THE NEW LAYOUT OF INDUSTRIAL TERRITORY IN FISSION AND MIGRATION.

STUDIES ON THE A+X LAYOUT MODE OF THE BUILDING CERAMICS INDUSTRY IN CHINA

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ABSTRACT

Although the development of building ceramics in China has a history of 30 years since the 1980s, its achievements in development speed and scale have attracted worldwide attention. However, as many other developing countries, over-speedy development has brought about a series of problems, such as the great demand for resources, serious environmental pollution, and short supply of energy in certain areas. Meanwhile, some undeveloped areas in China are eager for economic development, and by making use of the local advantages in resources and manpower, building ceramics is an investment project that can be readily accomplished. Therefore, the layout of the building ceramics industry in China has been changed in recent years. This paper proposes a creative A+X layout mode of the building ceramics industry in China based on many years of studies and analysis on the development rules of the building ceramics industry in China and Europe and the geologic characteristics of China, to provide an overview of the development of building ceramics in China.

1. THE NEW TREND IN THE MIGRATION OF THE BUILDING CERAMICS INDUSTRY IN CHINA

1.1. THE MIGRATION OF FOSHAN BUILDING CERAMICS ENTERPRISES AND THE ABRUPT RISING OF NEW PRODUCTION AREA

In recent years, a lot of large building ceramics enterprises in Foshan have attached importance to the investment of building new factories in other area, causing the migration in the building ceramics industry and an abrupt fission in the structure of the original production areas and the rapid rise of new building ceramics production areas. Nearly one hundred product lines have been put into use in Faku, in Liaoning, in the North East of China in recent years and Faku, in Liaoning, has become one of the important production bases in North China. Three major ceramic production bases in Qingyuan, Heyuan and Zhaoqing of Guangdong have formed a sizable scale in several years and more and more new building ceramics production bases are being planned and prepared.

The migration of Foshan ceramics has attracted a lot of investors from other building ceramics production areas in the west and central areas of China, including Yangquan in Shanxi, Huibei in Anhui, Danling in Sichuan, Beiliu in Guangxi, Zhongwei in Ningxia, Gaoyi in Hebei, Baiyin in Gansu, Baoji in Shaanxi and Gaoan in Jiangxi to offer business and investment invitations to enterprises in Foshan and accept the migration of Foshan ceramic industry with favourable business invitation policies and unique regional advantages.

With the business invitation craze rising one after another and the migration of building ceramics enterprise, some new building ceramics production bases have grown and expanded gradually. Abrupt and turbulent changes and adjustments have appeared in the territory of the building ceramics industry in China during the transition from the old production base to new production base.

1.2. THE CHARACTERISTICS AND INFLUENCE OF THE BUILDING CERAMICS INDUSTRY IN CHINA ON MIGRATION

The characteristics of the building ceramics industry in China: 1) As continuous production is required for the production lines, the requirements on the auxiliary project of the building ceramics enterprise are very high; 2) As it is a kind of industry with large input and output, it has rather high requirements on the dependence on resources and the convenience of transportation; 3) As powder making, dry pressing, drying and firing are included in the production procedures, it will cause a certain pollution of the environment; 4) As the building ceramics market has two levels and is diversified, different brands and products have different market orientations; 5) As most of the building ceramics enterprises are private enterprises, personal tendentiousness in decision-making is serious.

According to the above-mentioned characteristics, the influences of different production areas, different enterprises, different investors and different historical phases on the migration of the building ceramics industry are different. However, generally speaking, the building ceramics industry is moving towards greater resources (including greater raw materials and energy) and greater markets.

2. RULES OF THE INDUSTRIAL LAYOUT AND A+X PRINCIPLES

2.1. GENERAL RULES OF THE INDUSTRIAL LAYOUT

The reasonableness of the industrial layout has an important influence on the whole economy and the development of society. However, a reasonable layout shall comply with the general rules of the industrial layout.

Influence of economic development level on industrial layout. The economic development level is the original foundation for the expansion in quantity and leap in quality in an industrial layout. The conditions, content, form and characteristics of industrial layout depend on the level of economic development. This is an effective general rule regardless of social formation.

Influence of the regional division of labour on the industrial layout. The training and development of the regional division of labour has driven the revolution of the industrial layout from an elementary towards a high-level. A reasonable regional division of labour can give full play to the greater resources of different regions, promote industrial circulation, form a reasonable industrial layout and achieve the best economic benefits.

The change rule of dispersed – centralized – properly-dispersed. Centralized and dispersed are two alternative stages during the revolution of industrial layout. In the early stage of industrial development with an undeveloped social division of labour, the industrial layout is obviously dispersed. With the constant development of industry, the industrial layout begins to transit from dispersed to centralized, and is distributed in large and middle cities and coastal areas with sufficient supply of raw materials and energy and developed transportation and markets. However, with the over centralization of industrialization and urbanization, the unreasonable gathering and non-economy, a series of disadvantages have occurred, such as traffic jams, deterioration of environment, short supply of land, energy and raw materials in urban areas, causing the industry to transit from centralized to properly dispersed.

Difference in regional dispersion. Due to the limitation of many factors, the industrial distribution is unbalanced. For example, in the eastern part of China, facing the greatest consumer markets in China, production focuses on high-class products, while vice versa, in Jiajiang in Sichuan, facing the vast western and central part of China, production focuses on middle and low-class products.

2.2. PROPOSAL OF THE A+X INDUSTRIAL LAYOUT MODE

In contrast to other countries with only one rather centralized building ceramics production area, such as Italy and Spain, China is a large developing country with a diversified market structure due to its vast area and serious differences in regional development. One or several building ceramics production areas cannot meet market demands. With the constant rising and adjustment of different regional economies, and the focus of different regional governments on the development of building ceramics industries, the migration and layout of the building ceramics industry in China in the future will have many uncertain factors.

From the viewpoint of the developing industrial clusters, the trend to centralization of building ceramics enterprises may upgrade the general competitive power of certain regions. However, for the long-term development of the industrial layout, we must remain vigilant of high centralization. To grasp the development structure of the building ceramics industry of China in the future, based on a thorough understanding and analysis of the existing structure of the building ceramics industry, and the combination of the development experience and industrial characteristics of developed production areas in foreign countries, we specially proposed the A+X industrial layout mode for the building ceramics industry of China, that is, the layout mode of "industrial cluster + production area".

2.3. DEFINITION OF THE A+X INDUSTRIAL LAYOUT MODE

Before explaining the meaning of A+X industrial layout mode, it is necessary to distinguish the difference between production area and industrial cluster. Production area means the centralization of many similar production enterprises in one region, such as specialized production towns, industrial parks, etc. An industrial cluster includes enterprises in various economic development zones, high-tech parks and related enterprises, institutes of scientific research, associations, media and other organizations and institutions which provide services for enterprises in the production area involved. The characteristics of the industrial cluster is the competitive conveyance and cooperation based on the division of labour, completed industrial chain and industrial network as well as highly centralized space of enterprise and certain industrial scale. If there are only many building ceramics product manufacturers in a production area, without any related conveyance and innovative capacity, it cannot be deemed an industrial cluster. The production area may be relatively dispersed, such as the East China production area, Gaoan production area, while the forming of an industrial cluster should be rather centralized.

Therefore, we have the reality and theory basis for the proposal of the A+X industrial layout mode. "A" means industrial cluster and "X" means production area. Simply speaking, it is to attach importance to develop and construct several industrial clusters based on the existing production areas in China by focusing on several industrial clusters and radiating from multiple production areas, to allow those industrial clusters to spur on large and small production areas around, just like hatching eggs by hens, to link all production areas and industrial clusters in the whole country together and form an industrial layout with a combination of focal points and comprehensiveness, echelon distribution, even density and harmonic development. Such an industrial layout mode complies with either the "centre – periphery theory" proposed by Raul Prebisch, an Argentine economist (note 1), or the dispersed – centralized – properly-dispersed change rule of industrial layout.

The industrial layout of the building ceramics industry in China in the future requires not only several industrial clusters located in the "central" area but also a number of "periphery" production areas.

The essence of the "A+X" industrial layout mode includes two aspects: 1) the forming and layout of national industrial clusters and production areas; 2) the orientation and planning of industrial clusters and production areas.

3. ANALYSIS AND APPLICATION OF THE "A+X" MODE

3.1. COMPARISON OF ELEMENTS OF PRODUCTION AREAS AND INDUSTRIAL CLUSTERS

A successful industrial cluster includes many elements. The weight of each element is different. For example, the influence of traditional culture and natural resources on the forming of the industrial building ceramics cluster is relatively large. Moreover, some elements may be formed within a short period of time through technical and capital methods, such as specialized production, localized networks, financing channels and innovation capacity. Other elements need time, such as research development education, personnel resources, traditional culture and investment conditions. The comparison of elements of production areas and industrial clusters in China in table 1 shows that the most likely areas for the forming, developing and expansion of industrial building ceramics cluster are Foshan, Zibo, Jingdezhen and Jiajiang.

In fact, up to now, the well-developed industrial cluster of the building ceramics industry in China is only in Foshan. Zibo, Jingdezhen and Jiajiang have only developed an elementary form of industrial cluster, and Qingyuan, Zhaoqing, Yangquan and Faku are only production areas, rather than industrial clusters. In contrast, Jingdezhen with its advantages in research development education, traditional culture and natural resources may become the next industrial cluster of the building ceramics industry in China.

Element\Area	Foshan	Zibo	Junjiang	Jiajiang	East China	Faku	Gaoan	Jingdezhen	Baoji
Specialized industry									
Localized network									
Research development education									
Personnel resources									
Financing channels									
Innovation capacity									
Traditional culture									
Natural resources									
Investment conditions									

Table 1 Comparison of elements of production areas and industrial clusters in China

3.2. THE CONCEPTION OF THE "A+X" MODE OF BUILDING CERAMICS PRODUCTION AREAS IN CHINA

The following conception of the industrial layout of the building ceramics industry in China may be considered:

Industrial Cluster (A): further emphasize the core status of Foshan cluster, gradually develop Zibo and Jiajiang production areas towards industrial clusters, develop and direct Jingdezhen, Faku and Jinjiang to form new industrial clusters.

Production area (X): building ceramics production area outside an industrial cluster, such as Qingyuan, Heyuan and Zhaoqing in the southern part of China, Gaoan and Fengcheng in the central part of China and Huibei, Yangquan and Gaoyi in the northern part of China.

The purpose is to form a new structure consisting of one industrial cluster and many periphery production areas, that is, the "A+X" layout mode, in order to clarify the forming and layout of the industrial clusters and production areas of the building ceramics industry in China in the future, and to provide a certain experience and direction for the migration and expansion of building ceramics enterprises (as shown in diagram 1).

Diagram 1. The conception of the layout of building ceramics production areas in China in the future

3.3. ANALYSIS OF THE LAYOUT OF THE "A+X" MODE OF BUILDING CERAMICS PRODUCTION AREAS IN CHINA

China is a large country with a vast area, relatively unbalanced economic development, diversified markets with different consumer demands and regional cultural habits. Moreover, building ceramics industry is a large traditional logistic industry, with a high dependence on natural resources and regional markets. Therefore, taking measures suited to local conditions and putting in place an overall arrangement for development with an emphasis on several industrial clusters are necessary and reasonable strategy approaches.

From the viewpoint of the geographic structure of future economic development, the south-eastern coastal areas will still be the most prosperous areas in the economy in China and their consumer demands, consumer capacity and consumer level will be further increased in the future. With the smoothing of international trade barriers, international market will still be the major channel for rapid development of the building ceramics industry. Therefore, in the major production areas in Guangdong and Fujian, the industrial clusters will be further developed and strengthened.

The central and western parts of China are the new growing point of the economy in the future. With the increased economic level of those areas, market demands will greatly increase. At present, only Jiajiang in Sichuan has certain advantages over cluster forming in the central and western part of China. New building ceramics production areas in Yangquan in Shanxi, Baoji in Shaanxi and Miquan in Xinjiang have been planned in recent years. For the planning of long-term development, the strategy of multiple production bases around one industrial cluster will be more suitable for the development prospect of the building ceramics industry in the central and western part of China.

Although the Zibo industrial building ceramics cluster has formed in the northern market, with the vigorous development of an old industrial base and the increase in foreign trade in the north-eastern part of China, their market potential will be further promoted. Therefore, the new production bases in Jianping and Faku in Liaoning and Gaoyi in Hebei based on periphery industrial clusters will have the same favourable development prospects and have the possibility of forming other industrial clusters in the near future.

It is an inevitable trend and tendency of the building ceramics industry in China to carry out the "A+X" Mode based on taking suitable measures suited to local conditions, dispersed layout, echelon development, and harmonic coexistence.

3.4. ORIENTATION AND PLANNING OF BUILDING CERAMICS PRODUCTION AREA IN CHINA

Regardless of the building ceramics production areas or industrial clusters, because of the difference in forming elements and the diversified demands of market, the orientation and planning in the future are different. At present, in Foshan, the largest building production area in China, a manufacturers headquarters base located at Chancheng District of Foshan, focusing on the service industry and supported by industrial clusters consisting of environmental-friendly, famous brand, building ceramics manufacturers distributed in Nanhai, Sanshui and Gaoming, is under

construction, to bring forward the joint development of "Grand Foshan Ceramics" with periphery production areas in Qingyuan, Zhaoqing and Hequan, as shown in diagram 2, to take the layout mode consisting of one cluster and multiple production areas as the largest production area in the building ceramics industry in China.

As for the new building ceramics production areas that are being planned, the planning, layout and orientation are also very important. For example, Jingdezhen in the central part of China, close to the eastern part of China, has rich natural resources and personnel resources and faces the vast central and eastern market. Therefore, it is important to take into consideration the existing industrial building ceramics areas in the periphery areas in planning, in order to construct an industrial layout based on Jingdezhen and surrounded by the Gaoan, Fengcheng and Pingxiang production areas, radiating from Jingdezhen to East China and the Huibei building ceramics production areas. It is required to abandon the idea of constructing large industrial building ceramics park and specialized building ceramics town in the planning of an industrial layout, taking advantage of the successful experience of other countries, carry out scientific planning and multiple layouts, paying attention to the development and construction of an industrial cluster based on Jingdezhen, making full use of the influence of the cluster and gradually upgrading the competitive power of the whole production area in domestic and foreign markets. As for market orientation, Jingdezhen shall focus on middle- and high-class products, to either fill the vacancy in the East China production area left after the migration of the ceramic enterprises or avoid any conflict with those middle and low-end production areas such as Gaoan, to jointly share the largest cake in the central market and eastern market.

Diagram 2. Industrial building ceramics cluster in the Foshan area

4. THE APPLICATION TACTICS OF THE "A+X" INDUSTRIAL LAYOUT MODE OF THE BUILDING CERAMICS INDUSTRY IN CHINA

4.1. PROPERLY-SPACED AND ENVIRONMENTAL FRIENDLY

As for the density of one industrial cluster, a scientific and reasonable industrial planning is required to promote the harmonic and healthy development of the industrial cluster.

During the early and spontaneous forming of the building ceramics production areas, owing to the lack of scientific and reasonable planning, some specialized town

and specialized villages were formed, such as Shiwan, Nanzhuang, Xiaotang and Baini in the Foshan production area, Yangzhai and Zhangdian in the Zibo production area, and Guanqiao and Cizhao in the Fujian production area. However, because of the characteristics of the building ceramics industry, the sluggishness of enterprise in regard to environmental protection, and the constant increase in the number of enterprises, the pollution of the environment in the production areas mentioned has exceeded the unit bearing capacity and self-cleaning capacity of the air, and has become a serious problem restricting the development of the local economy.

Among those new industrial building ceramics parks and new production areas planned during the recent years, the problems of the over centralization of enterprises are still very serious, such as in Zhaoqing, Faku and Qingyuan. Some local governments and enterprises have concentrated on centralization and development without fully considering the importance of production area planning. The mistake in strategic planning will increase the operating risk for business in the future. With the increase in the conveyance capacity of the building ceramics industry and the perfection of the technology level of the enterprises, we need be clear headed in regard to the construction of specialized building ceramics production towns and large industrial parks, and adopt the tactics of properly-spaced and moderately-centralized layout, in order to build a harmonic and ecological industrial development layout.

4.2. CHARACTERISTIC DEVELOPMENT AND MUTUAL COMPLEMENTATION

With the rise of new production areas and the expansion and migration of large enterprises, a series of tremendous changes have taken place in the five major traditional production areas. During the fission caused by migration elements, both old and new production areas shall clearly make use of regional advantages, adopt staggered orientation and mutually-complemented strategy in order to guide and direct the development trend of industrial clusters and production areas.

The Foshan cluster shall make full use of the most favourable factors in comprehensive conveyance, to further strengthen its leading position in China's industrial building ceramics clusters, that is, to maximize favourable factors and minimize unfavourable factors, gradually concentrating on the high-end consumer market, technical equipment, glaze technology, product innovation and development, international trade agency, logistics and other favourable factors, in order to occupy the high end of the domestic industrial value link and abandon or minimize those unfavourable factors such as low-end products and raw materials. Meanwhile, Foshan shall make maximum use of the cluster effect and link up the new production areas including Qingyuan, Heyuan and Zhaoqing in periphery areas, in order to achieve a good development formation consisting of one cluster and several production areas.

Other building ceramics production areas except Foshan are still unqualified for the development conditions for comprehensive conveyance. Although Zibo, Linxi and Jinjiang have a certain industrial comprehensive conveyance capacity, from the development formation and tendency of the building ceramics industry, it is not very feasible to develop and construct an industrial building ceramics cluster in a place without a comprehensive conveyance capacity. The most feasible method is to make use of the favourable factors of other industrial building ceramics clusters and concentrate on strategic and resources advantages such as the middle and low end consumer markets and raw materials. The central and western parts of China and the

new industrial building ceramics clusters will give play to the regional superiority, optimize the industrial structure, reduce production costs and expand regional markets and regard the policy mentioned as its key strategy.

To conclude, industrial clusters shall gradually form a favourable industrial cluster competition structure with characteristic and mutually-complemented and stable development and make the "economic mosaic" pattern more colourful.

4.3. MULTIPLE COORDINATION AND INNOVATION PROMOTION

The most favourable factor of industrial cluster is that it is beneficial to the innovation of enterprise within the cluster region, including innovation in concept, management, technology, system and environment. It will form a good innovation atmosphere for enterprise, becoming a hotbed of study and innovation, being beneficial to the transfer and spreading of idea, technology and information, minimizing the business operating costs of an enterprise.

The relatively mature industrial distribution and industrial clusters in Sassuolo and Castellón have provided experiences and demonstration for the building ceramics industry. The emphasis of government on industrial layout and industrial cluster development will focus on the strengthening of industrial cooperation within and outside the region, developing positive competition and innovation conditions, to control disordered competition, establish technical innovation protection systems and encouragement systems, enhance industrial guidance, promote industrial upgrading, set up perfect tax and financial policy instead of unrealistic investment and business invitation, and build new factories.

To direct and guide the development of industrial clusters, we shall make full use of the effect of industrial cluster to spur on and enhance cooperation between enterprises in the periphery regions, promote innovation and upgrade the competition capacity of the whole production instead of simply gathering a large quantity of enterprises.

5. POSTSCRIPT

Now abrupt changes have taken place in the building ceramics industry in China. The decision-making in the layout, orientation and production area planning of the building ceramics industry will deeply affect the important and major strategic task in the long-term healthy development of the building ceramics industry in China in the future. This paper proposes the A+X mode for the layout of the building ceramics industry in China based on analysis of the current situation of domestic building ceramics industry and the advanced experience of foreign building ceramics industries, and analysis and study of the orientation and planning of industrial clusters and production areas in the building ceramics industry in China. It is worth mentioning that the writer has communicated and discussed the results of this study with professionals of the same trade and local government officers involved in planning and business invitation, who have attached great importance to and highly valued this study. Therefore, although problems have arisen during the high-speed development of the building ceramics industry in China, such as environmental protection, safety and over-competition, if we have an overall, considerate and reasonable layout, accurate

and continuous orientation and planning, gradual forming of favourable competition and cooperation relationships between production areas and enterprises, we will definitely promote the sustained, speedy and healthy development of the building ceramics industry in China. In the face of a domestic and foreign building ceramics market with great growth potential, we have reason to believe that the prospect of the building ceramics industry in China will be more beautiful.

Note 1: In 1950 Raul Prebisch, an Argentine economist proposed the "centre – periphery theory". Raul Prebisch classified the national economic system into two parts: industrial production centre consisting of developed areas and preliminary product periphery consisting of undeveloped areas. The development of the periphery area shall be around the aim of the central area, and the developed area shall be the centre and control the developing of the periphery area, which is the famous "centre – periphery theory".