International Journal of Data Analysis and Information Systems
Volume 11 • Number 1 • June 2019

# Study on the Industrial Transformation of Petroleum Resource-Based cities

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**ABSTRACT**

Petroleum resource-based city is the main source of power for the industrial development of a country. With the depletion of petroleum resources, industrial transformation is an urgent task to the oil-resource-based city which is suffering. In this paper , the actual situation of petroleum resource-based cities is analyzed, the problems and reasons restricting their development and transformation are found out, and some countermeasures and suggestions for promoting the industrial transformation of petroleum resource-based cities are proposed.

***Key words:*** Oil; Resource-based cities;Industrial transformation

## INTRODUCTION

Resource-based cities are the cities that rise or grow with the development of natural resources, and the resource-based industries in the industry accounts for a relatively large city. Most of the resource-based cities in China rise under the guidance of the national industrial policy and with the guidance of the planned economy system, and the initial economic development mainly depends on the growth of the number of resource products. Under the guidance of planned economy, resource-based cities and enterprises have always been mainly production-centered management system, which is bound to conflict with the modern market-oriented management environment. Currently, with the globalization of economy and the internationalization of market competition, the development of resource-based cities is still dominated by local natural resource endowments, supplemented by foreign capital, which may result in a fragile regional economy[1-3]. Therefore, resource-based cities must proceed from the reality of the region, base on superior industries, and develop other alternative industries that are not completely dependent on natural resources, so as to promote the successful transformation of resource-based cities' industries.

Many resource-based cities are first mining and then building cities, especially oil resource-based cities. In the early stage of oil resources development and exploitation, because of the great abundance of resources, the initial exploitation cost is low. Therefore, the petroleum resource-based cities have made great contributions to the economic growth of the region in the early stage, making the growth rate of GDP in the cities very fast. General resource-based cities are important economic sectors in the region, while it's similar to other resource-based cities, in addition, petroleum resource-based cities also have a single industrial structure, leading industries are dependent on resource endowment of the characteristics of the oil development industry. With the decline of recoverable reserves, oil-resource cities all over the world have entered the stage of resource depletion. At the same time, the technical difficulty of oil development is gradually increasing, and the cost of exploitation is rising, especially as foreign oil companies expand in China, the market competition is increasing day by day, and the competitive power of petroleum enterprises is declining, of which these factors inevitably have effect on the economic and social development of petroleum resource-based cities[4-5]. In this case, how to realize the industrial transformation of petroleum resource-based cities is an unavoidable problem in the development of petroleum resource-based cities.

## 2. FACTORS INFLUENCING THE INDUSTRIAL TRANSFORMATION OF PETROLEUM RESOURCE-BASED CITIES

### (1) Location factors of cities

The location factors of any city have a very important influence on its economic development and industrial

transformation. The factores on whether the roads, railways and air transportation of petroleum resource-based cities have a comparative advantage over other non-oil resource-based cities, whether the oil-resource-based cities are located on the borders of the countries in which they are located, the economic, political and social environment of neighboring countries will affect the development of petroleum resource-based cities. The characteristics of natural environment factors in petroleum resource-based cities will also influence or restrict the development of primary and tertiary industries in petroleum resource-based cities to a certain extent. In particular, compared with other cities in the countries where oil resource cities are located at the same time, the advantages and disadvantages of location factors will directly determine whether the economic development of cities depends entirely on natural resources and the final development result is that resources determine the overall economic operation of the city.

**(2) Industrial structure factor**

Petroleum resources products dominate the industrial structure of petroleum resource cities. Moreover, the petroleum industry of our country has existed in the form of monopoly for a long time. In the era of planned economy, the influence of the change of market structure on petroleum industry is not very obvious. It is currently of great significance for the industrial transformation of petroleum resource-based cities to rely on the sustainable development of other resources other than oil resources, as well as the degree of protection and utilization of this kind of oil resources[6-8]. Under the planned economy, the economic growth of the petroleum resource-based cities is almost exclusively the pursuit of the expansion of the production quantity of petroleum products. Therefore, as long as crude oil production and oil recovery remain stable, resource-based cities can lead other cities in paying taxes and economic growth. However, since international oil prices fell nearly 75 per cent from their peak in 2014, the loss problem of all oil resource cities has begun to be highlighted. However, even if the oil fields in the region begin to be as a loss, by 2016, the petroleum resource-based cities have had a dominant industrial economy, and the oil and chemical industry would be in an absolute dominant position. The development of the first and third industries in petroleum resource-based cities has been still widespread, and its economic development depends heavily on natural resource endowment.The monolithic economic characteristics of petroleum resource-based cities are very obvious, so that the depletion of petroleum resources and the change of market price of petroleum products have brought double pressure to the development of petroleum resource-based cities under the market economy.

**(3) Human resources**

In addition to natural resources, human resources are one of the most important resources for economic development. The rise of all alternative industries, the transformation of industrial structure and the reconstruction of new competitive advantages can not be separated from high-quality and relatively stable human resources[9]. Petroleum resource-based cities are mostly produced by oil with the characteristics of immigrant cities. In the early days of the construction of these cities, the local human resources were scarce and the living environment was difficult, therefore, the vast majority of them, including researchers, managers and technicians, moved in from other industries[10]. The large amount of labor needed for production comes from the family members of the enterprise workers, the army demobilized soldiers and the surrounding rural areas. The average level of education was on the low side, and the skills were single. At the same time, due to the single industrial structure of the petroleum resource-based city itself, the technical personnel were mainly concentrated in the petroleum resource-based industry and related scientific research institutions[11]. For example, it's showed based on the statistics that by 2016, the proportion of oil enterprises employed in Daqing City, the largest petroleum resource-based city in China, was as high as 38.7% of the city's employed population, and the professional composition of talents was unitary so that it was difficult for existing enterprises to expand and extend to other industries. Even though in recent years, there are many petroleum resource-based cities which have vigorously developed basic education, supported and introduced local and foreign higher education schools, they have also independently trained a large number of high-level talents. However, because of the work of various petroleum resource-based cities, the living environment is obviously inferior to the open coastal cities. Under the condition of two-way selection of

talents, on the one hand, petroleum resource-based cities lack the software and hardware to attract talents from other areas, and even more seriously, a large number of local talents leave, which leads to the shortage of high-level and complex talents that are badly needed in the industrial transformation[12].

### (4) Economic system

From the point of view of economic system, petroleum resource-based cities are built according to enterprises, so that they are affected by planned economy for a long time, with more institutional constraints and insufficient vitality of market subjects. The proportion of non-public economy in petroleum resource-based cities is small and the degree of economic extroversion is very low. The degree of economic extroversion of petroleum resource-based cities is generally lower than the average level of the whole country and the provinces. Even though in recent years, with the deepening of the reform of state-owned enterprises, there has been a change in government and business, and the burden on state-owned oil enterprises to run society has been greatly reduced. However, due to the historical problems, it is very difficult for enterprises to develop their own business. In addition, the oil field companies of petroleum resource-based cities belong to the China National Petroleum and Natural Gas Co., Ltd., belong to the central enterprise, and the vertical leadership of the central competent departments, forming a system of their own, with poor coordination with the localities and the relationship between the oil field party organization and the municipal government is parallel to the provincial party committee, thus forming the dual leadership of the oil enterprises. As a result, in the process of petroleum enterprise transformation, the city government of the petroleum resource-based city has power but no chance to give play, and the petroleum enterprise is difficult to give full play to the radiation and driving function of the petroleum resource-based city.

### (5) Strength of economy

By 2017, under the unfavorable conditions of the reduction of crude oil production and the decrease of refining capacity of Zhongzhi Petrochemical Company, petroleum resource-based cities achieve a gradual improvement in urban rconomic growth, with the GDP increasing from the same period of the previous year, the growth rate is also higher than that of the same period last year. From the perspective of the three times of industries, the output value of the primary, secondary and tertiary industries has increased from the same period last year. From the direct enterprises and local enterprises, the value added by China's direct enterprises decreased from the same period last year, while the local economy grew somewhat from the same period last year. From the point of view of oil economy and non-oil economy, the value added of oil economy decreased from the same period last year, and the non-oil economy increased from the same period last year. It can be seen from the above comparison that the output value of the secondary industry in the petroleum resource-based cities still accounts for a large proportion of the total output value although the oil production is in a negative growth state, as a result, it is especially noteworthy that the income tax of the Chinese direct enterprises needs to be paid to the central finance and has little contribution to the local finance, which leads to the increase of the total economic value of the petroleum resource-based cities and the contradiction of the poverty of the local finance, as a result, local governments lack funds to support the development of small and micro enterprises. Without adequate financial support, local enterprises will find it difficult to develop and grow due to the lack of internal impetus for the development of petroleum resource-based cities.

## 3. Strategy of industry transformation in petroleum resource-based cities

### (1) Innovative enterprise mechanism

It can be known based on the previous analysis that state-owned enterprises dominate the industrial enterprises in petroleum resource-based cities, while the planned economy system of state-owned enterprises has restricted the potential of enterprises. Therefore, it is necessary to deepen the reform of enterprise system in the industrial transformation of petroleum resource-based cities. First of all, it shall implement the establishment of public ownership based on the coexistence of multiple ownership of the enterprise mechanism. In addition, it is to attract individual investment, foreign investment and other economic elements into petroleum resource-based cities so as to vigorously support the development of private enterprises, foreign enterprises and joint ventures,

and form a sound market competition environment in petroleum resource-based cities. Besides, it's to change the functions of the government. The key point is to realize that the government should only provide supporting services for enterprises, carry out urban infrastructure construction and management, and the government will no longer interfere with the management and market competition of enterprises by administrative means.

**(2) The transformation from monolithic economy to diversified industries**

At present, the monolithic economy of petroleum resource-based cities has formed a certain scale, with a certain amount of capital, talent and market. The adjustment of the industrial structure of the petroleum resource-based cities should be proceeding from the actual situation of petroleum resource-based cities first, and based on the comparative advantages of petroleum resource-based cities so that the general goal of transforming urban industry from monolithic economy to diversified industry is decomposed into stage objectives, and the primary and secondary industries are transformed into diversified industries. The government of petroleum resource-based cities should introduce some preferential policies to support enterprises in key industries, attract physical enterprises, such as electronic and mechanical manufacturing, and finance, information and other service industries to settle in the region. The starting point of developing multiple Industries in petroleum resource-based cities is still petroleum resources, therefore, the deep processing and comprehensive utilization of petroleum and natural gas as raw materials and the auxiliary industries serving this system should also be the focus of the development of diversified industries in petroleum resource-based cities. Technological progress and technological innovation are new driving forces for social development, therefore, petroleum resource-based cities should continue to absorb, utilize and develop high and new technologies. In this process, the focus of government service should be put into practice in the transformation of high and new technology into practical achievements. Such a combination of multiple industries constitutes a diversified industrial system of petroleum resource-based cities. In the process of industrial transformation, the key work of the government includes that: first of all, it is necessary to strengthen the infrastructure construction and investment, further improve the supporting and service functions of the city, and create a good hard environment for the industrial transformation of the petroleum resource-based cities, in addition, it is necessary to continue to deepen local cooperation between enterprises and to support large enterprises in stabilizing production. While raising the local conversion rate of petroleum resources, it should continue to promote the development of the first and third industries, strive to achieve steady growth in agriculture, so that the leading role of the service industry is increasing

**(3) To support new leading industries**

Petroleum resource-based cities should grasp the opportunity of national "One Belt and One Road" policy in time, optimize the operating environment, speed up the economic transformation and upgrading and the transformation of new and old kinetic energy, and find new economic growth points. Petroleum resource-based cities should make full use of oil and non-oil resources to carry out joint development, take petroleum science and technology innovation as the starting point, make full use of the influence of oil brands, and strive to cultivate the entity enterprise brands of petroleum resource-based cities to realize the rapid growth of various entity enterprises. Petroleum resource-based cities should also vigorously support and introduce high-end manufacturing projects such as machinery manufacturing, biotechnology industry, information materials, electronic science and technology, and promote the development of related industries such as building materials, electricity, grain, transportation, etc. change the situation that the original industry is dominated by traditional industries such as petroleum and petrochemical industry; petroleum resource-based cities should make full use of tourism resources and create leisure and healthy tourism industry with characteristics of petroleum resource-based cities. In the process of supporting new leading industries, the governments of petroleum resource-based cities should not only give preferential policies and financial support, but also attract the injection of private capital to create a healthy market environment in which the economy of various forms of ownership is blooming, and to gradually realize a variety of industries to support the development situation of the urban economy, and to provide an orderly market environment for the economic transformation.

**(4) To perfect the system of scientific and technological innovation**

On the basis of the original high and new technology, oil resource-based cities are necessary to make full use of the scientific and technological forces of local and provincial universities and colleges, scientific research institutes, and local leading enterprises, to integrate scientific and technological resources, and to actively promote the organic integration of production, learning and research to further strengthen the R & D base of scientific and technological achievements and improve the platform for the introduction, integration and transfer of technology. It is necessary to break down the barriers between scientific research institutes, institutions of higher learning and enterprises, to build industrial, academic and research institutes and enterprise association of school land to strive to create an open R & D environment for enterprises in the fields of production, learning and research, and to realize the sharing of resources so that the transformation and promotion of new and high-tech achievements are really put into practice.

Talent is the key factor to perfect the system of scientific and technological innovation. First of all, petroleum resource-based cities should formulate effective policies for the introduction of talents and the policy should focus on making up for the disadvantages of petroleum resource-based cities in terms of location disadvantage and relative backwardness of regional economy, in order to attract talents to obtain employment here. In formulating the policy of introducing talents, the government should take into account the employment and placement of their families and the admission of their children, so as to relieve the worries of high-tech talents. In addition, it is necessary to increase the investment in the special fund for the introduction of talents, and to re-award those scientific and technological personnel who have made outstanding contributions; finally, the government should make full use of the favorable opportunity of the government's policy of allowing university teachers to work part-time within a certain scope, and establish a flexible talent mechanism to attract local university teachers to make suggestions for the economic development of the region and to create a good soft environment for attracting talents in petroleum resource-based cities

**(5) To strengthen reemployment training**

Similar to industrial transformation in other resource-based cities, the biggest difficulty in the industrial transformation of oil-resource-based cities is the employment of personnel. The industrial transformation of petroleum resource-based cities will inevitably result in the result that a large number of petroleum labor force will be transferred to the post and laid-off. There are two reasons. On the one hand, the personnel of state-owned oil enterprises in petroleum resource-based cities are used to the "a secure job" thinking and working style of enterprises, the ability of market adaptation is poor, and it is difficult to obtain employment across industries. On the other hand, the majority of employees of state-owned oil enterprises in petroleum resource-based cities are older, with less education level, accepting new idea and the poor capability in new technology. As a result, the relevant departments of the government must conduct field research to grasp the real will and current situation of employees in the enterprise transition. Based on the actual needs of the development of the industrial structure of petroleum resource-based cities, it should carry out targeted vocational and technical training. The training way should be convenient for the personnel in transition, the training result should pay attention to the actual effect, the training direction should be oriented to the market demand and the individual reality.

**(6) To learn from the experience of successful transformation**

In the process of transformation of petroleum resource-based cities, it shall correctly recognize the urgency and long-term nature of transformation. According to the experience of the transformation of petroleum resource-based cities at home and abroad, in the process of transformation, it shall actively plan the transformation strategy, and choose the correct transformation path on the basis of accurately grasping the actual conditions of the transformation, such as the location characteristics, resource endowment and economic level of the cities. At the same time, it shall give full play to the role of the market as well as the guiding role of the government, adopt the double-line promotion of petroleum gas resources industrial cluster and non-oil industrial cluster, build a diversified modern industrial system, establish the system mechanism of integration of production, education and research, and realize innovation drive.

First of all, oil field enterprises in petroleum resource-oriented cities should focus on the international oil market,

increase overseas investment and actively participate in oil exploration and development in other countries. Currently, the oil field enterprises in some oil resource cities have made preliminary achievements in this respect, which has laid a foundation for the sustainable development of oil fields. In addition, in the process of industrial transformation, petroleum resource-based cities should actively learn from the experience and lessons from the industrial transformation of resource-based cities in developed countries, seek for international cooperation and introduce advanced technologies which are suitable for the transformation of local industry.

## 4. CONCLUSION

Petroleum is a non-renewable resource. The industrial transformation of petroleum resource-based cities is the only way for urban development. How to make that "the mine is exhausted, but the city will not decline", the government of resource-based cities should vigorously promote and actively explore how to promote urban transformation, while optimizing the industrial structure. In the process of transformation of petroleum resource-based cities, firstly, it shall make clear that the core of resource-based cities is "city" rather than "resources". Therefore, in the process of transformation and development, petroleum resource-based cities should gradually get rid of the traditional development path of over-dependence on resource development, and return the fundamental task of urban development to the development of various industries and the improvement of basic functions of cities, which is also the core of exploring the industrial transformation of resource-oriented cities. For non-renewable resource-based cities, such as petroleum, government departments should fully understand the resource conditions and location conditions of cities, and predict the future development trend of urban economy, as well as take corresponding optimization measures at different stages of urban development. In the process of transformation of petroleum resource-based cities, on the one hand, it shall enlarge the main industry of petroleum and petrochemical, extend the petrochemical industry chain, and at the same time, it shall strengthen other industries with potential and vigorously develop the diversified urban economy. On the other hand, relying on their original industrial base and advantages of open cooperation and urban centrality, petroleum resource-based cities can radiate their neighboring regional cities, create abundant urban functions, and achieve the purpose of comprehensive urban development.

The industrial transformation of petroleum resource-based cities involves not only economic development, but also social development, population employment, science and technology, institutional innovation and other aspects. Especially with the increasing marketization degree of the main investors, and the maturity of market economy in allocating resources, in the process of industrial economic transformation of oil-resource-based cities, the choice of alternative industries and successive industries will be mainly determined by the market.

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