita GDP index, industry index and practitioner index as the indicator of industrialization (GYH); sum of per capita postal and telecommunication service index, postal outlet index and telephone penetration index as the indicator of informatization (XXH). This paper selects national data during 1978 – 2011 as samples and data are from China Statistical Yearbook and 55 Years of Statistics Compilation in New China. To reduce the volatility of data and heteroscedasticity, we take the natural logarithm of each variable, represented by LNXDH, LNCZH, LNGYH and LNXXH. The statistical description of variables can be shown in Table 1.

2.2   Unit root test   Since there is spurious regression in the non-stationary series, this paper draws upon the ADF unit root test developed by Dickey and Fuller to perform stationary test of explanatory variables and variables to be explained. Test results are shown in Table 2, and ADF statistic of LNCZH, LNGYH, LNX-DH and LNXXH is less than critical value at 5% level, indicating that the four series are non-stationary series. After the first order difference of four series, the ADF test is conducted. The results show that they are stationary series. Thus it can be found that LNCZH, LNGYH, LNXDH and LNXXH are integrated of order one I (1).

Table 1   Statistical description of variables

Variables	Samples	Mean	Standard deviation	Minimum	Maximum
LNCZH	34	− 1.184 230	0.309 179	− 1.719 253	− 0.668 064
LNXDH	34	0.097 904	0.608 286	− 0.879 653	1.301 571
LNGYH	34	4.753 093	0.481 246	4.131 789	5.703 783
LNXXH	34	4.375 197	0.534 722	3.882 838	5.623 854

Table 2   Unit root test of variables

	Test form(c, t, k)	ADF statistic	5% level	Prob. *	Stationarity
LNCZH	(c,t,1)	− 1.557 662	− 3.557 759	0.787 2	Instationary
LNGYH	(c,t,1)	− 1.804 345	− 3.557 759	0.679 0	Instationary
LNXDH	(c,t,1)	− 1.315 612	− 3.557 759	0.865 7	Instationary
LNXXH	(c,t,0)	− 0.958 499	− 3.552 973	0.936 4	Instationary
D(LNCZH)	(c,t,0)	− 4.250 392	− 3.557 759	0.010 6	Stationary
D(LNGYH)	(c,t,0)	− 4.049 525	− 3.557 759	0.016 9	Stationary
D(LNXDH)	(c,t,0)	− 3.668 459	− 3.557 759	0.039 5	Stationary
D(LNXXH)	(c,t,0)	− 6.641 581	− 3.557 759	0.000 0	Stationary

Note: In (c, t, k), c is the constant term; t is the trend term; k is the lag.

2.3   VAR model   Since the test results of AIC (Akaike Information Criterion), SC (Schwarz Criterion), HQ (Hannan –

Quinn Information Criterion) and FPE (Final Prediction Error) are inconsistent, this paper uses LR (Likelihood Ratio) test to

determine the optimal lag length of VAR model at 1, and uses OLS (Ordinary Least Squares) to estimate the model.

The results are as follows:

$$LNXDH = -1.2053 + 0.3007LNCZH_{t-1} + 0.2307LNGYH_{t-1} + 0.5788LNXDH_{t-1} + 0.1310LNCZH_{t-1} + e_{1t} \quad (2)$$

$$LNGYH = 0.9701 + 0.6962LNCZH_{t-1} + 0.8837LNGYH_{t-1} - 0.3235LNXDH_{t-1} + 0.1107LNXXH_{t-1} + e_{2t} \quad (3)$$

$$LNCZH = -0.2025 + 0.9638LNCZH_{t-1} + 0.0290LNGYH_{t-1} - 0.0161LNXDH_{t-1} + 0.0127LNXXH_{t-1} + e_{3t} \quad (4)$$

$$LNXXH = -1.4021 - 0.6022LNCZH_{t-1} + 0.4779LNGYH_{t-1} + 0.2973LNXDH_{t-1} + 0.6440LNXXH_{t-1} + e_{4t} \quad (5)$$

Most of t-statistics of model parameters are significant, and meanwhile, the goodness of fit of equations is as follows: $R^2_{LNXDH} = 0.9967$, $R^2_{LNGYH} = 0.994$, $R^2_{LNCZH} = 0.9985$, $R^2_{LNXXH} = 0.9735$.

It shows that the overall goodness of fit of equations is high.

2.4 Johansen cointegration test The lag order of VAR model is 1, and LNCZH, LNGYH, LNXDH and LNXXH are integrated of order one, so this paper uses Johansen test to determine the number of cointegration vector in the model. The test results are shown in Table 3.

Table 3 Johansen cointegration test results

The null hypothesis: the number of cointegration equations	Trace test			Maximum eigenvalue test		
	Statistic	5% critical value	Pro.**	Statistic	5% critical value	Pro.**
None*	53.862 04	47.856 13	0.012 3	24.397 66	27.584 34	0.013 2
At most 1	29.464 38	29.797 07	0.054 6	16.421 91	14.264 6	0.652 6

It can be found from Table 3 that there is a cointegration relationship among the four time series LNCZH, LNGYH, LNXDH and LNXXH, and the long-term cointegration equation with the level of agricultural modernization as the variables to be explained is as follows: $LNXDH = 2.3705LNGY + 0.2272LNXXH - 2.1363LNCZH$ (6)

The coefficients of equation (6) show that during 1978 – 2011, China's industrialization and informatization had a positive impact on agricultural modernization. For every 1% increase in industrialization and informatization, the level of agricultural modernization will increase by 2.3705% and 0.2272%, that is, the role of China's industrialization is greater than that of informatization in promoting agricultural modernization. From the point of view of China's current situation at present, it is very realistic. Since the reform and opening up, as the world famous "manufacturing power", China's industrialization level has continued to rise. Driven by industrialization, China's agricultural modernization has been on the rise. The "industry nurturing agriculture"

policy at the national macro-control level also has a profound impact on the agricultural modernization. China's informatization is weakly promoted in rural areas, but its impact on agricultural modernization has been gradually emerging. With the improvement of the level of urbanization, tens of millions of migrant workers go to city for jobs, laying a solid foundation for agricultural modernization. However, due to the household registration system, urban-rural dual structure and excessive pursuit of urbanization rate, most highly educated skilled labor forces stay in the city, leading to insufficient human capital in rural areas and slowing the pace of agricultural modernization.

2.5 Granger causality test There is significant correlation between many economic variables, but such correlation may not have practical significance. When there is no causal relationship between economic variables, the correlation between variables does not exist. In this paper, we use Granger causality test to test the causal relationship among LNGYH, LNCZH, LNXDH and LNXXH, and the results are shown in Table 4.

Table 4 Granger causality test

The null hypothesis	Sample size	F-statistic	Prob.	
LNXXH does not Granger cause LNXDH	32	1.134 04	0.336 6	Rejected
LNXDH does not Granger cause LNXXH		2.428 74	0.107 2	Rejected
LNGYH does not Granger cause LNXDH		2.619 54	0.091 3	Accepted
LNXDH does not Granger cause LNGYH		0.213 62	0.8090	Rejected
LNCZH does not Granger cause LNXDH		1.262 85	0.299 0	Rejected
LNXDH does not Granger cause LNCZH		0.396 32	0.676 6	Rejected
LNGYH does not Granger cause LNXXH		3.292 2	0.052 5	Accepted
LNXXH does not Granger cause LNGYH		0.421 83	0.660 1	Rejected
LNCZH does not Granger cause LNXXH		1.177 82	0.323 3	Rejected
LNXXH does not Granger cause LNCZH		0.184 29	0.832 7	Rejected
LNCZH does not Granger cause LNGYH		2.030 93	0.150 8	Rejected
LNGYH does not Granger cause LNCZH		0.302 87	0.741 2	Rejected

From Table 4, in the case of lag 1, industrialization does Granger cause urbanization, suggesting that the enhancement of industrialization level will demand more labor and promote the

transfer of surplus rural population to the cities. Urbanization does Granger cause industrialization, informatization and agricultural modernization, showing that the enhancement of urbanization level

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will increase the demand for agricultural products, industrial products and information, and thus promote the level of industrialization, informatization and agricultural modernization. Agricultural modernization does Granger cause industrialization, informatization and urbanization. The enhancement of agricultural modernization level and agricultural production efficiency will increase the demand for agricultural information technology and agricultural machinery operation, further liberate the rural labor force, and promote transfer of rural population to urban areas. Informatization does Granger cause industrialization, urbanization and agricultural modernization, indicating that the improvement of informatization level will enhance the use of new technology, promotion of agricultural mechanization and drive the urbanization level.

2. 6   Impulse response analysis   Impulse response function (IRF), of a dynamic system is its output when presented with a brief input signal, called an impulse. More generally, an impulse response refers to the reaction of any dynamic system in response to some external change. In both cases, the impulse response describes the reaction of the system as a function of time (or possibly as a function of some other independent variable that parameterizes the dynamic behavior of the system). It is used to measure the impact of one "pulse" from a random disturbance variable on all variables of the VAR model. Fig. 1 – 4 show the pulse response path of agricultural modernization, informatization, industrialization and urbanization, respectively. It can be obtained from Fig. 1 that the development of informatization has a positive increasing impact on the agricultural modernization, and until the fifth year, when the informatization grows by 1%, agricultural modernization increases by 0.022183%, reaching the highest value; the development of industrialization has also a positive impact on the agricultural modernization, reaching the highest value of 0.015451 in the sixth year; the increase in urbanization rate has a continuing impact on the agricultural modernization, reaching the highest value of 0.022837. It shows that the process of informatization, industrialization and urbanization in China is always in the process of optimization of development status, forming a positive impact on agricultural modernization. It can be obtained from Fig. 2 that the impact of industrialization on informatization is always positive, rising from 0 and reaching the maximum in the fifth year; the impact of agricultural modernization on informatization rises from 0.019825 to 0.32875, and then declines; the impact of urbanization on informatization declines from 0, and after reaching the minimum of − 0.006661, it begins to rise. Overall, in the long or short term, the development of China's agricultural modernization, industrialization and urbanization has a significant impact on the development of informatization. As can be seen from Fig. 3, the development of agricultural modernization has also a positive impact on the development of industrialization, continuing to decline after the first year of 0.01978; the impact of informatization on industrialization begins to rise from 0.003216 to the maximum in the third year; the impact of urbanization on industrialization continues to rise from 0 to 0.021566 in the tenth year. It indicates that

due to the development of agricultural modernization, informatization and urbanization, coupled with the development of agricultural mechanization and network communication technology, there is an increasingly rapid demand for agricultural machinery and network tools, to a certain extent promoting the rapid development of industrialization. From Fig. 4, it can be found that the impact of development of industrialization on development of urbanization is negative in the initial period, but begins to be positive from the seventh year. It shows that the development of industrialization plays a role in absorbing the rural surplus labor force, but due to the imperfections of the household registration system and other constraints, the process of urbanization is restricted to a certain extent, influencing the urbanization quality.

2. 7   Variance decomposition   In econometrics and other applications of multivariate time series analysis, a variance decomposition or forecast error variance decomposition (FEVD) is used to aid in the interpretation of a vector autoregression (VAR) model once it has been fitted. The variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregression. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. From Table 5, it can be found that agricultural modernization is not only affected by itself, but also affected by industrialization, informatization and urbanization. The development of agricultural modernization is subject to its own shocks. It is 100% from the beginning, and then declines slowly to 39.82% in the tenth year. The development of agricultural modernization is also affected by industrialization, informatization and urbanization, 0% in the beginning, rising slowly to 12. 95%, 29.49% and 17.73% in period 10. This shows that the industrialization, informatization and urbanization have obvious pulling effect on agricultural modernization. From Table 6, it can be found that informatization is not only affected by itself, but also affected by agricultural modernization and industrialization. The development of informatization is subject to its own shocks, 95.48% in the beginning, subsequently declining slowly to 62.48% in period 10. The development of informatization is also affected by agricultural modernization and industrialization, 0% in the initial period, rising slowly to 15.11% and 18.13% in period 10. This shows that the agricultural modernization and industrialization have obvious pulling effect on informatization. From Table 7, it can be found that industrialization is subject to its own shocks, 66.23% in the beginning, followed by slow decrease to 33.91% in period 10. Affected by agricultural modernization, it is 33.07% from the beginning and then slowly declines to 10.65% in period 10. It is also affected by informatization and urbanization, 33.07% in the beginning, rising slowly to 15.45% and 39.99% in period 10. This shows that agricultural modernization, informatization and urbanization have obvious pulling effect on industrialization. Table 8 shows that urbanization is mainly affected by the shocks of its own, 79.27% in the beginning, maintained at 76.40% in period 10. In addition, urbanization is also partly affected by agricultural
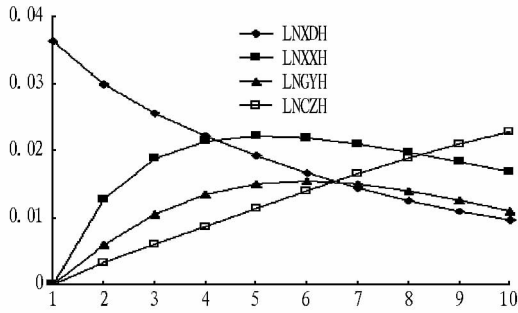
modernization and informatization.

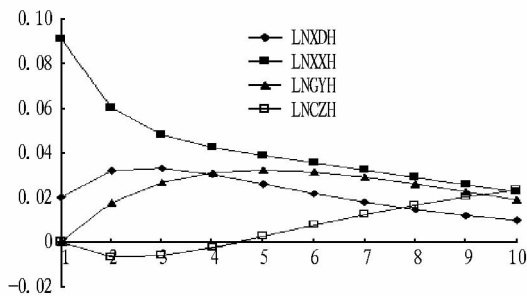**Fig. 1 Impulse response impulse path of LNXDH**
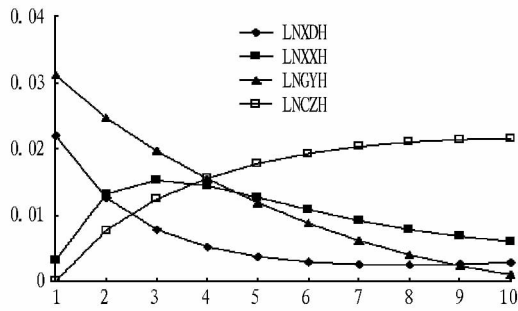

Fig. 2 Impulse response impulse path of LNXXH
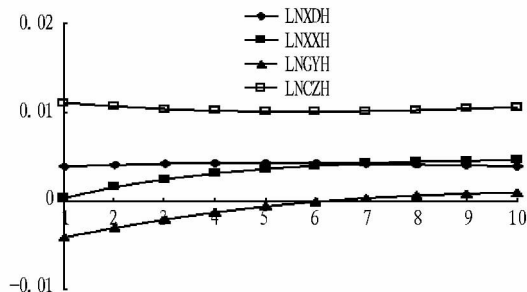

Fig. 3 Impulse response impulse path of LNGYH

Fig. 4 Impulse response impulse path of LNCZH

Table 5　Variance decomposition results of LNXDH

Period	S. E.	LNXDH	LNXXH	LNGYH	LNCZH
1	0.036 347	100.000 0	0.000 000	0.000 000	0.000 000
2	0.049 234	91.331 83	6.751 036	1.460 749	0.456 389
3	0.059 814	80.165 69	14.441 49	4.065 703	1.327 117
4	0.069 168	70.229 63	20.375 08	6.827 775	2.567 524
5	0.077 469	62.157 72	24.441 60	9.204 307	4.196 381
6	0.084 819	55.716 62	27.057 22	10.996 77	6.229 388
7	0.091 338	50.541 34	28.615 99	12.187 54	8.655 128
8	0.097 168	46.316 07	29.410 56	12.842 80	11.430 57
9	0.102 450	42.800 65	29.651 40	13.062 42	14.485 54
10	0.107 311	39.820 75	29.493 55	12.953 76	17.731 94

Table 6　Variance decomposition results of LNXXH

Period	S. E.	LNXDH	LNXXH	LNGYH	LNCZH
1	0.093 295	4.515 281	95.484 72	0.000 000	0.000 000
2	0.116 872	10.244 96	87.234 62	2.195 595	0.324 830
3	0.133 287	13.960 23	79.936 23	5.648 439	0.455 099
4	0.146 290	15.785 33	74.672 60	9.137 344	0.404 726
5	0.156 789	16.447 54	71.048 92	12.128 76	0.374 771
6	0.165 267	16.497 81	68.506 20	14.463 24	0.532 749
7	0.172 121	16.258 77	66.615 70	16.146 17	0.979 364
8	0.177 714	15.900 51	65.090 04	17.250 96	1.758 482
9	0.182 370	15.505 92	63.747 18	17.876 43	2.870 471
10	0.186 360	15.111 69	62.478 07	18.126 63	4.283 612

Table 7　Variance decomposition results of LNGYH

Period	S. E.	LNXDH	LNXXH	LNGYH	LNCZH
1	0.038 220	33.066 31	0.7079 77	66.225 72	0.000000
2	0.049 596	26.071 21	7.4833 96	64.034 22	2.4111 78
3	0.057 399	21.310 14	12.658 64	59.552 93	6.4782 82
4	0.063 337	18.172 88	15.583 01	54.885 46	11.358 66
5	0.068 133	16.001 71	16.925 12	50.461 84	16.611 33
6	0.072 226	14.401 67	17.301 60	46.373 33	21.923 39
7	0.075 887	13.157 79	17.128 30	42.662 26	27.051 65
8	0.079 270	12.154 99	16.666 96	39.352 69	31.825 37
9	0.082 460	11.330 82	16.077 17	36.444 21	36.147 80
10	0.085 500	10.649 70	15.453 02	33.91222	39.985 07

Table 8　Variance decomposition results of LNCZH

Period	S. E.	LNXDH	LNXXH	LNGYH	LNCZH
1	0.012 424	9.908 122	0.082 432	10.744 26	79.265 18
2	0.017 212	10.761 23	0.899 60	8.683 559	79.655 61
3	0.020 778	11.493 06	2.033 819	6.956 760	79.516 36
4	0.023 769	12.041 50	3.288 130	5.598 497	79.071 88
5	0.026 433	12.394 58	4.539 866	4.577 435	78.488 12
6	0.028 888	12.570 37	5.711 631	3.832 811	77.885 19
7	0.031 199	12.600 68	6.759 09	3.297 946	77.342 29
8	0.033 399	12.520 40	7.662 341	2.913 114	76.904 15
9	0.035 511	12.361 60	8.418 477	2.630 705	76.589 22
10	0.037 548	12.151 08	9.035 391	2.415 759	76.397 77

3　Conclusions and recommendations

3.1　Conclusions　(ⅰ) Industrialization does Granger cause urbanization; urbanization does Granger cause industrialization, informatization and agricultural modernization; agricultural modernization does Granger cause industrialization, informatization and

urbanization; informatization does Granger cause industrialization, urbanization and agricultural modernization. (ii) There is a long-term stable equilibrium relationship among China's industrialization, informatization, urbanization and agricultural modernization. (iii) Industrialization, urbanization, informatization and agricultural modernization show a significant response after one standard deviation shock of "industrialization, urbanization, informatization and agricultural modernization". (iv) Through the variance analysis, it is found that there is a clear pulling effect among "industrialization, urbanization, informatization and agricultural modernization".

3.2　Recommendations

3.2.1　Adhering to the new road of industrialization to make industrialization become the core driving force for the synchronous development of "industrialization, urbanization, informatization and agricultural modernization".

　　Industrialization is often defined narrowly as the process of rising share of output value of industry or secondary industry in GNP, and the process of rising proportion of industrial employment. Industrialization is the core content of modernization, the process of traditional agricultural society transforming to modern industrial society, and the core driving force for synchronous development of "industrialization, urbanization, informatization and agricultural modernization". Therefore, at the current stage of China's economic and social development, it is necessary to adhere to the new road of industrialization, use informatization to drive the development of industrialization, and use industrialization to promote informatization.

3.2.2　Promoting the construction of new urbanization to make urbanization become the key factor for the synchronous development of "industrialization, urbanization, informatization and agricultural modernization".

　　It is necessary to change the mode of urban development, and take the resource-saving and environment-friendly road of new urbanization with Chinese characteristics. China has a vast territory, and there are large regional disparities, so it is necessary to develop urbanization development strategy according to local conditions. Meanwhile, it is necessary to adhere to urban-rural coordination to promoted balanced urbanization and new rural construction; adhere to sustainable development and strengthen the planning and management of urban and rural space; adhere to the people-oriented principle to improve the urban living environment. Through the new urbanization, it is necessary to transfer rural surplus labor force, and promote labor to transfer from primary industry to secondary and tertiary industries, thereby improving the agricultural productivity and driving the development of agricultural moderniza-

tion, industrialization and informatization.

3.2.3　Vigorously developing agricultural modernization to make agricultural modernization become the powerful guarantee for synchronous development of "industrialization, urbanization, informatization and agricultural modernization".

　　The agricultural modernization refers to the process of transformation of traditional agriculture to modern agriculture. In this process, agriculture should be equipped with modern industry, modern science and technology and modern management methods, to change the backward traditional agriculture to world advanced agriculture. To achieve the goal of agricultural modernization, it is necessary to use agricultural mechanization, scientific production technology, agricultural industrialization and agricultural informatization to improve the quality of agricultural practitioners and take the road of sustainable agricultural development.

3.2.4　Building comprehensive information-based network to make informatization become an effective catalyst for the synchronous development of "industrialization, urbanization, informatization and agricultural modernization".

　　Informatization must be linked to cities, towns and all aspects of rural economy and society. It is necessary to accelerate IT development and industrialization, to improve the application of information technology in various China's economic and social fields, promote the formation of new industrialization and agricultural modernization, and provide technological support for the new urbanization.

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