

A Study on the Motive Mechanism of the Urban Integration of Wuhan and Ezhou under the Background of Aviation Metropolitan Area Construction

Jiawei Zheng, Yueheng Huang, and Sicheng Liang

Abstract—In the central city working conference, it was proposed to speed up the construction of the central city group centered on Wuhan. The urban integration of Wuhan and Ezhou as a pilot area of Wuhan city circle has attracted much attention. In addition, Shunfeng Airport has recently been located in Ezhou, the goal is to make Ezhou into an international freight transit. This paper expounds the driving factors of the urban integration of Wuhan and Ezhou and the transformation direction of the same city in the three aspects of economy, society, policy and so on. It is considered that the three driving forces of economy, society and policy take the same role in the process of urbanization. Diffusion, one-way demand "into" two-wheel drive, mutual attraction, further accelerate the process of urbanization.

Index Terms—Urban integration, motive mechanism, aviation metropolitan area.

I. INTRODUCTION

Urban integration is a new form derived from the process of regional integration [1]. It is not only a stage process of regional integration, but also a high-level embodiment of regional integration. The urban integration of Wuhan and Ezhou is not only the product of the development of Wuhan metropolitan area, but also a typical sample of the development of Wuhan metropolitan area. On the track of urban development, shipping, canals and waterways, railways and highways have played an important role respectively [2]. In twenty-first Century, the burden will be borne by air freight. The emergence of Ezhou Airport has brought about a new turning point in the urban integration of Wuhan and Ezhou. Once the aviation metropolitan area is built, Ezhou will appear in the process of the urban integration of Wuhan and Ezhou with a new attitude [3].

II. CONCEPT AND CONNOTATION

A. Aeronautical Metropolitan Area

The emergence of new traffic nodes will bring new possibilities, it even determines the new mode of urban development. The airport has long been more than just a

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combination of air operations as a comprehensive transport hub today, airport construction in the process of urban development, become more diversified. Due to the characteristics of the airport, with its core, with the relative concentration of factors such as population, capital, information and technology, the "City Airport" has gradually changed to "airport city". In the end, we create a "new aviation city" which integrates logistics, manufacturing, production services, and even tourism, leisure, housing, education, medical treatment and so on.

B. Urban Integration

The concept of "urban integration" was first put forward in Shenzhen 2030 Urban Development Strategy in 2005. In fact, China's administrative division is too rigid, resulting in many economic activities and other restricted market segmentation resulting from the administrative area. In order to break through this division, most of the regions have chosen the mode of "withdrawing counties from districts". However, there seems to be no good way to solve the problem of market segmentation between cities and prefectures. Therefore, the concept of urban integration is born [4].

Generally speaking, the development of urban integration is an advanced stage of development of metropolitan areas, but also in the process of regional economic integration is an inevitable process. To sum up the current phenomenon of urban integration, it can be considered that urban integration is a new regional development strategy which is closely related to cities and industries and closely related to economic development. The main purpose of the strategy of urban integration is to break the restrictions of administrative divisions and local protectionism, so as to achieve the goal of resource sharing and co-ordination to enhance the overall economic competitiveness of the region [5].

III. ANALYSIS OF THE DRIVING FACTORS OF THE URBAN INTEGRATION OF WUHAN AND EZHOU

The driving factors of the urban integration described in this chapter are mainly the driving factors at this stage, from the economic, social and policy aspects to consider. Considering the huge economic disparity between Wuhan and Ezhou, the main driving force of the urban integration between two cities at this stage is the one-way demand of Ezhou and the one-way diffusion force of Wuhan.^[6]

A. Economic Power

The External Driving Force of the urban integration of Wuhan and Ezhou is to Reduce Transaction Cost. Today, the

development trend of regional synergy is remarkable [7]. In the development trend of the whole country and even the whole world, if we want to always maintain our competitiveness and speed up our own sustainable development, we need the industrial division and cooperation among different regions, and in the process of cooperation, we should minimize the consumption of resources [8]. It is easy to cost. The implementation of the urban integration can effectively achieve this point. Therefore, the external driving force is to reduce transaction costs.

1) The driving force of the terrible land economy promotes the diffusion of the industrial and economy in Wuhan, which promotes the process of urban integration

In the course of economic activities, factors of production are indispensable. Factor of production is the most important cost of economic activity. Among these costs, land factor has become the biggest cost of economic activity because of the domestic land price rise in recent years. The enormous land economic disparity between Wuhan and Ezhou prompted some industrial economies to spread outward. At the same time, under the joint effect of transportation costs and other factors, most of the industrial economy spread in Ezhou. Therefore, in order to reduce the transaction costs of economic activities, the extremely poor land economy of the two cities has become an important driving force for the two cities to become the same city.

Most of the industries invested by the investment and construction of the Indus Lake New Town in Ezhou and the new industry of Ge Hua new city come from the diffusion effect of the industrial and economy in Wuhan. Because of the poor land economy, the bio pharmaceutical industry, technological innovation industry, business logistics and other cost sensitive industries of Wuhan are beginning to spread to Ezhou. In such a general trend, the formation of a similar "front shop after factory" model. The technology and sales department of the company is in Wuhan, while the production and storage functions are deployed in Ezhou.

2) The extension of industrial chain promotes the process of urban integration and accelerates economic integration

The industrial chain mainly refers to an economic and technological relationship between various industrial sectors. There are a lot of upstream and downstream relations and the relationship between service objects in the industrial chain. It is mainly the complementary exchange between the two related industries. The upstream industry delivers products or services to the downstream industry, while the downstream industry feeds back information to the upstream industry. The formation of the industrial chain generally shows that the industry as a whole is perfect, and its core competitiveness is bound to be greatly enhanced. At the same time, the formation of industrial chain can greatly reduce the transaction costs between industries.

With the development of industrial economy in Wuhan, the industrial chain is constantly improving. The industrial chain mainly refers to the division of labor and cooperation between existing enterprises, and the extension of the industrial chain is to perfect and supplement the original industrial chain. The upward extension of the industrial chain generally means that the industrial chain enters the basic industrial links and the technological R&D links, while the

downstream expansion enters the market expansion links. The optoelectronics industry and some biopharmaceutical industry chains of Wuhan future city are facing the extension of the industrial chain. Many service industries need to be supplemented, and some basic productive industries also need to enter the industrial chain. However, the land of Wuhan is limited, while some industries in Ezhou have begun to start, the industrial chain between the two cities between the nature of enterprise cooperation is also increasing. There are many enterprises that form industrial chains such as Wuhan and Ezhou, such as the industrial docking of NiuShan Lake and the ecological cultural tourism of Red Lotus Lake, and the development of automobile industry of Wuhan in the future may lead to the development of Ezhou auto parts manufacturing industry. The commerce and logistics industry in Ezhou is also a kind of upstream and downstream industry of service nature for many industries in Wuhan. Such close activities between the industrial chains have directly accelerated the process of economic integration between Wuhan and Ezhou, and made Wuhan and Ezhou go to the same city.

3) The construction of trade logistics has promoted the urban integration

Convenient transportation is also a good way to reduce transaction costs. With a faster and more complete business logistics system, enterprises can make the most appropriate transport plan according to their own time cost and transport cost. At the same time, the construction of commercial logistics directly affects the transaction between the two cities and the construction of a unified market system.

Relying on the construction of Wuhan New Port and Shunfeng Freight Airport, the regional transport capacity will be greatly increased. With the rapid development of business logistics industry in Ezhou, its service object itself is not located in Ezhou, but Wuhan as the most important target market. Its scope of service is bound to be a large area in Wuhan and even the whole central region. Moreover, Shunfeng Airport is aimed at building a national air logistics center.

B. Social Power

At the early stage of urban integration, the gap between the two cities is relatively large, for example, the medical and educational capacity in Wuhan and the ability of various public service facilities are significantly stronger than those in Ezhou. With the huge gap between the social security capacity and the public service facilities, the demand for the urban integration of urban residents of the two cities will increase significantly. Ezhou residents will promote the urban integration of the two cities when they ask for the treatment of Wuhan citizens [9]. At the same time, some residents in Wuhan will choose to buy houses in Ezhou because of the relatively low housing prices in Ezhou. Under this demand, they will also promote the urban integration of the two cities. It is not just the distance between traffic and distance, but also the urban integration of the residents in two cities, or the psychological development of citizens. Therefore, it is necessary to break the psychological distance between the two cities. If we want to break this psychological distance, we must achieve the same citizenship, in a real sense, the two cities to achieve complete homogeneity of

public treatment. Therefore, in the early stage, the two cities have very different treatment of citizens, it will form the demand for the same treatment of the citizens of the two cities. This demand will become an intrinsic driving force for the two cities to become the same city.

1) Wuhan population evacuation leads to separation of work and residence and demands for urban integration

The urban resident population in Wuhan has exceeded 10 million at the end of 2011. Such a large population clearly confirms the strong attraction of Wuhan for talents. However, population evacuation is synchronized with population agglomeration. Population evacuation in Wuhan is mainly concentrated on the evacuation to the surrounding area. The main object of evacuation is the surrounding cities. Some of the evacuation is due to the relocation of the company, but most of which are caused by the rising housing prices in Wuhan. Many young people are disillusioned with the idea of buying houses in Wuhan, resulting in a large number of work in Wuhan. Young people are buying a house in Ezhou. As a result of the separation of living in the two cities, there will be a certain demand for the integration of the cities and cities in the border area of the two cities, thus promoting the development process of the two cities.

2) Ezhou citizens needs to share the treatment of Wuhan citizens

The level of public service facilities in Wuhan and its social security capability are obviously higher than those in Ezhou. In this way, Ezhou residents will go to Wuhan when seeking better public services, such as to see a doctor in Wuhan and go shopping in Wuhan. However, such a long distance way is extremely inconvenient. Moreover, due to the existence of barriers to social security system in the two cities, Ezhou residents can not enjoy the same social security in Wuhan, such as the maintenance of endowment insurance rights in the endowment insurance system, the "remote place" in the medical insurance system. The medical problem, the restriction of "social assistance system linked to household registration system" in the social assistance system. These gaps in public services and social security will inevitably lead to demands of Ezhou citizens for treatment of Wuhan citizens. Similarly, the construction of equalization of public services and the construction of a "inclusive" social security system will promote the further deepening of the city.

C. Policy Power

The process of rapid urban integration will encounter various obstacles. At this time, it is extremely important to formulate corresponding policy guarantees to eliminate such obstacles [10]. Therefore, the policy driving force is a more escorting role for the urban integration of Wuhan and Ezhou. In essence, it is a guarantee function, and some policies will also play a guiding role.

1) Economic policy is the guarantee of the economic integration of the two cities

In the process of the urban integration of Wuhan and Ezhou, the two cities of tax revenue are not unified, which may lead to the problem of repeated tax collection, which directly leads to the increase of transaction costs in the process of production factors exchange, thus causing a certain counterforce to the urban integration of Wuhan and

Ezhou. In this way, we need to introduce relevant economic policies to ensure the unification of the taxation system of the two cities in Wuhan and Ezhou, avoid duplication of taxes, and ensure that the transaction costs between the two cities will not rise because of policy reasons. The consistency of economic policies between Wuhan and Ezhou will ensure the speed of economic integration and speed up the integration of the two cities.

2) Social policy is the guarantee of eliminating the isolation of the citizens

The main objective of social policy is to eliminate the differences in the treatment of citizens in the two cities, which plays a decisive role in meeting the social needs of residents. The unified medical and social security system will directly eliminate the difference between the public and the public, that is, directly close the psychological distance of the citizens of the two cities of Ezhou and Ezhou, so as to achieve the real meaning of "urban integration of citizen" and thus promote the development of the urban integration of Wuhan and Ezhou.

3) The premise of environmental policy in two cities to protect the ecology

The disunity of environmental protection investigation mechanism and industrial access mechanism in two cities will directly lead to psychological speculation in polluting industries, and polluting enterprises will be concentrated in areas with low industrial access threshold, which will directly render other environmental protection measures ineffective. Therefore, the two cities in Wuhan and Ezhou, especially Liangzi Lake, red lotus lake, purple lake, and other areas near the lake, the unified protection policy, namely unified industrial access system, unified environmental inspection mechanism and unified negative list, will become the prerequisite for the co insurance ecology of Wuhan and Ezhou two cities, and also the development of the urban integration. The exhibition provides ecological protection.

4) Space policy is the guide to the construction of the same city in the two cities

Whether it is the direction of the spatial development of two cities or the delineation of the three districts and four lines in space control, it needs the coordinated layout of the two cities. If there is no uniform space policy restriction, there will be unreasonable layout of land in the border area between Wuhan and Ezhou, such as low polluting creative technology industry of Wuhan at the juncture. In the vicinity, Ezhou has laid a heavy polluting chemical industry, and even the layout of residential land near heavy industry. The different delineation of space control will also lead to incomplete and incomplete protection. For example, the Jiangxia District in Wuhan surrounding the Liangzi Lake will not be allowed to be built as a strictly controlled area, while Ezhou will be built and built everywhere. This will cause the protection efforts of Wuhan Jiangxia to be destroyed, and at the same time, it will have a huge impact on the space ecology. Therefore, Wuhan and Ezhou jointly define the joint construction area, and then unified planning, unified space policy and unified three zone and four line delineation in the co construction area will guide the process of construction of the urban integration and have great guiding significance for the urban integration of the two cities.

IV. THE CHANGE OF THE DRIVING MODE OF THE URBAN INTEGRATION UNDER THE BACKGROUND OF THE CONSTRUCTION OF AVIATION METROPOLITAN AREA

Before the construction of Aeronautical metropolis, the gap between Wuhan and Ezhou is very large. The driving force of development is mainly due to the fact that Wuhan is superior to Ezhou. This driving force can only be a slow driving force. And when the construction of the aviation metropolitan area is put on the agenda, when the Ezhou aviation metropolitan area has gradually entered the "post airport era", the construction of the aviation metropolitan area has become a turning point of the driving force of the urban integration of Wuhan and Ezhou, or a break point.

In the post-airport era, the airport is no longer the airport of the city, but in turn, the city has become the "airport city". Aviation metropolitan area is not only a distribution center of freight logistics, but also a large number of industrial entities and labor positions due to the impact of freight logistics. Such industrial agglomeration has resulted in the formation of a new aviation metropolitan area. The emergence and construction of the aeronautical metropolitan area has formed a two-way diffusion and agglomeration effect with Wuhan. The interaction between them has become more and more profound, thus strengthening the process of Wuhan City in all aspects.

A. Economic Drive: From "Single Nuclear Proliferation" to "Two Wheel Drive"

The construction of aviation metropolitan area makes the economic relationship between Wuhan and Ezhou closer. The economic relationship between Wuhan and Ezhou has long remained in the "single nuclear proliferation" of Wuhan, mainly the economic radiation of Wuhan to Ezhou. This one-way influence is limited. The size of the influence depends entirely on the speed of development in Wuhan. The influence of Ezhou on Wuhan is very small, sometimes even a drag. Therefore, there is great uncertainty in this development model. With the landing of the Ezhou airport, a new city, the aviation metropolis, will be located in Ezhou. Relying on vip.com, Amazon and sunning cloud providers and other series of e-commerce enterprises, we will build the central China electricity supplier headquarters and develop the Ezhou logistics hub economy. This dislocation development will complement short development of Wuhan and meet needs of Wuhan. The growing demand, at the same time, has also found the development orientation of Ezhou itself.

The aviation metropolitan area is an industrial city mainly based on logistics services. Its development can not be separated from the industrial foundation of Wuhan. Meanwhile, the explosive demand for logistics services in the industrial development of Wuhan is also inseparable from the construction of the aviation metropolitan area. In this way, the economic links between Wuhan and Ezhou are no longer a one-way diffusion of Wuhan, but also become a "two wheel drive" between Wuhan and the aviation metropolitan area of Ezhou, and further promote the pace of the urban integration of Wuhan and Ezhou.

B. Social Demand: From "One-Way Demand" to "Mutual Attraction"

The construction of aviation metropolitan areas has

accelerated the flow of labor force, and the demand for social equality has increased unprecedentedly. All along, the industrial energy level of Wuhan is better than that of Ezhou. Therefore, the direction of talent flow is mainly one-way flow from Ezhou to Wuhan. At the same time, the social development level of Wuhan is far higher than that of Ezhou, and its medical treatment, education and other citizen treatment is also what Ezhou residents yearn for. This directly constitutes the one-way demand for the same city of Ezhou in the process of urban integration of Wuhan and Ezhou.

However, with the construction of the aviation metropolitan area, he will also play an increasingly important role in promoting the development of the urban industry. Meanwhile, the continuous influx of talents is also one of the characteristics of the construction and development of the aviation metropolitan area in the process of industrial development. The landing of Shunfeng Airport and the construction of Ezhou Aviation Metropolitan Area are expected to bring 200,000 jobs, of which a large part will be high-tech talents. With the flow of labor, the demand for social security will increase, and there is a certain gap between the level of social security in Ezhou and Wuhan. This makes the labor force seek to achieve the level of social security in Wuhan, thus promoting the overall urban public service and social services in Ezhou. It will guarantee the improvement of the level. Thus, the social needs of Wuhan and Ezhou changed from the "one-way demand" of Ezhou to the "mutual attraction" of Wuhan and Ezhou.

V. CONSTRUCTION OF THE DYNAMIC MODEL OF THE URBAN INTEGRATION OF WUHAN AND EZHOU

According to the above analysis of the driving factors of the development of the urban integration, we can find that the driving forces of the urban integration are mainly divided into three categories: economic, social and policy forces. The relationship between these three driving forces and urban integration is mutual. They can be the driving factors of urban integration. At the same time, the urban integration can also become their driving force for development. That is, the urban integration can promote the economic development, social prosperity and policy improvement of the two cities. At the same time, there are some interactions among economic, social and policy forces. The relationship between economy and society is mutual promotion and mutual influence, and policy power is more about the support of the former, and society and economy are also the direct reasons for the emergence of policies.

The relationship among the various driving factors is also an important factor in the dynamic model of the urban integration. However, the final driving factors will fall into the original appeal of the three categories: reducing transaction costs, social needs and security guidance.

A. Economy and Society Are Mutually Reinforcing and Influencing

Economic and social forces jointly promote the process of urban integration, and at the same time, their internal forces also have mutual influence. The three reasons for the industrial diffusion, the further improvement of the industrial

chain and the construction of trade logistics are the gradual and gradual influence. Meanwhile, the economic activities related to the three factors are inseparable from the flow of labor. These economic activities are directly affecting the direct dispersion of the population in Wuhan. The evacuation process also acts on economic activity. In the process of population evacuation, the demand for homogenization of treatment begins to emerge. Similarly, the homogenization of Wuhan and the treatment of Ezhou citizens will also accelerate the population flow between the two places, and indirectly affect economic interaction. Therefore, economy and society promote and influence each other.

B. Policy Is the Guarantee of Economy, and Economy Is the Motive Force of Policy

Industrial diffusion, industrial chain, trade and logistics in the economy all need policy guarantee. In economic activities, unified tax protection is the fundamental condition to ensure that transaction costs do not float. At the same time, the demand for economic development will also lead to the emergence of relevant policies.

C. Policy Is the Guarantee of Society, and Society Is the Demand Factor of Policy.

The treatment of residents in two cities of Wuhan and Ezhou is different because of the social demand for the urban integration. If we want to protect the unified treatment of residents in two cities, we must break the policy barriers of social security and public services, and the only way is the policy guarantee system. Similarly, such policy-making comes from the demand for equal treatment of citizens in both cities. Therefore, policy is the guarantee of society, and society is the demand factor of policy.

D. The Construction of Aviation Metropolitan Area Is a Breakthrough Point, Which will Comprehensively Promote Three Driving Forces.

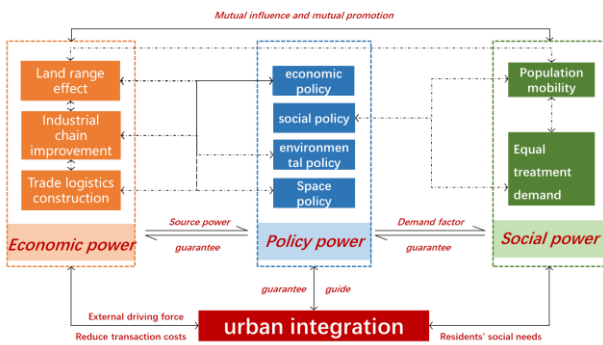


Fig. 1. Dynamic model of the urban integration.

Economic power, social force and policy force are all slow driving forces. The process of the urban integration of Wuhan and Ezhou needs a kind of breaking force, which makes the transformation from quantitative change to qualitative change. The aviation metropolis can be said to have changed the degree and dynamic mode of the urban integration of Wuhan and Ezhou. Before the emergence of the aviation metropolis, the dynamic role was mainly caused by the economic diffusion power of Ezhou to Ezhou and the social demand power of Wuhan to Wuhan. After the emergence of the aviation metropolitan area, it became an aviation metropolis of Wuhan and Ezhou. Two-way forces, the

economic links between the two, industrial exchanges, social mobility and so on have become extremely frequent. Therefore, the construction of the aviation metropolitan area is a breakthrough point. His appearance will promote the upgrading of three driving forces, thus making a qualitative change in the urban integration of Wuhan and Ezhou.

REFERENCES

- [1] Y. R. Zhu, X. M. Cheng, and J. W. Zheng, "Research on the change and development of historic blocks in the context of cultural creativity - Taking Tanhua Lin in Wuhan as an example," *Central China Architecture*, 2015, vol. 33, no. 12, pp. 171-176.
- [2] H. L. Liu, J. X. Nie, and J. W. Zheng, "Research on the development stage and space development direction of Wuhan metropolitan area," *New Building*, 2016, vol. 6, pp. 28-32.
- [3] W. Fan, B. H. Xu, H. L. Su *et al.*, "The connotation and extension of the concept of aviation metropolitan area - Reference for the development of the International Airport City," 2014.
- [4] *Shenzhen 2030 Urban Development Strategy*, Leadership Decision Information, 2005.
- [5] Q. H. Zeng, "Study on the integration of the Yangtze river delta from the perspective of new institutional economics," East China Normal University, 2011.
- [6] D. K. Tao, X. R. Lin, and Y. P. Huang, "Study on the space optimization strategy of Xiaochi lake in Hubei province from the perspective of urban convergence," *Urban Planning*, 2016.
- [7] S. Yu, "Retrospect and case analysis of the implementation of the strategy of internationalization," Tongji University, 2008.
- [8] X. Ming, "Research on the development of metropolitan area in the same city," Northeast Normal University, 2011.
- [9] H. H. Yang, "Study on the generation mechanism and cooperative model of guangfo apos; S Citizenization," *Guangdong Economy*, 2010.
- [10] J. W. Zheng, "Research on the relationship between inland free trade zone and urban and regional development - Taking Xiangyang free trade zone as an example," *China Urban Planning Society*, 2016.



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