

Regional Economic Linkages and Evolution along the New Western Land and Sea Corridor

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Abstract: In order to study the degree of economic linkages among western regions and promote coordinated development among regions. Based on the economic development of 13 regions in 2000, 2010 and 2019, the article uses a modified gravity model to measure the strength of economic linkages in each region, and then analyzes the economic network structure of the regions along the Western Land and Sea New Corridor from three aspects: network density, core-edge relationship and multidimensional centrality through social network analysis methods. The results show that, firstly, the amount of economic ties among the 13 regions along the Western Land and Sea Corridor is low, but the overall trend is one of rapid growth, and the regions are becoming more and more closely connected. Secondly, the density of linked networks in the 13 regions along the New Western Land and Sea Corridor is steadily increasing, with cities in the core and peripheral areas evolving and being influenced by national policies, and the phenomenon of multiple cores coming to the fore. Finally, the rise of non-core regions, the status of core regions is constantly diluted, and the unevenness of the structure of the economic linkage network is improved. And suggestions are made to promote the coordinated economic development between regions.

1. Introduction

On 15 August 2019, the National Development and Reform Commission released the "Western Land and Sea New Corridor Master Plan", which officially elevates the Western Land and Sea New Corridor to a national strategy. It is also an important initiative to promote in-depth regional economic cooperation. So far, the "New Western Land and Sea Corridor" has been expanded from the initial four provinces to 13 provinces and municipalities, which are not at the same level of economic development and have different degrees of economic ties, so it is important to understand more intuitively and deeply the links between them and to promote each region to give full play to its own advantages^[1]. Strengthening synergy and cooperation and promoting the rational allocation of resources within the region are important measures to promote the dual domestic and international cycle, and are also important strategic directions for national economic development.

2. Research Methodology

2.1 Modified gravity model

In order to gain a deeper and clearer understanding of the degree of economic linkages between the 13 provinces and urban areas along the New Western Land and Sea Corridor, this paper adopts a modified gravitational force model^[9] to conduct an accurate analysis and study of the strength of economic linkages among these 13 provinces and urban areas. Due to the different scale of economic development in each region resulting in different gravitational contributions, a correction factor α is introduced and calculated as follows.

$$F_{ij} = \alpha \cdot \frac{\sqrt{p_i q_i} \times \sqrt{p_j q_j}}{D_{ij}^2}, \alpha = \frac{p_i}{p_i + p_j},$$
$$C_i = \sum F_{ij}. \quad (1)$$

In the formula: F_{ij} is the intensity of economic ties between regions i, j ; p_i, q_i and p_j, q_j are the GDP (gross product) and year-end resident population of regions i, j respectively; D_{ij} is the linear distance between regions i, j ; C_i is the amount of economic ties in city i .

2.2 Social network analysis method

Social network analysis^[8] is widely used in academia to study the actors in structural networks and their relationships with each other. This paper uses the social network analysis software Ucinet 6.0 to measure the overall network structure of the 13 regions along the New Western Land and Sea Corridor using the network density, core-edge model, and the position of individual regions in the network structure using centrality-related indicators.

2.2.1 Network density

The higher the density value, the stronger the tourism economic ties between the node cities in the region, calculated as follows:

$$D = \sum_{i=1}^n \sum_{j=1}^n d(k_i, k_j) / n(n-1). \quad (2)$$

In the formula: D is the network density value, taking the range of $[0, 1]$; n is the number of areas along the new western land and sea corridor; if there are links between cities i and j then $d(k_i, k_j)$ is 1, otherwise it is 0.

2.2.2 Core-edge model

The core-edge model was used to derive the core and edge areas of the economic spatial structure of the 13 regions along the New Western Land and Sea Corridor, and to further discover the tourism economic linkages of the various nodal areas along the corridor.

2.2.3 Centrality

The centrality indicates the role of the node in the overall urban network and is divided into point centrality, near centrality and intermediate centrality. The formulae are calculated as follows.

$$\begin{aligned}
C_{RD(i)} &= \frac{C_{AD(i)}}{n-1}, \\
C_{RP(i)}^{-1} &= \frac{\sum_{j=1}^n d_{ij}}{n-1}, \\
C_{RB(i)} &= \frac{2 \sum_j \sum_k g_{jk}(i) / g_{jk}}{(n^2 - 3n + 2)}.
\end{aligned} \tag{3}$$

In the formula: $C_{RD(i)}$ denotes the point degree centrality of node i , $C_{RP(i)}^{-1}$ denotes the proximity centrality of node i , $C_{RB(i)}$ denotes the intermediate centrality of region i ; $C_{AD(i)}$ denotes the number of points in the network connected to i , n is the number of regions along the new Western Land and Sea Corridor, d_{ij} is the distance between i and j . g_{jk} is the number of shortcuts between j and k ; $g_{jk}(i)$ is the number of shortcuts through i that exist between j and k .

3. Analysis of the intensity of economic ties along the new western land and sea corridor

The amount of economic linkages in 2000, 2010 and 2019 for the 13 regions along the New Western Land and Sea Corridor were calculated according to the modified gravity model formula, and the results are shown in Table I. From the total economic linkage volume of the 13 regions, the total economic linkage intensity from 2000 to 2019 shows a leapfrog upward trend in general, which indicates that the economic linkage between the regions along the New Western Land and Sea Corridor is getting closer and closer, which has an important relationship with the economic development level of each region, the progress of logistics and transportation as well as the cooperation and communication between governments.

Table 1: Volume of regional economic linkages along the New Western Land and Sea Corridor, 2000, 2010 and 2019

City	2000			2010			2019		
	economic relatio	proportion	rank	economic relatio	proportion	rank	economic relatio	proportion	rank
Szechwan	186.39	28.69%	1	799.42	27.88%	1	2354.34	27.59%	1
Chongqing	173.20	26.66%	2	747.10	26.06%	2	2240.71	26.26%	2
Guizhou	62.76	9.66%	3	261.78	9.13%	4	950.47	11.14%	3
Yunnan	62.67	9.64%	4	251.28	8.76%	5	792.27	9.29%	4
Shaanxi	49.79	7.66%	5	271.58	9.47%	3	727.46	8.53%	5
Guangxi	46.64	7.18%	6	198.90	6.94%	6	623.97	7.31%	6
Gansu	29.88	4.60%	7	136.71	4.77%	7	342.95	4.02%	7
Inner Mongolia	14.54	2.24%	8	79.69	2.78%	8	175.11	2.05%	8
Ningxia	8.31	1.28%	9	48.45	1.69%	9	124.72	1.46%	9
Qinghai	7.31	1.12%	10	36.00	1.26%	10	99.81	1.17%	10
Hainan	4.57	0.70%	11	18.50	0.65%	11	52.16	0.61%	11
Xinjiang	3.56	0.55%	12	16.83	0.59%	12	45.75	0.54%	12
Xizang	0.14	0.02%	13	0.68	0.02%	13	2.68	0.03%	13

In terms of the volume of economic ties of each region, from 2000 to 2019, the economic ties of all 13 regions along the route have maintained an upward trend, and the degree of ties between each region and other regions has gradually deepened^[2]. Among the regions along the route, the economic ties of five regions - Sichuan, Chongqing, Guizhou, Yunnan and Guangxi - in 2000, 2010 and 2019 have been in the top five regions along the route, with a better foundation for economic development, a relatively high level of economic development, and somewhat higher economic ties

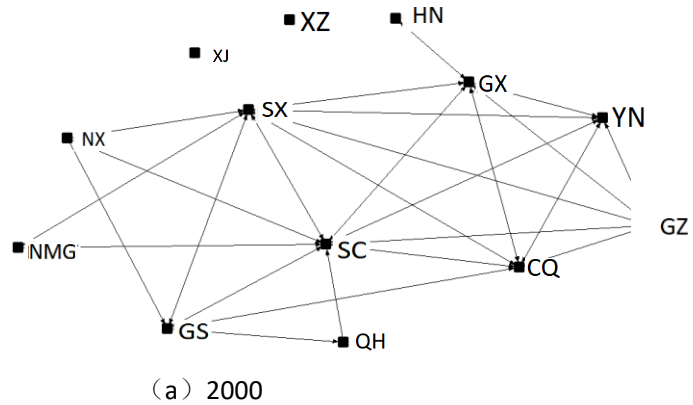
with other regions along the route^[3]. Shaanxi, Hainan and Gansu are next in line, and by the data are far from the first tier in terms of the volume of economic ties, and there is a large gap in the level of economic development. While Qinghai, Inner Mongolia, Ningxia, Xinjiang, Tibet and Hainan have seen an increase in the volume of economic ties in 2000, 2010 and 2019, the total amount of data is still very low and there are very few economic ties with neighbouring cities, mainly due to their more distant geographical location and backward level of economic development, and the complex topographical conditions have caused huge difficulties in the construction of transport in these regions, and further improvement of Infrastructure development is an important direction to enhance the strength of economic links between regions.

4. Analysis of the economic network structure along the new western land and sea corridor

Based on the modified gravity model, the economic linkage intensity values for the three time sections of 2000, 2010 and 2019 were calculated, resulting in three initial matrices of 13 x 13. To accommodate the software analysis, the median economic linkage intensity value of 2.51 was selected as the cut-off value for the economic linkage network, and an economic linkage value greater than 2.51 was considered to be a strong (above A value greater than 2.51 is considered to be a strong (above the median level) economic linkage between the two regions (assigned a value of 1), while a value less than 2.51 is considered to be a non-existent economic linkage (assigned a value of 0). This results in a dichotomous matrix of economic linkages along the new Western Land and Sea Corridor, consisting of only 0 and 1.

4.1 Visual analysis of economic network structure

By integrating the three 13×13 initial matrices formed by the economic linkage intensity values of the regions along the New Western Land and Sea Corridor in 2000, 2010 and 2019, the spatial structure of the economic linkages of the 13 regions along the New Western Land and Sea Corridor was drawn using the Netdraw function by inputting the Ucinet 6.0 software in turn, as shown in Figure 1.



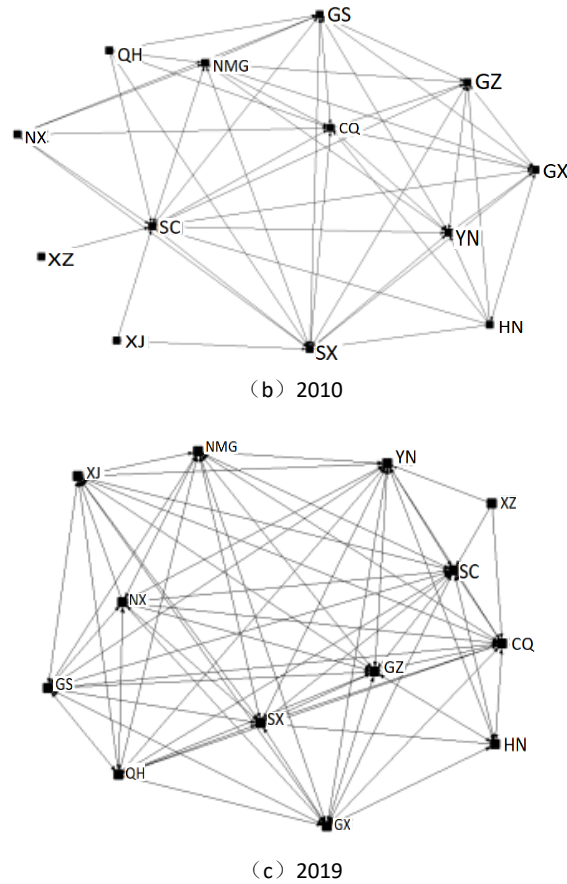


Figure 1: Structure of the economic linkage network of 13 regions along the new western land and sea corridor

From Figure 1, it can be seen that the structure of the network of economic links along the new Western Land and Sea Corridor has changed considerably from 2000 to 2019, with the network structure being relatively loose in 2000 and becoming more closely linked in 2019, which indicates the increasing economic links in these regions^[4].

In 2000, the structure of the economic linkage network along the New Western Land and Sea Corridor was relatively loose, and the effective relationship lines between regions were relatively sparse, among which, Chongqing, Guangxi, Sichuan, Guizhou, Gansu, Yunnan and Shaanxi were relatively more connected with other cities, followed by Ningxia, Qinghai, Inner Mongolia and Hainan, while Xinjiang and Tibet were basically unconnected with other regions, which was closely related to the geographical location and complex In 2010, the structure of the economic linkage network along the route became relatively complex, with an increase in the number of effective relationship lines^[5]. Chongqing, Guangxi, Sichuan, Guizhou, Gansu, Yunnan and Shaanxi remained the regions with more links to other regions, while Ningxia, Qinghai, Inner Mongolia and Hainan strengthened their links with other regions, with an increase in the number of effective linkage lines, and Tibet established links with the closer Sichuan While Xinjiang has established links with Sichuan as well as Shaanxi, the structure of the economic linkage network between the regions tends to be closer. 2019 saw a marked increase in the economic linkage network in all regions, with closer inter-regional economic ties. The most significant change was in Xinjiang, where direct economic ties were established with almost all regions. Xinjiang is at the heart of the Belt and Road

Initiative, the gateway to the North Road of the Silk Road Economic Belt and a bridge between China's interior and East Asia, and the development of the Belt and Road has given full play to Xinjiang's connectivity, resulting in a more dense network of economic links^[6]. The development of the Belt and Road has given full play to Xinjiang's connectivity, making it a more dense network of economic links.

4.2 Analysis of the overall network structure of the economy

4.2.1 Network density analysis

The network density along the new Western Land and Sea Corridor was calculated using the "network-cohesion-density" software Ucinet 6.0, and the results are shown in Table 2.

Table 2: Density of regional economic linkage networks along the New Western Land and Sea Corridor, 2000, 2010 and 2019

result	2000	2010	2019
network density	0.28	0.50	0.72
rate of increase/%		81.42	44.88
Correlation Coefficient	43.00	78.00	113.00

From Table 3, it can be obtained that the network density of regional economic ties along the Western Land and Sea New Corridor showed a steady growth overall in 2000, 2010 and 2018, and there is a trend of accelerated growth. in 2000, there were only 43 effective relationship lines between regions along the Western Land and Sea New Corridor, and the network density was also very low, just 0.2567, with relatively few inter-regional economic ties. in 2010, the number of effective relationship lines between regions along the Western Land and Sea New Corridor increased to 78, and the network density also rose to 0.5, an increase of 81.42% over the previous period. In 2010, the number of effective lines along the new Western Land and Sea Corridor increased to 78, and the network density rose to 0.5, an increase of 81.42% over the previous period. increased to 113, and the economic network density of the regions continued to grow, reaching 0.7244, an increase of 44.88% from 2010, with increasing economic cooperation and exchange between cities.

4.2.2 Core-edge model analysis

Table 3 Core-edge structure of the economic linkage network, 2000, 2010 and 2019

partition	region		
	2000	2010	2019
core area	Chongqing Guangxi Sichuan Guizhou Gansu Qinghai Ningxia Yunnan Shaanxi Inner Mongolia	Chongqing Guangxi Sichuan Guizhou Gansu Ningxia Yunnan Shaanxi Inner Mongolia	Chongqing Guangxi Sichuan Guizhou Gansu Qinghai Ningxia Yunnan Shaanxi Inner Mongolia Xinjiang
fringe area	Hainan, Xinjiang, Xizang	Qinghai Xinjiang Xizang Hainan	Hainan, Xizang

Based on the data obtained, Ucinet 6.0 software was used to measure the core-periphery structure of the economic linkage network along the new Western Land and Sea Corridor in 2000, 2010 and 2019, and the results are shown in Table 3.

The statistical results from Table 4 show that the core and peripheral areas along the new western land and sea corridor are in a state of continuous evolution in 2000, 2010 and 2019. in 2000,

Chongqing, Guangxi, Sichuan, Guizhou, Gansu, Qinghai, Ningxia, Yunnan, Shaanxi and Inner Mongolia are all located in the core area and have established economic links with other regions, while Xinjiang, Tibet and Hainan are in the peripheral area and have less economic links with The high cost of economic ties due to geographical location and transport constraints has prevented them from better economic cooperation with other regions^[7]. 2010 saw no significant breakthrough in economic exchanges in the core regions of Chongqing, Guangxi, Sichuan, Guizhou, Gansu, Ningxia, Yunnan, Shaanxi and Inner Mongolia, but instead the marginal regions added Qinghai, increasing the number of marginal regions to four They are Qinghai, Xinjiang, Tibet and Hainan. From the statistics, it can be seen that the GDP of Qinghai province increased from 26.368 billion yuan in 2000 to 114.418 billion yuan in 2010, which is several times higher, but a comparison with other regions will show that the GDP of Qinghai province in 2010 was lower than all regions except Tibet (with a GDP of 50.746 billion yuan) and was in the second last place among the regions in the same period, therefore Qinghai Province was classified as a fringe region in 2010. In 2019, the core regions along the New Western Land and Sea Corridor increased to 11, namely Chongqing, Guangxi, Sichuan, Guizhou, Gansu, Qinghai, Ningxia, Yunnan, Shaanxi, Inner Mongolia and Xinjiang, while only Tibet and Hainan remained in the fringe region, and Xinjiang was classified as a core region. It is clear that in 2013, when the "Belt and Road " initiative, Xinjiang's economy has taken a huge leap forward^[12] . Overall, the core and peripheral zones of economic development are evolving, generally in a more rational direction.

4.3 Analysis of individual network structure

Using the statistical data, the "Network-centrality" in Ucinet 6.0 software was used to calculate the point-centrality, proximity-centrality and intermediate centrality of the areas along the new Western Land and Sea Corridor in 2000, 2010 and 2019, as shown in Table 4.

Table 4: Analysis of the centrality of the economic spatial network structure, 2000, 2010 and 2019

City	degree centrality			closeness centrality			betweenness centrality		
	2000.000	2010.000	2019.000	2000.000	2010.000	2019.000	2000.000	2010.000	2019.000
Chongqing	6	10	12	30.000	85.714	100.000	3.750	2.367	4.033
Guangxi	6	8	11	30.000	75.000	92.308	17.250	11.667	1.700
Szechwan	9	12	12	32.432	100.000	100.000	24.083	16.367	10.200
Guizhou	5	8	11	28.571	70.588	92.308	2.000	0.500	1.700
Gansu	5	9	10	27.907	80.000	85.714	10.833	16.867	3.167
Qinghai	2	5	10	23.077	46.154	60.000	0.000	0.000	0.000
Ningxia	3	5	10	7.692	52.174	63.158	0.000	0.000	0.250
Yunnan	5	8	12	29.268	75.000	100.000	0.250	0.667	4.033
Xinjiang	0	2	10	7.692	7.692	85.714	0.000	0.000	0.000
Shaanxi	8	11	11	29.268	92.308	92.308	16.833	12.367	4.667
Inner Mongoli	2	9	10	24.000	80.000	85.714	0.000	1.200	1.250
Xizang	0	1	3	7.692	7.692	7.692	0.000	0.000	0.000
Hainan	1	6	6	24.490	44.444	63.158	0.000	0.000	0.000

4.3.1 Point degree centrality analysis

The higher the degree of point centrality is, the more the region is directly connected to other regions. Table 4 shows that in 2000, 2010 and 2019, the point degree centrality of the regions along the new Western Land and Sea Corridor has been increasing, indicating that the number of regions directly connected with each region has been increasing. 2000, Sichuan and Shaanxi have higher point degree centrality than other regions, and have more direct connections with the surrounding areas, and have a greater influence among the regions along the corridor and are in the centre^[10]. In contrast, Qinghai, Ningxia, Inner Mongolia and Hainan had lower point degree centrality and were on the periphery, hindered by their geographical location and altitude, making it difficult to establish direct economic links with other regions, while Xinjiang and Tibet even had zero point degree centrality, areas without any direct links and with very weak economic influence. 2010 saw an increase in overall point degree centrality, with Sichuan and Shaanxi still being the highest

Chongqing followed closely behind, rising to third place, with its 2009 'urban-rural integration' and 'Liangjiang New Area Plan' making significant progress and leading to rapid economic development. Xinjiang and Tibet have also escaped the 0 point-centredness mark and have both established links with neighbouring cities. 2019 has seen rapid growth in total point-centredness across all regions, especially Xinjiang, which has seen a leap from 2 to 10 as a result of national policies such as the Belt and Road Initiative. In addition, Chongqing, Yunnan and Sichuan are tied for first place, and other regions have also seen significant growth. National policies are increasingly supportive of economic cooperation and exchange in the western region, bringing brighter prospects for economic ties in the west.

4.3.2 Proximity centrality analysis

The higher the proximity to the centre, the closer the region is to other regions, and the stronger the centrality. Table 4 shows that in 2000, 2010 and 2019, the proximity centrality of the 13 regions along the New Western Land and Sea Corridor is on the rise, indicating that the economic cooperation among the regions is increasing. In 2010, the overall proximity to the centre grew significantly, with Sichuan still in first place, its rich economic base and relative proximity to the centre giving its economic network more vitality. The fastest growing region is Xinjiang, which is growing rapidly under the auspices of the Belt and Road Initiative. The region along the new Western Land and Sea Corridor is developing towards a multi-core pattern of radiation in all directions.

4.3.3 Intermediate centrality analysis

The degree of intermediate centre of each region represents the role played by the region in the overall economic network, and the larger the intermediate centre, the stronger the role in connecting the entire economic network. As can be seen from Table 4, in 2000, Sichuan was definitely ahead of the other regions in terms of intermediate centrality and played the strongest role in the overall economic network, thanks to its long-term economic accumulation advantages and better infrastructure. In 2010, Sichuan's intermediate centrality tended to decline, with Gansu showing a reverse trend and Sichuan's ability to control the economy being weakened, with the number of cities with intermediate centrality of 0 falling to Qinghai, Ningxia, Xinjiang, Inner Mongolia, Tibet and Hainan. In 2019, the overall degree of intermediate centres declined, but the number of cities with zero intermediate centres changed to four, namely Qinghai, Xinjiang, Tibet and Hainan, with more cities participating in the control of the entire economic network and more regions playing a role in connecting the entire economic network^[11]. The economic gap between the regions along the new western land and sea corridor is narrowing, the economic influence of major regions such as Sichuan is broken down and the whole economic network structure is progressing towards a more balanced and rational direction.

5. Conclusions and Recommendations

5.1 Conclusion

This paper uses a modified gravity model to analyse the strength of economic ties in 13 regions along the new western land and sea corridor, and on this basis constructs an economic spatial network matrix, and uses social network analysis to measure the overall and individual network pattern of the economy along the new western land and sea corridor in terms of network density, core-edge model and centrality, and obtains the following conclusions.

In terms of total economic ties, the 13 regions along the New Western Land and Sea Corridor

showed steady growth overall in 2000, 2010 and 2019, with the barriers to economic exchange between the regions gradually weakening and economic ties and cooperation becoming closer.

In terms of the overall economic network structure, in terms of network density, the economic network density along the Western Land and Sea New Corridor was in a state of continuous growth in 2000, 2010 and 2019, with a growing sense of economic coordination and cooperation between regions. From the core-edge model, the core and edge areas of the regions along the Western Land and Sea New Corridor were in a state of continuous evolution in 2000, 2010 and 2019, and the overall development tended to be more balanced.

In terms of the structure of the individual economic network, from the point centrality, the point centrality of the regions along the new western land and sea corridor in 2000, 2010 and 2019 is a continuous growth, and the economy between the regions will be closer and closer. From the perspective of proximity centrality, the proximity centrality of each region in 2000, 2010 and 2019 has grown significantly, the total distance between regions has gradually decreased, and the development trend of multi-core economy has been strengthened. In terms of intermediate centrality, the intermediate centrality of core cities such as Sichuan gradually decreases in 2000, 2010 and 2019, but Inner Mongolia and Ningxia regions gradually move away from the intermediate centrality of 0. More regions play a role in urban economic network connections, and the control of core cities is constantly being decomposed.

5.2 Recommendations

First, enhance the strength of internal development and cultivate a hub economy. Give full play to the driving role of Sichuan and Chongqing to lead and radiate the economic development of the surrounding areas and create more competitive city clusters. Accelerate the construction of city clusters such as Sichuan and Chongqing, Qianzhong and Beibu Gulf, and make use of the national policy of east-west counterpart support to implement the construction of one-to-one support from the more developed cities in the east to the western region, so as to build a western central city with stronger radiation capacity. Relatively backward pivotal areas actively undertake the transfer of industries from the east, smooth the regional industrial cycle, clarify the division of labour, give full play to their comparative advantages, and promote the construction of an integrated regional industrial layout.

Second, to enhance external help to invoke power, reduce barriers between regions, and promote the free flow of resources, technology, capital and talent. To play the role of a carrier for the new Western Land and Sea Corridor, it is particularly necessary to promote innovative market mechanisms for the efficient circulation of factors across regions, simplify the engagement in commercial and trade activities across regions, form intelligent and informative processing of approval procedures, and relax the path for more convenient circulation of factors. In addition, strengthen financial investment cooperation between regions along the new Western Land and Sea Corridor, activate the vitality of capital in the region, and create a highly cooperative platform where finance, logistics and economy are integrated into one.

Third, improve the construction of regional transport infrastructure and promote the integrated development of logistics. We will apply various modes of intermodal transport such as road-railway-river, road-railway-sea, etc., build a system of multimodal transport hubs, and comprehensively promote the development of land, river and sea transport linkages. It is necessary to speed up the construction of "single window", promote the digitization and informatization of transportation, strengthen the connection and coordination of high-speed railways, national highways and ports, dry ports and airports, improve the developed transportation network of multimodal transportation, and open up the last kilometre of logistics transportation in the new

western land and sea corridor.

Fourth, strengthen government policy support and clarify the direction of development. The implementation of the eastern and western local counterpart assistance and assistance plan urges the nine provinces in the east to provide one-to-one assistance to the western region in planning and development, give full play to the role of the 22 national development zones in the east, and provide counterpart assistance to the 17 development zones in the west, give full play to the government's fiscal and taxation policy support, encourage excellent domestic and foreign enterprises to invest in the western region, lower the investment threshold, relax the transfer payment conditions in the western region, improve the investment business environment, and enhance the government's public service capacity. Use policies to guide outstanding college graduates to support the economic development of the western region, combine the ability of the western region to develop itself with the ability to obtain external support, promote coordinated regional development, and promote a more balanced and reasonable high-quality development of the western land and sea new corridor.

References

- [1] Yang Yaoyuan. *The key path to promote the high-quality development of the new western land and sea trade corridor under the new development pattern of "double cycle"*[J]. *Business and Economic Research*, 2021(07):145-150.
- [2] Fu Yuanjia. *Research on high-level construction of new land and sea corridors in western China*[J]. *Regional Economic Review*, 2019(04):70-77.
- [3] Wang Jingmin. *Challenges and solutions to the construction of the logistics system of the "Western Land and Sea New Corridor"* [J]. *Foreign Economic and Trade Practice*, 2019(05):83-85.
- [4] Quan Yi. *The construction of western land and sea corridor and new ideas of southwest opening and development* [J]. *Economic system reform*, 2021(02):50-55.
- [5] Yu Chuanjiang, Gong Qinlin, Li Zongzhong, Tan Ying, Zhang Lina. *Study on the development path of "Western Land and Sea New Corridor" from the perspective of open corridor economic development model--based on the analysis of domestic provinces and international competition and complementary relationship*[J/OL]. *Journal of Chongqing University (Social Science Edition)*:1-15 [2021-05-10].
- [6] Zhao Mingfei, Chang Ting, Xiang Ye. *An empirical study on the efficiency of resource allocation for economic integration of 14 provinces and cities in the construction of new land and sea corridors - a comparative analysis of the efficiency of Chongqing's transportation industry*[J]. *Statistical Theory and Practice*, 2021(02):10-16.
- [7] Ma Zihong. *The construction of new land and sea corridors and the reshaping of western development pattern* [J]. *Thought Line*, 2021, 47(02):84-92.
- [8] Zong Huiming, Du Yu, Huang Yan. *Land transport accessibility and urban spatial connectivity patterns in Southwest China-Southeast Asian countries* [J]. *Economic Geography*, 2020, 40(05):90-98.
- [9] Zhou Liangjun, Qiu Qingda, Chen Qiang. *A study on the characteristics of the spatial association network of the sports industry in Guangdong, Hong Kong and Macao Greater Bay Area--based on gravitational model and social network analysis* [J]. *Guangdong Social Science*, 2021(02):100-108.
- [10] Dong Zunmeng, Li Xiaodong, Li Yixing. *Structural evolution and driving mechanism of Xinjiang's tourism economy network* [J]. *Geographical Research and Development*, 2018, 37(05):106-111.
- [11] Tao Weirong. *The evolution of tourism economic network structure and spatial development pattern of Hunan counties in the Wuling Mountains Area* [J]. *Economic Geography*, 2020, 40(12):211-220.
- [12] Jiang YM, Li X. *Study on the economic integration of Sichuan, Chongqing and Qian to promote the construction of twin-city economic circle in Chengdu and Chongqing region* [J]. *Western Forum*, 2020, 30(05):43-56.