Civil Marginalization from Multi-Criteria Decision Science Perspective

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Abstract. Civil urbanization increased dramatically which caused the problems in every aspects of human settlement, such as marginalization of migrants, urbanization lags industrialization, urban sprawl, expensive housing, and automobile pollution. These problems attract public and academic attentions by affected certain policies or economic background variation. Taken the city as a huge, complex system, the human settlement science studies the city in an integrated way. It provides a comprehensive perspective to study the issues happened during the course of civil urbanization. In the paper, new ideas will be provided to multi-criteria decision-making to solve civil marginalization to make fuzzy comprehensive to be more wildly used.

Keywords: Civil urbanization; Marginalization of migrants; Multi-criteria decision-making.

1. Introduction

Before 1994, the policy 'Unified management, unified distribution, affording housing by rent' was taken to satisfy citizens housing requirement. In that time, all houses belong to state, but people could get house by pay rent to the department which manages these assets. But after 'The State Council decision on deepening the urban housing system reform' was implemented in 1994, the way distribution house changes from welfare to currency and these supporting systems, such as housing commercialization and housing credit system, have the permission to set up. This trend got the climax in 1998 for the State Council ended allocation housing in welfare way totally.The marginalization rate is not consistent within the 287 cities. According to the marginalization level, al these cities were divided into four groups over half cities were belonging to the lowest group. However, the marginalization level of this group was under 30%. There were 93 cities in the lower marginalization group with marginalization rate from 30.1% to 50%. The cumulative percentage was 82.60% which indicated that majority cities were in lower marginalization. There were 38 and 12 cities distributed in higher marginalization (50.1% to 80%) and highest marginalization groups (>80%), respectively. However, they were just small part of the 287 cities which accounted for only 17.40%.

Gau and Buehere proposed vague set theory [1] in 1993. With further researches and development of intelligent systems, vague sets, fuzzy sets, rough sets, artificial neural networks, and genetic algorithms are more and more widely used, becoming important soft computing methods. Unlike fuzzy set theory, vague theory, being able to express simultaneously the information of "support", "against", and "uncertain" has been widely used in many fields, such as controlling, decision making, fuzzy fault diagnosing and so on. Since Vague has the above characteristics, it is often applied to fuzzy decision deciding by scholars. As consequence, fuzzy multi-criteria decision-making based on Vague has been formed.

Recently, scholars have initially studied on the method of multi-objective decision making based on Vague Set Theory. In 1994, Chen and Tan [2] have studied for the first time the multi-criteria fuzzy decision making based on Vague Set Theory. In 2000, Hong and Choi [3] noted that Chen and Tan didn't fully considerate all the possible options, thus failed to provide three options of maxima, minimum and medium according to the attitude of policy-makers when they face risks. In 2001, Li Fan and other scholars [4] studied the fuzzy multi-objective decision-making based on vague set. In 2004, Liu Wenhua [5] proposed three methods: new scoring function, weighted scoring function and distance method for multi- objective decision making under fuzzy conditions by refining "abstaining section". In 2005, Lin Zhigui and his colleagues [6] have improved sorting function proposed in the literature [1, 2]. Wang Yu discussed the methods of fuzzy multi-objective decision making to solve civil marginalization with fuzzy vague sets. Zhou Zhen and other scholars have studied fuzzy

multi-criteria decision-making based on Vague set [8] and interval value of vague sets [9] in accordance with the improved sorting function.

In the method of multi-criteria decision making based on vague set, scoring functions $S\left(A_{ij}\right)$ and weighting $w_j, w_k, \cdots w_p$ have decisive effect on the results of the evaluation, so researchers focused on the scoring function and the weighting. According to researches, there are three kinds of Weighting Model currently, including linear weighting, which is like $y = \sum_{j=1}^{m} w_j x_j$, non-linear weighting model, similar to the application of nonlinear models $y = \prod_{j=1}^{m} x_j^{w_j}$,which highlights the consistency of the evaluated object and the less influence of different coefficients of weighting, the third category is a more ideal (TOPSIS) method, which sets an ideal target (samples) $x_1^*, x_2^*, \cdots, x_m^*$ for the evaluated objects, and then compares the ideal target and the evaluating index of the evaluated objects and finally determine the ranking[11]. In the methods of comprehensive weighting evaluation described above, the weighting coefficients are determined, namely steady weighting. There are three methods to determine the weighting $w_j, w_k, \cdots w_p$, including Subjective Weighting, Objective Weighting and Synthetic subjective and objective weighting. Though these methods are simple and feasible for simple practical problems, they appear to be less scientific because of relatively strong subjectivity. So they are not suitable for some more general problem of comprehensive evaluation, being not able to provide effective basis for decision-makers. Dynamic weighting method seems to be better, because it overcomes the drawbacks of the method described above. The weighting of this method is no longer a steady weighting, but a weighting function with property value as argument, which is consistent with common sense. After all, improving the results from zero to pass exams is relatively easier than from passing to full mark. The method is mainly used to solve the problems of more general comprehensive evaluation in practice.

This article established a new model of multi-criteria decision making based on vague set, which is verified with examples, by using a dynamic weighting function to determine the weighting of multiple criteria decision making based on vague set.

2. Analysis of civil cities marginalization

Over the past decades, estimated 225million Civil migrants have been moved from rural to urban in China. Due to the magnitude of rural-to-urban migrants and its potential economic and social influences, migrants attracted more and more attention during the course of Civil marginalization. Affected by the dualistic society, lots of issues are presented when the migrants move to the urban. Among them, the marginalization is important but also very to be neglected. The segregated labor market and occupations is one of the major reasons to make the rural-to-urban migrants marginalization. There is segregated labor market between the migrants and local urban residents. Even controlled the age, sex and education level, threefold difference was founded in high level occupation between urban permanent residents and migrants. The migrants usually get the job with long working hours, poor working conditions, low salary, and no social insurance which are unattractive to urban residents. In addition, the deficiency of social welfare, such as endowment insurance, medical insurance, retirement pensions, unemployment insurance, and housing found exacerbate the marginalization of migrants. Furthermore, the residential problems make the integration between migrants and urban residents become more difficult. Dormitories, shelters on the work site, workshop and other temporary facilities are usually taken as the house for rural-to-urban migrants.Affected by these problems, it is hard for rural-to-urban migrants to integration with local urban residents to achieve the marginalization in terms of population who lived in the cities. The marginalization becomes to a serious but invisible problem during the course of Civil marginalization in terms of human system.

3. Marginalization Lags Industrialization

There is no consensus in the level of coordination between marginalization and industrialization in China. However, in essence, marginalization lags behind industrialization does exist in China for lots of non-agricultural population and the people who affiliated with them could not live the cities. The anti-marginalization policies block the coordination between urban and rural area, industrialization and marginalization to advance the development of industry. After the founding of China in 1949, the strategy of prior development of heavy industry, unaffordable capital from rural to urban area, and the unit-marginalization sharply weakened the growth of non-agricultural population, but sharply advance the conventional development of heavy industry. After the reform and opening up, lots of rural surplus labor is attracted into the township and village enterprises which further delay the transformation of population from agricultural population to non-agricultural population. As the result, the development between industrialization and marginalization is not coordination. After 1990, huge number of rural labor transform into the developed coastal region and cities to work. They become the main force to advance the development of industrialization, marginalization and economics. However, the Hukou system, discrimination employment between urban and rural area, and social security system integrate into the urban and rural isolation system which makes rural migrants hardly become the real citizens. There are 200 million rural migrants work in non-agricultural sectors, but none of them is the real citizens. This is the strong evidence that marginalization lags industrialization in China. Those people reduce the cost of Civil industrialization, but would increase the cost of Civil marginalization. In a word, Civil marginalization lags industrialization is the result of the incompatibility of low-cost process of industrialization and the expensive of marginalization process. In the terms of human settlement science, the marginalization lags industrialization is caused by the social system in China which choose the low-cost industrialization but not to supply the basic protection to realize the transformation from rural migrants into urban citizens.

4. Urban Sprawl

For a long time, urban sprawl is not a city problem of China for they keep development in a compact model which is obvious different to U.S. But after 1978, affecting by economic reform, especially land reform, driving by the desire to advance the development of local economic, Civil cities have experienced dramatically urban expansion which is known as urban sprawl. There are two boom period for Civil built-up area dramatically developed: the first from 1992, when Deng Xiaoping started his 'Southern Tour', to 1995, when Rongji Zhu implemented macroeconomic adjustment; and the second from 2000, when the property market recovered from 1997 Asian financial Crisis, to now.Unlike what happened in U.S., urban sprawl in China was mainly driven by the policy formulated by local government with the purpose of incentive the local economic growth (Tang 2000). After the land reform, market forces were introduced and played a very important role in urban development. For example, Vanke, a famous developer in China, increased its land preparation to nine million square meters after State Council announced that all land-leasing for commercial uses should proceed through open bid or public auction (Wu et al. 2007). The urban sprawl takes large cultivated land in rapid and extensive way which tremendously changes the natural system in short time.

Supposing u is the domain, of which $u_i\left(i=1,2,\cdots n\right)$ represents an element, and the vague set A in the domain refers to a pair of membership functions t_A and f_A , that is $t_A:U\to[0,1]$, $f_A:U\to[0,1]$ with the requirement of $0\le t_A\left(u_i\right)+f_A\left(u_i\right)\le 1$, in which $t_A\left(u_i\right)$ is called the true membership function of vague set A, showing supporting the fact that $u_i\in A$ are the next session of the degree of membership; $f_A\left(u_i\right)$ is called the false membership function of Vague set A, showing opposing the fact. $\pi_A\left(u_i\right)=1-t_A\left(u_i\right)-f_A\left(u_i\right)$ is called the degree of hesitation of $u_i\left(i=1,2,\cdots n\right)$ with respect to A, that is the

missing information. Obviously, with the condition of $0 \le \pi_A(u_i) \le 1$, when $\pi_A(u_i)$ is greater, $u_i\,(i=1,2,\cdots n)$ indicates more missing information with respect to A, which is briefly recorded as $\langle t_A(u_i), 1-f_A(u_i)\rangle$ or $\langle u_i, t_A(u_i), f_A(u_i)\rangle$. When U is discrete, $A=\sum_{i=1}^{n}[t_A(u_i),1-f_A(u_i)]/u_i$ and when U continuous, $A=\int[t_A(u\ ),1-f_A(u)]/u du$

5. Conclusion

The so-called city problems are phenomena emerged when components of this system couldn't keep harmonious relationship with any one of them. There are always city problems for people couldn't always keep all factors in balance condition. But people's understanding of city system will deepen after problems have solved.

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