Research on Spatial Cognitive Differentiation of Regional Cooperative Development Based on Rail Transit Construction

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Keywords: Rail Transportation, Coordinated Development, Regional Space

Abstract: Regional Coordinated Development of Rail Transit Stations is an Important Strategy and Trend for the Sustainable Development of Cities. It Can Promote the Efficient Operation of Regional Functions, Realize Regional Catalysis and Promote the Compact Development Mode of Public Transportation Priority. Inter-City Rail Transit Has Become a Link between Large Cities and Small and Medium-Sized Cities in the Region with the Advantages of Punctuality, Speed and Large Capacity. Regional Economic Integration is One of the Important Features of the World Economic Development Today, Which Coincides with the Concept of Regional Coordinated Development. the Construction of Inter-City Rail Transit Integrates the Regional Spatial Structure, Which Drives the Development of Regional Economics Along the Line and Creates the Necessary Conditions for the Formation of Metropolitan Economic Belts in Developed Regions. the Ultimate Goal of Collaborative Development of This Complex and Complex Model is to Enable the City to Achieve Multi-Dimensional Positive Effects Beyond Traffic Optimization While Developing Rail Transit. While Studying the Historical Experience of Collaborative Development, This Paper Points out the Spatial Development Trend and Puts Forward the Advantages and Necessity of Urban Design to Promote Coordinated Development.

1. Introduction

Urban Belt and Urban Agglomeration Are the Inevitable Result of Urbanization. Grasping the Change Characteristics and Evolution Trend of the Distribution of Land Use Properties under the Condition of Rail Transit Construction is an Important Premise to Realize the Benign Interaction between Rail Transit and Land Use and to Formulate the Integrated Planning of Rail Transit and Land Use [1]. Inter-City Rail Transit Has Become a Link between Large Cities and Small and Medium-Sized Cities in the Region with the Advantages of Punctuality, Speed and Large Capacity. the Construction of Inter-City Rail Transit Integrates the Regional Spatial Structure, Promotes the Development of Regional Economy Along the Line, and Creates Necessary Conditions for Developed Regions to Form Metropolitan Economic Zones [2]. for Any Country or Region, Neighboring Countries or Regions Usually Have Similar Living Habits and Cultural Traditions, and Their Communication is More Convenient. Therefore, Compared with Economic Globalization, Regional Economic Integration is More Practical [3]. Promoting the Healthy Development of Cities is Not Only a Question of Regional Economic Development, But Also an Important Factor in Determining the Overall Development of Metropolitan Areas. under the Conditions of Rail Transit Construction, the Changing Characteristics and Evolution Trend of Land Use Property Distribution Are Important Prerequisites for Realizing the Benign Interaction between Rail Transit and Land Use and Formulating Integrated Planning for Rail Transit and Land Use [4].

The Construction of Urban Rapid Rail Transit in China Has Just Started. Urban Development Has Not Fully Utilized Rail Transit Construction to Promote the Change of Land Use Structure and Urban Development Model [5]. At the Physical Space Level, Collaborative Development Includes the Coordination of Different Traffic Function Carriers, and the Coordination of Traffic and Other Functional Spaces. At the Social Level, It is Reflected in the Synergy of Travel Behavior, Consumer Behavior and Other Activities [6]. the Rail Transit Lines Are Mostly Arranged Along the

  DOI: 10.25236/iwass.2019.118

Existing Traffic Trunks. the Urban Land Use Model Has Not Broken the Traditional Functional Partition Structure, and the Route Direction Has Not Been Combined with the Urban Development Direction. the Ultimate Goal of Collaborative Development of This Complex and Complex Model is to Enable the City to Obtain Multi-Dimensional Positive Effects Beyond Traffic Optimization While Developing Rail Transit [7]. the Existence of a Large Number of Uncertain Factors in the Interaction between Transportation and Land Use Makes the Trend of Land Use Area of Various Nature Around Rail Transit Exhibit the Characteristics of Non-Stationary Stochastic Process, Which Further Increases the Difficulty of Prediction [8]. Based on the Construction of Urban Rail Transit in China, This Paper Dynamically Evaluates the Inter-Regional Coordinated Development in China, Reveals the Dynamic Characteristics and Spatial Differentiation of Regional Cooperative Development in China, and Attempts to Propose Countermeasures to Improve Regional Coordinated Development in China. Degree.

2. Development of Regional Intercity Rail Transit

The Construction of Inter-City Rail Transit Has Promoted the Connection and Division of Labor between Urban Agglomerations by Means of Transportation Axes, and Organically Linked with Other Modes of Transportation to Realize Coordinated Development of Transportation, Economy and Urban Regions. the Coordinated Development of Regional Economic Systems is the Coordinated Development of Complex Systems, Which Needs to Be Evaluated by Effective and Convenient Methods. Domestic Regional Tourism Cooperation is Based on the Regional External Communication Activities among the Actors within a Certain Administrative Division Scope, and Realizes the Spatial Integration and Optimal Allocation of Tourism Elements through the Contractual Relationship with Its Neighboring or Equivalent Members. with the Coordinated Development of This New Cultural and Communication Mode and New Residential Areas, the Form of Traditional Cities Has Been Greatly Changed. Compared with Dominant Conditions Such as Location and Transportation, the Cultural Driving Mechanism in the Development of Regional Tourism is More Internal and Stable [9]. Cross-Administrative Distribution of Cultural Resources and Cultural Space Has Become a Common Spatial Phenomenon, and Rail Transit Has Become an Important Driving Force to Promote Regional Coordinated Development. Inter-City Rail Transit is Helpful to Strengthen the Connection and Division of Labor between Urban Agglomerations, Enhance the Matching Capability between Cities, Save Costs and Promote the Industrial Upgrading and Transformation of the Whole Region.

In the Inter-City Rail Transit System, Positioning Navigation and Wireless Data Transmission Are Always the Main Components of the Rail Transit System, and Are Also the Two Main Technologies in the Rail Transit System. Vehicle Location Enables the Driver to Accurately and Real-Time Determine the Current Position of the Vehicle When Traveling, and Display It in the Background of Electronic Map in a Graphical Way. At the Same Time, the Driver Can Plan the Best Route with the Least Travel Cost According to the Current Road Condition Information. through Information Technology to Guide and Integrate the Traffic Activities Carried out by Individuals, Help Individuals Fully Understand the Relevant Macro State, So as to Promote the Rationalization of Their Traffic Behavior, and Achieve a Certain Degree of Overall Coordination of the System. after Reflecting on the Excessive Automobile Oriented Development after the Second World War, the Public Sector Has Re Emphasized the Requirements of Promoting Public Transport, Enhancing the Internal Attraction and Improving the Environment. in Order to Give Full Play to the Error Correction Function of Rail Transit System and Realize the Intelligent, Real-Time and Dynamic Management of Rail Transit System for Vehicles. in the World, a Special Short Distance Communication Protocol Has Been Developed, Which is Suitable for the Field of Rail Transit System.

This paper analyzes the performance of polling access and broadcast access from three aspects: transmission time, access time and bit error rate. The transmission time comparison results of polling access and broadcast access are shown in Table 1.

Table 1 Comparison of Polling and Broadcast Access Transmission Time

	Theoretical estimate	Actual test value
Polling access transmission time	8.37	8.42
Broadcast access transmission time	5.68	6.24

3. Spatial Cognitive Differentiation of Regional Cooperative Development

The participation of the subway company in the development project enables the external benefits and commercial benefits generated by the construction of public utilities to be returned to themselves and realize self-compensation. Besides autonomous navigation, vehicle positioning and navigation systems all need the support of communication networks to facilitate the transmission of various data information. Collaborative development can expand the traffic capacity of the station, expand the entrances and exits and passages guiding passengers from the station to a wider range, and combine with the surrounding functional space to form a network. An in-depth analysis of the development status of regional rail transit and the cognitive differentiation of related elements of rail transit between regions will help all regions to grasp the actual status and conditions of rail transit development and form more targeted development ideas and collaborative paths. Rail transit construction affects different land uses in different ways and with different intensity. The agglomeration of many high-tech industries in suburbs and cities, coupled with the improvement of fast connection channels with the main urban areas, has driven the suburbanization of the real estate market and prompted the emergence of a large number of large shopping centers. In order to give full play to the complementary functions between cities, we must break through the fetters of administrative divisions and integrate their resources.

In the process of road 3D modeling, flat curve, vertical curve and their combination can be easily determined and adjusted. But also can accurately model according to the technical standard of highway engineering. Let the gradient of the adjacent longitudinal slopes at the variable slope point be m, and their algebraic difference is expressed by k. the basic equation for obtaining the quadratic parabola vertical curve is as follows:

$$e_j = -k\sum_{i=1}^{m}(p_{ij}\ln p_{ij}) \tag{1}$$

The length of the vertical curve or the radius of the vertical curve is:

$$w_j = g_i / \sum_{j=1}^{n} g_i \tag{2}$$

In order to reduce the complexity of the system in urban rail transit systems, the error correction coding access method with centralized control is generally selected. Because the communication in the system has the characteristics of short time and small amount of data, it is not suitable to adopt the reservation mode, and usually the circular and competitive modes are selected. Rail transportation has a strong attraction to residential land, and the time evolution curve of residential land area shows a rapid upward trend [10]. With the support of computer software and hardware, the theory of system engineering and information science is applied to provide the technical system of information needed for management and decision-making. In addition, various technologies such as centralized information, communication and control technologies are adopted in the subsystems, which are combined with traffic engineering technologies to form various unique technical means in the rail transit system [11]. Two indexes are selected to measure the difference in the degree of coordinated development between regions in China, i.e. the ratio of maximum to minimum and coefficient of variation. The ratio of maximum to minimum reflects the maximum variation range of given data. Rail transit has obvious repulsive effect on industrial land, and the time evolution curve of industrial land area shows a downward trend. From the perspective of the whole system, rail transit is the embodiment of many technologies [12].

4. Conclusions

Before the formal operation of the rail transit line, a comprehensive study on urban rail transit and land use along the line will be proposed, and forward-looking suggestions for land use along the traffic line will be proposed. Studying the evolution law of spatial differentiation of land use properties along rail transit is of forward-looking significance for realizing the benign interaction between rail transit and land use and optimizing the layout of rail transit network. From the perspective of the combination of rail transit and public cognition, this paper quantitatively analyzes the spatial cognition differentiation of the coordinated development of rail transit regions, and summarizes its laws to reveal its positive significance for the government-led model. Regional economic integration is one of the most important characteristics of the world economic development. According to the evolution law of complex system, regional economic system can reduce transaction costs and give full play to overall advantages through cooperation and competition under certain conditions. Coordinated development is a scientific issue related to the fairness and efficiency of regional tourism development. The coordinated development of rail transit and city is a very important field in the process of multi center and high-density construction in metropolitan area. It is of great theoretical and practical significance to study the coordination between the two.

Acknowledgement

Social Science Fund of Hunan Province Study on Regional Spatial Heterogeneity of Population Migration under the New Normal (17yba373).

Social Science Review Committee Project of Hunan Province, Analysis of the Influence and Mechanism of Traffic Construction on Regional Coordinated Development (Xsp18ybc265).

Scientific Research Fund of Hunan Province Education Department, a Study on the Influences of Traffic Foundation on Population Migration and Agglomeration(16c1571).

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