The Internal Mechanism and Empirical Study on the Change of Development Mode of Green Food Industry

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Abstract: The transformation of industrial development mode is closely related to the stage of industrial development, which is an inevitable requirement and fundamental approach to the optimization of industrial structure and the sustainable development of industries. On the basis of constructing the logical analysis model of industrial development mode, this paper uses C-D production function to judge the development mode of green food industry, and empirically analyzes and reveals that the development mode of green food industry is still dominated by extensive scale expansion. At the same time, combining with the characteristics of the phase of green food industry and the basic conditions of reality, we put forward the policies and measures to promote the transformation of industrial development mode, the optimization and upgrading of industrial structure and industrial development, and provide scientific decision-making basis for formulating industrial planning and industrial policies.

1. Introduction

In recent years, China's green food industry has maintained a sustained and strong unconventional development, the rapid expansion of industrial scale. From 1990 to 2013, the number of green food enterprises in China has grown from 63 to 6,003, and the number of products has grown from 127 to 15,707 with an average annual growth rate of 27% and 29% respectively, including agriculture, forestry, livestock and poultry four major categories, and has covered more than 1,000 varieties of agricultural products and processed foods. However, the development of green food industry in our country actually follows an extensive growth path with an increasing number. Gradually exposed problems such as low level of product deep processing, inefficient industry, unbalanced industrial development and resources and environment in the process of industrial development. Therefore, Its industrial development mode and industrial policy letter needs to be changed and adjusted.

Industrial development is not only a process of quantity expansion, but also a process of continuous optimization and upgrading of structure and layout as well as continuous innovation in technology, market, system and management (Malerba Fetal, 2006)[1].The differences in industrial development mode are caused by the differences in constraints, the factors faced by industries at different stages of development, and the constraints on resources and environment. As the relationship between supply and demand and the changes in the pattern of scarce factors require the adjustment of development modes (Zhou Shulian, 2008)[2]. The change of industrial development mode is closely related to the stage of industrial development and also an inherent requirement for the optimization and upgrading of industrial structure. Therefore, it is necessary to clarify the connotation of the development mode of green food industry and its transformation, clarify the inherent rules and influencing factors of the development mode of green food industry, and then make an empirical analysis on the mode of development of the green food industry that is of important theoretical and practical significance to promote the transformation of the mode of green food industry development, the optimization and upgrading of industrial structure and industrial development[3].

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The transformation of green food industry in China and its industrial development can not be divorced from the stage of development and industrial base in which the industry is located. In particular, it is necessary to clarify the impact mechanism of the development of green food industry and provide a theoretical basis for the transformation of industrial development through empirical analysis. Therefore, this article mainly solves the following basic questions:(1) Green food industry development mode (change) and its internal relations with the stage of industrial development;(2) Realistic analysis of the transformation of green food Industry development;(3) How to promote the development of green food industry in industrial policy.

2. The internal mechanism of the transformation of the green food industry development mode

To study the development of green food industry must relate to the stage of development in which the industry is located[4]. Stage of industrial development is the realistic basis and logical starting point for the study of the development of green food industry. The change of green food industry's development mode is determined by its specific stage of development and subjected to the combined effect of various factors in a particular stage of development.

The mode of development of green food industry is the sum of the combination ways, means and modes of various factors that promote the development of green food industry, that is, the source structure, development mechanism and development path of green food industry depends on the way of resource allocation. The problem which development of green food industry solved is the goal to achieve, and the problem which the transformation of green food industry development mode solved is the way to achieve the goal and road, the relationship between them are goals and ways.

The mechanism for the transformation of the green food industry's development mode is that the internal promotion of technological progress and the external stimulus of changes in market consumption demand put forward requirements on the transformation of the development mode of the green food industry in order to promote the transformation of the green food industry's development mode. The transformation of industrial development mode mainly depends on the actual demand of the industrial development stage change, which is the inevitable requirement of the transformation of economic development mode and the scientific development concept. It is also the fundamental way to solve the deep contradictions in industrial economic development and realize the sustainable development of industry. The requirements for the transformation of industrial development mode, which are determined by the specific elements of the development of the green food industry, such as the optimization of resources and elements, the optimization and upgrading of industrial structure, and the improvement of efficiency, are the main factors restricting the transformation of industrial development mode. However, the key to whether the green food industry can change its mode of development lies in whether it provides institutional arrangements conducive to the transformation of the industrial development mode, that is, the support of government industrial policies and the guidance and catalytic role played by them[5]. These factors directly contribute to the green food industry The improvement of development ability and the optimization and upgrading of industrial structure and industrial development. At the same time, the optimization and upgrading of the green food industry structure is an inherent requirement and an outward manifestation of the industrial development mode transformation.

The transformation of green food industrial development mode should take into account the stage of industrial development, and the constraints of resource conditions and the existing industrial base and the changes of market demand and consumption upgrade determined by the government. Through the government industrial policy and institutional arrangements, enlarge the green food industry. By coordinating the relationship between technology, market and policy, we can seek the best fit point for the development variables of green food industry, and promote the optimization of green food industry structure and efficiency, so as to realize the sustainable development of industry and the enhancement of industrial competitiveness (Figure 1).

3. Determination of the development mode of green food industry

In this paper, we use the improved C-D production function and Solow residual model to determine the development mode of green food industry to judge the main driving factors and industrial growth mode of industrial development, and provide theoretical support for the transformation of green food industry development mode in order to promote green food industrial resource optimization and industrial development.

3.1. Model setting and variable selection

Assuming that the technological progress is Hicks neutrality, adopting Cobb Douglas production function model which Dobbin improved is used to observe the effect of capital and labor factors on industrial development. Select the output value of green food industry as output variables, capital, labor, land and technology as input variables, and establish the contribution rate model of production function and growth factor of green food industry as follows:

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} M_t^{\gamma} e^{rt}$$

Among them, the variable Y_t represents the total output value of green food industry (100 million yuan), A_t represents the impact of technological progress on industrial growth, namely total factor productivity, K_t represents the total amount of fixed capital and liquidity in the green food industry(100 million yuan), L_t represents the labor force in the green food industry(10,000), and M_t represents the monitoring area (10,000 mu)in the green food industry. α, β, γ represent the output elasticity of capital, labor and land respectively. r is the annual average rate of technological progress, indicating the average annual rate of increase in output due to the comprehensive technological progress. The contribution rate of total factor productivity growth is the "Solo residual value" of output growth rate other than labor and capital (Schultz, 1968), which contains more extensive than just technological progress, such as the improvement of labor quality, Factor optimization, management improvement and institutional change (Helpman, 1990).

3.2. Empirical process and result analysis

The development of green food industry is affected by natural environment, social and economic environment and policy intervention, but the most basic production factors are land, labor force and capital. Due to the limitation of data availability, this paper uses the input and output data of relevant factors of green food industry in Heilongjiang Province (2003-2013) to make empirical research. The data are from *Statistical Yearbook of Heilongjiang Province* from 2003 to 2014 and *Statistical Report of Green Food* of Heilongjiang Green Food Development Center.

First of all, the model is initially estimated and tested. Assuming there is technological progress, the progress of technological progress is linear over time. Using Eviews6.0 to eliminate the dimension of the above sample data OLS method to estimate the parameters, the preliminary estimation results and the main parameters shown in Table 1.

Table 1 The preliminary estimation results of green food industry production function

variable	Parameter estimation	Standard deviation	t-Statistics	P-value
Constant term C	lnA=-11.63	6.7059	-1.736	0.1576
capital lnK	α=0.879	0.488	1.8	0.1461
Labor force lnL	β=1.367	0.734	1.86	0.1362
Monitoring area lnM	γ=1.408	1.238	1.1369	0.3191
Time t	r=-0.475	0.339	-1.4025	0.2334
R2=0.981 F=51.81 D.W.=1.676				

From the above estimation results, it can be seen that the model has a large coefficient of determination ($R^2 = 0.981$), F test (F = 51.81, $\Pr ob$ ($F - statistic$) = 0.001) is significant. But in the t test, the coefficient of t value did not pass the test. But in the t test, the coefficient of t value did not pass the test. The t -test value of the parameter estimate of the constant term and the capital is too small to pass the significance test. After adjusting the model and re-estimating and testing, the results show that the statistical properties have been greatly improved compared with the preliminary estimation results. The explanatory power of the model is strong, and there is no significant autocorrelation problem among the variables. Therefore, we get the production function model of green food industry:

$$Ln\left(\hat{Y}_t\right) = 2.62 + 0.132Ln\left(K_t\right) + 0.414Ln\left(L_t\right) + 0.308Ln\left(M_t\right) + 0.1056Ln\left(t\right)$$
(0.1028) (0.1627) (0.0258) (0.0915)

$R^2 = 0.945$ $D.W. = 1.78$ $F = 46.96$

The final production function of the green food industry is:

$$\hat{Y}_t = 13.96K_t^{0.132}L_t^{0.414}M_t^{0.308}e^{0.1056}$$

Through the green food industry production function estimation and testing, you can get the following analysis results:

1) For each factor input, the output elasticity of capital, output elasticity of labor and output elasticity of monitoring area of green food industry in Heilongjiang Province are 0.132, 0.414 and 0.308 respectively. We can see that the high contribution rate of labor and monitoring area to output is the main factor to promote the growth of green food industry. The promotion of technological progress on the green food industry is not obvious. Therefore, how to increase the contribution rate of technological progress to the production of green food industry in Heilongjiang Province will be an important issue for a long time.

2) Because $\alpha + \beta + \gamma \prec 1$, indicating that the overall green food industry is currently in the stage of economic diseconomies of scale, characterized by extensive industrial development, the overall economy of scale has not been played. It also shows that there is little scope for increasing output by increasing input, and the growth efficiency of the development of the epitaxial industries is not high.

4. Conclusion and policy recommendations

Through the above theoretical analysis and empirical research, draw the following conclusions:

1) The mode of development of the green food industry is restricted by the stage of economic development and has stable mutual adaptability and interdependence with a certain level of productivity, economic development strategy and economic system. It also reflects the specific economic development momentum structure and economic growth objectives. Under the conditions of the established level of productive forces, different development strategies and economic system conditions will affect the mode of industrial development. In order to realize the transformation of the mode of development of the green food industry, we must make fundamental changes to the original development strategy and economic system. Without the transition of development strategy and the reform of the economic system, it is impossible to completely realize the transformation of the industrial development mode.

2) Due to the inherent promotion of technological progress and the external pull of market and industry demand, it is a realistic requirement to promote the optimization of green food industry structure and the transformation of industrial development mode. Due to the "rigid" characteristics of technological progress and market demand, we can play an institutional arrangement that is conducive to the transformation of the mode of industrial development and the optimization and upgrading of industrial structure according to the specific stage of industrial development and resource constraints. That is, the guidance and catalytic role of industrial policies are crucial.

3) The sources and determinants of the economic growth of green food industry are mainly explained by the growth of investment in production factors, which shows that the mode of economic growth of green food industry is an extensive and modest development mode driven by factors. Therefore, on the basis of large-scale development of the green food industry, it is necessary

to make adjustments to the industrial structure and transform the mode of industrial growth and further develop the structure and efficiency.

Suggestions on the transformation of green food industry development

1) According to the specific stage of development of green food industry and resource constraints, through the adjustment of government industrial policy guidance and regulation of demand, technology, products and organizational structure, through increased R & D investment to improve green food industry independent innovation ability, industrial technology level and management innovation, to promote the optimization of green food industry structure and the transformation of industrial development.

2) The development of green food industry not only refers to the simple expansion of the number of industries, but also refers to the improvement of the quality and efficiency of industrial growth. It also includes the optimization of industrial structure, the radiation and driving of related industries, the carrying of resources and environment on industrial development degree and so on. In order to realize the scientific development of green food industry, we must change the mode of industrial development so that the development of green food industry will change from extensive growth to intensive growth or from epitaxial growth to connotation growth, improve factor utilization efficiency. Through the adjustment of industrial structure and efficiency, green food Industrial growth is gradually getting rid of the extensive mode of development that relies on the number of factors to promote industrial growth.

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