Research on the Industrial Transformation of Resource-based Cities: Take Hainan Province as an Example

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Abstract. Industrial transformation and upgrading is a necessary condition to realize the sustainable development of resource-based cities. This paper studies the industrial transformation of Dongfang, Hainan Province. In view of the strategic goal of establishing ecological civilization society and realizing the development mode of green economy in China, the industrial transformation of resource-based cities with the advantages of mineral resources becomes an inevitable trend. Based on the SWOT analysis, the author analyzes the industrial adjustment of Dongfang, and puts forward the target and related measures of industrial transformation. The research of this paper has both rich theoretical and practical significance for improving the efficiency of industrial transformation.

1. Introduction
On December 3, 2013, the State issued the National Sustainable Development Plan for Resource-based Cities (2013-2020) (hereinafter referred to as the “Plan”), which established the list of 262 resource-based cities and the development goals for 2020. Among them, Dongfang in Hainan province was selected. According to the Plan, resource-based cities must transform their economic development mode and build a decision-making mechanism to promote sustainable development of resource-based cities.

As an important industrial city in Hainan Province, Dongfang has been focusing on the secondary industry represented by industrial parks to create an economic environment with effective capital allocation, multi-industry coordinated development and multi-product equal emphasis. However, the secondary industry has always been characterized by high investment and high energy consumption, the problems faced by dongfang is a high proportion of secondary industry, while lower in tertiary industry proportion. That is the problem of “secondary-first-third” industrial structure. Therefore, on the industrial adjustment, transformation of the mode of economic development is of far-reaching both in theoretical and practical significance.

2. Mechanism of Industry Transformation in Resource-based Cities
The fundamental reason of industrial transformation lies in the bottleneck of economic development caused by unreasonable industrial structure. As a measure of economic growth, this paper takes GDP as a reference and sets the following production functions:

\[ Y = Af(L, K) \]  (1)
\( Y \) indicate economic output, \( L \) indicate labor, \( K \) indicate input, and \( A \) technical level. Based on marginal output, we can further deduce the output change:

\[
\Delta Y = MP_L \times \Delta L + MP_K \times \Delta K + f(L, K) \times \Delta A
\]  

(2)

Based on the principle of maximizing factor efficiency: \( MP_L = P \), (2) can be expressed as:

\[
\frac{\Delta Y}{Y} = \beta_1 \frac{\Delta L}{L} + \beta_2 \frac{\Delta K}{K} + \frac{\Delta A}{A}
\]  

(3)

Among them, \( \beta_1 \) indicate the proportion of labor input, \( \beta_2 \) indicate the proportion of capital investment.

According to (3), economic growth comes from technological progress and input of labor and capital, and technology and factors of production become necessary drivers of economic development.

Table 1. Gross Domestic Product and Investment in Fixed Assets

| Time | GDP (10 Million Yuan) | Investment in Fixed Assets (10 Million Yuan) | Fixed Investment in Secondary Industry (10 Million Yuan) |
|------|----------------------|---------------------------------------------|--------------------------------------------------------|
| 2013 | 123.94               | 54.7                                        | 12.8                                                   |
| 2014 | 134.5                | 57.8                                        | 13.7                                                   |
| 2015 | 144.56               | 59.8                                        | 14.2                                                   |
| 2016 | 149.55               | 61.7                                        | 15.3                                                   |
| 2017 | 157.10               | 62.2                                        | 16.6                                                   |
| 2018 | 177.91               | 64.94                                       | 22.4                                                   |

Note: The data are from Hainan Province Statistical Yearbook in 2013-2018.

For resource-based cities, economic growth mainly depends on the high input of mineral resources and belongs to the typical extensive development mode, which not only consumes a lot of resources, but also inhibits the operation efficiency of resource-based enterprises and reduces the corresponding added value of products. According to the statistics in Table 1, although the number of fixed assets investment in Dongfang, especially in the secondary industry, shows a trend of increasing year after year, its contribution to GDP is not high, and the proportion of fixed investment in the secondary industry is low. It is necessary to adjust the industrial structure and realize the transformation of the urban economic development model so that its economy can take the road of sustainable development.

3. Analysis of Industrial Transformation SWOT Dongfang, Hainan Province

3.1. Advantages

3.1.1. Mineral resources. The main mineral resources in Dongfang include copper, aluminum and crystal, as well as marble and quartz sand for construction. The quality of the locally mined quartz sand is second to none in the country, where the sand used for beach volleyball during the Beijing Olympics originated.

Rich mineral resources are undoubtedly an important source to promote economic growth. Dongfang can make use of abundant mineral resources and make effective use of mineral resources to promote the sustainable development of the city's economy and open up the road of green economy development.

3.1.2. Geographical Location. Dongfang is not only the industrial town of Hainan Province, but also has a natural port - eight ports, smooth shipping, the island-wide railway through the city, only 200 kilometers away from the provincial capital, and Hainan's famous tourist city - Sanya one hour away.
In addition, it is not only an important industrial town in Hainan Province, but also the status of its industrial park. The city also continues to improve the infrastructure of the park in strict accordance with the “five links and one level” guidelines, and strives to contribute to the industrial development of Hainan Province.

3.2. Disadvantages
The proportion of secondary industry is low, different from the overall situation of Hainan Province, the economy of Dongfang belongs to the “industrial leading type”, and the proportion of low consumption service industry is obviously insufficient. According to the statistical yearbook, the economic structure of Dongfang from 2013 to 2018 has always existed in the form of “secondary-first-third” structure. Although the proportion of service industry has increased, the industrial output value of high energy consumption is still high, and this unreasonable industrial structure needs to be solved urgently.

3.3. Opportunities
Since the 18th National Congress of the Party, the national government has taken the construction of an ecological civilization society as a national policy, going deep into all levels of politics and culture, especially the “overall plan for the reform of the ecological civilization system” issued in the autumn of 2015. Take it as an example, through the development of a low-carbon energy economy, changing the unreasonable industrial structure of provinces and cities, and opening the door to a low-carbon economy through the form of economic transformation. Thus, as a resource-based city in Hainan Province, the industrial transformation of Dongfang has been supported by national policies.

3.4. Threats
Reducing the proportion of secondary industry and focusing on the development of service industry is the only way for Dongfang to realize industrial transformation and develop green economy. First of all, as a resource-based city of Dongfang, the proportion of industry is large, but the service industry is still in its infancy, and facing the fierce competition in other parts of the province, the most obvious is facing the reputation and brand effect of Sanya in tourism, the short-term want to compete in Sanya, the difficulty can be imagined. Secondly, by searching the annual statistical yearbooks of Hainan Province, we can see that the service industry in other areas of Hainan Province is also very large, which poses a severe challenge to the industrial transformation of Dongfang.

4. Orient City Industrial Structure Adjustment Target Planning

4.1. Sustainable Economic Development
The so-called economic sustainable development is to realize the current economic development without depriving the next generation of people of their welfare. First of all, the power supply in Dongfang mainly comes from fire power, and despite the previous reform of power plant resource utilization technology, it is still unable to get rid of the shackles of coal-dominated type. Therefore, the future development must make every effort to promote the use of new energy technology in the secondary industry and reduce the emission of harmful gases.

4.2. Economic Transformation
In 2018, the proportion of the three major industries in Hainan Province was 20.7%, 22.7% and 56.6% in turn, while the proportion of the three major industries in Dongfang was 22.5%, 47.6% and 29.9%. Therefore, by adjusting the industrial structure, the service industry plays an important role in the industrial development of Dongfang, but considering the actual situation of the secondary industry in Dongfang, the industrial structure of Dongfang is not necessarily better than that of the whole province, but it is necessary to catch up with the western city level as soon as possible.
For the secondary industry, the existing industrial products in Dongfang have lost their innovation and competitive advantage, resulting in blocked sales, therefore, from the supply-side angle, economic transformation must be through science and technology, professionals and management of scientific, in order to find a way out. As a result, it is necessary to enhance the advantages of the A, formulation in the above-mentioned production functions for scientific development.

5. Concrete Measures of Industrial Structure Adjustment in Dongfang

5.1. Exploring Models of Economic Transformation Consistent with Their Own Development
If we want to promote the sustainable development of the economy, we must rely on the industrial transformation. From the perspective of cross-section, there are differences in policy inclination, geographical location, industrial base and so on in each resource-based city, which makes its industrial transformation produce different degree of difficulty. For example, Tangshan, which also belongs to the resource-based city, is the only way from Beijing to Tianjin to the three eastern provinces, showing a significant location advantage. In addition, as the core city of Beijing, Tianjin and Hebei, Tangshan has received policy support from the national level. Therefore, Dongfang should start from its own actual situation, looking for the development model applicable to this city.

5.2. Improvement of Traditional Industries and Development of Emerging Industries
From the above point of view, compared with other cities in Hainan Province, Dongfang has a higher proportion of secondary industry, and the economic development is seriously led by the traditional industry. Therefore, we should not only pay attention to the improvement of the traditional high energy consumption industry, slow down the waste of resources, but also cultivate new industries and enhance economic welfare at the same time. Based on the upsurge of the construction of Hainan Free Trade Test Zone and the Free Trade Port with Chinese characteristics, Dongfang Industrial Park, with the help of abundant superior resources in Beibu Gulf and even the South China Sea area, combined with the advantages of transportation such as roads, railways and seaports, takes oil, gas, chemical industry, South China Sea resources development and supporting equipment manufacturing and service as the leading factor to train new industries such as fine chemical industry, energy reserve, express logistics industry, etc.

It is worth noting that we do not want to abandon traditional industries, but to optimize and upgrade existing resource-dependent industries. Throughout the development process of Dongfang, the collection and accumulation of mineral resources as the driving factor, resulting in the corresponding industrial products lack of added value, it is difficult to form a significant competitive advantage in the market. It is not difficult to imagine that once the city’s resources are exhausted, economic development will go to depression.

5.3. Strengthening Environmental Protection and Promoting Sustainable Development of Ecological Resources
Looking back on the economic development of resource-based cities, resource-invested enterprises, which occupy the dominant position, often destroy the ecological environment significantly. As far as the development mode of Dongfang Industrial Park is concerned, it still belongs to the extensive mode of high investment and high consumption. Specifically, the first is to construct a persistent mechanism of environmental protection, optimize the system of levying fees for enterprises to discharge pollutants, rationally draw up cost standards, effectively achieve the purpose of reducing pollutant emissions, and collect ecological protection tax, so as to increase the cost of pollution to reduce enterprises’ emissions and increase their willingness to reduce pollution. Second, make every effort to develop circular economy and expand publicity for environmental protection.
5.4. Re-employment of the Labour Force and Promotion of Social Security

If we want to promote the industrial structure adjustment of resource-based cities, it will inevitably involve structural unemployment, the sharp decline of industrial posts and the imbalance between labor supply and demand in the stage of economic transformation, which will undoubtedly increase the difficulty of re-employment significantly, and the existence of re-employment bottleneck has a non-negligible impact on the economic transformation, and even lower the welfare level of the whole society. Obviously, dealing well with the problem of re-employment of labor force involves the overall development of urban economic transformation and is the core link of promoting social security. Specific measures include: first, the government should introduce more preferential policies to provide a good entrepreneurial environment for the majority of fresh graduates with entrepreneurial ideas or entrepreneurial ability, thus indirectly providing a large number of jobs. Second, for the labor force unemployed because of the adjustment of industrial structure, it is necessary to expand the intensity of professional skills training for it, enhance the professional literacy of the unemployed labor force, and establish the foundation for its future re-employment.

6. Conclusions

Taking a resource-based city Dongfang, which located in Hainan Province as an example, this paper studies the industrial transformation of the city. Firstly, the mechanism of economic growth is analyzed through the function of classical economic production, the disharmony between the unreasonable allocation of industrial capital and economic growth is found. Then, it analyzes the advantages, disadvantages, opportunities and challenges of realizing industrial transformation in Dongfang, and puts forward the target plan of industrial structure adjustment and the corresponding measures of industrial structure adjustment in Dongfang.

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