The Challenges of Talent Drain in Northeast China and Urban Planning Response Strategies

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Abstract: The report of the 20th National Congress of the Communist Party of China points out that "talents are the primary resource", and the quantity and quality of talents are important factors determining the competitiveness of a city. In recent years, the problem of talent outflow in Northeast China has been severe, which has to some extent affected the optimization of the industrial structure and economic and social development in Northeast China. This paper analyzes the reasons for the outflow of talents in Northeast China and, on this basis, puts forward relevant countermeasures and suggestions for urban planning in Northeast China, hoping to play a certain reference role in solving the problem of talent outflow in Northeast China.

Keywords: Northeast China; Talent outflow; Economic development; Urban planning

1. Introduction

Talents are the driving force for innovative development and determine the competitiveness of a city. However, in recent years, the phenomenon of population outflow in the three northeastern provinces has become increasingly serious. Among the large number of outflowing people, the proportion of technical talents, high-education and high-level talents is high, while the number of introduced talents is less than one-tenth of the outflowing number [1]. Therefore, the outflow of talents is a severe challenge faced by the development of Northeast China. The problem of talent outflow has to some extent affected the transformation and upgrading of Northeast China, and is not conducive to the optimization of the industrial structure and economic and social development in Northeast China [2].

This paper introduces the push-pull theory, the hierarchy of needs theory and the public governance theory, and uses methods such as literature research, statistical analysis and comparative analysis to analyze the reasons for the outflow of talents in Northeast China. On this basis, it puts forward relevant countermeasures for urban planning in Northeast China, hoping to play a certain reference role in solving the problem of talent outflow in Northeast

China.

2. Current situation: The phenomenon of brain drain in Northeast China is severe

"Those who gain people thrive, those who lose people decline." This has been a crucial factor in the rise and fall of dynasties throughout history, and the same principle applies to urban development. To thrive and prosper, to be at the forefront in the competition among cities, it is essential to attract, retain, and utilize talent effectively, making the best use of all available talents [3].

However, the reality is that the problem of high-level talent outflow in the three northeastern provinces has been worsening year by year. According to the latest data from job search websites, in the regional ranking of the retention rate of college graduates in China for 2024-2025, the Northeast region ranks at the bottom.
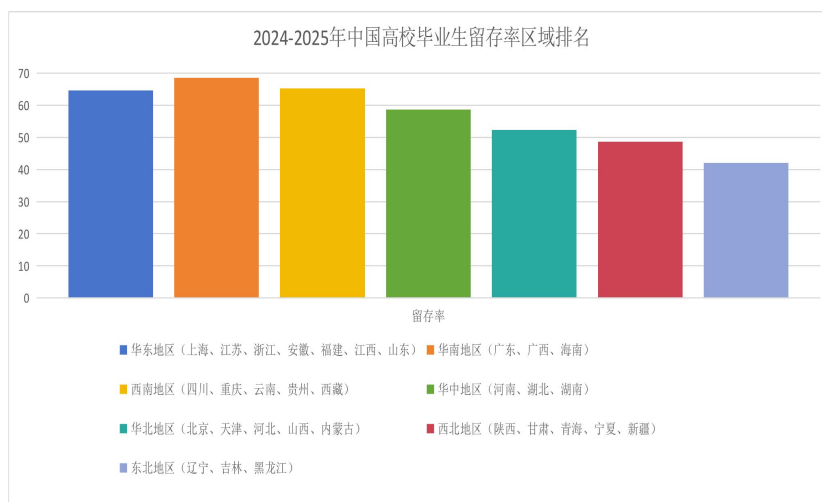

Figure 1. shows the ranking of regions where Chinese university graduates will be retained in 2024-2025
Data source: Compiled based on the latest data and industry report data

According to statistics from the Ministry of Education, there are currently 260 regular colleges and universities in Liaoning, Jilin, and Heilongjiang provinces. Considering factors such as national recruitment and national influence, 20 representative universities including Harbin Institute of Technology, Jilin University, Dalian University of Technology, and Northeastern University were selected as research subjects. The research found that among the 105,900 graduates (including undergraduates, master's and doctoral students) from these 20 representative universities in the Northeast, only 38,700 remained in the Northeast for employment, accounting for only 36.54% of the total [4].
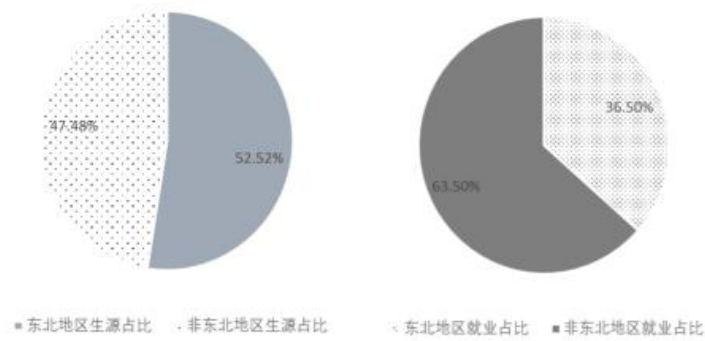
Figure 2. Source and Employment Structure of Graduates from 20 Representative Universities in Northeast China (Unit: %)

Data source: Compiled based on the employment quality report data of sample college graduates

Based on the general statistical methods for talent outflow rates and considering the characteristics of college graduate employment statistics, two methods, broad and narrow, were used to estimate the talent outflow rate in the Northeast. The results showed that the outflow rates were 63.46% and 26.45% respectively. According to the source of students, among the 2019 graduates, there were approximately 55,600 students from the Northeast region. Only if the number of graduates employed in the Northeast region is no less than this critical value can talent outflow be avoided. However, the number of graduates remaining in the Northeast for employment was only 38,700, with a shortfall of 16,900, indicating a severe situation of talent outflow in the Northeast region (see Figure 2). Moreover, compared to provincial universities in the Northeast, the outflow rate of talent from universities directly under the Ministry of Education and other ministries is even higher, suggesting that elite talents are more inclined to leave the Northeast for development. Among the 52,400 graduates from universities directly under the Ministry of Education and other ministries, only about 14,500 remained in the Northeast for employment, accounting for only 27.67%, while 37,900 graduated to non-Northeast regions, accounting for 72.33% [5]. Taking Harbin Institute of Technology as an example, nearly 90% of this year's graduates found employment outside the Northeast. The proportions of graduates from Jilin University, Northeastern University, and Dalian University of Technology who found employment outside the Northeast were also as high as 69.56%, 70.56%, and 78.14% respectively [6].

It must be clear that the lower limit of a city's economic development is determined by ordinary people, but the upper limit largely depends on the number of elite talents. Because talents represent high-end labor force and also mean a stable and large consumer market; however, the above statistics show that the talent reserve in the Northeast region is seriously insufficient, and the outflow trend is obvious.

3. Analysis of the Causes of Talent Drain in Northeast China

3.1. Disadvantages of Natural Conditions and Geographical Location

The natural conditions are relatively harsh. Located in a remote area, the logistics cost is high; the winter is long, and the cost of keeping warm is high; the climate is cold, and the incidence of endemic diseases is high. These are the objective factors that cannot be avoided for the population loss in Northeast China.

3.2. Impact of National Policy Orientation

There are relatively few policy advantages. The financial situation in Northeast China is tight, and it cannot provide matching funds, resulting in low enthusiasm for project applications. In terms of industrial development, Northeast China can neither retain its "native birds" nor attract "golden phoenixes". This is also an indirect factor for the continuous population loss.

3.3. Persistent Economic Downturn

This article introduces the famous push-pull theory to explain the reasons for talent migration in Northeast China. In the 1960s, American scholar E.S. Lee proposed a systematic theory of population migration - the "push-pull theory". He first divided the factors influencing migration into two aspects: "push" and "pull". The push-pull theory holds that the factors in the inflow area that are conducive to improving living conditions become pull factors, while the unfavorable living conditions in the outflow area are push factors. Living conditions refer to educational opportunities, complete public facilities, and convenient transportation conditions, all of which are related to the regional economic conditions (GDP). Only regions with good economic conditions have the financial capacity to achieve these [7].

Table 1. Statistics of GDP in All Regions of China in 2024

地区	GDP(亿元)	名义增长率（%）
广东	141633.81	4.39
江苏	137008	6.85
山东	98566	7.06
浙江	90100	9.14
四川	64697	7.59
河南	63589.99	7.54
湖北	60012.97	7.54
福建	57761.02	6.27
上海	53926.71	14.21
湖南	5320.99	6.43
安徽	50625	7.6
北京	49843.1	13.9
河北	47526.9	8.15
陕西	35538.77	5.19
江西	34202.47	6.22
辽宁	32612.7	7.96
重庆	32193.15	6.97
云南	31534.1	5.04
广西	28649.4	5.32
内蒙古	26314.6	6.85
山西	25494.69	-0.79
贵州	22667.12	8.39

地区	GDP(亿元)	名义增长率（%）
新疆	20534.08	7.36
天津	18024.32	7.69
黑龙江	16476.9	3.73
吉林	14361.22	6.13
甘肃	13002.9	9.6
海南	7935.69	5.09
宁夏	5502.76	3.53
青海	3950.8	3.99
西藏	2764.94	15.56

Note: Data source: Local statistics bureaus

As an old industrial base in China, the development of Northeast China has been deteriorating in recent years. Under the dual pressure of industrial transformation and epidemic control, economic growth has naturally become even more difficult. In 2024, the actual GDP growth rates of the three northeastern provinces are all lower than the national average[1].

Table 2. Statistical Table of the Composition of per capita Consumption Expenditure of Residents by Region

地区	消费支出	食品烟酒	衣着	居住	生活用品及服务	交通通信	教育文化娱乐	医疗保健	其他用品及服务
全国	28227	8411	1521	6263	1547	3976	3189	2547	773
吉林	23118	6332	1413	4305	1029	3787	2742	2774	735
黑龙江	23467	6979	1468	4144	971	3270	2722	3250	663

Note: Data source: National Bureau of Statistics

According to the push-pull theory, the economic gap between the Northeast region and developed cities has been widening, which creates a push force. The sustained high economic growth in southern developed cities forms a pull force, leading to the outflow of talents from the Northeast region.

3.4. Low overall salary and welfare benefits

Maslow's hierarchy of needs theory states that the most basic requirements for human survival include food, clothing, housing, and transportation. If these needs are not met, human survival becomes a problem. In this sense, physiological needs are the most powerful driving force for human action.

Taking the per capita disposable income in 2024 as an example, the national average is 41,314 yuan. The three northeastern provinces are all below the national average. Moreover, in terms of nominal growth rate, the growth rate of Heilongjiang, Jilin, and Liaoning is far lower than the national average growth rate. Low salaries cannot support people, and poor benefits cannot retain people. This is the most direct factor for the population loss in the

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1 As Liaoning Province has not yet disclosed detailed data on each sub-item of consumption expenditure, food, tobacco and alcohol, clothing, housing, daily necessities and services, transportation and communication, education, culture and entertainment, medical care and health, and other goods and services, they are not displayed here.

Northeast region.

Table 3. Statistics of Per Capita Disposable Income of National Residents in the Past Two Years

地区	2023年居民人均可支配收入（元）	2024年居民人均可支配收入（元）	名义增速（%）
上海市	84834	88366	4.16
北京市	81752	85415	4.48
浙江省	63830	67013	5.0
江苏省	52674	55415	5.19
天津市	51271	53581	4.51
广东省	49327	51474	4.35
福建省	45426	47857	5.35
山东省	39890	42077	5.5
辽宁省	37992	39876	4.96
内蒙古自治区	38130	40077	5.1
重庆市	37595	38797	3.19
湖南省	35895	37560	4.63
湖北省	35146	36863	4.89
安徽省	34893	36631	4.98
江西省	34242	36014	5.17
海南省	33192	34417	3.69
河北省	32903	34366	4.45
四川省	32514	33806	3.97
陕西省	32128	33588	4.54
宁夏回族自治区	31604	33071	4.64
山西省	30924	32338	4.57
河南省	29933	31203	4.24
吉林省	29797	31104	4.39
黑龙江省	29694	30954	4.25
广西壮族自治区	29514	31125	5.5
贵州省	27098	28561	5.4
甘肃省	25011	26612	6.4
青海省	28587	30117	5.4
西藏自治区	28983	31358	8.2
新疆维吾尔自治区	28947	30899	6.7

Note: Data source: National Bureau of Statistics

3.5. Failure of industrial transformation and lack of new technology industries

Since the founding of the People's Republic of China, the three northeastern provinces have led China's industrial and economic development with their abundant mineral resources,

superior geographical conditions, and relatively complete infrastructure and industrial systems left by the Russian and Japanese occupations. However, the economic development of the Northeast region has been deteriorating.

During the initial and critical stages of urbanization in the Northeast region, a large-scale heavy industrial system laid the foundation for the urban form. In terms of enterprise structure, a unique structure dominated by state-owned enterprises was naturally formed. The combined effect of state-owned enterprises, the government, and heavy industry made the urban structure in the three northeastern provinces extremely stable, but this also led to a lack of vitality and autonomy in the market economy environment.

In recent years, with the support of national policies, cities in the central and western regions have developed relatively rapidly. However, due to the stable industrial structure in the Northeast region, despite long-term efforts in various aspects, the development of the three northeastern provinces has been difficult to reverse the long-term decline. Difficulties in industrial transformation, severe environmental pollution, slow economic growth, and the lack of support from new technology industries have all led to a large outflow of talents.

3.6. The Matthew effect between northern and southern cities

The Matthew effect is a term commonly used by sociologists and economists, reflecting the phenomenon of the rich getting richer and the poor getting poorer, a form of social polarization.

The Matthew effect has made the gap between northern and southern cities increasingly obvious. Compared with the north, the southern region has accumulated obvious advantages in terms of economy, ideology, and other aspects. The southward shift of China's economic center from the end of the Han Dynasty and the Three Kingdoms period to the Song Dynasty made the southern region the economic center of the country. The long-term accumulation of advantages in economy, ideology, and other aspects has enabled the southern region to lead the northern region. Due to the obvious regional advantages, the southern region can attract more talents, thus forming a virtuous cycle of talents, which has also led to the current outflow of talents from the Northeast region.

3.7. The humanistic environment and urban construction need improvement

Overall, compared with northern cities, southern cities have better infrastructure construction. In terms of urban supporting facilities, the transportation network, urban appearance, and leisure and entertainment facilities are generally better. In addition, many southern cities have rich cultural heritage and humanistic connotations. Intellectual groups have certain preferences for the cultural quality of cities. Therefore, the "city cards" of southern cities also attract high-end talents to move there[8].

3.8. Insufficient innovation and development of enterprises, weak

employment creation through entrepreneurship, and incomplete talent policies

In recent years, the research and development (R&D) activity funds and full-time equivalent of large-scale industrial enterprises in the Northeast region have been far lower than those of the six central provinces (see Figure 3). In Northeast China, large-scale industrial enterprises lack the impetus for innovation-driven development, and state-owned enterprises lag behind in supply-side structural reform. The professional structure of graduates does not match the demand structure of industrial development, and there is limited space for absorbing college students through innovation and entrepreneurship. Meanwhile, compared with the eastern and central and western regions, policies in Northeast China that encourage "mass entrepreneurship and innovation" and promote employment are relatively backward. Talent policies in large and medium-sized cities lack precision in attracting, utilizing, cultivating and retaining talents. There is no comparative advantage in terms of graduate settlement, employment public services and living facilities. In addition, the service awareness of government departments is insufficient, and the talent development environment and ecosystem need to be optimized urgently. In some areas, there are still problems such as emphasizing evaluation over utilization, emphasizing introduction over cultivation, and emphasizing introduction over utilization in talent introduction, selection and evaluation. Some experts point out that some service policies are difficult to implement. For example, schools convey that high-end talents can enjoy a green channel when seeking medical treatment, but when they go to the hospital to consult, the hospital is not aware of this situation. Some local policies state that the children of high-end talents can be taken care of in terms of school enrollment, but in practice, they often need to go through very complicated procedures. All these show that there are still many problems in the talent introduction policies in Northeast China.
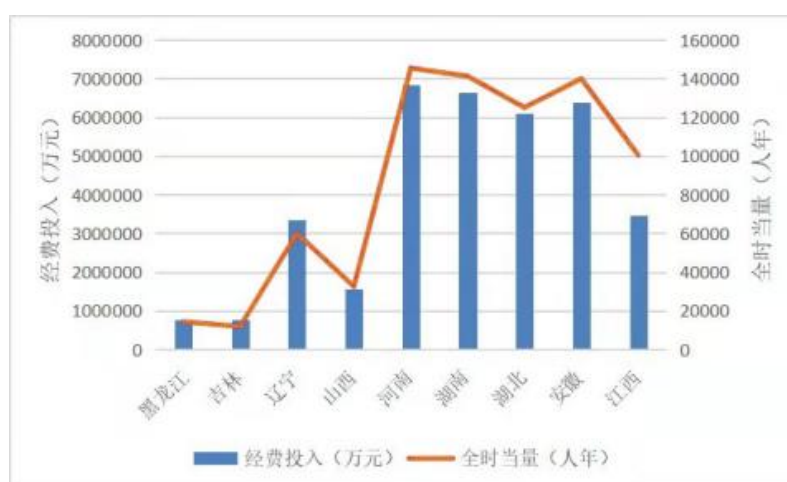

Figure 3. Comparison of R&D situations of large-scale industrial enterprises in the three northeastern provinces and the six central provinces（The six provinces include Shanxi, Henan, Hunan, Hubei, Jiangxi and Anhui）

Source: Compiled based on data from the National Bureau of Statistics

4. Countermeasures: Measures that urban planning can take to address the issue of talent outflow in Northeast China

4.1. Optimize the spatial development pattern of the three northeastern provinces, form metropolitan areas, and drive regional economic and industrial development

From the perspective of the provincial urban spatial network correlation structure, attach importance to large-scale ecology, large-scale agriculture, and the large-scale urban spatial structure. Large cities and their metropolitan areas should strengthen cooperation with cities inside and outside the region, gather advantages for development; medium and small cities should improve their quality and integrate into the regional network in characteristic fields. Compared with urban agglomerations, more attention should be paid to the cultivation and functional development of metropolitan areas of provincial capitals and secondary central cities, and further cultivate the Liaozhongnan urban agglomeration to make greater contributions to the urbanization and industrial economic development of Northeast China.

4.2. Utilize the advantages of the old industrial base and old factories in Northeast China to transform into new manufacturing and new producer services

As Northeast China is a heavy industrial base, there are many old industrial areas and old factories. Such industrial land can be updated to other uses to generate economic value. A successful case is the Ice Mountain Wisdom Valley in Dalian, which revitalized the Dalian Refrigeration Machinery Factory and turned it into a cultural and creative park, meeting various demands such as business, office, and tourism. However, there are still many old industrial sites in Northeast China that have not been utilized rationally, such as the old shipyard in Harbin and the Harbin Bearing Factory. In the next step, these old factories should be transformed and utilized rationally.

4.3. Improve the living environment through urban renewal to rejuvenate old cities

At present, the principal contradiction in Chinese society has transformed into the contradiction between the people's ever-growing needs for a better life and unbalanced and inadequate development. The people's aspiration for a better life should be implemented in the continuous improvement of the living environment. When people first come to Northeast

China, their first impression is often of old and dilapidated conditions. Compared with southern cities, Northeast China indeed lacks vitality, and the living environment needs to be improved. Cities such as Shenyang, Harbin, and Changchun have successively announced their full commitment to urban renewal actions, including old residential areas, old industrial zones, old commercial districts, historical and cultural cities, and industrial cultural relics. It is believed that through urban renewal, the three northeastern provinces can improve the living environment, rejuvenate urban areas, and attract talent to stay.

4.4. Strengthen the construction of science and technology parks in key universities, promote the coordinated development of industry, academia, research and application, and enhance the transformation of achievements

Northeast China has four "985 Project" universities and eleven "211 Project" universities, but the region has not made good use of its university resources. The coordinated innovation among industry, academia, research, and application needs to be broken through, and the local conversion rate of scientific and technological achievements is low.

In planning, consideration should be given to strengthening the construction of university science and technology parks. For example, provide complete service facilities for science and technology parks, rationally arrange the internal structure of science and technology parks, beautify the internal landscape space of science and technology parks, and optimize the transportation routes between universities and science and technology parks. At the same time, efforts should be made to establish high-standard innovation source platforms, attract high-level laboratories to settle in, closely combine university scientific and educational intellectual resources with market-oriented innovative resources, promote the integration of innovation resources, the transformation of scientific and technological achievements, the incubation of scientific and technological entrepreneurship, the cultivation of innovative talents, and open and coordinated development, and integrate industry, academia, research, and application to promote the economic and technological development of Northeast China.

4.5. Highlight cultural and tourism characteristics to attract talent aggregation

Many people initially get to know a city through tourism. Therefore, the development of the tourism industry to a certain extent determines the attractiveness of the city. If talents have a good first impression of a city, it is likely to become one of their future employment options. Cities like "Ice City" Harbin, "Romantic City" Dalian, and "Spring City of the North" Changchun are always on the list of recommended tourist cities. Developing characteristic cultural and tourism industries is an excellent way to create a brand for Northeast China. Northeast China has high-quality tourism resources with strong seasonality and regional characteristics. Highlighting ice and snow tourism, coastal culture, and border

characteristics can attract tourists to visit. In urban planning, it is necessary to combine the city's characteristics to focus on building tourism demonstration zones. At the same time, it is important to enhance supporting service facilities and service management, and create convenient facilities such as tourism special lines, so that tourists can experience the regional characteristics while also feeling the warmth of being at home, attracting talents to linger and return again and again.

4.6. Design dynamic and youthful communities to generate cultural clustering effects

After the smooth transition of talents, the issue of home purchase needs to be considered. First, it should be understood that the characteristics of this group are: limited funds but high requirements for living quality; fond of following trends and having certain entertainment demands. It is advisable to design high-quality dynamic communities with good cost performance for young people to meet their spiritual needs. For instance, the popular "Jinmao Beijing International Community" has three eye-catching features: high-quality property services; low total price with fine decoration; and a self-built dynamic art commercial street, which attracts young people to compete for this project.

In Northeast China, it is also possible to consider building shared communities for young people, equipped with dynamic art commercial streets. Young people gather together, generating cultural clustering effects, allowing them to balance work and entertainment, and meet their needs for making friends and hosting guests. For young people, spiritual needs are also an important part of life. With both satisfactory material income and pleasant spiritual enjoyment, talents will naturally choose to stay in Northeast China and continue to develop.

4.7. Technology-driven, building a smart Northeast

There are 29 "smart city" pilot cities in the three northeastern provinces. Currently, the construction of smart cities has entered the technology-driven 2.0 era, and "digitalization" construction will become the foundation and focus of future urban smartization.

In terms of planning, the three northeastern provinces can further develop smart cities, bringing the Internet of Things and big data into citizens' lives. For example: building intelligent transportation facilities. Enhance the intelligent level of traffic management, promote the construction of intelligent rail transit facilities, and create smart ports and smart airports, making citizens' travel more convenient; develop new social infrastructure, improve the digital level of public services, and enhance the efficiency of handling affairs; build smart education infrastructure, smart medical infrastructure, etc., making citizens' lives more comfortable. This can not only drive the development of the information technology industry in Northeast China and provide more job opportunities, but also attract more talents to develop in Northeast China as the cities progress.

5. Conclusion

This paper finds that the problem of talent outflow in Northeast China is rather serious, which to some extent affects the optimization of the industrial structure and the economic and social development of the region. Taking the issue of talent outflow in Northeast China as the research object and guided by the push-pull theory and Maslow's hierarchy of needs theory, this paper first conducts a survey on the talent development environment in Northeast China, focusing on the current economic development situation, salary conditions, consumer prices, etc. The main reasons for talent loss in Northeast China are summarized as follows: First, the disadvantages of natural conditions and geographical location; second, the influence of national policy orientation; third, the continuous sluggish economic development; fourth, the low overall salary and welfare levels; fifth, the failure of industrial transformation and the lack of new technology industries; sixth, the Matthew effect between northern and southern cities; seventh, the need to improve the humanistic environment and urban construction; eighth, the insufficient innovation and development of enterprises, weak ability of entrepreneurship to drive employment, and the imperfection of talent policies, among other factors.

Based on the analysis of the causes, the following measures can be taken in urban planning: First, optimize the spatial development pattern of the three northeastern provinces to form urban agglomerations and drive regional economic and industrial development; second, take advantage of the old industrial base and old factories in Northeast China to transform towards new manufacturing and new producer services; third, improve the living environment through urban renewal and rejuvenate old cities; fourth, strengthen the construction of science and technology parks in key universities to promote the coordinated development of industry, academia, research, and application, and enhance the transformation of achievements; fifth, highlight cultural and tourism characteristics to attract talent aggregation; sixth, design vibrant and young communities to generate cultural cluster effects; seventh, drive with technology and build a smart Northeast.

Solving the problem of talent outflow in Northeast China is a long and arduous task. It is believed that under the guidance of the government, with reasonable urban planning and the efforts of all sectors of society,

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