

Research Article

New Urbanization Research Basing on Ecological Niche Theory

Jing Liang^{1,2}, Lingyong Ma^{1,2}, Xiaoli Xu^{1,2}

¹College of Civil and Architecture Engineering, Northeast Petroleum University, Daqing, Heilongjiang, 163318, China

²Heilongjiang Key Laboratory of Disaster Prevention, Mitigation and Protection Engineering, Daqing, Heilongjiang 163318, China

***Corresponding author**

Xiaoli Xu

Email: xxl_nepu@163.com

Abstract: As one of the basic theory of ecology, niche theory has important guiding significance on the new urbanization ecological and intensive. The original natural ecological niche research focused on micro-level relations between species in the community, and then the urban ecological niche theory research focused on a certain area or even country within the scope of the macro-level relationship between cities, both exist some limitations. This study focuses on medium measure effect among the constituent elements of the city, puts forward several suggestions to the construction of the new urbanization based on the theory of ecological niche.

Keywords: New urbanization, niche, sustainable development, ecological and intensive

INTRODUCTION

The Central Economic Working Conference in 2012 officially first proposed "Fully integrate the ecological civilization concept and principle into the whole process of urbanization, and make it intensive, intelligent, low carbon and green." [1], then it is radicated as the new growth for China's economic future development and an important means of expanding domestic demand. After that, "the New Urbanization" is known to the broad by masses of Chinese people and gets the attention of various academics more and more.

The new urbanization is based on the scientific concept of people-oriented and comprehensively balanced sustainable development, which aimed for developing intensive economy and building a harmonious society, dominated by market mechanism, making the medium cities have moderate scale, rational layout, coordinate structure and perfect network system, interacting with the new industrialization, informationization and agricultural modernization, having strong industry support, fully employment opportunity, a beautiful ecological environment, with integration of urban and rural urbanization development path [2].

Therefore, the new urbanization puts forward new requirements for urban and rural planning: Urban and rural planning should have the characteristics that the urban and rural integrated planning, economical and intensive, ecological livable and harmonious

development and so on, among which the construction of intensive ecological city is the essential characteristic of the new urbanization. To overall integrate the ecological civilization concept and principles into the process of urbanization, make the new urbanization intensive, intelligent and green, low carbon, the new urbanization can be understood as the ecotype urbanization in one way. As the basic principle of ecology, ecological niche theory plays a guiding role in the development of new urbanization as green low carbon production way of life and urban construction operation mode.

The research and development in Niche theory

Niche theory is an important basic theory of ecology. The American ecologist Grinnell firstly applied the word "Niche" in 1917, which is defined as the creature's position and functions in the community. E.P.Odum defined Niche as the physical space and functions of some creature in the community, and its range in various environments [3].

Several decades after that, Niche theory and its application both have been highly developed in its breadth and depth, especially after the 1980s, Ru-song Wang Expert and other scholars published a series of articles, started applying ecological niche theory to urban ecology. The using of ecological niche theory expanded from a relative small area population unit to a city, region and even a nation. Urban ecological niche is defined as a collection of all kinds of ecological factors (such as water, food, land, building, transportation, etc.)

and the ecological relationship (such as productivity level, environmental capacity, quality of life, etc.), which can be applied by the city to people [4]. Based on the theory, multidimensional factors of a city or region such as the nature, function, position, population, the advantages and disadvantages of resource conditions are comprehensively analyzed and evaluated, to judge its situation, status and appeal and influence on surrounding, which reflects the ecological niche of a city or region. The theory and method can be widely used not only in natural ecological system, but also in social, economic ecological system. So the urban ecological niche can include natural, economic and social ecological niche.

The basic contents of the ecological niche theory and method are niche situation theory and analysis method, ecological potential theory, the ecological suitability analysis method, the niche overlap and separation theory and so on [3].

The limitations and pitfalls of urban ecological niche theory research and application

In the past 30 years, the rapid industrial development in our country is synchronized with rapid development of China's urbanization. In 2011, China's urbanization rate broke through the 50% mark for the first time and reached 51.27%, and has always maintained a fast growth speed steadily. In nearly a decade, the growth of China's urbanization rate raised more than 10 %. (Fig.1) Before long a stage, city development was fast in city level improvement, increase in the number of the population and the expanding scale and so on, however, the development of the urban-rural fringe, small and medium-sized towns and villages are always ignored. This made the urban development too concentrated to make urban issues conflict seriously and the gap became bigger and bigger between the urban and rural. In this process, there are some following pitfalls in the development and application of city ecological niche theory:

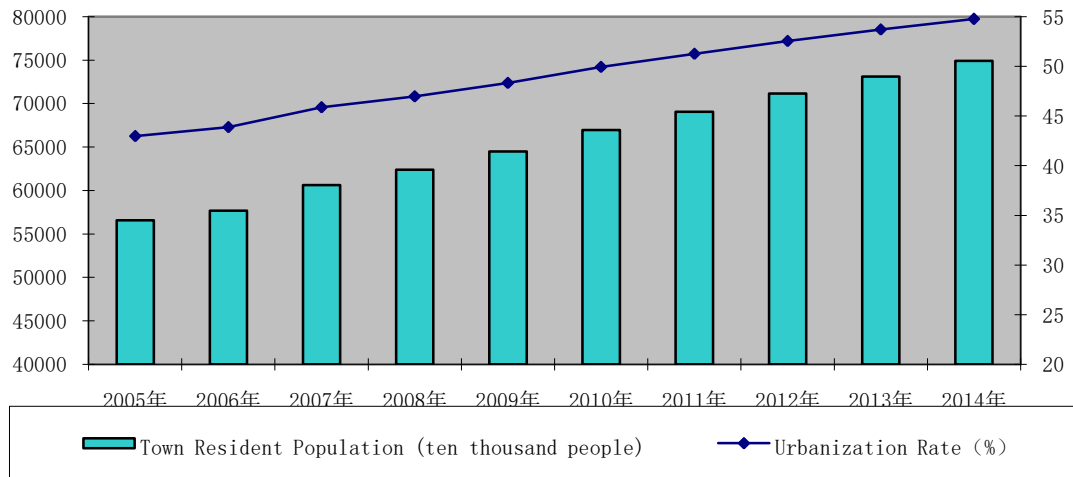


Fig-1: Town resident population and urbanization rate in our country during from 2005 to 2014 (Source: National Bureau of Statistics)

Attach most importance to the micro and macro levels and neglect the effect of medium measure and contact in Niche theory research

With the development, Niche theory research spanned from a species of micro level to a city, regional, and even the country, making the research to a macro level. This is a research of Urban ecological niche concerned the relationship between the city and other cities and the environment within a certain area, as well as its position and role of the whole system composed by multiple factors such as transportation, economy, politics, culture, nature, etc. All of these belong to the macro factors of urban development. However, medium factors of the city are rarely considered, such as distribution and utilization of urban internal natural resources, the composition of the relationship between urban structure and its elements,

the society, economy, history and culture background difference between each element, etc. These are the internal causes of the city development, which are the fundamental impetus to the city development. Therefore, they can't be ignored.

Unbalanced development in economic, social and natural ecology niche

Urban ecological construction involves multiple aspects of complex factors, economic, social and natural factors, which contain and influence each other. Some cities are in pursuit of economic niche one-sided, but at the expense of the soil erosion, ecological deterioration. Some other cities one-sided understood the ecotype urbanization which is creating cities with green or perfect ecological environment, only to meet the needs of ecological protection, limit its reasonable development and application of resources; In fact, there

are many other ecological problems with essentially a human social ecological imbalance. As a result, some towns of economic, social and ecological niche developed imbalanced, because one aspect was too much emphasized on and others were ignored. Hence, a lot of towns are developed in deformity; many urban issues did not ease, but more and more highlighted.

Unclear orientation of the functions in some small and medium-sized cities and small towns, their positions and directions need to be determined with the niche theory

The developing in some small and medium-sized cities and small towns often exist blindness. Some local government leaders subjectively thought only for the pursuit of rapid increase achievement regardless of the actual situation of local development, understood the urbanization partially, impatient for success, impractical to promote the urban construction. In addition, someplace planning guidelines may change with the leaders change, the scientific planning is difficult to be carried out. The ecological niche theory can help the local government clear up the thoughts avoiding blind development, formulating the scientific and reasonable planning, determining the development direction of the planning.

Several inspirations to the new urbanization in niche theory

Pay attention to economic, natural and social ecological niche simultaneously to promote the development of urban harmonious, comprehensive, stable

Although economic development for the new urbanization is essential, but it should sustainably grow under the premise of the environment protection, maintaining ecological balance, and building a livable city. Otherwise, only with the pursuit of rapid economic ascension, the cities are shrouded by haze and fog and covered by foul water, which is inadvisable. So, only the development and promotion of the compound new ecological urbanization pattern can gradually reduce and even eliminate the increasingly serious resource, social contradictions, population and traffic problems, and so on. The niche theory instruction is needed, paying attention to the natural and economic and social ecological niche simultaneously in the process of urban development. The natural ecological niche is endowed with new connotation: It not only embodies the use of natural resources in a certain range such as land, water, forest, mineral resources, but also including urban sustainable utilization of resources, urban environmental quality, urban environmental comfort, beautiful degree in urban natural environment and artificial environment, etc. The indices should be included in the natural ecology, making the town balanced sustainably develop.

Using the ecological niche expansion theory to achieve the sustainable development of urbanization

Niche expansion and compression refers that under the condition of limited and competitive resources, any species have the potential to occupy a larger space for the survival and development. When a species niche expands, there must be the other one (or more) species niche is invaded, leading to some ecological unit knocked out in the competition or forced to release part, even all of the resources space, at the same time dominant species niche is expanded [3].

In the urban ecological system, development of each urban element should follow the ecological niche expansion and compression theory. The urban development process can also be used as the embodiment of niche expansion and compression. At first, much more and better material and non-material resources like nature, economy and information and so on gathered in the city center, which is also the development and labor accumulation center, therefore having higher niche. Nevertheless, after the development to a certain stage, a series of problems are found such as traffic congestion, unharmonious between infrastructure and population in the city center. The resource advantage is no longer obvious, and some functions began to spread to the outside city. The small towns or some high-tech campus surrounding the city continuously extend the ecological niche with the improvement of transportation condition or innovation of scientific technology and industry, and eventually form secondary or satellite town center. On the other hand, some towns' niche width is narrow, with the change of resources (such as the exhaustion of mineral resources) or policy adjustment and offset, if these towns niche can't be effectively expanded, they will be compressed or even disappear. So the urban ecological niche expansion and compression in the city is the dynamic mechanism for the city development from junior to senior, from simple to complex.

Using the niche overlap and separation theory to solve contradictions among the towns

In the ecological system, when the two organisms occupy a certain resource together, can appear the phenomenon of niche overlap. The more niche overlaps, the greater competition and repulsiveness between the two organisms are. Competition to a certain degree, there will always be one-side elimination or niche separation. In the urban ecological system, there is a certain commonality between ecological units, which means that the ecological niche will be a lot of overlap. On the one hand, the ecological niche of every unit in the town should be evaluated, compared with urban resources and environment, avoiding excessive niche overlap. On the other hand, if the ecological niche in the ecological system is completely separated, there will be no competition, but the resources may be underused. Therefore in the urban system, the ecological niche isn't

separated excessively. The best ecological units are causal, premised, a moderate amount of overlap each other, to ensure that resources can be fully used.

CONCLUSION

The new urbanization must develop ecologically. At present, the niche theory research in the urban system is still under way. With the development and modification of the ecological niche theory, it will indicate the path and direction for the new urbanization's development.

Acknowledgement

Foundation item : Daqing Philosophy Social Sciences Foundation (DSGB 2015067); Daqing Philosophy Social Sciences Foundation(DSGB 2014008)

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