IMPACT ANALYSIS OF INTER-REGIONAL HIGH SPEED RAILWAY ON ACCESSIBILITY AND COMMERCIAL LOCATION IN CHINA

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1 Introduction

Economic growth and urbanization in developing countries has resulted in a rapid increase in transport demand and associated energy consumption. Since the economic reform in 1978, China has been the most rapid economic growth country in the world, whose inconsistency between economic growth and the insufficiency of infrastructure such as road and railway is increasingly worsening. High Speed Railway (HSR), significantly improves the accessibility (AC) by shortening temporal distance between regions, at the same time, brings the growth of economic and social efficiency.

China is experiencing rapid expansion in HSR. By the end of 2010, the total length of HSR in operation has reached 7,400 km, and there are other 10,000 km under construction, which make China become fastest growing, longest operating distance country in the world. The figure 1 shows railway and HSR network and employee number of each province. Railway construction is with long period and large investment, the efficiency evaluating of HSR become very important work.

Goal of this research is to evaluate the impact of inter-regional HSR on accessibility and commercial location. First, a comparison of accessibility between general railway and HSR is made. Then commercial location effect is estimated based on the improvement of general cost (travel time and fare) of HSR.

2 Research Framework and Methodology

2.1 Research Framework

Figure 2 shows the research framework. After the HSR put into use, the general cost of travel such as time and fare changed. Referring to railway time table and China statistical yearbook of 2000 (Before HSR put into use) and 2009 years, The general cost before and after HSR’s opening can be calculated. And based on the long term plan (2020) of railway ministry of China, the travel time of 2020 is defined. Based on Accessibility model and Commercial Location model, we can use input factors (travel time and fare) to forecast change of output factors (AC and impact to commercial location).
2.2 Commercial Location Model

The following equation is proposed to estimate the relationship between province \( i \) and \( j \) based on employee, population and traffic general cost.

\[
\ln E_i^k = \alpha_k \ln \left( \sum_m \theta_{mn} \left( \sum_j \left( E_{jm}^m \cdot S_{jn}^m \right) \right) \right) + \beta_k \ln \left( \sum_j R_{ji} \cdot S_{ji}^k \right) - y_k \ln (AT_i) + c_k \]

\( E_i^k \)  Number of employee of Industry \( k \) in province \( i \)

Employ Relationship between Industry \( m \) and \( k \)

\( S_{jk}^k \)  Business Selection Rate between Industry \( m \) and \( k \) in province \( j \) and \( i \) (Accessibility)

\( R_{ji} \)  Population of province \( j \)

\( S_{ji}^k \)  Selection Rate of Receive Service \( k \) from province \( j \) to \( i \)

\( AT_i \)  Traffic Impedance to province \( i \) (consider travel time and fare)

3 Study Area and Data

The study area is all the provinces in China except Taiwan and Hainan province considering the two areas are islands. As for industry types, we divide the industries into 11 types which highly related to railway. Data in this research are shown in table 1.

4 Mid-Result

The table 2 shows the employ relationship among different industries considered in the research.

5 Conclusion

About the final result of this research, the value of AC and commercial location are got. The final result will be shown in the presentation.

<table>
<thead>
<tr>
<th>Data</th>
<th>Categories</th>
<th>Data source</th>
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<tbody>
<tr>
<td>Travel time</td>
<td>Accessibility</td>
<td>Time table (railway, road, aviation)</td>
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<tr>
<td>Fare</td>
<td>Accessibility</td>
<td>Fare table (railway, road, aviation)</td>
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<td>Employee</td>
<td>Accessibility and Commercial Location</td>
<td>China Statistical Year Book (2002)</td>
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<tr>
<td>Input-output table</td>
<td>Commercial Location</td>
<td>China Statistical Year Book (2002)</td>
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Table 1 Data source

Table 2 The employ relationship among different industries

References
