Based on Strategic Emerging Economy Study on Eco-environment Model and Countermeasures of Petrochemical Industry Cluster in Jiangxi Province

Huazhi Liu, Lin Wang*

The Department of Business Administration, Nanchang University of GongQing College, GongQing City, 332020, China

*Corresponding author email:19056286@qq.com

Abstract. The development of strategic emerging industries is another major strategic decision for China to cope with the international financial crisis, comply with the trend of world science and technology revolution, and grasp the future development initiative. Through the discussion of the connotation of industrial clusters' ecological, Jiangxi Province put forward the development model of industrial clusters' ecological. Combined with the practice of petrochemical industry clusters, it confirms that this development model can effectively promote the sustainable development of regional economy, and is expected to be a petrochemical industry cluster. Ecological model provides reference.

1. Introduction
Accelerating the development and development of strategic emerging industries is an inevitable requirement for Jiangxi to adjust its industrial structure and change its mode of development. It is a major strategic choice for leading sustainable economic and social development in the future and enhancing the overall competitiveness of the economy. It is also a development and upgrading of Jiangxi. The basic hopes and major paths of the new pace for speeding up the development of the society, the rise of the green world, and the implementation of the “prosperous development” [1].

Strategic emerging industries are technology-intensive, knowledge-intensive, talent-intensive high-tech industries. The idea of ecological of petrochemical industrial clusters stems from the industrial ecology. The core idea lies in the recycling of resources. The construction of eco-economic zones in Jiangxi Province conforms to the national strategy and meets with the world's scientific and technological development and the historic opportunity of industrial adjustment, thereby taking the opportunity to develop strategic new industries. This will transform Jiangxi's development mode, strengthen its economic development potential and seize the commanding heights of future development, bringing about a golden opportunity [2].

2. Definition of industrial cluster
Petrochemical industry clusters have the characteristics of broad market prospects, strong industry-led growth capabilities, and numerous job opportunities. They can transform economic development patterns and lead China's future economic growth. Strategic emerging industries refer to emerging industries that are related to the development of the national economy and society and the optimization
and upgrading of the industrial structure, and are characterized by overall, long-term, orientation, and dynamic characteristics. The competitiveness of the petrochemical industry has been enhanced and it has become a new local economic growth point, which has effectively stimulated the development of the regional economy.

The petrochemical industry agglomeration area has become an important carrier for China's industrial development and has played an important role in accumulating industrial resources, expanding opening to the outside world, and promoting the development of industrial modernization. Clustering and large-scale development are important trends in the development of modern industries. The cultivation and development of strategic emerging industries require a large amount of capital investment and talent team support, which determines that in the early stage of industrial development, China will build a group of petrochemical industries with complete industrial chain, strong innovation capacity and distinct characteristics.

3. Characteristics of the petrochemical industry cluster ecological model

The petrochemical industry is a capital-intensive and technology-intensive heavy chemical industry with no high accumulation of related industries, finance, science and technology, education, and training, and unhealthy development. There is no oil extraction and transportation, and the downstream petrochemical industry absorbs and absorbs various petrochemical products. With deep processing, it is impossible to form an intensive large-scale petrochemical industry. Therefore, the development of petrochemical industrial clusters in Jiangxi Province is not only created by time and place, but also based on the theory of industrial development [3].

The development model of industrial clusters is not stereotyped, considering the characteristics of the petrochemical industry in Jiangxi Province. In addition to Jiangxi Province's strong policy support, the development model should adopt the axis-wheeled, multi-core cluster strategy. Axle wheeled and multi-core clusters are mainly based on large enterprises and are applicable to capital-intensive, technology-intensive industries and some labor-intensive industries. The formation of shaft-wheeled and multi-nuclear enterprise clusters requires adequate market supply, large-scale concentration of capital within the region, and free flow of labor and industrial technology. It is suitable for the policy and market environment for the growth of large enterprises. It is necessary to strengthen the protection of resources based on scientific and technological innovation, institutional innovation as the driving force [4].

4. The advantages of the ecological model of petrochemical industry clusters in Jiangxi Province

4.1. Jiangxi Province has abundant natural resources

Jiangxi Province has considerable natural resources such as oil and natural gas. The proven oil reserves in the Poyang Lake Basin amount to 127 million tons. The natural gas reserves amount to 217 million cubic meters [5]; there are large areas of wasteland that can be used, the project construction does not occupy farmland and cultivated land, and provides sufficient land resources for the development of the petrochemical industry base.

4.2. Jiangxi Province has strong technology and talents

There are 32 colleges and universities in Jiangxi Province. The total number of postdoctoral stations in the province reached 117, including 26 post-doctoral research stations and 91 postdoctoral research stations. Postdoctoral innovation practice base 31 [6]. In 2016, the comprehensive level of scientific and technological progress in Jiangxi ranks third in the country, and the conversion rate of scientific and technological achievements is about 80%. There are a large number of scientific and technological talents and well-trained industrial workers, among which 500,000 are various types of professional and technical personnel, and the petrochemical and chemical industries are employed. There are 220,000 people. For the development of the petrochemical industry reserves a strong technical and human resources.
4.3. *The Poyang Lake basin has a solid foundation for the petrochemical industry*

Sinopec, Petro China, and Sinopec's three major petrochemical groups have all focused their attention on Jiangxi Province. Consider Jiangxi Province as one of the key areas for development in the future. Planning and construction of projects such as large oil refining, ethylene, liquefied natural gas and new chemical materials. The Poyang Lake Basin has become the largest and most promising petrochemical base in the country. The construction of these projects not only enables the petrochemical industry in Jiangxi Province to form a good pattern of refining and chemical integration, but also further optimizes and extends petrochemicals represented by chlor-alkali and soda ash and organic chemicals represented by phthalic anhydride and maleic anhydride. Fine chemicals based on dyes, coatings, and pesticides, and industrial chains based on carbon black, tires, and rubber products. In the national oil refining and ethylene development plan, the country has identified Jiangxi Province as a state-level petrochemical industrial base represented by 10 million tons of refined oil and millions of tons of ethylene. The National Energy Administration listed Jiangxi Province as a strategic reserve of crude oil. Backup base. Planning and construction of 500,000 tons of crude oil strategic reserve pool and 8 million tons of refined oil strategic reserve pool [7].

![Graph showing petrochemical industrial cluster ecology and ten strategic emerging industries in Jiangxi Province](image)

**Figure 1.** Comparison of the petrochemical industrial cluster ecology and ten strategic emerging industries in Jiangxi Province

4.4. *Jiangxi Province has superior location and market conditions*

Jiangxi Province is closer to the coastline and faces the Southeast Asia and Taiwan across the sea. Due to the convenient traffic in Jiangxi Province and the vast market in the hinterland, the economy has the advantages of linking the inside and outside, the east to the west, and the north and south. This has great potential for development. From the Pearl River Delta, Jiangxi Province, two large-scale urban belts, chemical industry such as light industry, automobile, household appliances, medicine and textiles are developed. The huge market capacity is the development of the petrochemical industry in Jiangxi Province.
Table 1. Completion of Key Indicators of Ten Major Strategic Emerging Industries in Jiangxi Province in 2017

| Municipality    | Value-added of petrochemical industry Real year (100 million yuan) | By addition year-on-year growth(%) | Value-added by main business Real year (100 million yuan) | Ranking according to main income | Income of main business Real year (100 million yuan) | year-on-year growth(%) | Sort by total profit |
|-----------------|---------------------------------------------------------------|----------------------------------|--------------------------------------------------------|---------------------------------|---------------------------------------------------|-----------------------|---------------------|
| Nanchang City   | 389.20                                                        | 13.81                            | 1673.20                                                | 2                               | 89.09                                             | 19.5                  | 3                   |
| Yichun City     | 253.47                                                        | 12.29                            | 1017.05                                                | 6                               | 90.7                                              | 18.0                  | 2                   |
| Shangrao City   | 237.53                                                        | 12.35                            | 1131.15                                                | 3                               | 103.34                                            | 111.0                 | 1                   |
| Yingtan City    | 231.56                                                        | 10.70                            | 2481.83                                                | 1                               | 65.51                                             | -17.9                 | 4                   |
| Jiuyiang City   | 229.15                                                        | 17.88                            | 1081.98                                                | 4                               | 61.87                                             | 121.6                 | 6                   |
| Ganzhou City    | 201.65                                                        | 14.89                            | 880.78                                                 | 7                               | 52.77                                             | 96.1                  | 7                   |
| Xinyu City      | 186.86                                                        | 4.00                             | 1065.98                                                | 5                               | 31.54                                             | 245.6                 | 8                   |
| Ji'an City      | 177.82                                                        | 10.40                            | 838.33                                                 | 8                               | 63.6                                              | 15.0                  | 5                   |
| Jingdezhen City | 87.38                                                         | 12.73                            | 431.38                                                 | 9                               | 22.74                                             | 21.5                  | 9                   |
| Fuzhou City     | 60.12                                                         | 12.71                            | 344.85                                                 | 10                              | 19.69                                             | 38.1                  | 11                  |
| Pingxiang City  | 47.41                                                         | 2.24                             | 319.6                                                  | 11                              | 22.39                                             | 18.9                  | 10                  |

5. Environment of the Eco-environmental Model of Petrochemical Industrial Clusters in Jiangxi Province

5.1. To create a development environment for industrial clusters
Focusing on the core industries of industrial clusters, improve the innovation environment of industrial clusters, especially the supporting service system. (1) According to the development of regional economic integration, combine the local economic conditions in the area where the industrial cluster is located. Break down the bar, regional division, overall layout of functions, build a variety of network platforms. It is necessary to build and share public facilities as much as possible, and truly allocate all kinds of essential resources according to market rules. (2) Take measures to reduce the threshold of entrepreneurship for small and medium-sized petrochemical enterprises and simplify the creation of procedures. Improve service efficiency. For example, the registration of high-tech companies in the United States does not require minimum registered capital and does not require venues and full-time personnel. (3) Establish and improve various consulting and intermediary service agencies (such as market survey agencies, scientific and technological achievements trading centers, etc.), and business service centers, etc., and reduce the transaction costs of enterprises as much as possible through various intermediary services and policy services within the region. Continuously enhance the overall competitiveness of the enterprise group. (4) Strengthen the construction of soft environment, provide quality services for the growth of business groups in various aspects such as enterprise innovation and credit construction.
5.2. Accelerate market liberalization and mergers to create economies of scale
Joining the global production system is a shortcut for companies to gain competitive advantage. Because the global value chain can provide product innovation, process innovation and functional innovation for enterprises and industrial clusters. Promoting the move of industrial clusters to new, more profitable value chains can enhance the competitiveness of regional industries as a whole. Large-scale mergers and acquisitions are the main methods for foreign petrochemical companies to reduce costs. Mergers and alliances between large companies can significantly reduce costs, improve economic efficiency, expand scale, and increase competitiveness in a short period of time. The Poyang Lake Basin in Jiangxi Province should increase mergers and acquisitions within the petrochemical industry. To expand the scale of business production.

5.3. Promote technological innovations Strengthen core business advantages
The petrochemical industry in Jiangxi Province should vigorously promote technological innovation in order to achieve the purpose of industrial upgrading. We must rely on technological innovation to promote economic growth. On the one hand, it is necessary to strengthen cooperation with universities and research institutes and organic integration of production, learning, and research. On the other hand, we must take advantage of late-development and focus on the digestion and absorption of advanced foreign technologies. In the process of technological innovation, we must pay attention to the economies of scale of product development. Pay attention to the competitiveness of products and the advanced nature of technology, we must form a group of high-tech enterprises. Drive economic growth. The streamlining of non-core businesses with no competitiveness or poor profitability is an effective practice adopted by foreign petrochemical companies in the 1990s to reduce costs, obtain replacement funds, and improve asset quality and profitability. The petrochemical industry in Jiangxi Province should also learn this experience. Carefully analyze and sort out the business scope. Concentrate strength to break through core business advantages.

6. Experience in Petrochemical Industry Development in Poyanghu Basin, Jiangxi Province

6.1. Do a good job in the development planning of the park to ensure the orderly development of the industry
Jiangxi Province can make the Poyang Lake Basin into a world-class stone chemical industry park. An important prerequisite is that they have a clear industrial orientation and strategic positioning. They have a reasonable overall development plan, and they can implement the “long-term planning and step-by-step implementation”. Principles, unremittingly promote the construction of chemical parks and industrial development. With reference to the practice of the Poyang Lake Basin, when developing the heavy chemical industry parks, various localities should carefully plan and plan the development of the park, analyze the opportunities, challenges, and regional positioning of the industry in detail and compare their advantages and disadvantages with each other. A high starting point, high standard planning, a clear orientation of the park's functions and direction of industrial development, avoiding the blindness and randomness of development and construction, and ensuring the orderly development of the industry. Park planning should be scientific, normative, and in line with the inherent requirements of industrial development. Maintain the authority and seriousness of the plan and firmly implement the plan.

6.2. Improve Infrastructure Construction and Optimize Investment and Entrepreneurial Environment
Doing a good job of the construction of hardware and software in the heavy chemical industry park is an important prerequisite for attracting investors. Jiangxi Province adopted the “infrastructure first” strategy. From the very beginning, it put infrastructure construction as the key point for the development of the chemical park, invested a lot of funds to improve the infrastructure construction, and played an important role in promoting the rapid development of the chemical industry park. All localities must vigorously promote infrastructure construction in accordance with their own conditions and industrial
development requirements. It adopts a rolling development model of “building, investment, development, and production” to reduce input costs and investment risks. Integrate and optimize park resources, build shared public projects, and implement integrated services. We will expand the content and scope of business services, speed up the construction of information consulting services, establish a multi-level information platform, establish much-needed labor training institutions, and strive to optimize the investment and entrepreneurial environment.

6.3. Intensify investment promotion and promote the development of industrial agglomeration
Jiangxi Province can seize the opportunity to vigorously introduce investment from multinational corporations, and use the advanced production technology and management experience brought by foreign capital to drive other enterprises in related industries to follow up, thus forming industrial agglomeration and economies of scale. Therefore, all localities should also formulate a clustering strategy for attracting investment, adopting the investment mode of the industrial chain when attracting investment, relying on their industries, and introducing a combination of upper and lower or horizontal affiliate companies in accordance with the requirements of the link relationship of the value chain. Competitive advantage, nurturing local leading industry strategy. Give full play to the leading effect of leading enterprises, gradually induce or attract more relevant SMEs to gather in the park, enrich the industrial chain of the park, continuously improve the level of division of labor within the industry and between industries, and expand the industrial scale of the park, and strive to form large enterprises. Enterprises are leading industrial clusters, rational division of labor among large and medium-sized enterprises, close contact, and integration of upstream and downstream industries.

6.4. Adhere to the Priority Principle of Environmental Protection and Solve the Challenge of Developing Environmental Protection
The petrochemical industry is not only the pillar industry for the development of the national economy, but also a resource-intensive industry with high energy consumption and high pollution. Jiangxi Province created a petrochemical park in Poyang Lake to give full play to the industrial clustering effect and solved the contradiction between petrochemical industry development and environmental protection. The development of the petrochemical industry in Jiangxi Province for decades has been self-evident, but the negative impact on the environment is not obvious. This can be reflected in the test data and people's feelings. According to relevant information, the air quality in Jiangxi Province has always been good. The achievements of environmental protection in the Poyang Lake Basin have benefited from advances in science and technology and self-discipline among enterprises. They also attributed to strict policies, strict management, and strict implementation. If the high-risk petrochemical park lacks the latter, even the best companies will be assimilated due to their natural profit-seeking behavior. It will certainly be a disaster for safety and the environment. Therefore, in the development of heavy chemical industry, we must adhere to the principle of “priority in environmental protection” and learn from the experiences of “chemical zones” and “chemical groups” in the Poyang Lake Basin in Jiangxi Province, vigorously develop circular economy, and strive to build ecological parks. The road to sustainable development.

7. Conclusion
The intensification of industrialization, informatization, urbanization and agricultural modernization will provide market space for the expansion of domestic demand and the development of the real economy. The innovation of institutional mechanisms will further stimulate the market's vitality, and it will be beneficial to the promotion of the development of the industrial economy, and also to strategically emerging industries. The development of the industry provides a more favorable environment, making the industrial development continue to move toward innovation-driven, market-led, and quality-improved. On the basis of this strategic emerging economy, the ecological model of petrochemical industrial clusters in Jiangxi Province has won long-term development. Under the influence of policies, it has adopted the strategy of strengthening petrochemical industrial provinces,
accelerating the development of new-type industrialization, and assisting provincial leaders in joint efforts. Enterprises and a series of policies and measures for industrial development will promote the sustained and steady growth of strategic emerging industries in Jiangxi Province and promote the rapid and orderly development of the petrochemical industry.

Acknowledgments
This article is funded by the Science and technology research project of Jiangxi Provincial Education Department (Project number: 161537) and 2016 annual project of Humanities and Social Sciences in Jiangxi Universities (Project number: JJ162030).

References
[1] Cheng Juan, Zhang Kerang, et al. Ecologicalization of Industrial Clusters and Its Development Countermeasures. Economic and Social Development, Vol. 4 (2006) No. 1, p. 102 - 105.
[2] Chen Yonghong, He Peng, et al. Research on ecologicalization of industrial clusters based on the perspective of industrial ecology. Economic Forum, Vol. 14 (2006), p. 12 - 13.
[3] Zhu Yulin, He Bini, Li Jia, et al. Research on the path and pattern of industrial clusters in China. Economic Issues, Vol. 4 (2007), p. 48 - 50.
[4] Yuan Zengwei, et al. Research and Application of Ecological Model of Traditional Industry. China Population, Resources and Environment, Vol. 14 (2004) No. 2, p. 108 - 111.
[5] Yi Chengdong, Luo Zhijun, et al. A preliminary study of China's eco-industrial park. China Population, Resources and Environment, Vol. 12 (2005) No. 3, p. 113 - 116
[6] Ma Chuandong, et al. Industrial Ecological Economics and Circular Economy. Beijing: China Social Sciences Press, Vol. 16 (2007), p. 32 - 35.
[7] He Dong, Deng Ling, et al. Regional eco-industrial system theoretical framework and its implementation path. Social Sciences Research, Vol. 15 (2007), p. 15.