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## Research on the Land Scale Control Model of Public Housing Construction in China: An Example of Harbin

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### Abstract

Harbin possesses the largest housing stocks of Heilongjiang province, which provides accommodation for 3.3 million people, of which public housing is for about 210 thousand people. To meet the growing need for public housing, the government has committed to produce 73,650 public flat units in the next three year as its long-term housing policy. To meet this production target, the government officials are faced with the challenge of further speeding up the construction process. For this, the key issue is how to achieve the effective supply of construction-land, especially in the increasing process of rapid urbanization in China. In this paper, based on the data of National Bureau of Statistics of China and Harbin Bureau of Statistics, key factors of public housing construction-land scale have been analyzed to control the reasonable pattern of construction land. Because of the dynamic natures of Harbin economy and population development, an intelligent control model based on least squares support vector machines is presented to improve the construction-land management process.

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*Keywords:* public housing ; land scale control ; construction

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### 1. Introduction

The housing problem is the people's major concern and some hot issues in China have been drawn to the attention of scholars and researchers. In addition to security concerns, for example measures and

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strategies of construction safety management [1], housing industrialization of energy-saving and ecology are becoming important to meet the request of the low-carbon economy in China [2]. Based on the concept of ICA, about future home, the design, planning, and onsite robotization stages of house-building construction have been presented [3]. However, a key issue is not effectively solved. The public housing construction has been proposed as the national policy to improve the housing conditions of urban residents with low and middle incomes. Local governments must go all out to fulfill their assignments completely on time. It is obvious that such large scale public housing construction will impact the local landscape environment. Therefore, the construction land scales and distribution patterns need to be planned carefully and effectively controlled.

The construction land scale control is a complex problem in the city economy development activities [4], especially in our developing societies. There are too many factors for government departments to consider an appropriate construction land scale certainly, such as the local urban population, income level, family structure, economic growth speed, geographical features of urban areas, etc, and the interactions between these factors are out of linear relationships. In addition, it argues that there are so huge differences owing to economic basis for different region residents [5], which should be considered carefully in the decision-making process of public housing construction.

In this paper, based on the above considerations, this paper takes Harbin as an example in order to illustrate public housing construction land scale control in the local districts. We discussed the unique characteristics of public housing construction-land in the short term and the reasonable control targets for public housing construction-land. Then, an intelligent control model based on least squares support vector machines was presented to improve public housing construction management process.

## **2. Structure Key Factors of Public Housing Construction Land Consumption**

### *2.1. Indicators of the economy development*

Harbin, as the capital of Heilongjiang, in 15 sub-provincial cities, ranked much lower than Guangzhou, Shenzhen and other economically developed areas, according to GDP, total fixed asset investment, the local general budget revenue and other major economic indicators. There are also obvious gaps contrasted with Shenyang, Dalian, Nanjing, Hangzhou, Ningbo, Qingdao, Wuhan and other more developing cities, see Fig 1. Accordance with the number of registered population, Harbin is the second large sub-provincial city only less than Chengdu, far higher than other cities. Therefore, Harbin is poor in competitiveness with most of other sub-provincial cities.

### *2.2. Characteristics of the urban resident employment*

As the capital of a border province of Heilongjiang, Harbin is one of the key national industry base cities in China and 41.8% of the province's manufacturing sector has been focused in Harbin. The traditional industry enterprises are still dominant in the local economy development, of which the staff employment concentrate in the primary sectors, called the first industry-based. Although the proportion of primary industry has been significantly reduced after years of industrial restructuring vigorously in Harbin, at the end of 2010, the ratios of the first and second and the third industry were adjusted to 11.3:37.8:50.9, which was still higher than that of Beijing and Shanghai. In addition, the urban employment is mainly concentrated in non-private economic entities, see Fig 2.

### *2.3. Wage level of workers employed in the urban enterprises*

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