

# **A Research on Innovation Model of Regional Economic Management Based on Market Economy**

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## **Abstract**

In the environment of market economy, the model of management innovation at various levels of government has become an important force in promoting regional economic development. However, at present, administrative regions at various levels still face many problems in economic management. It is necessary to develop a scientific innovation model of regional economy management by considering population, science and technology, economy and other local development characteristics and combining with the trend of the regional economy development. Therefore, in this paper, the author briefly analyzes the basic requirements for innovation of regional economic management in the current context, establishes the corresponding evaluation index system of regional economic management innovation and puts forward the innovation path of regional economic management in market economy, aiming to lay a good foundation for the coordinated development of regional economy.

**Keywords:**Regional Skills, Market Economy, Management Innovation.

## **1.INTRODUCTION**

### **1.1 Background**

In recent years, with the continuous development of China's market economy, the concept of "Beijing Consensus" has been unanimously endorsed by scholars at home and abroad. In this context, governments at various levels in China have put forward higher requirements for innovation of regional economy management, and a lot of scholars have conducted in-depth studies on the innovation model of regional economy management (Huang, 2013). However, at present, the administrative system of various administrative regions in China restricts the development of regional economy and hinders the development of regional economy and economic growth to a certain extent. In this context, it is an important topic in regional economic management to explore how to change ideology in administrative regions and innovate the management mode of regional economy, so as to effectively promote the good development of regional economy in China.

### **1.2 Research Objectives**

In the context of economic marketization, economic globalization and decentralization in China, the management issues in regional economic development are becoming more and more prominent, which brings many difficulties to the regional economic management of governments at various levels. Therefore, in this paper, the author studies the innovation of regional economy management in market economy and uses an evaluation index system to analyze the function of innovation in regional economy management, aiming to provide appropriate help to the effective solution of regional economic management issues of governments at various levels and establishing regional economic development plans.

## **2. BASIC REQUIREMENTS FOR INNOVATION OF REGIONAL ECONOMIC MANAGEMENT IN MARKET ECONOMY**

### **2.1 Give full play to the initiative of economic entities**

In the market economy, administrative regions need to give full play to the initiative of economic entities and create a harmonious and equitable economic environment. They should also transform the government functions,

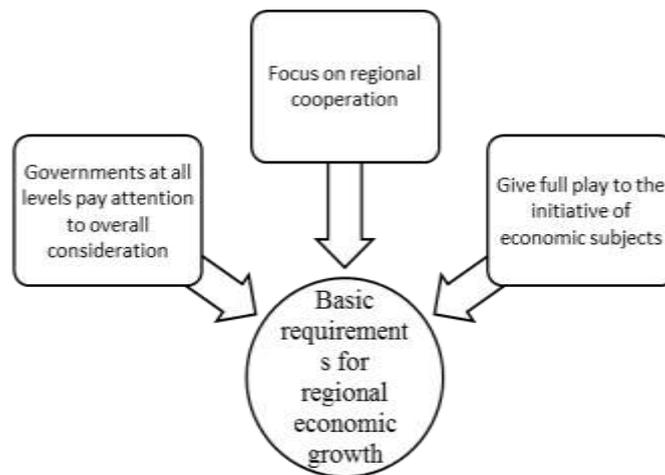
solve various problems in regional economic management and provide good public services, so as to drive the development of regional economy. Besides, governments at various levels should also take advantage of regional characteristic industries, pool the power of local government and enterprises, promote the development of leading industries, speed up the transformation of economy and industry and improve the core competitiveness of the region (Zhang, 2013).

**2.2 Governments at various levels attach great importance to overall consideration**

Governments at various levels should pay attention to the role of the regional economic and industrial zones and functional areas so as to achieve the coordinated and balanced development of the regional economy and take all factors into consideration; they should adhere to the cooperation among major participants of the regional economy and establish and improve regional economic development plans; they should study, in the market economy, the innovation mode of regional economic management and coordinate the development requirements of regional economy so as to lay a foundation for the coordinated development of regional economy (Zhang, 2004).

**2.3 Focus on regional cooperation**

With the introduction of the market economy system, the management of regional economy places more emphasis on pan-regional and cross-regional cooperation and coordination, which requires administrative regions at various levels of to break through the traditional regional barriers and promote the concept of mutual benefit, multilateral cooperation, open-mindedness & openness and competitive interaction (Li , 2004). It is necessary to establish a corresponding coordination system for the development of regional economy and a cooperation mechanism of mutual cooperation, coordination, common development and complementary advantages among the society, the market and the economy. Figure 1 shows the basic requirements of regional economic management innovation in the market economy.



**Figure 1.**The Basic Requirements of Regional Economic Management Innovation under the Market Economy Environment

**3. EVALUATION INDEX SYSTEM OF REGIONAL ECONOMIC MANAGEMENT INNOVATION IN MARKET ECONOMY**

**3.1 Construction of regional economic management innovation index system**

When studying the innovation model of regional economic management, we usually measure the development degree of regional economy from the 3 aspects of environment, technology and economy (Chen, 2010). Among them, natural resources, innovative technologies and industrial structure have an important impact on the research on the mode of regional economy management innovation. These indicators are the core elements in regional economic development. Only when these 3 indicators interact and interact with each other, it can promote the systematic development of regional economy (Liu 2010). In this paper, the author starts from these 3 elements and constructs the regional economic management innovation index system in market economy.

(1) Establishment of indicators

When establishing an index system for evaluating the innovation of regional economic management, we usually use the time-series data as the target of research. The principle for selecting and the establishing indicators is that: First of all, economic behaviors should be consistent with the selected indicators, so as to reflect the development characteristics of China's regional economy in the context of market economy. For example, the GDP per capita is more in line with the economic system in comparison with the regional GDP, which can well reflect the actual situation of the growth of the total regional economy; secondly, the selected indicators should be comparable with each other. When conducting price statistics, we usually take the current year's prices to make statistics, but the prices of different physical products vary from year to year (Liu, 2010). Therefore, we need to use the price index convert them into comparable prices, so that the data of different years and different physical products can be compared; in addition, the indicators selected should not be too intensive. If the index value of the selected objects is small in fluctuation or very close to a certain value in a certain period, it will bring unnecessary trouble for the construction of the evaluation index system in the later stage; finally, the actual results of objects should be selected.

(2) Basis of indicators

In this paper, the author selects 8 indicators in the 3 aspects of environment and natural resources, technological innovation and industrial structure as the objects of this research, as shown in Table 1.

**Table 1** Index System

3 aspects	Eight indicators
Environment and natural resources	Unit GDP energy dissipation
	Comprehensive utilization rate of industrial solid waste
Technological innovation	The number of college students per ten thousand people in Higher Education Institutions
	The number of full-time teachers in Colleges and Universities
	Authorized amount of invention patent
Industrial structure	Proportion of primary industry to regional output value
	Second industry accounts for the proportion of regional total output value
	Third industry accounts for the proportion of regional total output value

In the selection of indicators of environment and natural resources, the author selects 2 indicators of the comprehensive energy consumption per unit of GDP and the proportion of industrial waste water meeting discharge standards. Among them, the proportion of industrial waste water meeting discharge standards means that all the indicators of wastewater discharged by factory reach the regional or national discharge standards, including the 2 aspects of compliance before and after treatment. The proportion of industrial waste water meeting discharge standards is the ratio of industrial waste water discharge meeting standards out of the total discharge. The proportion of industrial waste water meeting discharge standards and comprehensive energy consumption per unit of GDP can reflect the regional economy management level, product quality and production technology level, etc. They are core elements that reflect the environmental impact, resource utilization and energy saving and consumption reducing. In this paper, the author uses these two indicators as indicators to analyze and evaluate the innovation model of regional economic management and reflect the important role of environment and natural resources in the innovation of regional economy management (Xiong, 2010).

In terms of technological innovation, the author selects 3 indicators: the number of students enrolled in higher institutions per 10,000 population, the number of full-time teachers in colleges and universities and the number of patents granted. Colleges and universities refer to short-term vocational colleges, junior college and higher full-time universities organized according to the national approval procedures and setting standards. Their training objects are mainly students passing college entrance examination, and the number of students enrolled in higher institutions refers to the number of students who are registered after the beginning of each academic year; the full-time teachers in colleges and universities refer to those engaged in education in higher education institutions, excluding the former teaching staff, the leaders of colleges and universities and those transferred from teaching posts; and the number of patents granted is the number of patents granted by the competent patent administration. According to the Patent Law, the patent administration is entitled to grant designers and

inventors the rights derived from the improvement and invention of technology and products. To a certain extent, the number of patents granted is an important indicator to measure the level of regional economic innovation and the level of system technology. The large number of patents granted in a region can improve the competitiveness of the regional economy and the overall quality thereof (Li, 2001).

In the aspect of industrial structure, the proportion of the three major industries accounting for regional GDP is taken as the indicators to evaluate the innovation of the regional economic management, which reflects the importance of the three major industries in the innovation of the regional economic management.

### 3.2 Analysis method of regional economic management innovation indicators in market economy

The index system of regional economic management innovation in market economy can reflect the role of economic management innovation in regional economic development. In analyzing the index system of regional economic management innovation, it is necessary, firstly, to analyze the degree of influence of each indicator in the regional economy and other indicators, secondly, to analyze the impact of each indicator on other indicators within a certain period of time in the regional economic system, and thirdly, to compare the two trends of each of the above indicators and find out the same indicators of the two trends. Through the aforementioned 3 kinds of ideas, we can accurately grasp the role of each element of the regional economy and the degree of the correlation of several elements on regional economic management innovation, and then provide a reasonable and scientific development strategy for the innovation of regional economy management.

#### (1) Data processing

$Y^i(j)$  is used to represent the indicator  $i$  in year  $j$ , and the formula is as follows:

$$Y^i(j) = \{Y^1(j), Y^2(j), \dots, Y^n(j)\}, (i = 1, 2, \dots, n) \quad (1)$$

Making  $Y^i(j)$  dimensionless and the result is between 0-1.

The formula is:

$$P^i(j) = \frac{Y^i(j) - \underline{Y}^i}{Y^i - \underline{Y}^i} \quad (2)$$

Where,  $P^i(j)$  is the dimensionless value,  $Y^i$  and  $\underline{Y}^i$  are respectively the maximum and minimum value in  $\{Y^1(j), Y^2(j), \dots, Y^n(j)\}$ .

$$Y^i = \max\{Y^i(j)\}, (i = 1, 2, \dots, n)$$

$$\underline{Y}^i = \min\{Y^i(j)\}, (i = 1, 2, \dots, n) \quad (3)$$

Making each value dimensionless, it can make an assessment and analysis of the indicators of regional economic management innovation.

#### (2) Mathematical characteristics of each indicator

Through the establishment of an index system for innovation in regional economic management, and especially the analysis of the impact of each indicator, it can reflect the interaction between several indicators in a regional economic system. The specific relations can be expressed by the following model:

$$U^i(j) = \sum_{\substack{i=1 \\ i \neq t}}^n r^{ti} s^t(j), (t = 1, 2, \dots, n; i = 1, 2, \dots, n) \tag{4}$$

Where,

$$s^i(j) = \frac{P^i(j)}{\sum_{i=1}^n P^i(j)}, (i = 1, 2, \dots, n)$$

$$r^{ij} = \frac{\sum_{j=1}^n (t_j - T)(i_j - I)}{\sqrt{\sum_{j=1}^n (t_j - T)^2} \sqrt{\sum_{j=1}^n (i_j - I)^2}}, (j = 1, 2, \dots, n) \tag{4}$$

Where,  $U^i(j)$  indicates the impact of a single indicator in the index system on the overall index.  $r^{ti}$  is the degree of interaction between various indicators, indicating the degree of interaction of indicator  $t$  on indicator  $i$ ,  $r^{ti} = r^{it}$ .  $j$  is the corresponding year. The larger the  $r^{ti}$ , the higher the degree of interaction between the indicators, indicating that the innovation of regional economy management has a good effect on promoting regional economy.

(1) Calculation of maturity level of regional economic development

$E(j)$  is used to show the maturity degree of the various indicators of regional economic management innovation:

$$E(j) = \sum_{i=1}^n U^i(j) Y^i(j), (i = 1, 2, \dots, n) \tag{5}$$

Through the establishment of the above index system, the maturity degree of regional economic development  $E(j)$  and the development degree of indication  $Y^i(j)$  influence each other and interact with each other, reflecting the role of regional economic management innovation in promoting regional economic development.

**4. EMPIRICAL ANALYSIS**

**4.1 Current situation of Province A's economic management innovation in market economy**

Province A has a population of about 30 million, accounting for 2.1% of the national total; it is 190,000 square kilometers in area, accounting for about 2% of the national total. Its processing and manufacturing industry is rather developed. With the continuous construction of market economy, agricultural products, automobiles and medicine have become the three leading industries in Province A (Liu, 2015). Besides, Province A is one of the major provinces of grain production in China, and the per capita grain share ranks the largest of the country. It has remarkable advantages in education, strong capabilities in science and technology, good ecological conditions. Generally speaking, in the context of market economy, the characteristics of regional economy in Province A are that the economic development is at a critical stage of structural adjustment and laying a solid foundation, a crucial stage of breaking the contradictions of the traditional system, stimulating the vitality of economic innovation and promoting economic transformation and upgrading as well as a crucial stage of mutual development and integration of urbanization and industrialization.

**4.2 Data processing**

Based on the specific requirements of the index system of regional economic management innovation in the previous chapter, the author selects 7 indicators in 4 years to make a brief analysis of the innovation model of

regional economic management in Province A. The year 2010-2013 is represented by  $H_1, H_2, H_3, H_4$ , respectively. The 7 indicators are:

$Y_1$ : Unit GDP energy consumption

$Y_2$ : The proportion of the three major industries accounting for regional GDP

$Y_3$ : The number of students enrolled in higher institutions per 10,000 population

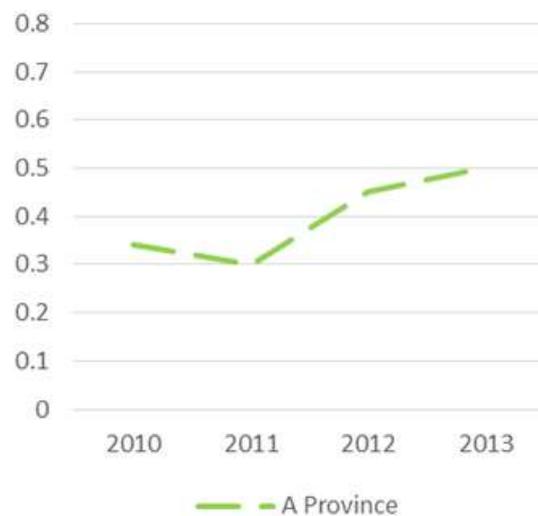
$Y_4$ : The number of patents granted

$Y_5$ : Proportion of industrial waste water meeting discharge standards (%)

$Y_6$ : Registered urban unemployment rate

$Y_7$ : The number of full-time teachers in colleges and universities

According to the aforementioned index system analysis method, the original data are transformed into dimensionless indicators, and the maturity degree of regional economic development  $E(j)$  and the development degree of indication  $Y(j)$  can be calculated. The results are shown in Figure 3 and Figure 4.



**Figure 2.** A Regional Economic Development Maturity in Hunan Province

**Table 2** A Regional Economic Indicator Development Degree in Henan Province

	$Y_1$	$Y_2$	$Y_3$	$Y_4$	$Y_5$	$Y_6$	$Y_7$
$E(j)$	0.32	0.31	0.43	0.52	0.32	0.65	0.68

### 4.3 Data analysis

It can be seen from Figure 3, in the 4 years from 2010 to 2013, the effect of industrial adjustment in Province A emerges gradually, which has changed the traditional agricultural-based economic development, and the comprehensive energy consumption per unit of GDP in Province A also declines gradually. And the resource and environmental factors have become the main factors restricting the economic development of Province A. From Figure 4, it can be seen that the highest maturity level of regional economic development is 0.68. Although the degree of regional economic development gradually increases every year, compared with the developed regions in China, the maturity level of regional economic development in Province A is not that high. In addition, there are differences in the development of various cities in Province A, which is also the cause of significant differences in the maturity degree of regional economic development in Province A (Pan, 2015).

## **5. INNOVATION PATH OF REGIONAL ECONOMIC MANAGEMENT IN MARKET ECONOMY**

### **5.1 Strengthen audits of economic development performance and improve regional economic supervision**

It is because of the lack of proper supervision of the regional economy in the market economy, the development of regional economy in the past was slow and it often failed to meet the expected economic goals (Liu, 2015). Therefore, performance audit can be implemented through the progress of regional economic development to improve its efficiency and meet the needs of the coordinated development of regional economy. The so-called performance audit in the context of market economy refers to the rigorous examination of the effectiveness, efficiency and economy of economic policies and projects in a certain region, which aims to reveal the potential problems in the regional economy development through a multi-angle examination and to put forward the corresponding solutions in time. Therefore, the nature of performance audit of regional economic development is out of the simple sense of the economic supervision and performance audit but a new path of new regional economic management mode on the basis of the integration of the two (Pei, 2015).

### **5.2 Build a differentiated public official performance appraisal system based on functional area as the basic module**

In the current administrative system, each administrative region as a separate political and economic object is also the subject of administration, an economic entity and an interested party. Due to the same market economy in the same country, there are countless linkage relations in the economic development among different roles. It is inevitable that a Party or government leader as the commander in chief of the economic development of a certain administrative region takes the development of regional economy and local interests as the main target in his term of office, which improves the achievements in his official career therefrom. This leads to a comparing mentality among the closely related administrative regions. In the pursuit of the interests of the local regions, the government's action of enterprising features or short-sighted government action hinders the development of regional economy. Therefore, under the precondition of being people-oriented and under the guidance of the scientific outlook on development, it is necessary to construct a differentiated public official performance appraisal system based on functional area as the basic module, and then provide different weights for the corresponding performance appraisal to achieve the fairness and rationality in appraisal (Yang, 2015).

### **5.3 Reform the planning of traditional administrative region and replace it will modern regional economic management**

As the supporting reforms of administrative decentralization have not been smoothly carried out, combined with the lag of legal construction and the political system reform, there are many new social problems that are difficult to solve in market economic reform, such as the Matthew effect in regional development, local protectionism, vicious competition among local governments, GDP worship and blind pursue of political achievements. These problems that emerged in the marketization development processes not only go beyond the limitation of government governance capacity under the planned system, becoming problems in the regional economic development, but also break through the rigid bondage of traditional administrative divisions and spread to a certain economic area composed of several regions (Yuan, 2016). Under such circumstances, the planning of traditional administrative regions has become very rigid and must be replaced by modern regional economic management in order to address the problems in the coordinated development of market economy in different administrative regions so as to enhance the efficiency of regional economic management.

## **6. Conclusions**

To sum up, in the research on the model of regional economic management innovation based on the market economy, we must realize that it is a long process to promote regional growth in China. In this process, we need the cooperation between local business organizations and governments at all levels and should learn from good experience regional economic management at home and abroad, combine the unique development characteristics of local area and summarize the risk factors that may affect regional economic development. On the basis of such risk factors, we should carry out research on innovation of regional economic management, deepen the development concept of regional economic management in the market economy, so as to provide a new direction for China's regional economic management innovation model.

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