



# Research on Job-Housing, Commuting in the Metropolis Based on Homo Urbanicus Theory: A Case of Zhuankou District, Wuhan

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**Abstract:** On the basis of “Homo urbanicus” theory, this paper structures a system of job-housing-commuting study method with focus on spatial accessibility and satisfaction of commuting. Taking survey and research data on Zhuankou district, Wuhan as analysis samples. Based on the logical interpretation of effect and mechanism in commuting spatial contacts, this paper compares the features of job-housing and commuting which are influenced by attributes of “Homo urbanicus” (gender, age, life stage) and factors of human settlements (types of housing and industry). It is found that the demander and supplier of opportunities for commuting spatial contacts, or to be exactly, workers and companies can reach a consensus by perspective taking and communicating, and trend to achieve balance of “self-good/common good”, although they have different expectations of desirable commuting. Finally, this paper explores the urban planning orientation to optimize commuting in metropolis industry cluster area, and proposes strategies from the thought of the “economic geometry analysis”.

**Keywords:** Homo Urbanicus, Job-Housing Commuting, Satisfaction, Accessibility, Human-Oriented, Zhuankou

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## 1. Introduction

As the planning of traditional industry aggregative zones, residential district and transportation device are drove by the government or capital, the construction of worker’s living space and their needs are easy to be forgotten, leading to the gap between the space design and the user’s expectation. Company with the change of job-housing relationship, the function and the special quality of blocks are getting concerned and the demand of job-housing balance is increasing.

This paper tries to explain and analyze the meaning of commuting choice and job-housing-commuting contradiction and construct the system of the job-housing-commuting research on the basis of the theory and framework of “Homo urbanicus”, providing new perspective, theory and practical method for urban studies.

## 2. Methods

### 2.1. Economic Geometry Analysis

As the “Homo urbanicus” theory considers that there’s a supply-demand relationship in spatial contacts, the method of “economic geometry analysis”, which is rooted in the geometrical interpretation of the supply and demand model in economics, can provide thought for planning. The principal of the method is to search the regulating objects and optimal direction according to the move of the intersection between the supply and demand curves of spatial contacts towards the target balance point through “move” or “rotate” the curves.

This paper considers the worker as the demand side and the employer as the supplier. The current commuting space chance can be transferred by the discrete points of the commuting satisfactory and average commuting time/ the labor coverage and the regression curve can be get. According to the empirical hypothesis, the commuting time of workers and the

satisfactory would be an inverse relationship and the commuting time of employers and satisfactory would be a positive relationship. The cross point of the curves is the cross of the demand side and the suppliers. As urban planning is a work of optimizing the commuting space chance, the move to the target point would be the solution.

(1) The move of the curve indicates the change of the resource and the commuting ability in the job-housing commuting environment. The curve of workers move to the right means adding the industrial land or the workplace density. The curve of the employers to the right means adding the housing density and the labor supply in the district.

(2) The rotation of the curve means the change of commuting environment and behavior. The rotation of the workers' curve means the change of commuting environments, like more comfortable commuting environment or more commuting choice. And the rotation of the employers' curve means the coverage of satisfied commuting methods adds through optimizing commuting service.

## 2.2. Planning Samples

Form a set of referable planning advice and regulating

index exacting from the human settlements' elements, like the density of population and the clustering property of the working place and residential district, the spatial construction index of commuting device, of the sample blocks which are scored high in the commuting satisfaction survey and present the improvement direction and optimizing index based on the analysis of influencing mechanism in the typical low commuting satisfaction blocks.

## 3. A Case Study

### 3.1. The Research Scope and the Research Data

Zhuankou is a manufacturing industry agglomeration area, which is the core of Wuhan economic and technological development zone, typical in job-housing relationship, with centralization of works and stabilization of workers and regulation of commuting. The population density of Zhuankou block is about 2805 people/ km<sup>2</sup>. The job-housing-commuting data is acquired by questionnaire survey.

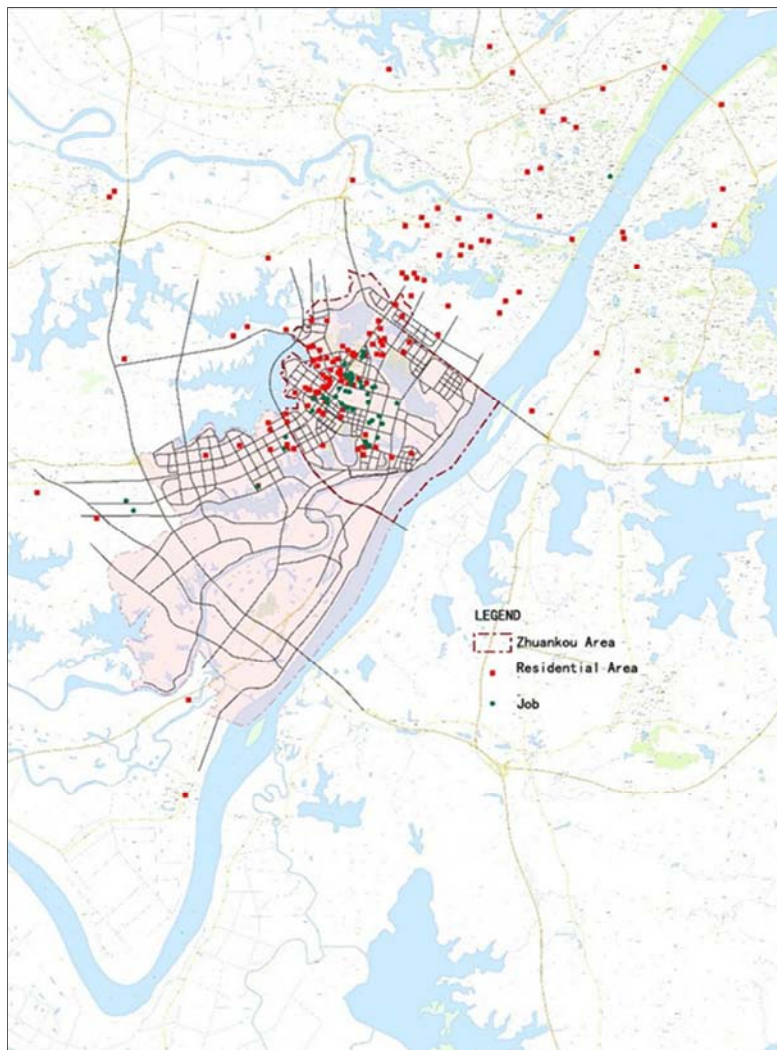


Fig. 1. Space distribution of workers' "housing-job" place.

**3.2. The Feature of “Typical Homo Urbanicus”**

The questionnaire survey of workers indicates that the male, the unmarried and the young major in the workers, which work in the industry of cars and auto parts industry, commercial service industry, electronic appliance industry and so on. The post of duty majors in worker, technician and low-level manager. And their income stays at the middle-low level, close to the average level of Wuhan.

On the other hand, the questionnaire survey of work shows that the company in Zhuankou major in manufacturing, typical in cars and auto parts manufacturing, which have large scare and stable development, ranking second is the commercial service, while most have small scare.

**3.3. The Feature of Job-Housing Development**

The survey results shows that most of the work place aggregate in the middle of Zhuankou, but the residential space is decentralized relatively and presents centripetal concentration distribution around the work space, bounded by the northeast-southwest urban artery.

The rental housing takes part of 52.49%, as lots of younger industrial workers rent to live close to the factory while cannot afford houses. Older workers live in reformed houses. And local residents who work on commercial service live in their self-established or house built in return.

**3.4. The Feature of Commuting**

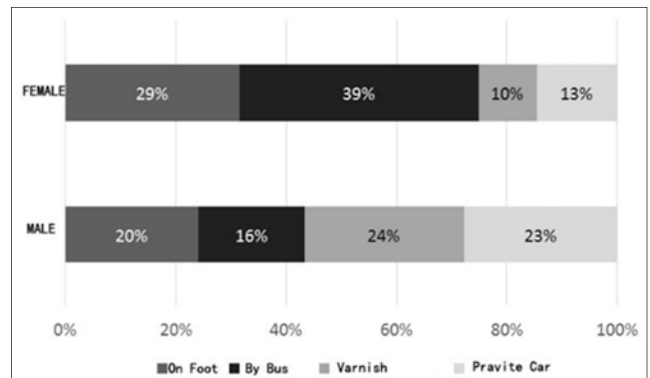
There’re 21 bus lines in this area while the underground is still under construction, the work people there most commute on foot or by bus, varnish or cars. The average commuting time of this area is 23min, commuting distance is 7.86km, compared with 25.9min in time and 6.3km in distance of Wuhan’s average commuting status, Zhuankou’s commuting time is relatively short.

In the perspective of 3 essential attributes of “typical Homo urbanicus”, the commuting status of Zhuankou has 3 features:

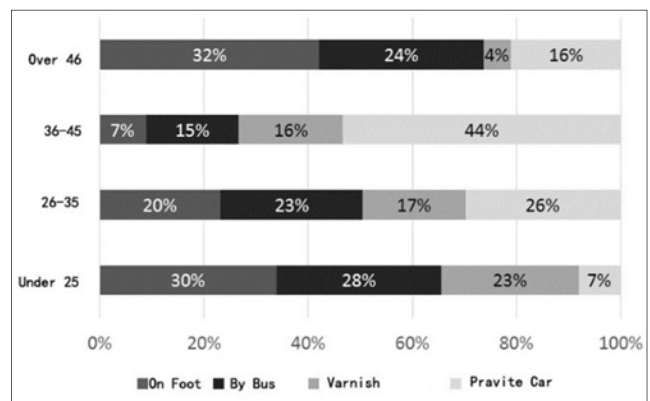
(1)In the perspective of gender: Male commutes by varnish or cars while female prefers to commute on foot or by bus and their commuting time is longer than male’s.

(2)The young and the older workers prefer to commute by bus or on foot, while the middle-aged uses cars more. The varnish is popular in all ages. The average commuting time adds as the age increases.

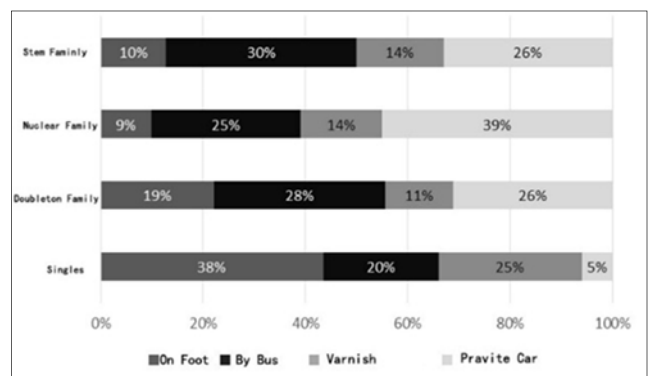
(3)As the family member adds, the use of cars increases and the unmarried average commuting time is obviously shorter than other people.



a) Gender and Commuting time



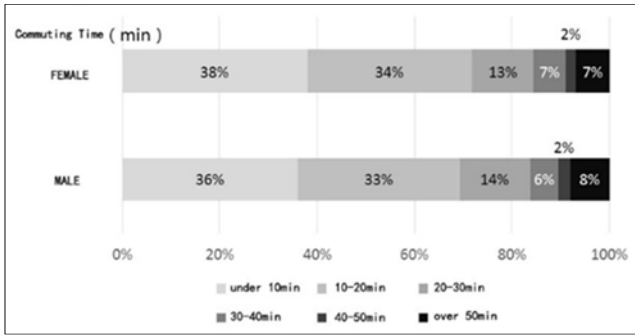
b) Age and Commuting time



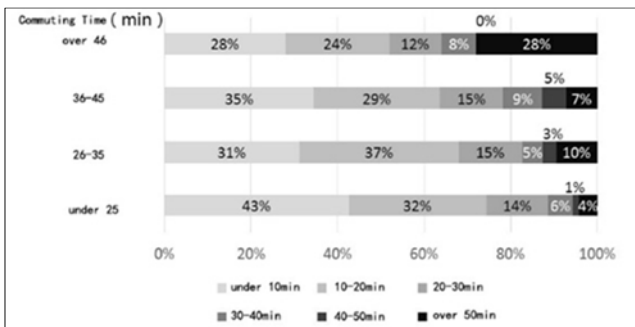
c) Life Stage and Commuting time

**Fig. 2.** Features of average commuting time taken by people of different gender, age and life stage.

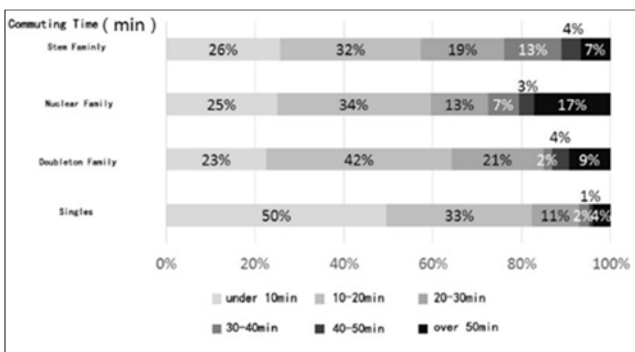
In the aspect of industrial clustering, the blocks major in manufacture have the feature of “enterprise+ residential supported”, which have 3 types: residential supported closed to the enterprise, represented by Citroen Automobile CO while their workers mostly commute on foot, work space distributed while the residential space centralized, represented by DONGFENG Motor Group while their workers mostly commute by bus or car, and residential space combined with resettlement community, represented by the southeast part of Zhuankou, as the bus line in this district is rare, the workers commute by bike or eletrombile.



a) Gender and Commuting time



b) Age and Commuting time



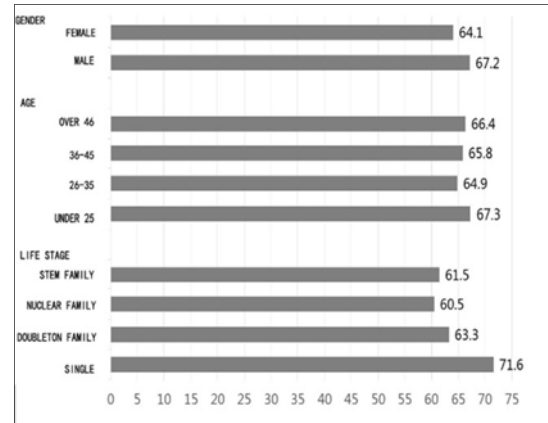
c) Age and Commuting time

Fig. 3. Features of average commuting time taken by people of different gender, age and life stage.

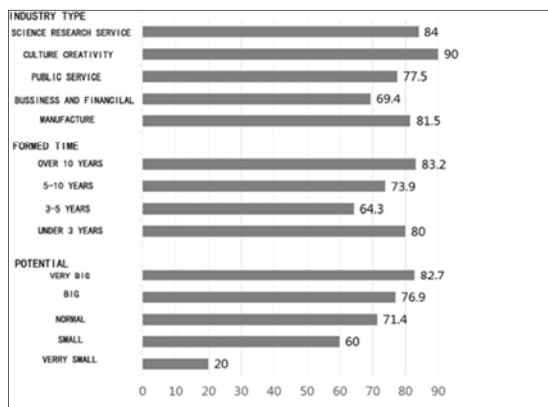
### 3.5. The Commuting Satisfaction

The worker's commuting satisfaction of Zhuankou is 66.6 point and in the aspect of the attributes of "Homo urbanicus", the result shows that male is more satisfied, the young satisfied most, the young adults less and the middle aged satisfied second and as the family member adds, the satisfaction of commuting falls.

The work providers' commuting satisfaction is 83.9 and in the aspect of them, the result shows that the more flexible and the more complete auxiliary facility the enterprise has, the higher the commuting satisfaction is, the enterprise which in mature period has higher commuting satisfactory and the enterprise with more potential either.



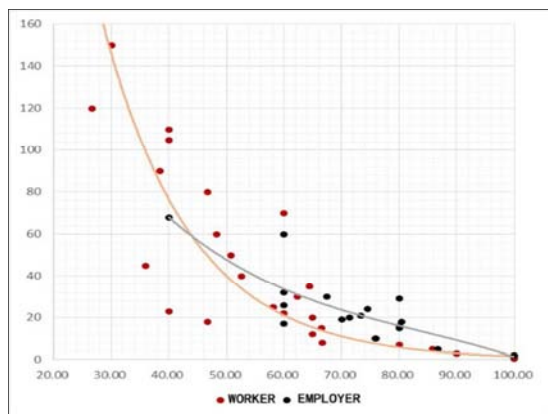
a) Worker



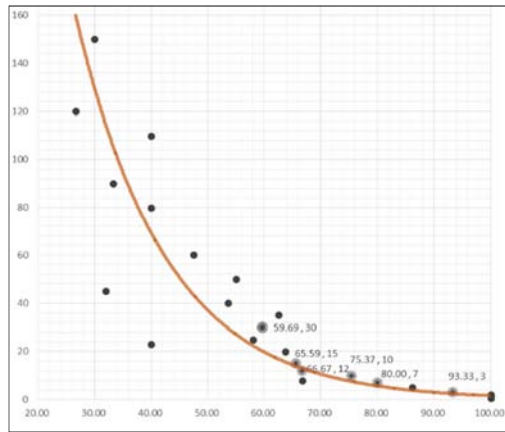
b) Employer

Fig. 4. atisfaction of commuting influenced by fundamental attributes of Homo ur.

The workers' satisfaction rises as the commuting time reduces vice versa, and the employers' perform the same way. When the workers' commuting time is 7min, the satisfaction reaches 80 which indicates very satisfied with commuting and when the time 12min, the satisfaction reaches 67 which means satisfied. The result also shows that when the commuting time is under 15min, the satisfaction improves stably.



a) Both sides' satisfacion and commuting time



b) Workers' satisfaction and commuting time

Fig. 5. Satisfaction and commuting time.

The most satisfied commuting tool is walking as it's free and getting away from the traffic jam also gives the commuters more enjoyable experience. On the other hand, the bus shows the worst satisfaction as the bus station's distribution and the departure times cannot meet the workers' need as the block in Zhuankou is too big.

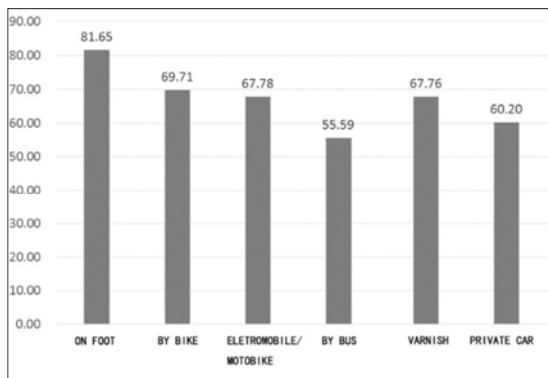


Fig. 6. Workers' satisfaction of each commuting mode.

The survey represents that the workers choose to commute under 10min because of their "self-preservation" makes them pursue the shortest commuting time, but the employers would choose the workers' commute time between 30-40min for the same reason. The best commuting time considered both sides' expectation, lower bound is under 10min, the upper bound is between 30-40min.

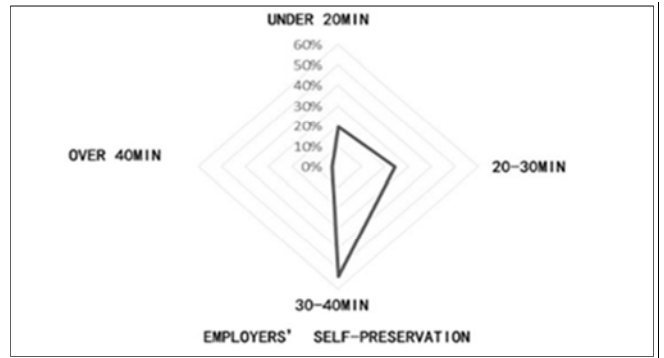
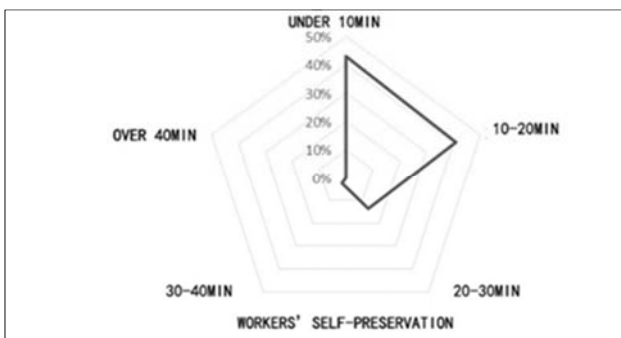


Fig. 7. Expected commuting time of workers and companies based on "self-preservation".

On the other hand, the reasonable commuting time accepted by the workers is 20-30min, follows followed by 10-20min, the average commuting time is 23.5min, while the employers consider the most reasonable commuting time is 20-30min and 30-40min, the average of which is 27.3min. This shows both sides would reach the reasonable commuting time on account of the limit of the commuting time accepted by each side, which presents the rationality of "Homo urbanicus".

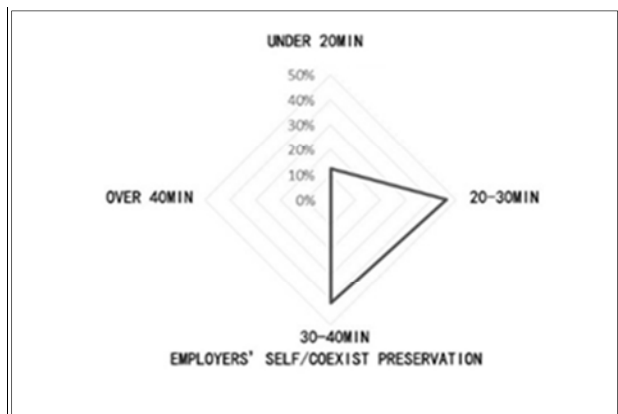
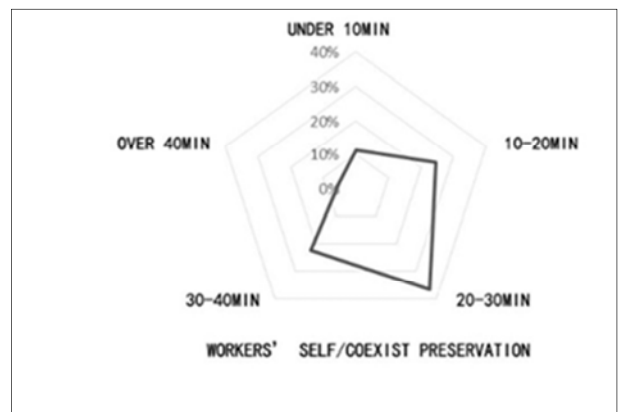


Fig. 8. Reasonable commuting time of workers and companies based on "self-preservation/ living-with-others".

Combined with the commuting time study, the reasonable commuting time accepted by the workers and the employers is between 20-30min.



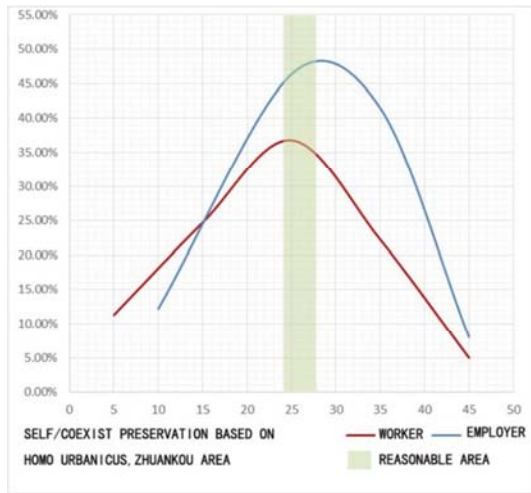


Fig. 9. Reasonable commuting time interval.

According to the study of satisfaction, reducing the commuting time of all the workers of Zhuankou to 15min, and adding the ratio of the workers whose commuting time is under 12min, would make the special contact close to the best. And the ratio of commuting time of 20-30min which is accepted by both sides rises, and the ratio of commuting time longer than 30min reduces, would make the accessibility of this area's commuting more reasonable.

### 3.6. The Countermeasure of Planning Based on the "Homo Urbanicus" Theory

Based on the economic geometric analysis, this paper gives some advice to Zhuankou about planning:

"Move the curve" which means to add the put into the resource, like adding jobs and the residential density through upper the volume fraction, add the accessibility and optimizing facilities, like optimizing the density of local road, add the density of bus station and the bus lines and public bikes.

"Rotate the curve" which means to change the commuting ways and environment, like encouraging commuting on foot, by bus or by bike and improve the surroundings of the road.

Encouraging reasonable human settlement scale according to the consensus of commuting time and high satisfaction commuting ways. The average commuting speed and distance of each commuting ways combined with the conclusion acquired in this study, 12-15min commute by bike or on foot, gives that 5000-100000 people of human settlement scale is reasonable.

## 4. Conclusion

This paper constructs a system of job-housing-commuting research under the theory of "Homo urbanicus" and uses it as a method to study the workers and employers in Zhuankou, which shows that the divergence of workers and employers in pursuing the commuting contact chance would explain of the contradiction of job-housing-commuting. The age, life stage would be more relative to the commuting feature and satisfaction in the basis of the workers' attributes, while the job performs the most influential in the other attributes.

When the commuting time of workers and employers is relatively short, commuting on foot and by bike is more satisfied, the best commuting time would be found in the reasonable commuting time(20-30min) accepted by both sides.

The countermeasure of optimizing the human settlement should consider the aspect of optimizing the job-housing, commuting and combined with consensus. It's also very important to take the attributes of "Homo urbanicus" into account. How to link up with people's need, to complete the framework of "Homo urbanicus" theory, to explain the practical job-housing-commuting problem to guild the practice is worth researching and exploring.

Annotation:

"Homo urbanicus" is a framework of urban planning theory which was first raised by Hok-Lin Leung enlightened by the economics and human settlement science and the "Homo urbanicus" was invented on the basis of "Homo economicus" in economics.

The "rationality" in this paper means the balance of self-interest and the public-interest.

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