

Development Research in Beijing-Tianjin-Hebei's Rail Transit Integration

Can LIU

School of Economics & Management, Chongqing Jiaotong University, Chongqing, China

Abstract: The coordinated development strategy for the Beijing-Tianjin-Hebei has been ranked as the national strategy, as the strong support of regional integration, rail transit integration becomes very necessary. The coordinated development of Beijing-Tianjin-Hebei Beijing traffic integration advancement scheme was put forward, aimed at reasonable cohesion of rail transit system in main railway, intercity railway, suburban railway and urban rail transit, four layers of rail transit network. This paper first summarized the concept of integration of rail transit, and then expounded the significance of achieving Beijing-Tianjin-Hebei 'integration of rail transit. From Tokyo circle and Paris district 's developing experience, Beijing-Tianjin-Hebei integration of rail transit development can learn how to develop better. Also, this paper illustrated the principle of the realization of the integration of rail transit. After that, we introduced the current implementation of the Beijing-Tianjin-Hebei region where rail transit integration needs to be improved to promote the implementation of rail transit integration of the Beijing-Tianjin-Hebei region, thus to realize the harmonious development of Beijing-Tianjin-Hebei.

Keywords: Rail transit integration; Significance; Principle of the realization; Measures

1. Introduction

Integrated rail transit system means forming a passenger rail transit mode of reasonable division of labor, cohesion and orderly development, resource sharing, through unified planning, design, construction and operation. Integration refers to the process of that originally independent railway and urban rail transit system are planned, designed, constructed and operated uniformly in order to realize the convenient travel, reduce the pressure of urban transportation (especially the city ground traffic)[1].

2. The Great Significance of Beijing-Tianjin-Hebei Integration of Rail Transit

Seeing from the space distance, Beijing, Tianjin, Hebei is relatively close to each other, not suitable for choosing airlines, because the cost this means of transportation is relatively high, and road transportation has the disadvantages of pollution and traffic congestion, and so these two means of transportation are not suitable for large scale of aviation at present. Rail transit has advantages of big capacity, high security, relative separation of passenger flow and logistics, so it is suitable for developing. The realization of Beijing-Tianjin-Hebei integration of rail transit will push for an hour or even half an hour

economic circle formed between major cities, promote the development of city between passenger flow and logistics.

On the one hand, after the construction and operation of Beijing-Tianjin-Hebei orbit transportation, contact between these cities will be more strong, can trigger new market demand. Such a demand can lead to resource reconfiguration, cause of restructuring of internal structure, make the original single center city evolve into more cities, especially it is good for small and medium-sized cities along in their development opportunities and it promotes their development. On the other hand, because of the scale effect and multiplier effect and agglomeration effect's comprehensive function, the urban competitiveness of urban agglomeration in central city get promoted, and the structure of the "core - edge" reinforcement, the attraction of the central city on the surrounding city becomes stronger. So, adjacent surrounding city or region near central city are affected by the radiation effect of central cities through inter-city rail transit, began to reposition and corporate, which is beneficial to promote the economic growth and coordinate development of the Beijing-Tianjin-Hebei urban agglomeration. The efficiency comparison of all kinds of transportation is shown as Table 1.

Table 1. The efficiency comparison of all kinds of transportation

Means of transport	Average speed (km/h)	passenger capacity(10000/h)	appropriate time(min)	energy consumption(kal /person*km)	Operating costs(yuan/person*km)
bus	14-16	0.5-0.9	8-30	180-216	2.47

tramcar	14-18	1.0-15	8-30	135	1.85
subway	35-45	4.0-6.0	10-60	80-93	1
Light rail	25-35	1.0-3.0	10-50		
Suburban railway	60	4.0-8.0		58-70	
car	40	<0.8		721-831	

Data sources: Zhang YunQuan the analysis of characteristics of urban rail transit, urban planning proceedings, 1999.6

2.1. Saving the travel time of Beijing-tianjin-hebei 's residents , easing traffic pressure

If Beijing-Tianjin-Hebei achieve the integration of rail transit, can build a rapid passage between the source and destination, this reduces the unnecessary transfer and journey delay, thereby reducing the travel time of Beijing-Tianjin-Hebei 's passenger , also this reduces the time of passengers involved in traffic on the way, naturally reduces the unnecessary traffic, traffic has been reduced. Compared to choose other ways of transportation such as buses and private cars, rail transit will greatly save the residents travel time once achieving inter-connectivity.

2.2. Promoting the further development of the economy in Beijing-Tianjin-Hebei region

Realization of the integration of the Beijing-Tianjin-Hebei region's rail transit , will build the inside city traffic and outside city traffic, the connection between the Beijing-Tianjin-Hebei city, improves the urban and inter-city traffic network. Beijing-Tianjin-Hebei urban agglomeration and the development of Beijing-Tianjin-Hebei transport network layout and optimization are inseparable, places of sustained and rapid economic growth to stimulate the transport network construction and optimization of the Beijing-Tianjin-Hebei region, and provides the funds needed for the development and technical support. At the same time, the development of transportation network and optimization provides guarantee for the steady growth of the economy. With the level of urbanization is increasing day by day, the traffic problem is increasingly serious today, Beijing-Tianjin-Hebei integration of rail transit development has become the hot topic and trend of the world's research , and thus established the traffic network system that can adapt to and guide economic development demand to ensure the sustained and rapid development of economy.

2.3. It is helpful for the improvement of the environment of Beijing-Tianjin-Hebei

With the Beijing-Tianjin-Hebei economic development, the level of urbanization and motorization are also constantly improved, transportation demand increases rapidly within these districts, contradiction between supply and demand of traffic has become increasingly prominent , transportation system service levels drop, traffic congestion increases, traffic delays increase, traffic accidents frequently happen, huge energy are wasted, automobile

noise are caused, gas pollution are exhausted and other issues. Therefore, the traffic problem is not only the internal problems in the field of transportation, it has become a widespread social problem. Rail transport security environmental protection makes the integration of both become the inevitable way to solve the problem mentioned before , the formation of the rail transit network provides better services for the city, so as to improve urban environment[2].

3. Lessons from the Experience of Tokyo and Paris to Promote Rail Transit Integration of the Beijing-Tianjin-Hebei Region

There are many lessons we can draw from the advanced experience of Japan's Tokyo circle and Paris region in the development of integration of rail transit,. Their experience of construction and development of rail transit system has passed the test of time and is proved to be successful, which greatly ease the traffic pressure in the region. This is worthy of our reference.

3.1. Experience of Circle traffic integration in Tokyo, Japan

At present, there is a permanent population of 34 million - 37 million in Tokyo, Japan, accounts for about thirty percent of the country's population, concentrated population makes transportation\ network very developed. Outside the Tokyo, emerges many new communities. In these places, there is Japan's pre-war fixed network. To solve the problem of these emerging community's travel problem, the Japanese government stepped up in both the railway construction on the new station, increase the vehicle, enhance the capacity. At the same time, an extension of the old line and the construction of new lines, also got great advance. At present, the Tokyo circle rail network has been developed ,six Shinkansen lines, 12 JR lines , 13 subway lines, 27 private lines and other 4 rail transit line , a total of 62 lines have been built in only 23 area in the city of Tokyo. There is one rail transit station within 10 minutes walk.

Tokyo metropolitan rail transit throughout Tokyo has played a main role in the traffic system, carrying 43.5 million passengers a day, bear 62% of the total traffic 's capacity (86%\of the urban city) in the Tokyo metropolitan area.

3.2. Rail transit integration experience in Paris region

The Paris Ile-de-France Region 's rail transit consists of subway, rapid rail transit (RER) , suburban railway and light rail, high-speed railway, the subway line 19, the total length is more than 330 km, crisscross, forming a urban rail transport network extending in all directions, consisting of five RER line and more than 20 branch lines, line length of nearly 557 km, there are 3high-speed rail (TGV)lines . The subway and light rail serves mainly in urban passenger transport..Urban rail transit and suburban railway mainly undertake the intercity passenger transport in Paris between the large area because of the characteristics of long lines and large station spacing and high speed. A Paris railway station of rail transit transfer to line 1 is shown as Table 2.

The railway station	Rail transit lines	Cohesion direction number
North station	M2,M4,M5,RER — B,RER — D	8
east station	M4,M5,M7	6
St lazar station	M3,M12,M13	6
Montparnasse station	M4,M6,M12,M13	8
Lyon station	M1,M14,RER — A,RER — D	8

Seeing from Tokyo circle and The Paris Ile-de-France Region 's experience above, we can see, to promote strategic goal of coordinated development of Beijing-Tianjin-Hebei,we must focus on the development of the integration of rail transit to support and promote the coordinated development of regional integration of the Beijing-Tianjin-Hebei region.

4. The Realization of the Integration Principle of Beijing-Tianjin-Hebei Rail Transit

Construction of Beijing-Tianjin-Hebei integration of rail transit transportation system, on the one hand, needs to provide passengers with fast travel conditions, also needs to be helpful for smooth transport organization, even at the same time satisfies the requirement of urban development and land use. Therefore, building integrated orbit transportation needs to follow the following basic principles:

4.1. Building a integrated passenger rail transportation system must adhere to the concept of "people-oriented"[3]

Building integrated passenger rail transport system must follow "people-oriented "concept, from the angle of the passenger, coordinate track traffic, satisfy traffic convenient distribution requirements. On the one hand, it needs to meet passengers' demand of taking a drop more , reduce the transfer times and time cost; On the other hand,the inter-city rail transit needs to be closely connected inside, provide efficient transfer service, make the rail transit system undertake more passenger flow distribution tasks in urban external passenger transport.

4.2. Conforming to the rules of the development of the city, promoting the reasonable development and utilization of urban land, reducing the pressure on the city ground traffic[4-5]

Passenger rail transportation system is part of the city, at the same time plays a vital role to the development of the city, which leads the trends of urban form and land development. Integration of the construction of passenger rail transport system must conform to the city's reality, provide a good transportation services for external and internal urban traffic, reduce the city ground traffic pressure of railway passenger travel distribution, ensure the normal conduct of various social and economic activities. At the same time,it should also be combined with urban planning, promotes the rational development and utilization of land, promotes urban sustainable development[6-7].

5. How to Optimize Beijing-Tianjin-Hebei Integration of Rail Transit Further

After understanding the importance of developing rail transit integration to solve the current Beijing-Tianjin-Hebei region's traffic integration and realize the coordinated development, we discussed the present next step on how to optimize Beijing-Tianjin-Hebei integration of rail transit.

5.1. Beijing-Tianjin-Hebei rail transit cohesion needs to be optimized

Beijing-Tianjin-Hebei region is independent on administration , every city is planning their own transportation system, which leads to the difficulties of cohesion. So the Beijing-Tianjin-Hebei regional transportation proposed the orbit of Beijing-Tianjin-Hebei this a new idea. Rail transit each other between these three regions, is one of the important skeleton of traffic integration in the future. We should use inter-city railway and regional express with faster speed and greater station spacing to connect Beijing-Tianjin-Hebei region's key city group, and build a rapid rail transit network consisting of high-speed rail, inter-city railway, regional express. Reasonable traffic share and effective connection problems of the Beijing-Tianjin-Hebei region's inter-city rail network, suburban rail network, high speed highway network should gain more attention.Seeing from"The coordinated development of Beijing-Tianjin-Hebei Beijing traffic integration advancement" released from July 13,2015, the key problem it solved about Beijing-Tianjin-Hebei rail transit cohesion is aiming to achieve true connectivity in Beijing-Tianjin-Hebei district,and achieve joint development in these three regions. (<http://www.stec.net/sites/suidao/ConPg.aspx?InfId=eab85f8a-d01d-4970-b976-94fa2834f75d&CtgId=77bc9040-5c59-4063-b0a5-2771b7223dd9>).

5.2. How to position the cities in Beijing-Tianjin-Hebei region

In the vast network of rail transit, there are some problems in positioning many urban cities of Beijing-Tianjin-Hebei region. At present, in addition to Beijing, Tianjin, Shijiazhuang, Tangshan, etc ,many cities have put forward the target to build a regional transport hub or logistics center , competition between these cities is very obvious. Beijing-Tianjin-Hebei region now is faced with the problem of unbalanced development ,unclear position. Some of the industry is the same, also there exists irreconcilable conflict in Industrial chain division of labor cooperation

In the common pursuit of integration in Beijing-Tianjin-Hebei traffic, Hebei hopes to increase density of regional traffic network, Tianjin hopes to build a fast, convenient and cheap Beijing- Tianjin high-speed railway network, Beijing hopes to decrease the pressure of the city traffic inside. This is also directly leads to that the government's collaborative is incomplete and lack , the interests of all parties is different and inter regional coordination is difficult, the progress of the integration of the Beijing-Tianjin-Hebei region has been slow. In order to improve the problem of unclear positioning, these 3 regions need to make joint mechanism of agreement to stipulate benefit sharing and responsibility share.

5.3. Financing problems of Beijing-Tianjin-Hebei on achieving the integration of rail transit

Beijing-tianjin-hebei inter-city railway investment co., LTD. Plans to construct four lines in recent two years ,which is Jing-Tang inter-city railway, Jing-Bin respectively inter-city railway, Lang-Zhuo inter-city railway, the capital airport to Beijing airport inter-city rail link. The total investment of this is about 100 billion yuan. Government invested 10 billion yuan for the above four inter-city railway's construction,, the rest 90 billion yuan needs to be raised via multi-channels. Therefore, solving the problem of implementation of the Beijing-Tianjin-Hebei integration of rail transit's financing also cannot be ignored.

5.4. Lack of supporting policies of promoting implementation of the integration of rail transit

Integration of rail transit can evacuate the Beijing-Tianjin 's population, industry, but if the Hebei industrial development supporting policies and public service resources, such as industrial development policy, fiscal and tax policy, health, culture, education and so on do not improve, it will fail to attract and retain the evacuation elements, but it will form tidal migration reversing to the Beijing-Tianjin , Beijing-Tianjin-Hebei need to plan as a whole industry layout. Industry integration will contain the speed of the integration of rail transit[8].

6. The Measures on How to Realize Beijing-Tianjin-Hebei Integration of Rail Transit

6.1 Beijing-Tianjin-Hebei coordinated development of rail transit

Handling the relationship between the various coordination and cohesion between rail transit and overall coordination of various rail transportation is an important basis of guaranteeing the integration of the Beijing-Tianjin-Hebei region. Analysis of Beijing-tianjin-hebei's coordinated development of rail transit from traffic circle are as follows: air shipping channel whose base point is urban agglomeration, airport and port group ;transportation network of regional envelopes which is based on the ground rail and highway traffic;the main urban core network whose base point is bus rapid transit, underground railway, bicycle lanes and ancient sites dedicated lines[9].

6.2 Innovating mechanism, establishing authority organization

The current system of Beijing-Tianjin-Hebei economic group is constructing the infrastructure based on administrative region , it needs a forward-looking organization with authoritative voice, organization and coordination ability and strong execution of. We should develop effective rail transit from the perspective that Beijing-Tianjin-Hebei economic circle is a system and need to be long-term planned. When carrying out the integration construction, investment and financing, income distribution ,construction and operation and management planning should also be taken into consideration, to effectively promote Beijing-Tianjin-Hebei economic circle of commuter's openness as soon as possible.

At the same time, in the process of coordinated development of Beijing-Tianjin-Hebei, we should pay attention to our country's general situation , promote national strategy. , We should establish effective coordination mechanism, reform the current management system, coordinate and cooperate the region development starting from the orbit transportation in the "de-administration", "de-industrialization" way.

6.3 Accelerating reform of the investment and financing, solving the financing problem

We might as well draw lessons from foreign major infrastructure construction 's PPP mode (Public Private Partnerships, the government and social cooperation mode), establish a reasonable risk allocation mechanism and scientific compensation mechanism and new type of enterprise relationship between the government and society . We should give full play to the market, establish the government purchase services concept, change our government full fiscal plight and government failure in investment and operation management, improve the efficiency of project operation, reduce the dependence on the

government's fiscal, realize the benign development of itself and sustainable development.

Fund transactions in Beijing-Tianjin-Hebei inter-city railway's PPP industry structure, trust and social capital through established collection (query trust products) become the priority LP (LPS), railway construction companies become intermediate levels of LP (LPS), both enjoy the fixed fund returns. As a government-funded inter-city investment co., LTD., it affords part of capital contribution and set up a fund management company, as a GP (general partner), can allocate excess returns. And on specific lines, industrial funds, financial investors, operators of railway administration, construction of the line, Beijing-Tianjin-Hebei inter-city investment co., LTD. have different proportions of contribution. Financial institutions also offer debt financing. This will attract social capital well to participate in Beijing-Tianjin-Hebei's rail transit construction.

Because the inter-city railway and the suburban railways often involves two or three provinces and cities, so it is more complex than the ordinary PPP projects, before attracting social capital, clear agreement between the government should be made.

6.4 Optimizing the industrial integration, promoting the integration of rail transit.

At present, the gap within the three places 's education and talents is far greater than the other two coastal economic circle. Beijing is as a giant black holes, absorbs the surrounding's a large number of talent and capital. The Beijing-Tianjin as bimodal is too outstanding, at the same time element flow cost is too much, weaken the radiation of the Beijing and Tianjin in Hebei. Compared with the Yangtze river delta's first city, Shanghai, Beijing and Shanghai's development is very quick, but the difference lies in the interaction with surrounding city, Beijing's pulling power not only is much weaker than Shanghai, even brings the "negative" radiation, Hebei region bordering Beijing was strongly inhibited in the circumstances of the economic development. Through ecological environment compensation scheme, the special tax policy, the Beijing-Tianjin-Hebei's equal basic public services mechanism innovation, it can reduce running cost, promote to speed up the information flow, funds, talents and other elements across the area. industry optimization will be led, in turn, promoting the integration of rail transit[10].

At the same time, a large number of entrances and exits should be set up in the rail transit site, through the underground passage to the traveler destination directly,

make the rail transit site fully serving the surrounding land use, which can improve the orbit transportation service level, promote the development of green transportation, improve the efficiency of traffic. National development and reform commission (NDRC) in recent years has been organizing the study of exploring the thought, policy, and related technologies about integration of rail transit site and its surrounding land use development, the purpose is to promote the integrated development of rail transit site and the surrounding land. Through reasonable land use layout, we can determine appropriate development strength, establish a seamless integration of comprehensive transport hub, not only can greatly improve the transportation efficiency of the transportation system, but also can get very good development, realize sustainable development.

7. Conclusion

Beijing-Tianjin-Hebei integration of rail transit has important strategic significance for realizing the coordinated development of Beijing-Tianjin-Hebei, the existing planning scheme fully demonstrated its importance. But in the concrete process to promote the integration of rail transit, there are some principles we must follow, but also exists some problems that have to be solved and cannot be ignored, these problems, this paper put forward the corresponding implementation ways to realize integration of rail transit, and promote the important national strategy of implementation of the coordinated development of the Beijing-Tianjin-Hebei region.

References

- [1] Wang Nan, Zhu Zhiguo, Hu Yan. Railway hub bus layout optimization under the condition of passenger dedicated line[J]. Journal of Southwest Jiaotong University. March, 2008(6), 398-403.
- [2] Ye Hong. Rail transit and urban coordinated interaction development discussion[J]. Journal of Suzhou institute of science and technology, March(9), 2010, 68-71.
- [3] Xie Xiaozhong, Li Shuqing, Feng Shaohai. Study on the relationship between the urban land utilization and rail transit construction[J]. Traffic information security. May, 2010(4), 46-49.
- [4] Cai Wei, Hu Zhihui, Ye Xiafei. Research on Urban rail transit development benefit mechanism and influence scope[J]. Journal of Railway. April, 2006(8), 27-31.
- [5] Wang Zhi, Ye Xiafei. "Traffic guide development" mode study based on typical city rail transit at home and abroad[J]. City track traffic research. May, 2009(7), 1-5.
- [6] Liang Xiaolin, Xie Junjing. The evolution of the Beijing-Tianjin-Hebei region economic integration's present situation and development countermeasure[J]. Journal of hebei university of economy and trade. November, 2009(5), 12-15.