

# A STUDY ON SELECTION FACTORS OF RESIDENCE FOCUSING ON PERSONAL ATTRIBUTES AND DISTRICT CHARACTERISTICS - A CASE STUDY OF REGIONAL CITY IN JAPAN -

\*Tetsuo Morita<sup>1</sup>, Katsumi Matsumoto<sup>2</sup> and Shinya Tsukada<sup>3</sup>

<sup>1</sup>Maebashi Institute of Technology, Japan; <sup>2</sup>Chuoh Consultants Ltd., Japan; <sup>3</sup>Maebashi City Office, Japan

\*Corresponding Author, Received: 6 June 2017, Revised: 11 Nov. 2017, Accepted: 20 Dec. 2017

**ABSTRACT:** In Maebashi City, Gunma Prefecture, Japan like other regional cities, motorization is progressing year by year. Dependence on automobiles has become a major cause of urban sprawl. In Maebashi City, the DID (Densely Inhabited District) is expanding year by year, but the population density is decreasing. In this study, in solving these various problems of local cities, we will consider "Compact City" as one future image of local cities and consider the consolidation of cities. The purpose of this study is three as shown below. The first aim is to analyze the factors of resident consciousness to live in Maebashi City. The second aim is to analyze the reasons for settlement by resident, and to clarify the settlement factors. The third aim is to analyze the factors that define the awareness of residence selection by migrant-oriented persons. Focusing on personal attributes and district characteristics, we have grasped the factors of selecting residence in the regional city.

*Keywords: Personal Attribute, District Characteristic, Selection Factor of Residence, Maebashi City*

## 1. INTRODUCTION

### 1.1 Background and purpose of this study

In Maebashi City, Gunma Prefecture, Japan like other regional cities, motorization is progressing year by year. In 2015, 78% of transportation in the central metropolitan area of Gunma prefecture is occupied by automobiles [1]. Dependence on automobiles has become a major cause of urban sprawl. In Maebashi City, the DID (Densely Inhabited District) is expanding year by year, but the population density is decreasing. In this study, in solving these various problems of local cities, we will consider "Compact City" as one future image of local cities and consider the consolidation of cities.

The purpose of this study is three as shown below. The first aim is to analyze the factors of resident consciousness to live in Maebashi City. The second aim is to analyze the reasons for settlement by resident, and to clarify the settlement factors. The third aim is to analyze the factors that define the awareness of residence selection by migrant-oriented persons.

### 1.2 Significance of this study

Fujii [2] studied about Traffic Policy towards the introduction of Compact City for Takasaki City, Gunma Prefecture. Nishiyama et al. [3] analyze residence selection behavior based on resident preference of residential attribute in Utsunomiya metropolitan area. Morita et al. [4] analyzed the

living consciousness in the mountainous area of Gunma prefecture and proposed compact area creation. In addition, Morita et al. [5] studied on an aquatic environment assessment model for the comprehensive assessment of environmental measures in metropolitan areas. Morita et al. [6] focused on the environment of the water and green for Maebashi City, and evaluate the quality of life. Tsukada et al. [7] studied on assessing the value of the irrigation canal in regional city.

As mentioned above, this study is on the line of research on residence selection in local cities. The significance of this study is to divide it into people who intend to settle down and those who intend to emigrate, and analyze the factor of choosing a place of residence.

### 1.3 Study Area

A study area, Maebashi City, is shown in Fig. 1.

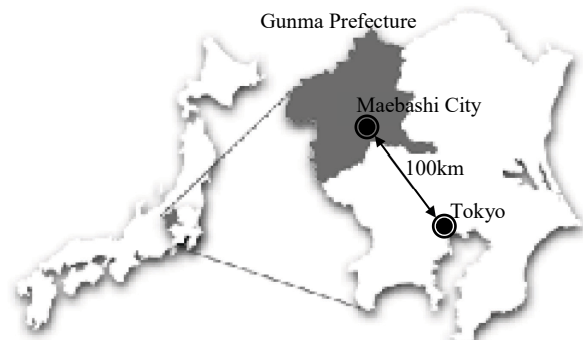


Fig.1 Location of Maebashi City, Japan

Maebashi City is the prefectural capital of Gunma Prefecture with a population of 340,000 people, and a local city located about 100 km from Tokyo. In Maebashi City, motorization is progressing even among local cities, and Maebashi City is studying toward realization of compact city.

## 2. RESIDENT CONSCIOUSNESS IN MAEBASHI CITY

The Gunma Person Trip Survey was carried out in 2015, and this data is used in this study. Fig. 2 shows resident consciousness. The percentage of those who want to continue living in the current place is 86.0%, and the proportion of people planning to move or to move is 14.0%. Looking at the proportion of residence by type of age group, those who want to continue living are over 60% in their 10's and 20's. As the age group goes up, the composition ratio of those who want to continue living in the current place tends to be higher.

The reason for continuing living (excluding unknown) is shown in Fig. 3. From the figure, it is found that 19.0% is "easy to go to commercial facility", 16.8% is "easy to go to medical and welfare facility", and 3.3% is "easy to go to child care support facility". The reason for accessibility to daily-related facility accounts for 39.1%. Also, "rich in green and nature" is 12.5%. 7.5% "easy to use railroad and bus", 12.3% "easy to move on foot and by bicycle", 18.9% "easy to move by car".

Fig. 4 shows the items that people who want to move and people planning to move from the current location emphasize when choosing a place of residence. Importance degree 1 means "absolutely not important", importance degree 2 means "not very important", importance degree 3 means "neither", importance degree 4 "slightly important" and importance degree 5 means "very important".

When looking at the composition ratio of importance degree 4 (slightly important) and importance degree 5 (very important), the highest is 90.8% in the "district with less risk of natural disasters and fires", 84.0% is district easy to go to medical and welfare facility ". Regarding accessibility to facilities, 73.2% are "easy to go to central shopping area" and 64.6% are "easy to go to shopping center in suburb". Regarding mobility, 74.3% are "district easy to move by car", 73.0% are "district easy to move on foot and by bicycle ", 67.4% for "district easy to use railway and bus". From the above, it is assumed that there are people who emphasize mobility by car and accessibility to suburban shopping centers, and people who emphasis mobility on foot and by bicycle and accessibility to central shopping areas.

Next, we will grasp the relationship between the district characteristics of the residential area and the

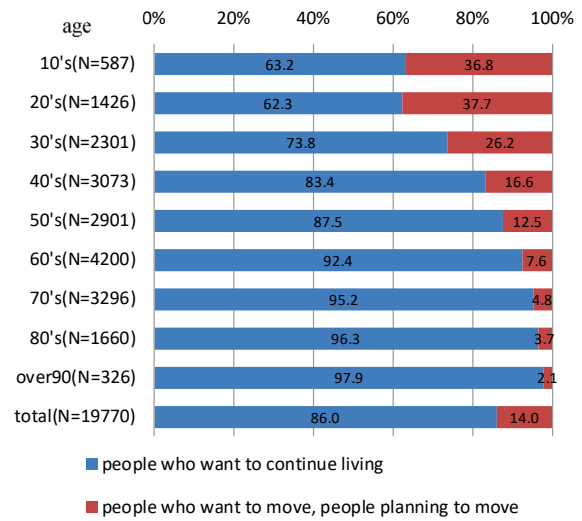


Fig.2 Resident consciousness by age group in Maebashi City (excluding unknown)

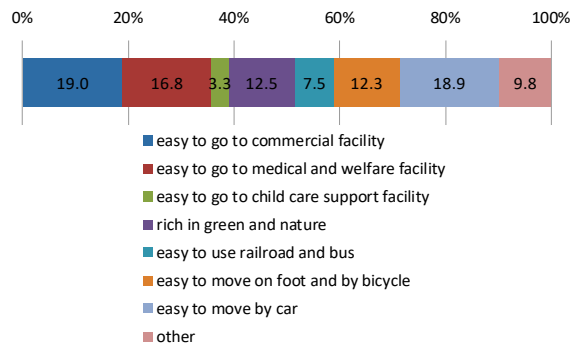


Fig.3 Reason for continuing living (multiple answers)

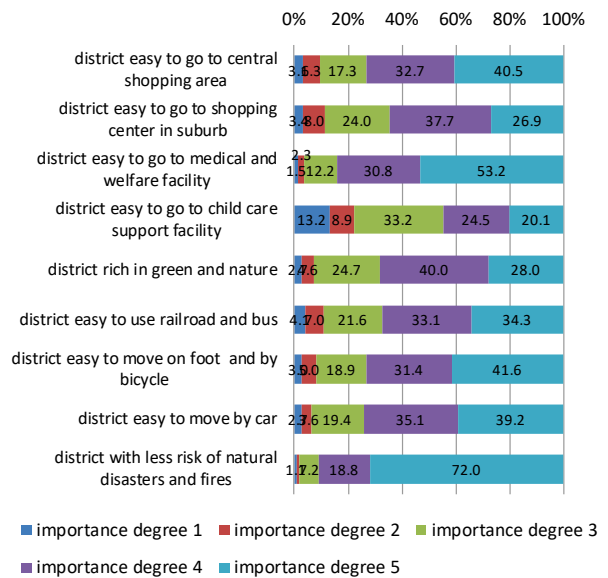


Fig.4 Items to be emphasized in selecting residence (people who want to move, people planning to move)

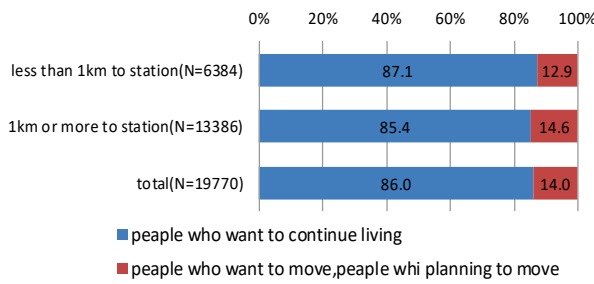


Fig.5 Resident consciousness by distance range to station

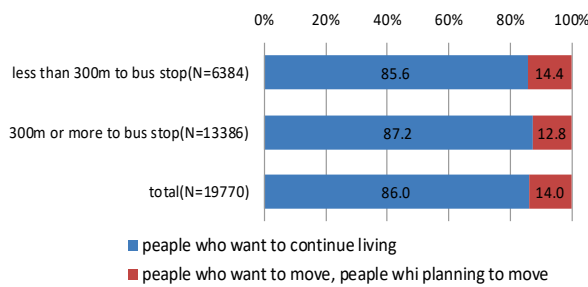


Fig.6 Resident consciousness by distance range to bus stop

resident consciousness. Fig. 5 shows the resident consciousness by distance range to station, and Fig. 6 shows the resident consciousness by distance range to bus stop. As a result, there is no difference in the consciousness by any district characteristics. There is an influence of individual attributes such as age group in resident consciousness, and multivariate analysis considering individual attributes and district characteristics is considered necessary.

### 3. DISCRIMINANT ANALYSIS ON RESIDENT CONSCIOUSNESS

The analysis results are shown in Table 1 (variable quantification II analysis).

The explanatory variable which most affects resident consciousness is age group, and both the category range and the partial correlation coefficient are higher than other explanatory variables. The explanatory variable that most affects the resident consciousness is age group. The category range and partial correlation coefficient are both higher than other explanatory variables.

Looking at the category score, the higher the age group, the higher the intention of "wanting to continue living" (hereinafter referred to as settlement intention) tends to be higher. Looking at other personal attributes, the variable with the greatest influence after age group is occupation. The settlement intention for people in the primary

Table 1 Discriminant analysis on resident consciousness (Variable quantification II analysis)

explanatory variable	category	number of samples	category score	range (rank)	partial correlation coefficient (rank)		
individual attribute	age group	10's	273	-1.970	3.384 (1)	0.294 (1)	
		20's	741	-2.221			
		30's	1191	-1.215			
		40's	1597	-0.320			
		50's	1453	0.195			
		60's	2104	0.602			
		70's	1576	0.880			
		over 80	1035	1.163			
individual attribute	occupation	primary industry	371	0.187	0.353 (3)	0.018 (5)	
		secondary industry	1231	0.066			
		tertiary industry	3985	0.021			
		other occupation	54	-0.166			
		student	375	-0.071			
		housewife/husband	1365	-0.034			
		unemployed	2589	-0.060			
individual attribute	necessity of attendance	always necessary	470	-0.072	0.137 (6)	0.010 (6)	
		necessary according to circumstances	539	-0.126			
		unnecessary	8961	0.011			
individual attribute	car ownership	myself only	7041	0.044	0.173 (5)	0.020 (4)	
		family shared	1022	-0.064			
		none	1907	-0.129			
district characteristic	distance range to station	less than 1km	2656	0.158	0.215 (4)	0.030 (2)	
		1km or more	7314	-0.057			
	distance range to bus stop	less than 300m	7814	0.023	0.107 (7)	0.009 (7)	
		300m or more	2156	-0.084			
	city planning area	urbanization promotion area and urbanization control area are not distinguished outside city planning area	urbanization promotion area	6474	-0.062	0.384 (2)	0.021 (3)
			urbanization control area	2080	0.076		
			area where urbanization promotion area and urbanization control area are not distinguished	1006	0.282		
			outside city planning area	410	-0.101		
[objective variable] resident consciousness	people who want to continue living	8585	0.120	correlation ratio 0.300			
	people who want to continue living, planning to move	1385	-0.746				

industry is high, and the intention to "want to move" (hereinafter referred to as migration intention) of students and unemployed people is high. The next most influential variable is car ownership, and there is a certain relationship between car ownership and resident consciousness.

Regarding district characteristics, the explanatory variable with a great influence is city planning area. People living in urbanization control area and area where urbanization promotion area and urbanization control area are not distinguished are highly likely to settle down. Residents urbanization area and area outside urban planning areas are highly motivated to migrate. It is assumed that residents of urbanization control area, area where urbanization promotion area and urbanization control area are not distinguished have a long residence age and are highly attached to the district. Also, since outside urban planning area is the mountainous area of Mt. Akagi, it seems that there is an intention to migrate to the area with high lifestyle convenience.

Regarding the distance to station, less than 1km tends to settle down, less than 1km tends to be more likely to emigrate. The distance to bus stop is less influential compared to all the other variables, but when it is close to the bus stop, the intention to settle is seen.

#### 4. ANALYSIS OF THE INTENTION OF RESIDENTS OF SETTLERS (SETTLEMENT INTENTION)

As a result of discriminant analysis of the resident consciousness, it became clear that the variables that greatly influence the residence intention are the age group. For that reason, we analyze the relationship of settlement reasons by age group. For the analysis, we use samples of people who have settlement intention. Correspondence analysis was performed to visualize analysis data. In conducting correspondence analysis, a composition frequency table of the settlement reasons of people who intend to settle down by age group (respondents who want to continue living) was prepared. The analysis results are shown in Fig. 7.

With respect to the horizontal axis, since it is arranged in the positive direction that "easy to move on foot and by bicycle" and "easy to go to medical and welfare facility" are arranged, "living area is narrow". The negative direction, "easy to move by car" is arranged, so "living area is wide" named. The vertical axis is named "natural" because "rich in green and nature" is a large positive value. We named the negative direction "urban".

Looking at each age group, the area of living becomes narrower as the age group goes up, with respect to the horizontal axis. Looking at each age group individually, the 30's cited it as reason for "easy to move by car". The 40's and 50's cited the reason for "easy to go to commercial facility". The 60's cited the reason for "rich in green and nature".

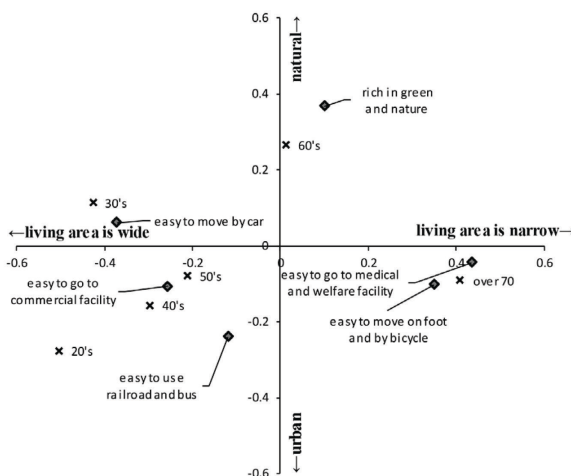


Fig.7 Analysis of the intention of residents of settlers (Correspondence analysis)

The 70's cited the reasons for "easy to go to medical and welfare facility" and "easy to move on foot and by bicycle". From the above, it became clear that the reasons for settlement differ according to age group. Young people want the convenience of life, people in their 60's want to have rich green and nature, people over the age of 70 want to go to medical and welfare facilities and to live on foot or bicycle.

#### 5. ANALYSIS OF THE INTENTION OF RESIDENTS OF MIGRATION (MIGRATION INTENTION)

In this study, we analyze the intention of persons who intends to migrate ((people who want to move, people planning to move). In the survey, people who intend to emigrate are questioned about the degree of importance of choosing a place of residence (hereinafter referred to as residential preference). Table 2 shows the results of applying principal component analysis to these data.

There were two principal components whose eigenvalues exceed 1. The accumulation contribution ratio of the two main components is 52.3%. Looking at the principal component loading amount of principal component 1, since all variables are positive values, it is regarded as a comprehensive evaluation for selecting residences, and the name of principal component 1 was taken as "living environment". The principal component 2 is positive value for "district easy to move by car" and "easy to go to shopping center in suburb". Also, negative values are "district easy to move on foot and by bicycle" and "district easy to use railroad and bus". Therefore, the name of principal component 2 was "suburb". The negative direction is "city".

By using the principal component scores obtained by principal component analysis, residential preference maps for each attribute were created (Fig. 8). In the residential preference map, the horizontal axis is defined as the principal component 1 "living environment", and the vertical

Table 2 Principal component analysis on residential preference

variable	principal component 1	principal component 2
	living environment	suburban (- urban)
district easy to go to central shopping area	0.672	-0.233
district easy to go to shopping center in suburb	0.611	0.251
district easy to go to medical and welfare facility	0.744	-0.022
district easy to go to child care support facility	0.474	0.414
district rich in green and nature	0.595	0.234
district easy to use railroad and bus	0.630	-0.520
district easy to move on foot and by bicycle	0.662	-0.524
district easy to move by car	0.533	0.510
district with less risk of natural disasters and fires	0.682	0.128
eigenvalue	3.542	1.167
contribution ratio	39.4%	13.0%
accumulation contribution ratio	39.4%	52.3%

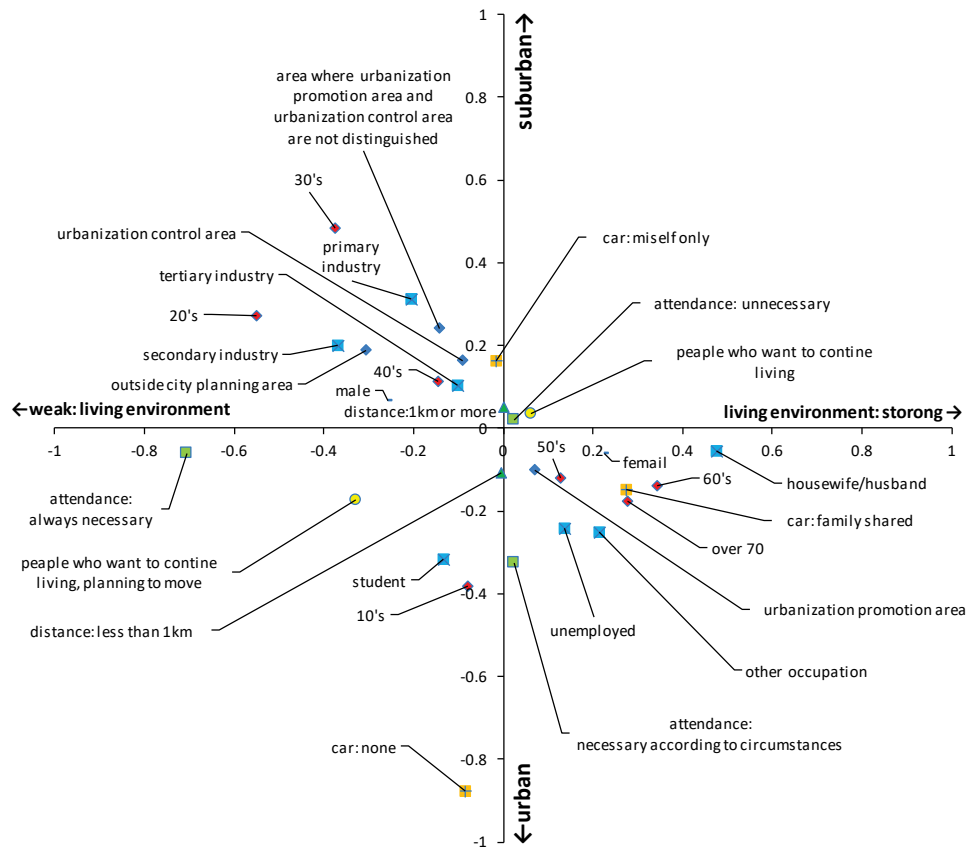


Fig. 8 Residential preference maps for each attributes (Principal component analysis)

axis as the main component 2 "suburban - urban". By calculating the average value of the principal component scores by attribute and plotting the values on the coordinates, we can visually ascertain the difference of the residential preference by the attribute.

Car ownership has great influence on "suburban - urban". People who do not own cars are strongly urban oriented, and those with their own car tend to be suburban oriented. In terms of gender, female tend to have strong feelings for living environment. Looking at by age group, young people are more suburban-oriented, weak in their living environment, the elderly are more urban oriented, and their habitat is strong. However, the tendency of the 10's is urban oriented, and there are trends of students who do not possess cars or students who go to school outside the prefecture. By occupation, people in the primary industry and secondary industry are oriented towards the suburbs, students and unemployed people are urban oriented. People who need attendance depending on circumstances when going out are urban oriented, and those who always need attendance tend to have weak consciousness to living environment.

By the above principal component analysis, we were able to grasp the tendency of intention to migrate by individual attribute.

## 6. CONCLUSION

Maebashi citizen's intention to settle is higher, and the tendency is higher for elderly people. People who want to continue living in the current place give accessibility to facilities and mobility by means of transportation as a reason for settlement. Some people who intend to emigrate are emphasizing mobility by car and accessibility to suburban facilities. On the other hand, there are people who place emphasis on mobility of walking and bicycle and accessibility to the city center.

Maebashi citizens, as a whole, are aiming for automobile use. On the other hand, there is a tendency that people who intend to settle live in the vicinity of station, and the elderly desire "easy to go to medical and welfare facility" and "easy to move on foot and by bicycle". From this, it is thought that there are a certain number of people who are oriented towards public transportation.

Among those who intend to emigrate, there are those who do not possess cars, those who need attendance when going out, and urban oriented students. It will be necessary to support the lives of such citizens from the transportation side and to form compact cities that are easy to use for public transportation.

## 7. ACKNOWLEDGEMENTS

The data of the Gunma Person Trip Survey used in this study was lent from Gunma prefectural government. We express our appreciation here.

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