

# Research Prospect on the Relationship between Transportation and Regional Economy in the Hui Nationality Agglomeration of China

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## *Abstract*

Transportation has a guiding role for economic development and economic structure optimization, economic development will also put forward new requirements for transportation systems continually. In order to promote the healthy and sustainable development of Hui ethnic community, it is necessary to research the interactions between transportation and regional economy, coupling relationships and optimization configuration methods of the area systematically. Firstly, the paper analyzes the current research situation on transportation and regional economy, and puts forward the current problems existing in the research. Then, the paper proposes the future research prospects, including the research contents, research difficulties and research ideas. Finally, the paper draws the research conclusion, and points out that the study is helpful to measure and master the condition of transportation and regional economy development in Hui ethnic community, and promote the economic development of ethnic areas.

*Keywords: Transportation; Regional Economy; Agglomeration; Optimization*

## 1 INTRODUCTION

The Hui nationality is the mostly distributed nationality among Chinese minority nationalities. According to the result of China's sixth census statistics, the population of Hui nationality among the 55 ethnic minorities rank only second to the Zhuang nationality, the majority of its population live in the northwest region of our country, such as Ningxia, Gansu, Qinghai and Xinjiang, etc. These places have unique natural landscape, cultural environment, huge exploit potential, market capacity and development prospect. But due to the restriction of natural, economy and historical development, etc, the social productivity is relatively backward, the ability of resource exploitation and transformation is weak, and economic development and social progress is faced with a series of difficulties and obstacles. Therefore, how to speed up the economic development and social progress of Hui ethnic community and achieve the goal of build a moderately prosperous society in an all-round way is an important research subject. For a long time, the relationship research between transportation and regional economy is an important research subject. Transportation has a guiding role for economic development and economic structure optimization, economic development will also put forward new requirements for transportation systems continually. With the increase of regional economic integration and traffic infrastructure construction, whether transportation ability and the quality, in the Hui ethnic community of western areas, will meet the development requirements of the regional economy or not? What kind of impacts of the development of regional economy will be brought to the transportation system? How to promote the sustainable development of regional economy further through optimization and configuration of transportation systems resources? These are the issues which concerned commonly by some relevant departments, experts and scholars.

If there are no balanced development of traffic and the economy, the growth of regional will have defects. In order to promote the healthy and sustainable development of Hui ethnic community of northwest areas, it is necessary to research the interactions between transportation and regional economy, coupling relationships and optimization

configuration methods of the area systematically.

## 2 LITERATURE REVIEW

Many scholars have studied the close relationship between transportation and regional economy from different aspects. Angles studied the location of agricultural products, profit maximization of unit area land was used as the goal to conduct industry layout, the cost of agricultural production, the sale price of agricultural products and the shipping cost of agricultural products is regarded as the profit source, because the carriage was the only means of transportation that time, so it is the direct proportion relationship between the distance and freight. Alfred Weber and Kautz studied the difference relationship among scale of urban economy, scale of regional economy, scale of enterprise economy and freight, thought that transportation, which as an important influence factors, is closely associated with the regional economic space structure. Emile Quinet and Roger Vickerman proposed many economic principles related with transportation<sup>[1]</sup>. In recent years, with the development of economic integration and globalization, many international urban agglomerations gradually formed, north-western Europe international urban agglomeration is a typical case. Because transportation is connection of the link between the two cities, so it promotes the process of the urban agglomeration. And UN discussed the transportation of urban agglomeration, and did a lot of researches on the function and effect of the cities' channel, including spatial dynamics research, system functional effect analysis, and urbanization mechanism research and so on. In China, the problem of transportation and regional economy is a hot issue of the academic and theoretical circle, many experts and scholars published a lot of important paper for this issue, a lot of research achievements have been achieved. Fei HongPing studied the formation and evolution of industrial belt along Jiaoji, analyzed the basic characteristics between enterprise space behavior the and enterprise connection along Jiaoji geographical, discussed microscopic mechanism of industrial belt formation along Jiaoji, and the integrity development and layout planning was also discussed and so on<sup>[2]</sup>. Zhang put forward the concept of traffic economic belt, and suggested that traffic construction and economic development along the area should be conducted at the same time<sup>[3]</sup>. Lu studied regional development and spatial structure systematically<sup>[4]</sup>. Wu took Jingjiu railway as an example to analyze the mechanism of production and the space development model of the economic belt along the railway<sup>[5]</sup>. Wang studied the synergistic relationship between transportation and economic development by establishing gray system coordination model, and used the large system theory and method to establish comprehensive index and evaluation method which can reflect the transportation and economy coordinated development degree<sup>[6,7]</sup>. Yang and Han conducted an in-depth analysis and research on the basic definition, main properties, common type and evolution mechanism of the traffic economic belt<sup>[8,9]</sup>. You and Han et al. studied the related questions of expressway economic belt, such as the formation and evolution mechanism, the characteristics of the layout and the main steps<sup>[10,11]</sup>. Zhang et al. put forward the life cycle theory, such as the key is to explore the domestic several typical traffic economic belts and the generation motivation and development of the important traffic economic belt in Germany, France, and Japan<sup>[12]</sup>. Wang et al. firstly analyzed the features and the present situation of the urbanization process of the Hada traffic economic belt in northeast China, then explored the development situation and the future pattern of the Hada traffic economic belt urbanization response, at the same time proposed the strategy of sustainable development of urbanization process<sup>[13]</sup>. Liu and Zhao studied the interaction relations of regional transportation development and economic growth of central China, they thought that the guiding factor of traffic development is the rapidly increase of local economy level and the speed up of urbanization, meanwhile the improvement of the transportation network has significant promote effect for economic growth<sup>[14]</sup>. Wang and Sun studied the transportation influence of economic development inside the region, mainly analyzed the problem of how transportation is to promote the economic development and to promote the development of other industries<sup>[15]</sup>. Lang thought that transportation will affect the economy of the related area industrial structure, spatial structure and regional economic market<sup>[16]</sup>. Zhang and Peng used the transport demand and distribution effect to analyze the interaction relations action principle and the characteristics of stage of regional transportation and social economic development on the basis of transportation optimization theory<sup>[17]</sup>.

Those above research results described the relationship between transportation and economy and the corresponding development counter measure from the different level features in different periods and different regions, it also laid a theoretical basis for further studying the relationship between transportation and regional economy. But due to the

complex relationship between transportation and regional economy, at present, there are still some deficiencies in the study field, this mainly displays in the following three aspects.

- (1) At present, there are a lot of research results, but some development strategies is very difficult to adapt to China's economic development, especially in economically backward regions.
- (2) Some related research results, which research scope is limited to common areas, lack of the systematic study of backward economic development in minority regions.
- (3) Research work of national cultural background and geographical features is not enough.

In a word, the existing research results of transportation and regional economic interaction, mutual influence and coupling relations presented in the interdependence, optimization allocation of Hui ethnic community in China are less, it need to be further studied combined with the specific Hui region economy development present situation and the status of the transportation.

### **3 RESEARCH PROSPECT**

- (1) The qualitative analysis of the coupling relationship between transportation and regional economy of Hui ethnic community, how the transportation system construction to promote the development of regional economy of Hui ethnic community should be studied from accessibility, reliability, sustainability aspects, the impact of the regional economic on the total transport demand can be studied from industrial structure, geographical location, ethnic tourism culture.
- (2) The quantitative study of the coupling relationship between transportation and regional economy of Hui ethnic community, through the establishment of multiple factors contribution model, calculating the contribution rate which is transportation systems contribute to economic growth, building the coupling model which reflects the interaction between transportation and regional economic of Hui ethnic community, depicting the relationship between transportation and regional economy by applying the improved gravity model, building coupling coordination degree model to measure the interaction strength of transportation and regional economic.
- (3) The optimal allocation of transportation and regional economic of Hui ethnic community should be studied by using multi-objective optimization method and robust optimization theory, considering good accessibility high reliability, large capacity, and other goals, establishing robust optimization model, which considering constraints of regional economic and geographical environment, for transportation network layout, and the intelligent optimization algorithm is designed to solve the model.
- (4) The empirical research. Taking a typical Hui communities in northwest China as an example, using nearly 20 years of development of regional economy and transportation basic data to reveal the interaction, and interdependence between transportation and regional economy of Hui ethnic community, evaluating the coupling state of transportation and regional economy, discussing the trend of the future, and put forward the coupling development pattern, optimization configuration and specific measures.

### **4 DIFFICULTIES AND POSSIBLE RESULTS OF STUDY**

- (1) Building factor contribution rate model and coupling coordination degree model for transportation and regional economic growth of the Hui ethnic community of northwest China and measuring contribution rate which is transportation to economic growth and the coupling between the two are one of the research difficulties.
- (2) Considering the regional economic and geographical constraints, establishing a multi-objective constraint robust optimization model for transportation network layout, designing multi-objective intelligent algorithm to solve the model, then robust optimal solution is obtained by programming calculation, it is another research difficulties.
- (3) Analysing inner link of transportation and regional economy of Hui ethnic community by using transportation economics, regional economics, operational research and related theory, building factor contribution rate model and coupling coordination degree model for transportation and regional economic growth of the Hui ethnic community

of northwest China, and measuring contribution rate which is transportation to economic growth.

(4) Building gravity model and coupling coordination degree model for transportation and regional economy of Hui ethnic community of northwest China, revealing the coupling relationship between transportation and regional economy of northwest Hui ethnic community, finding out the coupling development path economy and transportation system through the establishment of multi-objective robust optimization model and intelligent algorithm.

(5) The empirical research is conducted by using nearly 20 years data of development of economy and traffic, putting forward the specific strategies and measures for coordinated development, it can provide the reference for the western transportation construction orderly and sustainable development of regional economy and provide intellectual support for building a moderately prosperous society in an all-round way in China.

## 5 RESEARCH THOUGHT CAN BE ADOPTED IN THE STUDY

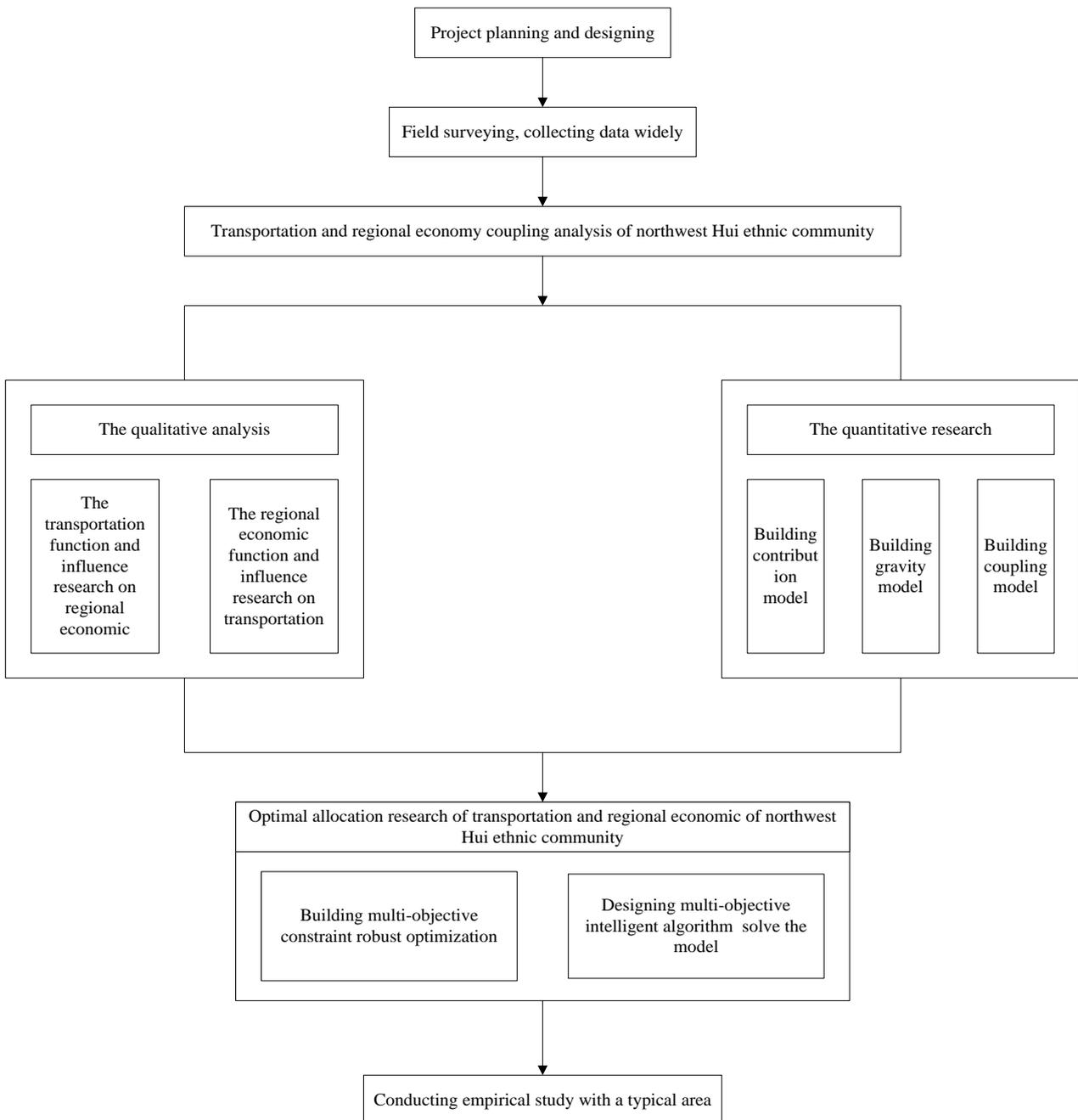


FIG. 1 RESEARCH IDEA

In the concrete research, firstly, meticulous research and information collection work should be conducted, and then qualitative analysis of the interaction between transportation and regional economy quantitative study of the coupling relationship between transportation and regional economy should be done. Secondly, using multi-objective optimization method and robust optimization theory to build robust optimization model and algorithm, which can meet fast and sustainable development of transportation network layout for the Hui ethnic community. Finally, the northwest typical Hui district is taken as an example to conduct empirical research. The specific research ideas are showed in Fig. 1.

## 6 CONCLUSIONS

China is a multi-ethnic country, it is important to study the transportation and the economic development issues and feasible countermeasures. Relying on transport economics, regional economics, operational research and traffic planning theory, integrating viewpoint and method of multidisciplinary, using qualitative analysis and quantitative research methods to analyze the coupling relationship between the two from the inner link of transportation and regional economy, respectively. On this basis, establishing the corresponding constraint robust optimization model, then using the advanced intelligent algorithm to calculate the robust optimal solutions of transport network layout scheme. And combining with the northwest typical Hui ethnic community to conduct empirical study, the coordinated development strategy and concrete measures are put forward. The study may help measure and master the transportation systems and the regional economy development Hui ethnic community on the practical application, it also will provide the reference for the extension of the western transportation network planning and construction as well as the development and management of ethnic areas.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper

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