

# Houston's Experiences of Industrial Transformation and the Enlightenment it provided for Tangshan

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**ABSTRACT:** Houston is a resource-based industrial city in the United States which has successfully carried out the industrial transformation. Its experience can provide enlightenment for Tangshan, which is also a resource-based industrial city experiencing transformation. In this paper, Houston's experience in developing the traditional industry, diversifying the economy and developing the tertiary industry was analyzed, and the enlightenment it provided for Tangshan was also discussed from the three aspects.

**KEYWORD:** Houston; Tangshan; industrial transformation; enlightenment

## 1 HOUSTON'S EXPERIENCES OF INDUSTRIAL TRANSFORMATION

Houston is an important industrial city of the United States. Founded in 1836, the city owed its early development to the burgeoning port and railroad industry. In 1901, oil was discovered at the Spindle top oil field near Beaumont, which set the stage for the city's growth as a petroleum center. In the end of 1920s, many big petroleum companies in the United States established their headquarters in Houston, and the city gradually developed into one of the most important cities in Southern America. At the beginning of 1980s, petroleum related industry took up 60% of the local industry. However, in the mid-1980s, because of the precipitous drop in the oil price, Houston suffered from a serious recession. In order to recover from the recession, the city began to make efforts to transform its industry and reduced its dependence on the petroleum industry. Through various approaches, the city finally succeeded in its industrial transformation and became a modern metropolis with intensive capital, knowledge, and high technology. Houston's experiences of industrial transformation can be summarized as follows:

### 1.1 *Extending the industrial chain to develop the traditional industry*

The history of Houston showed the important role of energy industry in the development the city's economy, and Houston is still known as an "energy center" in the world today. Therefore, although there was a decline in energy industry and the development of the industry are confined by the

limited resources, it's unrealistic and impossible to give up this industry immediately.

In order to revitalize the traditional energy industry, Houston took measures to extend the industrial chain. The city government established policies to encourage deep processing and comprehensive utilization of the petroleum products and the further development of petrochemical industry. The productivity was greatly increased. At present, 48% of the ethylene and 66% of the epoxy resin in the United States are produced in Houston (Wang, 2012). Besides the further utilization of petroleum products, the city also encouraged the development in oilfield equipment manufacture. In 2012, Petroleum products, chemicals, and oil and gas extraction equipment accounted for approximately two-thirds of the metropolitan area's exports (Houston, 2013), and Houston area has become a leading center for building oilfield equipment.

The extension of the industrial chain provided renewed vitality to the traditional energy industry and set a good example for the development of resource-based industry.

### 1.2 *Exploiting the regional advantages to diversify the economy*

While further developing the traditional energy industry, the government of Houston was ware of the limited life-span of the resource-based industry, so they also made efforts to develop the other industries and diversify the economy.

In the process of diversifying the city's economy, Houston made full use of its regional advantages. Taking the traditional competitive industries as the

first advantage, it further developed other new or high-tech industry related. For example, the development of petroleum related industry drove the development of the other industries serving for it, such as electronic power, steel, transportation and telecommunication. Besides, Houston has long been one of the important medical centers of the United States, so it made use of this advantage to develop many related industries, such as the manufacture of biological medicine and medical equipment. Furthermore, because of the establishment of NASA's "Manned Spacecraft Center" in 1961 (renamed the Lyndon B. Johnson Space Center in 1973), aerospace industry became an important part of the city's industrial structure. And depending on the development of aerospace industry, other related industries developed very fast, such as electronic information and the manufacture of aerospace instrument and precision machinery. Approximately 1300 small-sized high-tech companies related were established (Luo, 2008).

In addition to the development of industry, Houston also made use of its natural resources to develop its agriculture. At present, it has become the largest growing area of wheat in the United States. Its livestock inventories rank the second in Texas, and the sales of cows rank the first in Texas (Wei, 2011).

As a result of the diversification of its economy, Houston reduced its independence on energy industry. As is shown in Figure 1, the exploration and production of oil and gas, once was the backbone of Houston's economy, only accounted for 3% of the city's gross product in 2007 (Houston, 2007).

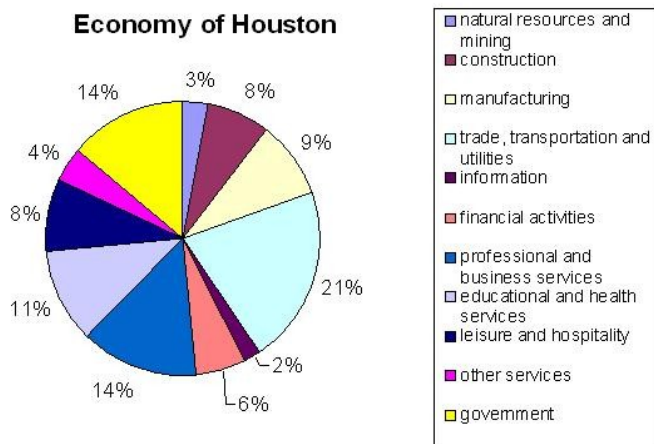


Figure 1. Major Sectors of the Houston Economy in 2007

### 1.3 Developing the tertiary industry to balance the industrial structure

In Houston's process of industrial transformation, the development of the tertiary industry is worth special attention, because compared with agriculture and industry, the tertiary industry has lower requirement for natural resources and more vitality,

thus playing a more important role in industrial transformation.

After the 1980s, the employment rate in tertiary industry in Houston rose greatly, and the value added accounted for more than 50% of the city's gross product. Its business, financial industry and the cultural and creative industry all experienced fast development. In the business sector, after the transformation, the sales of retail and wholesale business doubled and ranked the first among all the cities in America. In the sector of financial industry, the development of economy attracted many famous foreign banks to set branches in Houston and the city has become one of the four financial centers in the United States.(Wang, 2012) In the sector of cultural and creative industry, Houston is one of few United States cities with permanent, professional, resident companies in all major performing arts disciplines: opera (Houston Grand Opera), ballet (Houston Ballet), music (Houston Symphony Orchestra), and theater (The Alley Theatre). (Museums, 2009) In addition, it's Museum District and more than 300 parks attract many visitors every year, making great contribution to the development of tourism.

The development of tertiary industry balanced the industrial structure of Houston, accelerated the industrial transformation and strengthened the core competitiveness of the city.

## 2 THE ENLIGHTENMENT HOUSTON PROVIDED FOR TANGSHAN

Similar to Houston, Tangshan is also an industrial city whose early development is much depended on natural resources. It boasts very rich reserves of coal and iron, and the industry based on these resources has a history of more than 100 years. Today, the coal and steel industries are still the pillar industry in Tangshan. At the beginning of this century, the problems caused by the resource-based development become more obvious in Tangshan, so the city government began to establish policies to launch the industrial transformation. After the struggle of more than 10 years, Tangshan has made some achievements but still faced some problems in its transformation. Therefore, Houston's successful experience of industrial transformation can provide some enlightenment for Tangshan.

### 2.1 Enlightenment in developing the traditional industry

It can be seen from the transformation history of Houston that it didn't give up the traditional resource-based industry, but further developed it by extending the industrial chain. Compared with Houston, Tangshan's traditional industry, especially the steel industry, plays a more important role in its industrial structure. According to the statistics

provided by Tangshan Bureau of Statistics, in 2013, the total industrial value added of the city was RMB 335.5 billion, to which the steel industry contributed RMB 100.4 billion, ranking the first among all the industries. Therefore it is also impossible for Tangshan to give up the traditional resource-based industry.

According to Houston's experience, extending the industrial chain is a good way to revitalize the traditional industry, which set a good example for Tangshan. At present, although the steel output is very high in Tangshan, the products are insufficient in variety and quality. Most of the products are very common, such as hot-rolling narrow strip, rebar and wire rod which have very low value added, while the high-tech products with high value added and broader market prospect such as steel for car and other vehicles, electronic steel and steel for food and drink packages are still very rare. (Liu, 2013) Therefore, in order to increase the competitiveness, Tangshan's steel industry should enroll more talents and introduce more advanced equipment to increase the production of the high-tech and high quality steel, thus elevating the value of the products.

Besides steel industry, Tangshan has other traditional industry such as coal and building material industry. The further development of these industries can also follow the similar route.

## 2.2 *Enlightenment in diversification of the economy and development of tertiary industry*

In Houston's process of transformation, the city government made full use of its regional advantages to diversify the economy and made effort to develop the tertiary industry, which made the city's economy more balanced and healthy. These experiences can also provide some enlightenment for Tangshan.

First, in Houston's transformation, the city exploited its rich natural resources to develop its agriculture. Similar to Houston, Tangshan also has very rich natural resources. Facing the Bohai Sea on the south and bordering the Yanshan Mountain on the north, Tangshan is an ideal place for producing different kinds of agricultural products, including aquatic products, crops, vegetable, fruits and nuts. Tangshan should cultivate this advantage to develop some high-quality agriculture product brands thus making up for the deficiency of resource-based industry.

Second, in Houston's process of transformation, the city also made use of the traditional competitive industry to develop new industries. Many old resource-based enterprises in Tangshan have also done the similar thing; for example, Kailuan Coal Industry Group has built up the National Mine Park based on the first mechanized coal mine and Qixin Cement Co., Ltd. has also built up the Qixin 1889 Cultural and Creative Industrial Park based on the old cement enterprise. These attempts not only brought new vitality to the old enterprises, but also

promoted the development of tertiary industry. The city government of Tangshan should make more policies to encourage the development of these new industries. On the other hand, compared with Houston, Tangshan still needs to put more effort to the development of tertiary industry. For example, Houston has built up many museums, theaters and parks to promote the development of tourism. Tangshan also has rich cultural resources such as Pingju Opera and Shadow Puppet, but the theaters or performances of these art forms are still very rare. The city should further cultivate these resources to attract more visitors and contribute to the development of tourism. Besides, Tangshan can also learn from Houston's experience in the development of business and financial industry.

## 3 CONCLUSIONS

Houston's successful experience of industrial transformation provided great enlightenment for Tangshan in the development of the traditional industry, the diversification of the city's economy and the development of the tertiary industry. These experiences can not only help Tangshan to promote its industrial transformation, but also be applied to the transformation of the other resource-based cities in China.

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