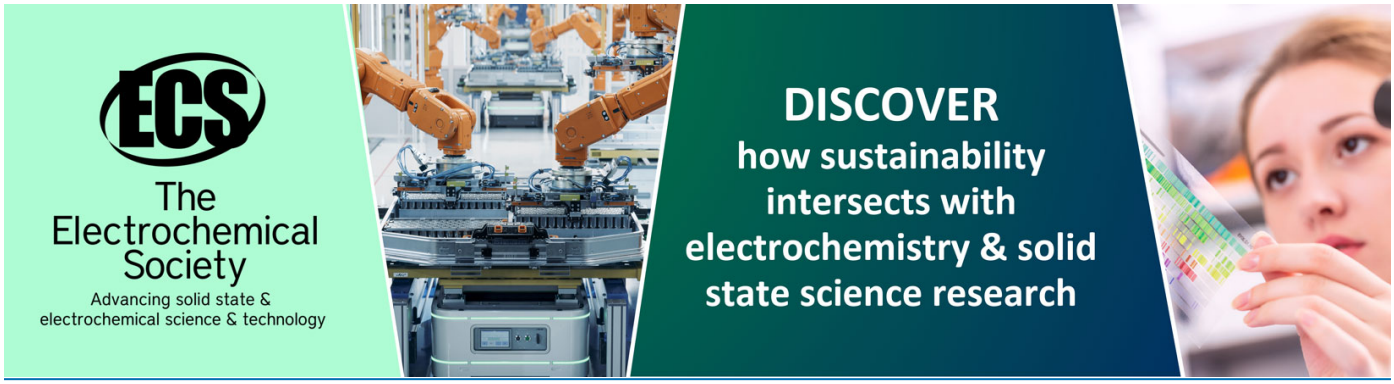
Research on satellite urban transportation and land spatial planning in big data environment



Research on satellite urban transportation and land spatial planning in big data environment

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Abstract: With the continuous development of computer technology, big data application has become a hot research area. Big data has the ability of high-speed and accurate data analysis, which provides great help for many research work. With the help of big data technology, we can provide data reference for the spatial planning of satellite urban traffic. Satellite towns are different from ordinary cities. Satellite town refers to the small city around the big city, which is a small town that provides residence for workers in the big city who are unable to buy houses in the big city. Compared with the general large and medium-sized cities, the space planning of satellite towns is relatively simple. Therefore, the complexity of traffic structure and function area planning of satellite towns is not as complex as that of big cities. Firstly, this paper analysis the characteristics of satellite urban traffic under big data. Then, this paper analysis the spatial planning of big data land. Finally, this paper puts forward the satellite town planning mode based on the people-oriented core concept under the big data.

1. Introduction

China's urban development is very fast, so we need to do dynamic long-term planning in the choice of satellite towns. Otherwise, with the rapid expansion of large cities, central cities and satellite towns will eventually become one in space. For example, with the rapid development of Beijing in the past decade, Beijing has rapidly annexed Fangshan, Tongxian and other satellite towns. Therefore, for the layout of satellite towns and real traffic, we must adhere to the strategy of slightly ahead of distance. Through the principle of "long space distance, short time distance", we can choose and plan. Through scientific and reasonable land space planning, China's land space development pattern has gradually changed to efficient, intensive, green, safe and open, which is related to the development of urban construction, transportation, water conservancy, ecology, agriculture, environmental protection and other industries. Through land and space planning, the regional economy of satellite city will develop comprehensively, harmoniously and sustainably. In recent years, through the extensive application of information technology, the efficiency and level of land and space development and utilization have been continuously improved, which has made a significant contribution to the sustained and rapid economic development. With the era of big data, we urgently need to establish big data thinking, which will reform the government planning management system. By establishing a unified land space planning system, we will innovate the way of land space development and utilization. By accelerating the transformation of economic development mode, we can promote the intensive and efficient production space and the livable and moderate living space.

2. Satellite urban traffic in big data environment

2.1 Satellite towns under new urbanization

Satellite town is a dependent living place in the big city system. It is a small and medium-sized city which is located around the big city and relatively independent from the big city. It can be said that satellite towns are dependent on the existence of big cities. Satellite town was first proposed by Howard in 1898, which was called "garden city" at that time. In 1903, such a city, lechworth, was built in the suburb of London, which is the earliest satellite town in the world. Satellite cities have many characteristics, such as low building density, high environmental quality and separation from the central city. The main purpose of establishing satellite towns is to disperse the population and industry of the central cities and alleviate the residents' living problems in the big cities. With the help of the radiation of the central urban area of megacities, most of the satellite towns are gradually formed by the development of the old small towns, and only a small part of them are built in the newly planned suburbs and rural open spaces.

2.2 Influencing factors of human settlements in satellite towns

Different scholars have different classification standards for the influencing factors of human settlements in satellite towns. However, these impact standards cover all areas that affect human settlements. The factors that affect the living environment of satellite towns can be summed up into five categories: infrastructure factors, residents' living factors, resources and environment factors, scientific and technological economic factors and social and cultural factors, as shown in Figure 1. Among them, infrastructure is the most important factor. Traffic environment is the most important factor in infrastructure. Therefore, it is the most important to study the traffic environment of satellite towns.

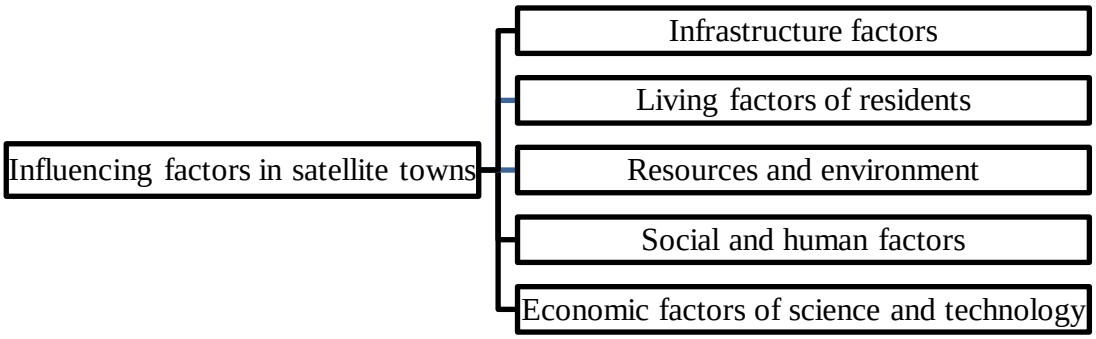

Figure 1: Influencing factors of human settlements in satellite towns

2.3 Space distance of satellite town traffic

According to the evacuation theory of big cities in developing countries, it is the expansion range of the built-up area of the mother city within 50km around the big cities, and the area of 50-100km can be the evacuation pole, which is the best ring belt for selecting satellite towns. In addition, the distance between the satellite town and the parent city should not be too close, otherwise the two will gradually be connected in the development process. The spatial structure planning of a city is shown as the Figure 2.

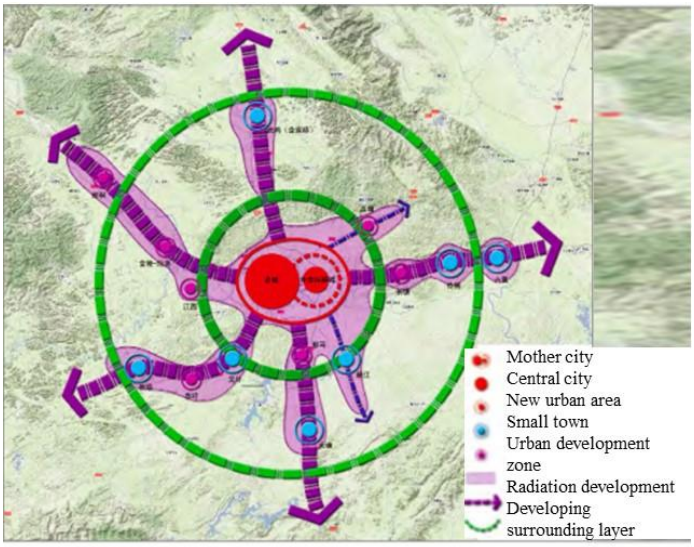

Figure 2: Spatial structure planning of a city

2.4 Time distance of satellite town traffic

Time distance is a measure of space accessibility, which is the convenience and convenience of material, energy and personnel exchanges between a region and other relevant regions, including national, regional, urban, linear and point infrastructure. The level of spatial accessibility will reflect the opportunities and potential of the region with other regions, including socio-economic and technological exchanges. Such contact opportunities and potential are extremely important development factors for regional development. A number of studies have shown that capital, information and personnel exchanges are the most frequent among cities in the one hour traffic circle of big cities. Therefore, at the same time, with modern means of transportation, one hour traffic circle is also the largest distance for commuting. According to the great gravity effect of the first level central city, the one hour traffic circle is an area with strong interaction.

3. Big data land spatial planning

3.1 The meaning of big data land spatial planning

Big data land space planning is an upgraded version of land space planning, which makes full use of cloud computing, GIS and other technologies and scientific research methods. By further integrating all kinds of land spatial element information and data, we carry out big data analysis and mining, which has a unified planning for land spatial distribution characteristics, dynamic simulation and visual expression of data resource services. Land spatial planning tends to combine and integrate multiple means. Through bottom-up public participation, we will have a strong ability to adapt to the environment. Based on the latest scientific and technological methods, we can plan the future land space development pattern as a whole, which will form a scientific land space development orientation.

3.2 Highlight resource capitalization and spatial resource management

With the establishment of the Ministry of natural resources, the state has given the Ministry of natural resources the power of unified management and supervision, including the development, utilization and protection of natural resources. The Ministry of natural resources focuses on the definition, confirmation, distribution, circulation, preservation and appreciation of natural assets. By using space as a natural resource asset, we can manage it. Through the asset of resources, China has put forward new requirements for the transformation of government functions and spatial planning, which ensures the clean and honest operation of China's land and space resource planning.

3.3 Transformation of space resource management

Urban spatial management and spatial governance must strictly abide by the ecological bottom line. At the same time, we should fully enlarge the comprehensive value of available land and space. By introducing the concept of "asset" operation, we can implement various ways, such as multi-agent, innovative protection and operation mode, which will greatly promote the comprehensive and optimal allocation of land and space resources. As resources change into assets, the transformation of land and buildings will not only be material space, but also an important asset. Therefore, the development of cities and towns will not be the process of the change of material space form alone, which will contain the redistribution of interests. In the context of big data, we must strengthen government regulation, which will ensure the overall development of the city and restrict the profit-seeking behavior of the market.

3.4 Transformation of spatial planning

In the past, China's land and space planning was dominated by resource allocation. Therefore, the main function of spatial planning is to comprehensively deploy and arrange land and resources. Through the planning of managing space resources as assets, we can allocate space resources, rights and interests and build space order. By designing the optimal scheme of spatial resource allocation efficiency, we can find appropriate ways, which will transfer resources into efficient allocation. In the new era, land spatial planning needs to balance the natural and asset attributes of resources. Therefore, we need to effectively protect the development of land and resources through the natural attributes of resources. At the same time, we also need to reasonably develop and fairly distribute the asset attributes of land resources, which will better coordinate the sound system governance of urban space, agricultural space and ecological space. Therefore, through the transformation of spatial planning, we can realize the value-added and benefit maximization of assets.

4.Conclusions

Big data plays an important role in urban traffic division. The accuracy and scale of big data will help designers to design and make decisions more effectively. With the rapid development of information technology, traditional data acquisition methods have been unable to meet the needs of society. Big data technology has become an indispensable basic data collection and analysis.

References

[1] Qin Xiao, Zhen Feng. Discussion on spatial planning method of smart city in big data era [J]. Modern city research, 2014, (10): 11-15.
[2] Chai Yanwei, long Ying, Shen Yue. Application of big data in China's smart city planning [J]. International urban planning, 2014, (6): 56-59.
[3] Li Chenggu, Han Shouqing, Zheng Wensheng. Study on the urbanization response of urban industrial structure upgrading [J]. Urban planning, 2014 (4): 31-36.
[4] Wu Yizhou, Chen Qianhu, Shaobo, et al. Study on spatial characteristics and urban development mode of metropolitan growth area - Taking Yuhang District of Hangzhou as an example [J]. Urban planning, 2010 (10): 36-42.
[5] Niu Xin Yi, Ding Liang, Song Xiaodong. Based on mobile phone data, Shanghai's central city's spatial structure is identified. [J]. Journal of urban planning, 2014, (6): 65-69.