

Research Article

Path Analysis of Agricultural Economy Information Construction under the Perspective of Urban-Rural Integration Strategy in the “Internet Plus” Era

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China Internet plus rural industrial integration is applied in the era of agricultural informatization in the era of Internet plus urban integration strategy. For many years, the themes of urban-rural integration, agricultural economy, and rural revitalization have been the core topics of China’s economic research. This study fully integrates the above elements and analyzes the development path of rural economic informatization in China’s special environment. Supported by the national strategic direction and related policies such as the integration of urban and rural areas, Internet plus agriculture, agricultural informatization, and rural revitalization, we hope to achieve faster agricultural economic development through the rational optimization of agricultural economic integration and supervision and promotion programs and the use of the existing information platform. The problems of China’s agricultural economic development caused by historical reasons are thoroughly solved. China’s regional agricultural economy should not only be not limited to the large-scale and intensive development of planting, animal husbandry, forestry, and fishery in the primary industry but also should realize the integration of urban and rural areas under the background of economic informatization, develop the secondary and tertiary industries related to agriculture in the agricultural economic zone, let the agricultural economy get rid of the constraints of the development ideas of the primary industry, and let the high value-added characteristics of the secondary industry and the tertiary industry fully contribute to the development of agricultural economy.

1. Introduction

Yang (2021) pointed out the applicability of modern Internet agricultural financial risk in the neural network and established a modern Internet agricultural financial risk assessment system to improve the predictability of financial risk [1]. Taking Li County as an example in the study, this paper drives agricultural development through the Internet sales mode of agricultural products, changes the single sale channel of local agricultural products, and drives regional economic development so as to improve regional per capita income and reduce poverty [2]. Yang pointed out that Internet plus, agricultural information, and technology promotion have a significant correlation. Many backward areas are backward in technology and low in productivity. Through the Internet and technology promotion, we can achieve efficient and high-quality technology popularization [3].

According to the data of China’s National Statistical Yearbook, since 2000, China’s urban and rural structure has changed significantly. On the premise that the overall agricultural output value remains basically unchanged, the rural population has decreased significantly, and the proportion of agriculture (primary industry) in the composition of social GDP has also decreased rapidly. Kulkarni and Khot (2014) pointed out that different characteristics of agricultural institutions have a positive impact on agricultural development, and population distribution and industrial structure have a positive impact on the balance of agricultural development [4].

China is a large agricultural country, with 43% of the people engaged in agriculture. China’s regional agricultural economy is mainly divided into planting, animal husbandry, forestry, and fishery. According to the data of the National Bureau of Statistics, the proportion of year-on-year economic output value is shown in Figure 1.

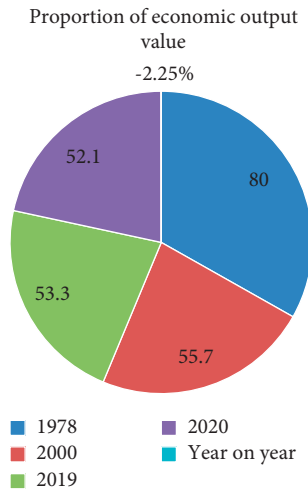


FIGURE 1: Agricultural economic output value in 1978, 2000, 2019, and 2020 (the meanings of relevant parameters in the figure are the same as those in Table 1).

Khot pointed out that different characteristics of agricultural institutions have a positive impact on agricultural development, and population distribution and industrial structure have a positive impact on the balance of agricultural development [4] (see Table 1 for details).

In Table 1, proportion of subdivided agriculture: the agricultural industry (the first industry) was subdivided into four major categories: agriculture, forestry, animal husbandry, and fishery, and the proportion of its GDP contribution was counted, respectively; the proportion of the three major industries: the whole domestic GDP is divided into the GDP contribution of the primary industry (agriculture, forestry, animal husbandry, and fishery), secondary industry (industry), and tertiary industry (finance and other service industries) and the proportion of its GDP contribution is calculated, respectively; urban-rural population ratio was obtained according to the urban and rural household registration dual-track system statistics, and their proportion was calculated respectively; year-on-year basis: growth rate in 2020 from 2019 data (down to negative); record: growth rate of 2020 data versus 1078 data (down to negative);

According to the data in Table 1, three important changes have taken place in China's agricultural economy: in subdivided agriculture, the proportion of planting industry has decreased, while the proportion of output value of forestry, animal husbandry, and fishery with high-added value has increased by different ranges; there is no doubt that the total agricultural output value has increased, but its proportion in the total national economy has continued to decline; the rapid decline of rural population and the rapid increase of urban population is accompanied by the rapid decline of rural population. Combined with the data in Table 1 and the actual social observation results, it can be considered that three important changes have taken place in the agricultural economy in China's macroeconomic environment: the concepts of elite agriculture, ecological agriculture, and large-scale agriculture have been formed, and

the small-scale peasant economy in the new era formed for historical reasons has been gradually replaced by large-scale, intensive, and ecological agriculture; the agricultural economy has been integrated into the secondary industry of deep processing of agricultural products and the tertiary industry of agricultural science, technology development, agricultural science, and technology services. Although the proportion of agricultural GDP has decreased, the rural economy has fully diffused and integrated into the secondary industry and the tertiary industry; agricultural school education has been transformed from technical school secondary school education mode to higher education mode in the early days of the founding of the People's Republic of China. Under the guidance of core universities such as China Agricultural University and China Ocean University, provincial agricultural universities have been established in all provinces and autonomous regions, and a large number of highly educated talents with agricultural professional knowledge reserves have entered the agricultural industry.

For many years, China's annual No. 1 document of the State Council has focused on the issues of agriculture, rural areas, and farmers; that is, China has taken agriculture, rural areas, and farmers as the primary issues for macropromotion for many years. Over the years, the themes of urban-rural integration, agricultural economy, and rural revitalization have been the core topics of China's economic research. This study fully integrates the above elements and analyzes the development path of rural economic informatization in China's special environment.

2. Practical Problems of China's Agricultural Economy and the Opportunities of the Times

The essence of China's agricultural economic problems is a problem left over by history. At the beginning of the founding of new China, it experienced three major construction stages. The major construction made China's economy develop rapidly and completed the social development process by the West for hundreds of years in just a few decades. Moreover, China has never invaded any country during the period of large-scale construction. It only relies on the economic double-cycle strategy, that is, the huge volume of internal circular economy brought by domestic demographic dividend and the surplus income of external circular trade brought by the continuous improvement of international relations. The early three major construction stages, whether first-line construction or third-line construction, focused on the development of light industry and metallurgy with the textile industry as the core and heavy industry with the energy industry as the core. It was not until the reform and opening up in 1978 that China began to pay more attention to the three rural issues, which brought many historical problems. Taking Britain as an example, the "enclosure movement" started in the 12th century reached its peak in the 14th ~ 15th century, and its subsequent economic impact on British agriculture has not been completely solved today. By establishing a socialist market economic system, China's economy has constantly adjusted and straightened out the relationship between the

TABLE 1: Summary of China's Agricultural Economy Development Yearbook for 20 years (data source: National Bureau of Statistics: China Statistical Yearbook 2021).

Particular year		1978	2000	2019	2020	Year on year	Ring ratio	Record
Proportion of subdivided agriculture	Agricultural output value	80.0	55.7	53.3	52.1	-2.25%	-6.46%	-34.88%
	Forestry output value	3.4	3.8	4.7	4.3	-8.51%	13.16%	26.47%
	Animal husbandry output value	15.0	29.7	26.7	29.2	9.36%	-1.68%	94.67%
	Fishery output value	1.6	10.9	10.1	9.3	-7.92%	-14.68%	481.25%
Proportion of three industries	Primary industry	70.5	50.0	24.7	23.6	-4.45%	-52.80%	-66.52%
	Secondary industry	17.3	22.5	28.2	28.7	1.77%	27.56%	65.90%
	Service sector; Tertiary industry	12.2	27.5	47.1	47.7	1.27%	73.45%	290.98%
Urban-rural population ratio	Town	17.9	36.2	62.7	63.9	1.91%	76.52%	256.98%
	Rural	82.1	63.8	37.3	36.1	-3.22%	-43.42%	-56.03%

government and the market, and continuously developed and enriched the means of macroeconomic market regulation and control. The goal of China's economic system reform finally chose the market economy, which is not only a major logical breakthrough in the past traditional ideas but also a historical choice in the stage of China's economic development, which fully mobilized the great transformation of China's economic market development. Since 1978, China has made efforts to solve the three rural issues, and its economic performance is shown in Table 2.

In Table 2, population: statistical population in the household registration system; practitioner: the statistical contract system employees in the labor and social security system, including civil servants, employees of state-owned enterprises and public institutions, and employees of private enterprises shall be counted according to the three major industries, respectively; total revenue: practitioner income data in the labor and social security systems; per capita disposable income: based on relevant system data; other fields and record names are the same in Table 1.

The data in Table 2 reflect the core sociostatistical expression of China's three rural issues; that is, although China's agriculture has developed rapidly since 1978, its growth rate in all aspects lags behind the secondary industry and the tertiary industry.

In Figure 2, in 2020, compared with 1978, the total income of practitioners in the primary industry (agriculture) increased by 7.53 times, while that in the secondary industry and the tertiary industry increased by 21.79 times and 61.11 times, respectively. However, due to the decline in the number of practitioners in the primary industry and the increase in the proportion of rural population entering the secondary industry and the tertiary industry, the increase of per capita disposable income of urban population and rural population was 12.68 times. However, it should also be noted that the ratio of per capita disposable income between urban population and rural population in the early stage of reform and opening up (1978) is 2.56 times, and there is no significant difference between them since 1978. Therefore, the actual value of per capita disposable income in rural areas is still less than that of urban population.

In Figure 3, the rural revitalization project still has a long way to go. However, we should also see two opportunities of

the times: the construction of urban-rural integration, especially the construction of township satellite cities so that rural residents can enter the secondary and tertiary industries for employment or entrepreneurship on the premise of maintaining rural household registration; taking advantage of the Internet plus urban integration opportunity, the rural population can still get higher personal income and achieve higher per capita disposable income of rural population under the premise that the increase of agricultural output and the proportion of three industrial development remain unchanged. With the rapid advancement of the large-scale and intensive high-tech agricultural industry, the demand for agricultural information construction such as agriculture, animal husbandry, forestry, and fishery is also higher and higher. Robot and artificial intelligence management technology have gradually replaced the previous traditional manual production mode. In the Internet era, high-quality and highly educated talents are more integrated into agricultural economic production and construction so that the actual income of practitioners in the primary industry has been rapidly increased. That is, under China's Internet + economy model, the available resources for agricultural economic development are shown in Figure 1.

In Figure 4, except that planting (agriculture in a narrow sense), forestry, animal husbandry, and fishery in the central part are included in the primary industry, other available resources are the statistical category and social functions of the secondary industry and the tertiary industry. Among them, straw deep processing (plate plant, charcoal plant, straw energy, etc.) and food deep processing belong to the business scope of traditional township enterprises, while integrating agricultural material plants (seeds, pesticides, chemical fertilizers, etc.), agricultural machinery plants (tractors, light agricultural trucks, plant protection UAVs, etc.), and living materials plants (textiles, furniture, building materials, kitchens, etc.) into the agricultural regional economy, the available resources for industrial integration of agricultural economic park can be expanded, and other nodes are tertiary industry nodes.

3. Available Path of Internet + Industrial Integration

3.1. Internet + Agricultural Industry Integration Driven by Agricultural Product Trade. The production and trade

TABLE 2: China’s agriculture and rural issues reflected in China’s economic data (statistics: China Statistical Yearbook 2021).

Particular year		1978	2000	2019	2020	Year on year	Ring ratio	Record
Population (ten thousands of people)	Whole country	96259	126743	141008	141212	0.14%	11.42%	46.70%
	Town	17245	45906	88426	90220	2.03%	96.53%	423.17%
	Village	79014	80837	52582	50992	-3.02%	-36.92%	-35.46%
Practitioner (ten thousands of people)	Total employment	40152	72085	75447	75064	-0.51%	4.13%	86.95%
	Primary industry	28318	36043	18652	17715	-5.02%	-50.85%	-37.44%
	Secondary industry	6945	16219	21234	21543	1.46%	32.83%	210.19%
	Tertiary industry	4890	19823	35561	35806	0.69%	80.63%	632.23%
Total revenue (hundred million yuan)	General income	3678.7	99066.1	98375.2	1008782.5	925.44%	918.29%	27322.26%
	Primary industry	1018.5	14717.4	70473.6	77754.1	10.33%	428.31%	7534.18%
	Secondary industry	1755.1	45663.7	380670.6	384255.3	0.94%	741.49%	21793.64%
	Tertiary industry	905.1	39899.1	535371	553976.8	3.48%	1288.44%	61106.14%
Per capita disposable income (yuan)	Town	343	6256	42359	43834	3.48%	600.67%	12679.59%
	Village	134	2282	16021	17131	6.93%	650.70%	12684.33%

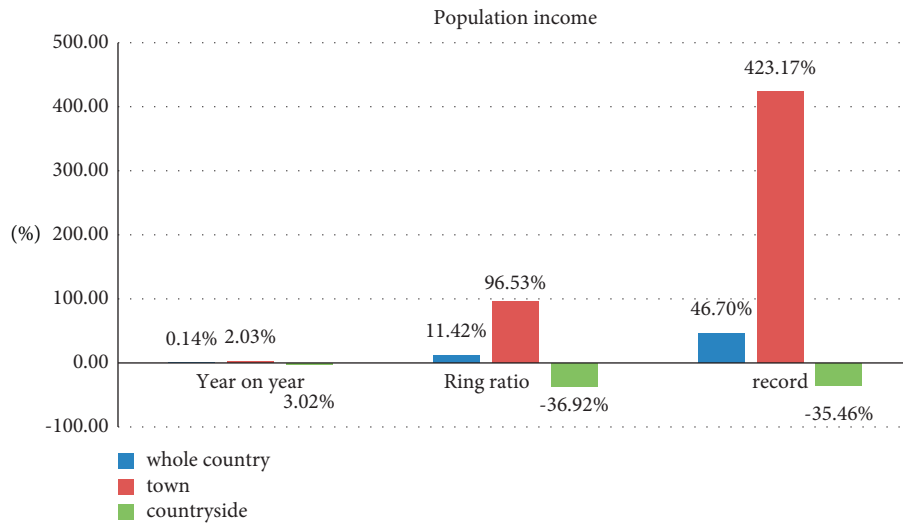


FIGURE 2: Comparison of national population income. (the meanings of relevant parameters in the figure are the same as those in Table 1).

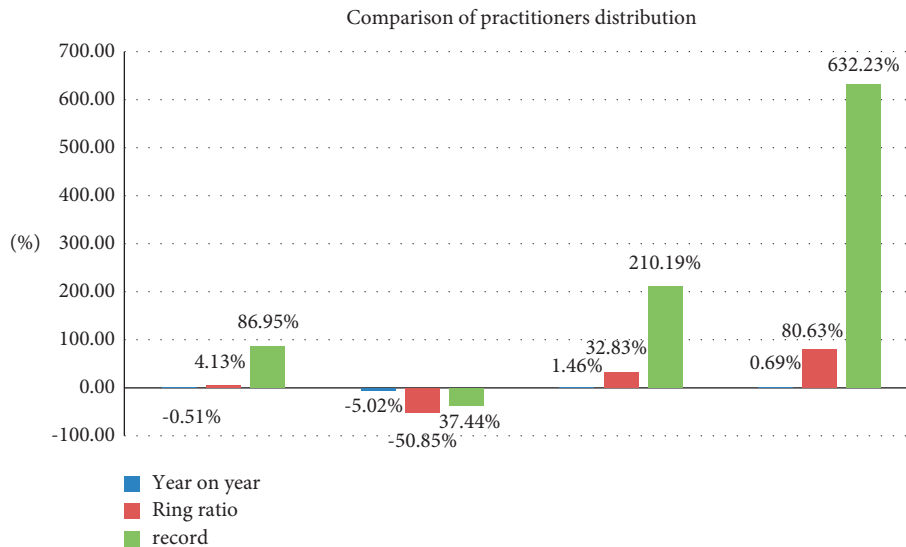


FIGURE 3: Distribution of population employment system (the meanings of relevant parameters in the figure are the same as those in Table 1).

process of agricultural products is the core cycle of agricultural economy. Agricultural enterprises or ordinary farmers produce agricultural products by planting, breeding, and fishing, sell agricultural products under certain market rules, and finally obtain income. Under the Internet plus agriculture mode, agricultural companies concentrate their land and water resources to scale, intensive, and high-tech planting (farming and fishing). Agricultural industry workers replace farmers to do farm work. Therefore, agricultural companies play an important role in the Internet plus agricultural production process. The core logic of the Internet plus agriculture industry is shown in Figure 2.

In Figure 5, farmers' income from agricultural companies is mainly used for family financial management and local living consumption. In addition to training investment and personal deposits to improve personal skills, they cannot directly provide additional funds for the expansion of investment in agricultural production. The agricultural company withdraws a certain proportion of funds from the company's revenue to expand investment in agricultural production such as land topdressing, agricultural water conservancy construction, upgrading and construction of planting greenhouses, and breeding shantytowns. Its investment will further increase subsequent output and production capacity, improve agricultural income, and realize the sustainable development of regional agriculture. The expanded value of agricultural industry investment in the above process logic is shown in the equation as follows:

$$f(t) = \gamma(t) \cdot \left[\sum_{i=1}^n \beta_i C_i(t-1) - \sum_{j=1}^n \delta_j B_j(t-1) \right]. \quad (1)$$

Among them, $f(t)$ is the investment increase of agricultural companies in the agricultural production system in a time period; $\gamma(t)$ is the investment conversion ratio of agricultural companies in t period; $C_i(t-1)$ is the i accounts receivable (notes) of the agricultural company in the $T-1$ period; β_i is the recovery rate of the i accounts receivable (notes) of the agricultural company; $B_j(t-1)$ is the j accounts payable (notes) of the agricultural company in the $T-1$ period; δ_j is the cashing rate of j accounts payable (notes) of the agricultural company; n is the total number of input items of agricultural companies; m is the total number of items issued by agricultural companies.

In the above chart, the biggest variable of agricultural company's agricultural production capacity is the intervention process variables of agricultural finance. However, agricultural finance has not only been supported by agriculture to the Internet plus agriculture but has a more complex financial system, which will be analyzed in the following sections.

3.2. The Internet + Agricultural Industry Integration Driven by the Financial and Insurance Service Industry. The Internet plus the early convergence of agricultural industry formed the online market system for the bulk commodities trading and delivery of agricultural products. The bulk trading finance, agricultural supply chain finance, agricultural

support loans, agricultural insurance and reinsurance, and the two-level financial market for the above financial system constituted the Internet plus agricultural financial system. The above system is shown in Figure 3.

As shown in Figure 6, because the agricultural industry has the inherent advantage of stable and high profits, that is, the agricultural production cost is far lower than the terminal retail price of agricultural products, the risk of agricultural finance is reduced year by year in the increasingly flat agricultural product sales and service network. However, financial institutions still need to assess the risk of agricultural finance. The assessment process is complex, but its core risk control functions are risk control functions based on risk recursive iterative functions, as shown in the following equation:

$$\begin{aligned} g(x) &= \frac{1}{1 - \alpha f(0)} \sum_{y=1}^x \left(a + b \frac{y}{x} \right) f(y) g(x-y), \quad x = 1, 2, \dots, \\ g(0) &= \sum_{n=0}^{\infty} p_n f(0)^n. \end{aligned} \quad (2)$$

Among them, α is the flag variable. When $\alpha < 0$, the function is binomial distribution, when $\alpha = 0$, the function is Poisson distribution, and when $\alpha > 0$, the function is negative binomial distribution; x, y is a statistically controllable variable; $f(y)$ is the risk statistical regression function; $g(x-y)$ is a recursive conduction function; a, b is the constraint control variable, which is used to adjust the coupling degree of the function.

The biggest potential of urban and rural integration strategy lies in the development of rural economic construction. The development path of agricultural informatization under the "Internet plus" era has promoted the integration of resources in rural areas and the promotion of rural informatization economy resources and the national economic market, bringing the reform dividend of the economic market, and also promoting the sustained development of the economic society. It is also an important institutional guarantee for the revitalization of information-based rural areas and the modernization of agricultural and rural industries. Agricultural finance has stepped in the integration of Internet plus agricultural industry; although it accelerates the development of agricultural economy, it is based on the core economic process of agricultural planting, farming, and agricultural product supply chain, or the cash flow rapid transfer mode brought about by agricultural financial intervention, and the agricultural economic structure reform of the second industry and the third industry. All need the support of a more precise information management system.

3.3. Internet + Agricultural Industry Integration Driven by Online Services. Under the current social environment and technical conditions, the information management mode of the integration process of regional agricultural economy and agricultural industry has rich available tool resources, including the government affairs 4.0 system operated by local governments. The secondary trading system and financial

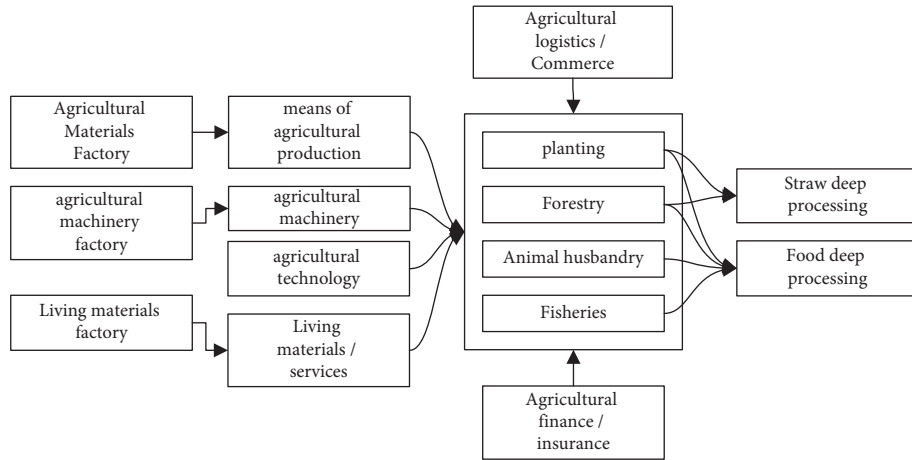


FIGURE 4: Schematic diagram of the available resources of industrial integration of Internet + urban-rural integration.

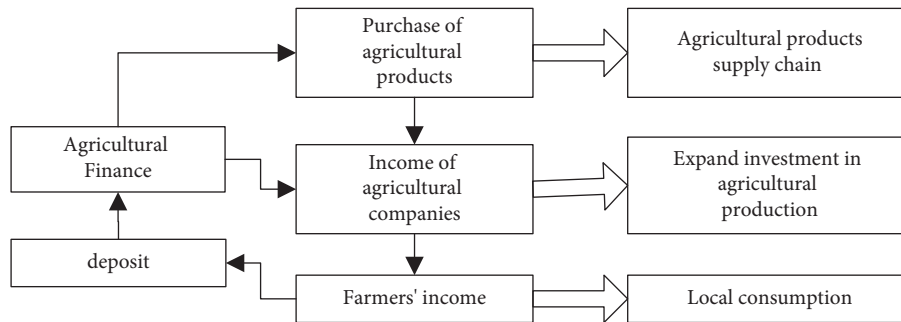


FIGURE 5: Basic logic of expanding agricultural production.

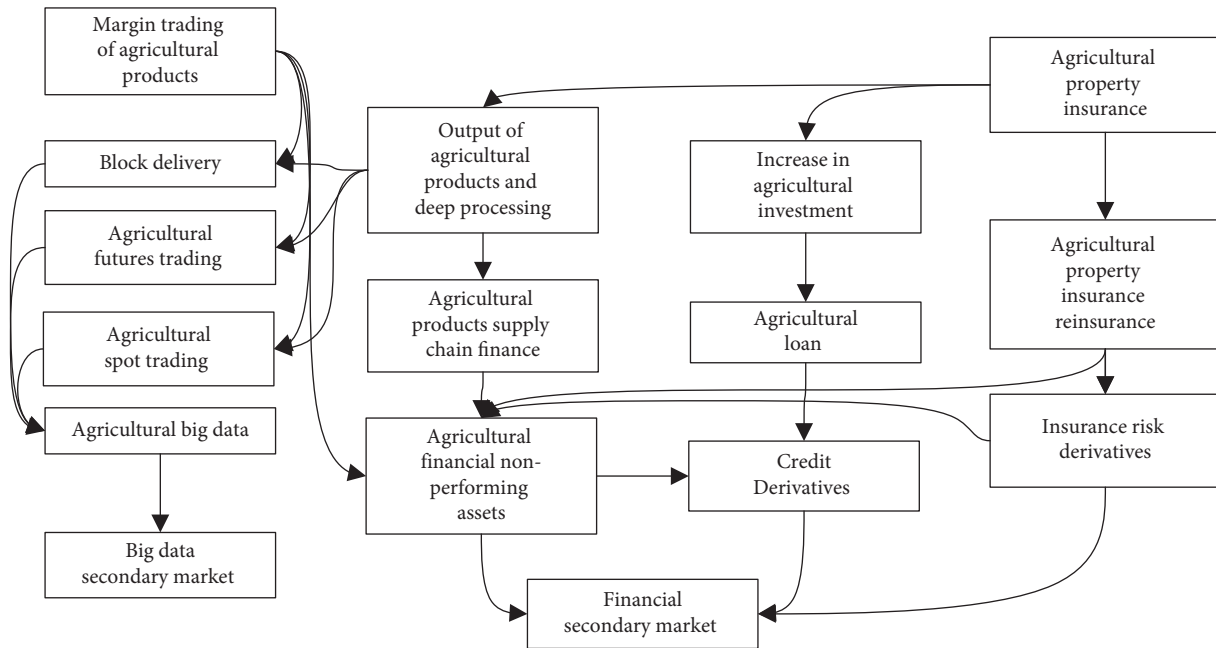


FIGURE 6: Derivative logical relationship of Internet + agricultural financial products.

information system of financial markets, as well as other information platforms provided by telecommunications, power grid, water supply and other enterprises, can provide

information tools. The study found that if the above information tools are applied rationally, the Internet plus agriculture industry's information fusion with minimum

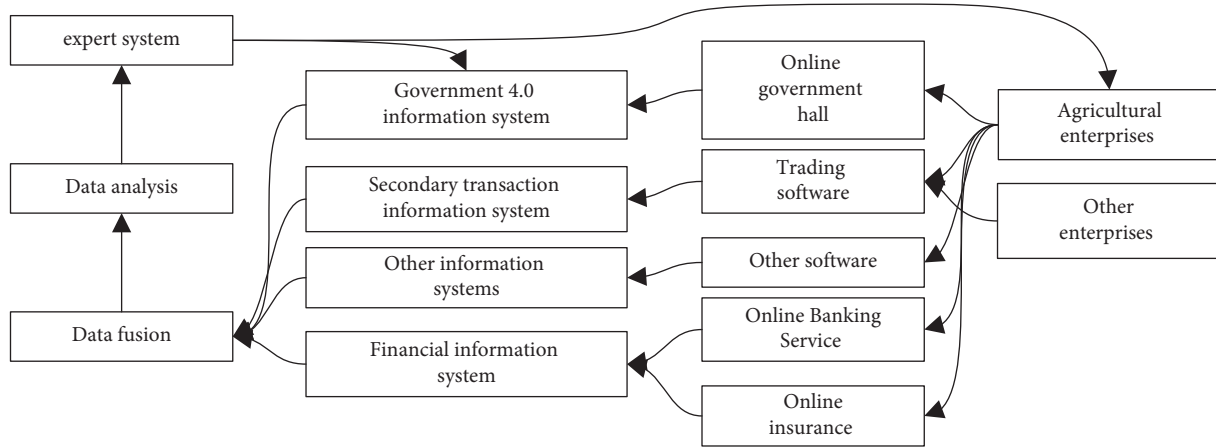


FIGURE 7: The Internet + agricultural information mode provided by the online service system.

investment can be realized. Its application logic is shown in Figure 4.

In Figure 7 agricultural enterprises and other Non-agricultural enterprises can realize information access through the foreground software and app provided by the existing information system. Under the goal of data fusion, the underlying data of all the above information systems can be shared and integrated, and then after data analysis, many strategy preparation and data early warning functions can be realized by the expert system. This function can serve the government 4.0 system, further serve the relevant government organs of regional economy, and serve agricultural enterprises at the same time.

4. Summary

Through the current situation problem analysis method, the main problem of China’s agricultural development is the legacy of history; that is, the relatively backward agricultural industry developed before 1978 has an insufficient driving force in the follow-up development, resulting in its inability to quickly catch up with and surpass the development speed of the secondary industry and the tertiary industry. With the Internet plus computer age coming, the rural economy is developing in accordance with the strategy of urban and rural integration. With the advantage of the Internet platform, it shows the development of rural informatization and economy through various computers and mobile phones to consumers all over the world. It is also the direction of the development of rural economy at this stage. The study found that China’s agriculture can form agricultural product processing, agricultural machinery, and agricultural material processing industries through integration with the secondary industry, and agricultural technology services and agricultural finance industries through integration with the tertiary industry. With the support of the existing information platform, the integration of deep agriculture industry under the Internet plus economic mode can be realized through the

integration of industries, and the further growth of the agricultural industry will be promoted [5–7].

Data Availability

The data underlying the results presented in the study are available within the manuscript.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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