STUDY THE EFFECT OF URBAN ECOSYSTEM TO FLOATING POPULATION

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Abstract: The urban ecosystem is a complex system hat are compounded of environment –economic-social ,the factors of urban ecosystem affect the decision of the floating population to chose city .In this paper ,we according to the urban ecosystem to design the questionnaire ,and study the weights of the factors that influence the decision by AHP ,and find that economy is most important which is 0.6806, the society and ecological environment are 0.2014and0.1180.

Keywords: urban ecosystem, floating population, AHP

1. INTRODUCTION

The economic reform in China that started in 1978 has Created a "floating population" Which is one of the most mobile population in the word (Zhigang LU et al ,2006;Yu Zhu,2007), a huge floating population of rural-urban migrants is transforming the urban force (Michael C.Seeborg et al ,2000).There are over 14,735million floating population according to data of the 2005 China 1% Population Sample Survey, of which the inter-province floating population is 47.79 million. Because China has been experiencing a great transition from planned to market economy, and the transition has been accompanied by the increasing mobility of production

factors such as: capital， labor ,technology and information (Chaolin Gu et al, 2006). On one hand so huge floating population meet the demand for labor of the rapid economic development of cities, on the other hand they lower the level of the structure of the working population and they become the importing factors that constraint the upgrading of the industrial structure to some extent , meanwhile as so many population move to cities , it glowed the density of urban population and caused many environmental and social issues（Peter Nannestad,2007； Pia M. Orrenius et al ,2007）.There are many elements that pulled so great number population moving to cities in China: higher income in cities, better opportunities ,better education ,better quality of life in cities and others (Zhigang Lu et al ,2006;Sandra Poncet ,2006) besides the characteristics of the population themselves ,such as education level ,sex and age(Tracy Simmons,2007) .

The studies on floating population mainly focused on the management of them, the staying time of floating population(Wang guanzhou, et al 2002;Zhu Haiyan,2001) ,and the influence that the floating population to economic of city(Zhou Chang lin et al ,2007) .There are many cities in China, what's the determinants of the city that attract man to move to ? In this paper ,we according to the urban ecosystem theory and analytic hierarchy process(AHP) to study the characteristics of city that attract men to move to.

2. URBAN ECOSYSTEM

The urban ecosystem is a complex system that are compounded of environment –economic-social, characterized by high level, multiple hierarchy and dynamical structure(Forrester JW. 1967,) environmental－economic－social compounds, cities evolve along the life cycle of growth, maturity and stagnation, and behave according to the inner changing mix of the factors involved under the support and constraint of the social and biophysical environment (Button K. 2002) It is shown in Fig. 1. As the center of the system, human is the main activities of social production and life ,and floating population is an important component of the subject.

3. MODEL OF FLOATING POPULATION CHOSE CITY

3.1 Analytic Hierarchy Process (AHP)

The AHP is an efficient approach to make multi-objective decision that employs pair wise comparison to determine the weights and priorities of a variety of factors ,attributes, elements and alternatives. Because Urban ecosystem is a multiple hierarchy, there are many factors ,so we applied AHP to study the degree which affect the moving to city .

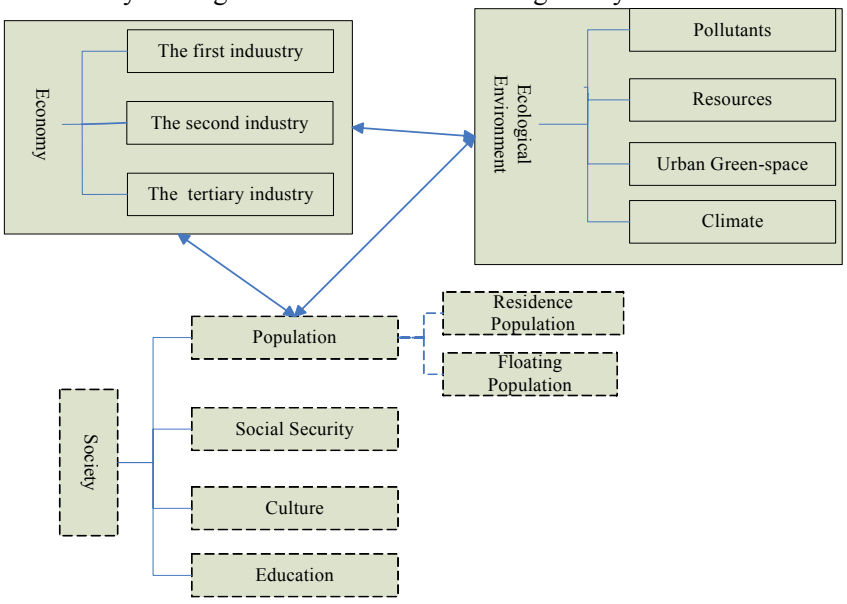

Fig 1. The framework of urban ecosystem

3.2 Hierarchy structural model

To study the determinants of floating population to choose city ,we according urban ecosystem , which is a multiple hierarchy system ,so we adopted AHP to get weights of each factors that influence the decision . The structure of AHP is shown in Fig.2.

(1) A－Objective layer: Choose city .First ,the floating population should decide what kind of cities they want to .then we could calculate orderly the power and weight of different factors effect on the general objective in order to know the reason why they chose the city .

(2) C－Criterions layer: This layer includes : society, economy and ecological environment which are the three main compositions . To weigh

and distinguish the estimating standard effecting on the object layer, the criterions layer can be divided into several sub-layers according to the the urban ecosystem theory .

(3) P－Policy alternatives layer: This layer includes 11 factors, they are expressed with expressed with Pi, i=1,2,…,11 respectively. They are the subsystem of society ,economy and ecological environment .

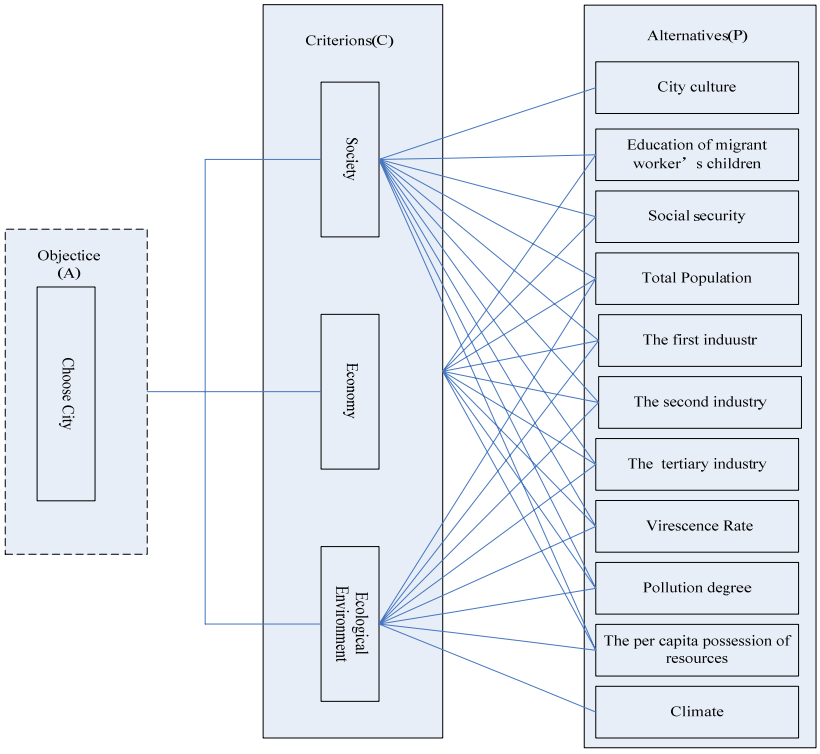

Fig 2. The hierarchy structural model for determinants of floating population chose city

3.3 Assessing policy preferences: analytic hierarchy process

The comparison matrix provides a measure of the weight factor for the decision making, which denotes the relative importance of the element of each layer shown in the hierarchical structural model. Often from top to bottom, the comparison matrix could be established with one elements of above layer pair wise comparing with all the elements of the neighboring below layer according to the relations between the elements or the layers.

Between layer A and C showed in Fig.2, the comparison matrix of A-C layer can be established as Table 1, which elements are evaluated using 9-

point scale shown in Table 2. The pairwise comparison of element i with element j of C layer is placed in the position of c_{ij} of the comparison matrix of A-C layer as shown in Table 1.

The comparison matrix is a square matrix as $A = (c_{ij})_{n\times n}$, and:

$$c_{ij} > 0; \quad c_{ij} = 1/c_{ji}; \quad c_{ii} = c_{jj} = 1 \tag{1}$$

Similarly, the comparison matrix of C-P layers can be obtained in term of the method of forming the comparison matrix of A-C layers. Data on pair-wise comparison matrices were collected from reviewers. Score of c_{ij} were estimated by doing survey in seven provinces in china : Beijing ,Shanghai, Guangzhou , Jiangsu ,Sichuan ,Jiangxi and Hebei then according to the survey ,We choose 300 Valid questionnaires . The participants are all with the local "hukou" ,it includes : farmers and college students from rural areas . we took full account of gender, marital status, academic qualifications and the proportion in the survey .

Table1 The comparison matrix of A-C layer

A	C_1	C_2	C_3	C_4
C_1	C_{11}	C_{12}	C_{13}	C_{14}
C_2	C_{21}	C_{22}	C_{23}	C_{24}
C_3	C_{31}	C_{32}	C_{33}	C_{34}
C_4	C_{41}	C_{42}	C_{43}	C_{44}

4. EVALUATION PROCESS AND RESULTS

4.1 Single ranks of the A-C hierarchical level

We explained the table to the participants then the filled the table according their own judgment about the importance of these factors The results are in Table 3.

Consistency test : λ_{max} =4.0325, CI =(4.0325-4)/3＝0.01083，RI＝0.89

$$CR=CI/RI=0.01083/0.89＝0.01216 <0.1\text{（accepted）} \tag{2}$$

Similarly we get the C-P level ranking and *CR* results of which are 0.0583,0.0623 and 0.0303 respectively. They are wholly less than 0.1. It shows that several matrices are very consistent and pass the consistency test (accepted).

Table. 2 The 9-point scale for pair wise comparisons

Score	Description	Comprehension
1	Equal influence	Two elements contribute equally to the objective
3	Moderate influence of one over another	Experience and judgment slightly favours one element over another
5	Essential or strong influence	Experience and judgment strongly favours one element over another
7	Obvious importance	An element is favored very strongly over another, its dominance is demonstrated in practice
9	Absolute importance	The evidence favouring one element over another is affirmed to the highest possible order
2, 4, 6, and 8	Intermediate values between adjacent values	Further subdivision or compromise is needed

*Table 3.*Comparison matrix of A-C layer

A	C_1	C_2	C_3	weight
C_1	1.000	0.2500	2.000	0.2014
C_2	4.000	1.000	5.000	0.6806
C_3	0.500	0.2000	1.000	0.1180

4.2 Overall rank of the hierarchical level

Overall rank of the hierarchical level is the importance rank of the elements of P to the general objective of A. The calculated method is shown as Table 4. The over rank of the hierarchical level is show in Table 5.

Table 4. Calculated method for overall ranks of the hierarchical level

Items	C_1	C_2	C_3	C_4	Overall rank of the hierarchical level
	W_{C_1}	W_{C_2}	W_{C_3}	W_{C_4}	$\sum_{i=1}^{4} W_{C_i} W_{P_j^i}\ (j=1,2,..,\ n)$
P_1	$W_{P_1^1}$	$W_{P_1^2}$	$W_{P_1^3}$	$W_{P_1^4}$	$\sum_{i=1}^{4} W_{C_i} W_{P_1^i}$
P_2	$W_{P_2^1}$	$W_{P_2^2}$	$W_{P_2^3}$	$W_{P_2^4}$	$\sum_{i=1}^{4} W_{C_i} W_{P_2^i}$
P_3	$W_{P_3^1}$	$W_{P_3^2}$	$W_{P_3^3}$	$W_{P_3^4}$	$\sum_{i=1}^{4} W_{C_i} W_{P_3^i}$
P_4	$W_{P_4^1}$	$W_{P_4^2}$	$W_{P_4^3}$	$W_{P_4^4}$	$\sum_{i=1}^{4} W_{C_i} W_{P_4^i}$
⋮	⋮	⋮	⋮	⋮	⋮
P_n	$W_{P_n^1}$	$W_{P_n^2}$	$W_{P_n^3}$	$W_{P_n^4}$	$\sum_{i=1}^{4} W_{C_i} W_{P_n^i}$
Σ	1.00	1.00	1.00	1.00	1.00

Notes：In the hierarchy structural model, n represented 11

Table 5. The infection weight of different urban factors that affects the decision of floating population（*CR*=CI/RI）

P	C_1	C_2	C3	Integrated weights
	0.2014	0.6806	0.1180	
P_1	0.0679	0	0	0.0137
P_2	0.1476	0.0913	0	0.0913
P_3	0.1214	0.1192	0	0.1153
P_4	0.0769	0.0806	0.0709	0.0867
P_5	0.0351	0.0462	0.0562	0.0462
P_6	0.2007	0.2057	0.1465	0.1979
P_7	0.2097	0.2237	0.1422	0.2163
P_8	0.0463	0.0758	0.1601	0.0713
P_9	0.0535	0.0964	0.1893	0.0820
P_{10}	0.0409	0.0610	0.1183	0.0664
P_{11}	0	0	0.1159	0.0129
CI	0.095	0.0532	0.0407	0.0818
RI	1.4840	1.4040	1.3410	1.4125

4.3 Analysis

From table3. the weights are: 0.2014, 0.6806, 0.1180 respectively, so in the opinion of floating population that economy is much more important than the others .according Zhigang Lu (2006) rural people migrate to city to seek higher income ,better opportunities ,a better quality of life and a better education for themselves and their children .The most important is higher income and better opportunities in city ,they are all related to economy . The income gap between urban and rural areas is increasing ,it is more than 2.5 now., and there are many Surplus labor in rural areas , so many people in rural areas move into city to earn money, but more of than are in the second and tertiary industry ,so they put them at top . From the table 5, the weight of social security(P3) is 0.1153,is the third important of all，because China's unique household registration (*Hukou*) system，the floating population can not share the same rights and benefits of urban *Hukou* residents, so most of the floating population hope that they can share the security of health, unemployment and old-age insurance Excepted the three ,there are another 8 factors that also effect the decision ,they are culture ,education for children, total population, the first industry, Virescence Rate pollution degree, the per capita possession of resources and climate, and the weights of them are: 0.0137, 0.0913, 0.0867, 0.0462, 0.0713, 0.0820, 00664, 0.0129, 0.0818 respectively.

5. CONCLUSION

The urban ecosystem effects the decision of the floating population's chose of city , the economy is the most important factor they consider ,

because in city they can get higher income ,but the society and ecological environment also have influence in the decision , the main factors are culture, education for children , social security ,total population ,the first industry, the second industry ,the tertiary , virescence Rate, pollution degree , the per capita possession of resources and climate, and their weights are : 0.0.137, 0.0913, 0.1153,0.0867, 0.0462, 0.1946,0.2163， 0.0713, 0.0820, 00664, 0.0129, 0.0818respectively.

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